

Regulation by tiers of governance: Evidence from water resource management regimes

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Abstract

In this paper, our purpose is to analyse the actual regulation of service quality by starting from the observation of its current implementation. The paper is structured as follows. In the first section, we investigate the evolution and the state of the art of water resource management regimes in some EU member states. In the second section, we draw some major insights. In particular, we figure out a stylised institutional frame, inspired by a pragmatic rationale, and derive some implications for the economics of regulation.

1 Introduction

Regulation of service quality deserves accurate investigation that can not limit to the design of exhaustive rules or optimal incentive regulatory schemes. In this paper, our purpose is to analyse the actual regulation of service quality by starting from the observation of its current implementation.

As will see, what results is a multi-actor/multi-level setting, by which public agencies and regulatory tools are integrated and coordinated. Many are the regulatory agencies operating at different levels of governance,

pursuing different objectives, making use of different tools, operating at different phases of the regulatory process, and continuously interacting among themselves.

By observing the evolution and the state of the art of the institutional settings (in terms of public authorities involved and regulatory tools adopted) behind the water management regime in some member states (Belgium, France, Italy, Spain and the Netherlands), we draw some major insights.

Firstly, we derive a generalised institutional movement from one single public agency, to multiple competing agencies, to multiple but (as much as possible) coordinated public authorities. Nowadays, what emerges is what we call *governance*, in as much multiple agencies implement different regulatory tools and/or different phases of the regulatory process under some form of vertical and horizontal coordination.

Secondly, we figure out a stylised multi-actor/multi-level institutional frame, inspired by a straightforward rationale, and derive some implications for the economics of service quality regulation. In this introduction, we anticipate it is the relevant geographical and temporal dimension of the service quality issue to cope with that allow first selecting the most suitable tier over which to let competent agencies work and, then, attaching to them an institutional task.

Thirdly, under the implicit assumption that a more integrated governance would imply better water quality performance, we propose to concentrate on *coordination* issues.

The paper is structured as follows. In section no. 2, we investigate the evolution and the state of the art of water resource management regimes in some EU member states, and in section no. 3 we draw some major insights. In particular, we figure out a stylised institutional frame, inspired by a pragmatic rationale, and derive some implications for the economics of regulation.

2. Regulation of quality in water resource management regimes: evolution and state of the art

Regulation of *service quality* is crucial in the water management sector, where the notion of service quality usually referred to somehow overlaps with the concept of *water resource sustainability*, which includes drinking

water quality (i.e., microbiological water quality) and sewage effluent quality (i.e., sewage treatment plant compliance)¹.

By relying on the results of two wide research projects, entitled *Eu-wareness* and *Euromarket*², we observe the evolution and the current profile of the institutional settings (in terms of public authorities and regulatory tools) behind water management regimes in some member states: Belgium, France, Italy, Spain and the Netherlands.

2.1 Evolution

Along the lines traced by Knoepfel, Kissling-Näf and Varone (2001), who investigate the correlation between the growing degradation of natural resources and the evolution of resource management regimes, we derive a generalised movement of the institutional settings behind water resource management:

1. from very simple institutional structures (i.e., with one *single* public agency),
2. to more complex (i.e., with multiple *competing* public agencies) settings,
3. to more integrated (i.e., with multiple but, to some extent, *coordinated* public authorities) ones.

Since the '60s, many EU member states became aware of the role that a more integrated and coordinated institutional setting could play to face water resource crises, both in terms of water quality degradation and quantity

¹ In the water sector, for service quality we could also refer to: water supply reliability (frequency of interruptions, restoration times, responsiveness to bursts); water resource security (reuse, unaccounted water); sewerage service reliability (frequency of blockages and interruptions, responsiveness); affordability (prices and charges, consumption, payment difficulties). In this paper, however, we refer to service quality as water resource sustainability, taking into account drinking water quality and sewage effluent quality.

² This section relies on the results of two broad research projects, called *Euwareness* (European Water Regimes and the Notion of a Sustainable Status) and *Euromarket* (on Water liberalisation scenarios: An empirical analysis of the evolution of the European water supply and sanitation sectors). These were referred to, respectively, for section 2.1 and 2.2. The former, supported by the European Commission under the 5th Framework Programme, has been coordinated by the University of Twente in the Netherlands, and has involved six research institutes from six European countries (Netherlands, Belgium, France, Spain, Italy, Switzerland). Also the latter project has been funded by the European Union, under the thematic programme Energy, Environment and Sustainable Development of the 5th Framework Programme and the State Secretariat for Education and Research. It has been coordinated by the Ecole Polytechnique Fédérale de Lausanne (scientific coordination) and UNESCO-IHE (administrative and financial coordination). For an overview, see also Kuks and Kissling-Näf (2004), Bressers and Kuks (2004), Finger, Allouche and Luis-Manso (2007).

reduction. To solve a wide scale of *rivalries*, in water uses but also among different institutions and regulatory interventions, a more *coherent* institutional setting was needed. It resulted a more *integrated* water resource management, where several public interventions and different regulatory perspectives on water were combined, first of all, into a more *consistent* policy-view.

According to Kissling-Näf and Kuks (2004), towards the end of the '80s and at the beginning of the '90s, in some EU member states, the phase of *rivalry* among different institutions (as is usual in complex regimes) was crossed and a new phase took place, characterised by a more *coordinated* framework, not only in terms of *policy* approach, but also in terms of *legislative* initiatives and governance settings.

With regards to our country-screenings, we observe the first attempts towards integration already in the '60s: different environmental and economic agencies' tasks and spheres of action were merged into a more balanced and coherent frame. We limit to mention some of these *institutional changes* by referring to:

1. the approval of a unique water policy planning (*pol*);
2. the adoption of more integrated legislation (*leg*);
3. the *administrative decentralisation* (*adm*; with resulting fragmentation of competences);
4. the institutionalisation of some sort of water basin approach (*wba*, meant as *functional decentralisation*)³.

Concerning the approval of a unique water policy planning, Belgium started *integrating water policy* only recently, in 1995. Before, water resource management was systematically implemented through other relevant (often prevailing) policies, such as agriculture, industry and public health. In Italy, a first serious and organic attempt to make *planning* in the water sector took place already in 1963 with *Law no. 129/1963*. An effective water policy planning started, however, only in 1990, with *Law no. 183/1989*. Spain adopted an integrated water policy approach in 2001, with the *National Hydrological Plan*: even though in this country a draft water distribution plan was already presented in 1993, in fact it was adopted 8 years later. In the Netherlands, water policy planning started before, in 1968: after the World War 2nd, risk of natural resources exhaustion created the conditions for water use planning, resulting in the first *Water Policy Plan*, which was adopted in 1968. Since 1985, a more integrated approach towards quantity and quality management was adopted: it formed the basis for the *National Water Policy Plan*, adopted only in 1989, with the *Third*

³ The short description below, on each of the institutional changes, is based on Kissling-Näf and Kuks (2004).

National Water Policy Plan. In France, the *Water Law no. 92-3* can be considered as the starting point of an integrated water regime, as created a new framework for water resource management by means of the introduction of the *ecological planning and management*.

With regards to the adoption of more integrated legislation, Belgium issued more *integrated legislation* very late; the problematical federalisation process, in fact, delayed considerably its adoption. In the Netherlands, the Water Management Act adopted in 1989 provided integrative legislation with regard to water management in its entirety. In the '90s, partly driven by the EU activism, serious efforts have been done to create a more rigorous legislative framework, according to which institutions, policies and plans could be coherently put in place. In France, as mentioned above, the *Water Law no. 92-3* aimed at creating a unitary legal framework for water: by proclaiming water resources as an object of national heritage, for the first time the legislator recognised the need to protect *per se* this resource, in terms of quality and quantity. Italy adopted integrated legislation in 1989 (with *Law no. 183/1989* on the creation of Water Basin Authorities), even if it is still incomplete. More interesting is the case in Spain, which represents an exception in the EU since it has not yet developed an integrated water management: the 1985 Water Act and the 1999 Water Act take care of environmental and ecological effects of water use, but not of water pollution.

It is very complex to represent the institutional movement towards *administrative decentralisation and fragmentation of competences*: firstly, because it is not simple to separate such institutional evolution from what we define *functional decentralisation*; secondly, for the difficulties linked to identify the many new administrative bodies created or those to which new and different functions were assigned; thirdly, for the many instances in which the reform was issued but, in fact, not implemented.

In France, with *Law no. 92-3*, new institutions were created, such as the *Local Water Commission* (composed of local authorities), State public administrative bodies and user representatives. There was also a closer coordination of administrative bodies at the local level (*MISE – Interdepartmental Water Mission*). In Italy, in 1994, it was introduced the *Galli Law* on the *optimum area* for water services, dealing with water services and their management, allowing Regions and municipalities to raise finance and set user charges. The objective was to overcome the fragmentation of the water supply sector: its actual implementation will force inter-municipal coordination. In the Netherlands, a though rivalry existed between the State and water boards: important water legislation adopted at the beginning of the XX century institutionalised the co-existence between a central/national and a regional water management. This is referred to as

the establishment of a *decentralised unitary* state for water management: central authorities were responsible for water with national importance, while regional water boards took care of water bodies with regional relevance. In Belgium, scenarios were more complex. In the Flanders, the 1971 National Law was partially implemented: for example, in 1975, municipalities were expropriated of their treatment plants, at the benefit of VZK (a company created for the coast territory) and VWZ (a company established for the *Escaut/Meuse*). In Wallonia, for instance, the national Minister of Walloon Affairs delegated in 1977 the task to treat wastewater to eight inter-communal associations of water treatment (the so-called *intercommunales*). In Spain, aside from the Drainage Basin authorities, which depended directly on the authority of the State and its financing, a very soft water policy decentralisation took place.

Concerning the *institutionalisation of a water basin approach* (what we refer to as *functional decentralisation*), in Belgium it took place in the Flanders, where informal basin committees were set up around 1995, for each of the eleven basins in the region. In France, six basin agencies (the so-called *Agences de l'eau*) were already set up in 1964 for the consultation, promotion and financing of water management. River basin committees were created in 1992, with *Law no. 92-3*, which provided for a water resource development and management plan for each river basin. In the Netherlands, the institutionalisation of a water basin approach took place with the *Water Boards*: although these were already existing before 1985, regional water management was assigned to them only in 1992. In Italy, river basin authorities are called *Autorità di Bacino*, created in 1989: *Law no. 183/1989* identified six major national watersheds (covering the most important Italian rivers), each with a special management authority, and eighteen inter-regional basin authorities. In Spain, a water basin approach was implemented in 1926 through the Drainage Basin authorities (the so-called *confederaciones hidrográficas*), which were created to group all major water users of each river basin. Sixty years later, the *1985 Water Act* established the water management through hydraulic basins and changed the *confederaciones hidrográficas* into basin institutions.

2.2 State of the art

Next, we aim at summing up the water resource management regimes currently *at work* in our selected EU member states. Such a short description is directed to put emphasis on the following main features of the institutional settings:

1. the high number of regulatory agencies;

2. the many tiers of governance involved;
3. the extent of the institutional interactions between them;

Before investigating the current water resource management regime, a *methodological premise* is compulsory.

In the first place, for the sake of simplicity, we look at only two stages of the integrated water cycle: water distribution and wastewater treatment. Nonetheless, given the strict linkage existing with the wastewater treatment stage and the strong support it provides to the sustainability goal, we also take into account the sewerage phase. What is left out, then, is just the phase of resource access and water production, because in some sense less relevant for our definition of service quality.

Secondly, we concentrate on quality prescriptions and on two economic instruments that have a less direct effect on water quality: tariff regulation (as long as it embodies a means to make people aware about water resource scarcity) and subsidies (turned, for example, to build new and more efficient distribution networks or treatment plants).

Lastly, we stylise the regulatory process into three major phases: design, implementation (including quality monitoring) and enforcement; all these phases, as will emerge in the next session, are carried out by several agencies with *different competences* and *institutional tasks*, and need to be vertically and horizontally coordinated.

As follows, we introduce the *public governance* of water resource management in each country, distinguishing by stages of the integrated water cycle, and highlighting competent authorities, tools and phases of the regulatory process.

Since **Belgium** is a federalised State, we deal separately with the two regions of the Flanders and Wallonia⁴: these are different in many respects and represent an exceptional field of investigation to carry out a benchmarking analysis and compare the performance of regulating water resource management by means of different institutional settings.

At the water supply stage, several are the actors of implementation in **the Flanders**: the Flemish Government adopts implementation decrees, sets the modalities of application and extends the missions of public service, after consultation of the Regulatory Authority. The Flemish Minister of the Environment, with the Administration of the Environment (*AMINAL*), prepares and implements the reform of the quality standards, after consultation of the Hygiene Inspection. A local Commission of water supervises on the entire water supply process. The scheme is completed by a Regulatory Authority with the duty to reach and accompany improvements in performance, a better service and more transparency. On a opera-

⁴ For the sake of brevity, we gave up from investigating the Region of Brussels.

tional level, many prescriptive instruments are used, and quality controls have been reinforced. Concerning the target of a decrease in drinking water consumption, the Regional legislator allocates subsidies for investments and operation of new infrastructures. A mechanism of price control remains functioning at the Federal level: the Federal Minister of Economic Affairs (Commission of Prices) gives his prior consent to any price increase (to control over inflation).

The objective for sewerage is tied to wastewater treatment. It is the Commune to formulate intentions to conduct works on sewers, the environmental agency *VMM (Vlaamse Milieumaatschappij)* makes the planning on a yearly basis and the Minister of the Environment adopts the subsidisation programme. Also the Province plays a role: it supervises the construction works conducted by the Commune. Here, instruments are mainly incentive-based. Concerning wastewater treatment, in 1991, the former regional and public treatment company was split into the *VMM* and one mixed company *Aquafin*⁵. *Aquafin* has the duty to build all the treatment plants and main sewers necessary to fit with the requirements of the *EC 1991 Directive on urban wastewater*. Moreover, it realises investment plans adopted by the Government on the whole regional territory, and operates infrastructures. Also wastewater treatment is highly subsidised: the Region invests every year for the *supracommunal* wastewater treatment, in respect to a convention signed between *Aquafin* and the Flemish Government. Finally, it is to mention that financial incentives are used to improve effectiveness of *Aquafin*, under the form of rewards (or penalties) given the respect (or not) of standards.

In **Wallonia**, at the supply stage, public actors are embodied by the Walloon Government, the Federal Minister of Economic Affairs, the *SPGE (Société Publique de Gestion de l'Eau)* the *DGRNE (Direction Générale des Ressources Naturelles et de l'Environnement)* and the Local Council. The Walloon Region makes use of several prescriptive instruments to insist on the norms of quality. The administration (i.e., the *DGRNE*) controls over the strict respect of legally-binding standards and adopts, if necessary, corrective measures. The public service obligations are detailed in the contractual agreement concluded between the regional company (*SWDE*) and the Region. Price determination remains a competence of the Local Council, with prior consent of the Federal Minister of Economic Affairs for price increases.

In Wallonia, Communes (formally competent on sewerage), the Government, the Minister of Water, the *SPGE* (that manages the *PASH, Plan d'assainissement par sous bassin hydrographique*), intercommunal asso-

⁵ A partnership between the Region and an international water company, *Severn Trent*.

ciations (which prepare the *PASH* under the supervision of *SPGE*, execute the construction works and operate treatment plants and sewers), and regional administrations (*DGRNE*, but also *DATLP*, *DGPL*) are the main actors of implementation at the sewerage and wastewater treatment stages. As prescriptive instruments, the Region sets a planning and determines a set of priorities. At the tributary basin scale, there is the *PASH*. As incentive, if works are included in a specific planning (i.e., the *PASH*), the Commune is granted of subsidies for the construction and refecton of sewers.

Also in **France**, water resource management is shared among several entities, acting at EU, national, departmental and local level, and performing different, limited tasks. In general, we identify the Government, the Ministry of Environment, the Ministry of Health, the municipalities, the Prefect, the *DDAF* (*Directions Départementales de l'Agriculture et de la Forêt*), the *DDAFSS* (*Directions Départementales des Affaires Sanitaires et Sociales*), the *IIC* (*Inspection des Installations Classées*), the Basin Agencies (*Artois-Picardie, Seine-Normandie, Loire-Bretagne, Adour-Garonne, Rhin-Meuse, Rhone-Méditerranée*).

At the water distribution stage, in application of the *EU Directive no. 98/93* on drinking water, the *Decree no. 2001-1220* fixes some microbiological, chemical and indicative parameters. A self-regulation is also in place, being the service provider obliged to continually control the quality of the water supplied. The *DDAFSS* (*Directions Départementales des Affaires Sanitaires et Sociales*) or authorised agents do the sampling of water, and the analyses are then elaborated by laboratories certified by the Ministry of Health. When the health parameters are not respected, the distributor must inform the mayor and the Prefect, who take corrective measure to ensure compliance with standards. If the Prefect decides that water quality represents serious health problems, it can take all measures necessary to interrupt or restrict water use. Regarding tariffs, a binomial mechanism is applied: the latter part is based on consumption, which enables a better use of drinking water. In the case of *régies*, these tariffs are fixed year by year, deliberated in the municipal Council. Regarding delegation contracts, they are fixed during the contract awarding (when the price evolution is specified too). An important part of investments in water supply infrastructure can be covered by subsidies, through Basin authorities and the *FNE* (*Fonds National de l'Eau*). *Départements*, *Regions* and the *EU* can also contribute to partially subsidising investments.

Sewage collection and treatment is planned at the municipal level. It is the municipality to decide those zones in which collective and individual sanitation must be established. Municipalities must ensure the control of individual treatment infrastructure through an organism named *SPANC*

(*Service Public de Contrôle des Dispositifs d'Assainissement non Collectif*). It is the municipality to deliver authorisations and define the conditions of discharges in sewers (characteristics of effluents, and means to follow-up these effluents). A sanitation charge (*Redevance d'assainissement*) is fixed by the municipality, and paid by all users connected or connectable to a sanitation service. The revenue pays the service of wastewater collection, transport and treatment. The Basin Agencies and the *FNE* (at department level) give subsidies for sanitation works and their operation. *Départements*, regions and EU funds can also give subsidies. Treatment plants can work only after wastewater that came out of the plant has been sampled, controlled and is conform to quality standards. Control of discharges from wastewater treatment plants is established as follows: each operator is responsible for establishing a system of self regulation of the facilities. The results are then given each month to the Water Police Service (*DDAF*, *DDE* or navigation services) and the Basin Agency.

In **Italy**, diverse are the institutions working at the different tiers of the governance. The *Galli Law* created the Committee of vigilance (*CoViRI*, *Comitato per la Vigilanza sull'uso delle Risorse Idriche*), below the Ministry of Public Works, depending on the Ministry for Environment, to monitor the implementation of the reform process. The Committee also determines and adapts rates and protects customers' interest. At the national level, an agency has been created to protect environment: this is called *ANPA* (*Agenzia Nazionale per la Protezione dell'Ambiente*). Depending on the Ministry for Environment, it defines the rules, norms and standards for water discharges. The Ministry of Health is responsible for quality control. Since 1999, it is the Ministry for Environment, responsible for water resource management, to provide the general framework for the service level (i.e., continuity) and rules for tariffs determination (i.e., proposals for normalised methods of price calculation). The Ministry of Infrastructures maintains an important role in national scale infrastructure management (i.e., long-distance water supply). Regions are very powerful entities, in as much they embody key-actors in implementing the *Galli Law*: they design the borders of the *ATOs* (*Aree Territoriali Ottimali*) and guide the cooperation between Communes, grant general frameworks for contracts between *ATO Authorities* (*AATOs*) and operators, and so on. They are also responsible for the regional water basin, by monitoring quality and quantity, by designing plans for water use, etc. Following the creation of *ANPA* in 1994, each Region in Italy was required to set up its own branch, the so-called *ARPA* (*Agenzia Regionale per la Protezione dell'Ambiente*), replacing the Local Health Units (*USL*, *Unità Sanitaria Locale*) in dealing with environmental issues: they monitor operators and control industrial actors' discharges of water (and other environmental impacts). Water Basin Au-

thorities (*Autorità di Bacino*), created in 1989 and endowed with technical skills and financial means, are entitled to planning in the Water Basin of competence. At the local level, it is the *AATO* the major entity devoted to water management. The *AATO*, composed of representatives of Communes and the Province, designs a plan (*Piano di Ambito*) to be carried out by the service provider. Moreover, it chooses the mode of management considered as the most appropriate, designs the contract, selects the operator and controls over it.

Concerning water distribution, Regions are responsible for restructuring and regulating: they are in charge of delimiting and designing the *ATO* on the basis of which water services are to be reorganised, defining the forms and methods of cooperation between the local authorities within the *AATO*, defining the rules (adopting a standard agreement and the corresponding conditions) on the basis of which the local authorities in the *AATO* will entrust the integrated water service management to third parties, defining the Contract Standard with the operator, etc. They also update planning and programming instruments concerning water resources and issue directives for the preparation of the investment plans for *ATOs*. *CoViRI*, as seen above, proposes rules for tariff definition and controls its setting. On the operational level, the usual prescriptive instruments apply to address water quality deterioration (by means of the Ministers, the *ANPA*, the *ARPAs*, the Regions, and so on), and full cost recovery should contribute to reduce water consumption (by means of the *CoViRI*, establishing the tariff method, and *AATOs* determining the relevant variables). The *canone*, fee for use of Commune's infrastructures, represents a valid incentive.

Concerning sewerage and wastewater treatment, municipalities and *AATOs* are in charge of the implementation, at the local level, of the *Decreto no. 152/1999* (integrating *EC 1991 Directives*) on the sanitation domain: Regions participate to this action by way of controls. Again, licenses for discharges and water quality plans contribute to raise the quality (the *ARPAs*, the *AATOs* and the Regions playing a crucial role), and several economic incentives work to improve the current state: through subsidies and funds provided at the regional, national and EU level.

The public governance of water resource management in **Spain** can be summed up as follows. It is the Ministry for Environment to legislate on water resource management: the Secretary of State (*Secretaría de Estado de Aguas y Costas*) establishes regulations on waters and coasts, the Directorate General of Hydraulic Works and Quality of Waters (*Dirección General de Obras Hidráulicas y Calidad de las Aguas*) elaborates the *National Hydrological Plan* and controls over all those activities might affect the hydraulic public domain. The *DGOHCA* is also responsible for authorising wastewater discharges. Autonomous Communities are in charge of the

execution of legislation and can elaborate additional rules for environmental protection. *Confederaciones Hidrográficas* and *Administraciones Hidrográficas* are responsible for the elaboration and follow-up of the Hydrological Plan of basins (*Plan Hidrológico de Cuenca*) and control water quality and discharges (*Comisarias de Agua*).

Law no. 48/1998 specifies general parameters within which water distribution contracts should be granted, but it is up to municipalities to establish more accurate clauses regarding contracts, which are different in each local case. Microbiological, chemical and indicative parameters have been fixed by the *Royal decree no. 140/2003 on health criteria for drinking water*: municipalities are responsible for guaranteeing water quality control (at the tap and in the drinking water reservoirs prior distribution). Regarding water tariffs, each municipality can follow a different pattern: there is either a fixed tariff or a binomial tariff (most current). Tariffs are proposed by service providers to municipalities, which in effect establish and impose it. A Price Commission (at Autonomous Community level) is legally bound to authorise water supply tariffs approved by municipalities, in order to prevent raise in price higher than the rate of inflation. Concerning wastewater networks and treatment, sewage networks are mostly managed directly by municipalities, that often carry out the construction of sewage disposal networks. Regarding wastewater treatment, private participation has significantly increased with the *EC 1991 Directives* on urban wastewater treatment, due to the important financial investments needed and technological know-how.

Most Autonomous Communities have developed regional plans for wastewater collection and treatment, and most were actually designed before the National Plan for Wastewater Treatment (*Plan Nacional de Saneamiento y Depuración de Aguas Residuales*, conceived by the Ministry for Environment as a document to provide some guidelines for wastewater management and treatment). Quality requirements for sewage collection systems must be respected, and restrictions are imposed on discharges (i.e., prior authorisation of River Basin Authorities is needed). Subsidies are given by the central government and the EU (i.e., EU Cohesion Funds). Most Autonomous Communities have also set up the water sanitation charge, which is based on the volume of water consumed. A better control of wastewater discharges is envisaged, basically through prescriptions. The control of discharges from wastewater treatment plants is established according to EU requirements and must be controlled by River Basin Authorities and Autonomous Communities. Investment plans are established in the National Plan for the development of wastewater treatment plants. Discharge fees (*canónes de vertido*) are set up, collected and managed by River Basin Authorities; while, sewage treatment charges are es-

established and regulated by Autonomous Communities. Calculation of charges is often based on water consumption and total revenue help finance the construction and operation of water treatment. In order to encourage Autonomous Communities to implement regional plans, subsidies are given by the central government and the EU whereas Autonomous Communities have established a regional plan for wastewater treatment and put into place a water sanitation charge (*canón de saneamiento*) covering the cost of construction and running of the wastewater treatment infrastructure.

In **the Netherlands**, the public governance behind water resource management seems to be straightforward: groundwater resource access is mainly delegated to the twelve Provinces; the *V&W* (Ministry of Transport, Public Works and Water Management) and the Water Boards are in charge for surface waters. The treatment and distribution of drinking water is in the responsibility of the drinking water companies but, as ordinary, municipalities and Provinces have a great say in their functioning, being their main shareholders. Sewage collection is part of the municipalities' tasks, while treatment of the sewage has generally been delegated to Water Boards.

Water Boards are also responsible for the overall water management within respective regions. As a consequence of this division of tasks, coordination of activities is essential and strong ties are created between different actors.

The *V&W* and the Ministry of Housing Spatial Planning and Environment (*VROM*) are the two most important ministries involved directly in the water management sector. The *V&W* is finally responsible for sewage treatment and surface water quality, while, *VROM* is responsible for drinking water and its quality. The *V&W* and the Institute for Inland Water Management and Wastewater Treatment (*RIZA*) are the main preparatory bodies for new legislations/regulations. Drinking Water Companies are responsible for extraction/abstraction of water, treatment and distribution. Inspectors from the *VROM* supervise the quality of the drinking water produced. Municipalities collect wastewater and, at the end of the water cycle, the Water Boards treat the wastewater. Like provincial and municipal authorities, Water Boards are also decentralised government bodies: these can, for example, draw up regulations and levy taxes. The EU Water Framework Directive is to influence the institutional set-up of Water Boards, since they are not arranged according to the River Basin principle. Tasks and competencies of Water Boards can be summarised in two Dutch words, *waterstaatkundige verzorging*, meaning "taking care of the state of water infrastructure".

The provincial level is the one where most of the vertical and horizontal coordination of the government is concentrated. Provinces are required to coordinate policies of the various sectors like environment, transportation, nature housing, physical planning, etc. These receive directives from the national level and pass them on to municipalities and the Water Boards for implementation, but also may have their own policies. In addition to this responsibility, Provinces also act as representatives of municipalities and Water Boards in front of the national government.

The *VEWIN* (association of drinking water companies) carries out a benchmarking study: different indicators related to water quality, services, environment and finance are collected and compared for Dutch water companies. The benchmarking study is used to increase the transparency of the performance of the companies and provide an instrument, which can be used to improve companies' processes. Among the actors of implementation, we have the Inspectorate for the Environment (a part of the Ministry of Housing, Spatial Planning and Environment) responsible in case of drinking water production and supply; the *VEWIN* exerts pressure on the water companies to keep up the performance.

For sewerage, different prescriptive instruments are used: the Environmental Management Act points out the Municipality is obliged to draft an annual environmental and a sewerage plan. The Water Boards are able to change this draft by putting in a petition. Another arrangement between the Water Boards and the Municipality is the *connection permit* in which requirements from the Municipality and the Water Board are described. The Pollution of Surface Waters Act establishes that licences are required to set up or operate any establishment and for discharge of wastewater: Water Boards use income from these levies to finance investments required to combat and prevent pollution. In addition to the income from the levies, Water Boards can also have access to bank loans borrowing at a rate lower than the commercial rates. The Water Boards charge polluters of the surface and the ground water to protect the raw water sources. Inspectors of the Ministry of Spatial Planning, Environment and Housing analyse the soil conditions, which are remarked by the water boards or the Provinces. Standards are also set, which points out the quality norms of the effluent. If the Water Board is not able to purify the wastewater according the national regulation, fines or charges need to be paid; as a last resort, discharge permits can be withdrawn. Water Boards share responsibility for the quality of surface waters with the Department of Traffic And Water Management of the Ministry of Transport, Public works and Water management.

3 Regulation of water quality by tiers of governance: the rationale

The *multiplicity* of public agencies operating at *different tiers of governance* is explicable looking at the many subtleties and complications that usually arise in addressing service quality issues. We limit to mention some of them: for example, how to identify the community (or the communities) affected by it? How to determine the level of service quality to provide? How to realize to what extent are people affected?

We exemplify the rationale behind the multi-actor/multi-tier governance of water resource management regimes in the following understanding. It is the relevant geographical and temporal dimensions of the service quality issue to address that allow:

- selecting the most suitable tier over which to let competent agencies work, and
- attaching to them an institutional task.

In this paper, we do not intend to stress the *multi-actor* aspect of regulation; rather, we aim at acknowledging that water resource management can not be governed efficiently only by making use of one single tier of governance. As observed in our country-screenings, water resource management is regulated by relying on several *distinct*, but *interfacing*, levels.

What has emerged from our country-screening is an integrated and, as much as possible, coordinated institutional frame that we call *governance*. Despite the many precise definitions seldom attached to the notion of *governance*, we interpret it in terms of the organisational structures and administrative processes by which regulation is carried out. Governance in the water resource management regime is composed of *multiple agencies*, placed at *different tiers*, carrying out their regulatory activity by means of *different tools* and performing *different phases* of the regulatory process.

In our opinion, such a *structural* approach represents a useful starting point for the economics of service quality regulation: in particular, it might contribute to achieve better regulatory outcomes than simply referring to the design of *a priori* exhaustive rules and *optimal* incentive mechanisms. The actual distribution of agencies within a given governance regime, and their concrete operations at different momentum of the regulatory process, in fact, determines the overall performance of the sector into account: if an agency at some level of governance, established with the institutional task of monitoring the actual implementation of a prescriptive quality requirement (set by an authority at the national or supranational level) does not perform adequately its mission, all the regulatory action will be negatively affected.

Then, all the efforts provided at the design phase to prepare *complete* rules and incentive schemes would be fruitless. In general, quality prescriptions and tariff regulation are not self-executing: when these are implemented inadequately, even rules and incentive mechanisms that in principle are valid will prove to be insufficient to neutralise unsustainable practices in resource use (see also Bressers and Kuks, 2004, 45).

At the same time, agencies in charge of the implementation phases could intervene to partially correct (or attenuate) the possible distortions set at the design stage.

First, to investigate the governance of water resource management regimes is crucial to identify the underlying principle guiding its constitution. The emerging stylised multi-actor/multi-level institutional frame is inspired by a straightforward and pragmatic rationale: the better (worse) the service quality, the more the positive (negative) effects will favour (penalise) *that* community living in *that* area at *that* time. In effect, whatever the service quality issue to address, the regulatory agency in charge of granting a given community will identify a geographical and a temporal dimension. As long as the regulatory agency properly performs its duties, however, it is likely that beneficial spillovers will arise for others outside *that* community and *in the future*. On the contrary, if it does not perform appropriately, some negative externalities will originate. But increasing service quality costs and it can not be discerned by monetary constraints: the public agency will be, then, requested to achieve that level of quality that *its* community is supposed to ask for (i.e., what the community is ready to pay for), irrespective of spillovers.

Assuming that public authorities just care for the social welfare of the (*spatially* and *temporally* defined) community they work for, negative externalities can be adequately addressed only at higher levels. Therefore, some sort of vertical and horizontal coordination has to take place so that the common good (i.e., water resource sustainability) can be ensured on behalf of the *global* community and of *future generations*.

The opportunity of making use of several governance tiers (shifting upward or downward according to the spatial and temporal scope of the public action) to properly cope with service quality issues implies an *administrative* and *functional* fragmentation of competences (for its distinction, see section no. 1.). Then, public agencies (each fulfilling a given institutional task) need to be *integrated* and *coordinated*, so that the overall public action could result as much as coherent and effective. From a vertical point of view, the following implications derive from this logics:

- the coordinating function is to be carried out by the authority at the highest level;
- depending on the scope of the relevant quality dimensions,

- the design of regulatory tools fits the agency operating at higher levels;
- the regulatory tool will be implemented at more than one tier of governance.

From a horizontal perspective, following the definition of *functional* (territorially) areas of intervention (i.e., the constitution of water basins), regulatory regimes will result in as many *sub-regimes* as necessary, each replicating the general rationale on a specified territorial (i.e., basin) scale.

The major insight from adopting such a *governance* perspective is that each regulatory tool is meant as taking place by means of several agencies fulfilling, at different tiers, only some phases of the entire regulatory process. Regulating by relying on more than one level might embody a feasible device to adequately address the multi-facets characteristics of service quality in environmental utilities. However, in order to be effective too, every regulatory tool needs to be properly designed and correspondingly implemented. An integrated and coordinated water resource management regime has to be coherent in many respects: among agencies and tools, between institutional tasks and adopted measures, and along the entire regulatory process (from design to enforcement).

It is emblematic the contribution by Lynn, Heinrich and Hill (2000a, 2000b), in which they note that policy programmes are implemented in a sort of network, where several actors play with different assigned objectives. Consequently, the governance model they build up takes into account not only the objectives and instruments of policy, but also the process of implementation. Researchers are, thus, invited to join such a broader view:

“the investigator is encouraged to take into account the endogenous nature of factors often assumed to be exogenous, such as local implementation structures or service and resource provider behaviour ... Governance research using such a logic also enlarges the intellectual scope of what is called implementation analysis. Within a governance framework, investigators can explore the determinants of policy and program impacts without becoming distracted by the alleged dichotomy between policy-level (...) and street-level (...) explanations of outcomes or performance” [Lynn, Heinrich and Hill, 2000b, 247].

We consider the adoption of a *governance* perspective exceptionally useful in economic regulation, in as much it increases the chance that empirical research would produce more accurate information for policy-makers. Concentrating on just one phase of the process or one regulatory device might push researchers to omit some relevant variables (such as the

extent of the institutional interactions among agencies at different phases of the regulatory process or between different regulatory tools) and lead them to take a *partial* and *biased* account of the public sector intervention.

We assume that a more coordinated governance will imply better sector performance (i.e., water quality). As highlighted by Bressers and Kuks (2004) with regards to water resources management:

“All in all, we predict that substantial steps towards more coherence will decrease specific forms of unsustainable use and that even in cases of a valid policy design and good implementation, certain specified forms of a lack of coherence will cause flaws in the sustainability of resource use” [Bressers and Kuks, 2004, 46].

4 Conclusions

The paper was structured as follows. In section no. 2, we investigated the evolution and the state of the art of water resource management regimes in some EU member states and in section no. 3 we drew some major insights. In particular, we figured out a stylised multi-actor/multi-level institutional frame, inspired by a straightforward and pragmatic rationale, and derive some implications for the economics of service quality regulation.

This paper aimed at providing a further viewpoint on the regulation of service quality in public utilities. In our opinion, economic literature should not be constrained either to the design of optimal regulatory incentive schemes, or to the understanding of the strategic games between competing or conflicting principals. To approach more pragmatically regulatory regimes in many public utilities, it would be recommended to recognise that these are composed of *multiple agencies*, placed at *different tiers*, carrying out their regulatory activity by means of *different tools* and performing *different phases* of the regulatory process.

We exemplified the rationale behind the multi-actor/multi-tier governance of water resource management regimes in the following understanding: it is the relevant geographical and temporal dimensions to first select the most suitable tier over which to let competent agencies work and, then, attach to them an institutional task.

We acknowledged that water resource management can not be governed efficiently only by making use of one single tier of governance. What has emerged from our country-screening is an integrated and, as much as possible, coordinated institutional frame that we call *governance*, including all

organisational structures and administrative processes by which regulation is carried out.

It is the actual distribution of agencies within a given governance regime, and their concrete operations at different momentum of the regulatory process that, in fact, determine the overall regulatory performance: if an agency at some local level, established with the institutional task of monitoring the actual implementation of a prescriptive quality requirement (set by an authority at the national or supranational level) does not perform adequately its mission, all the regulatory action will be negatively affected. Nonetheless, agencies in charge of the implementation phases could intervene to partially correct (or attenuate) the distortions set at the design stage.

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