

REGULATING SERVICE DELIVERY BY TIERS OF GOVERNANCE: AN INSTITUTIONAL APPROACH

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Abstract

In this paper, our purpose is to analyse regulation of service delivery (above all, service quality) under an institutional perspective. Several regulatory agencies are involved at different tiers of governance, pursuing different objectives (depending on the interest of the community they work for), making use of different tools, operating at different stages of the regulatory process, and continuously interacting among themselves. Such institutional setting is determined by many factors: among them, the spillover effects of service quality, which contribute to identify competent agencies and allocate tasks among them. We investigate the effectiveness of regulating service delivery by several levels of governance in the water sector: it is the overall coordination and coherence among goals, tools, agencies and phases of the regulatory frame/process that determines the successfulness of the final outcome. Further implications for the economics of regulation are illustrated.

Keywords: regulation; service provision; multilevel governance; water management

JEL code: L51, L95, Q01

Introduction

Despite it has been neglected by economic literature for a long time, regulation of service quality is emerging as a central subject matter in many public utilities. Roughly summing up the economic debate, it seems to us that service delivery issues can not be adequately addressed by

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A preliminary version of this paper was selected to be presented at the *CAIWA International Conference on Adaptive and integrated water management*, 12-15 november 2007, Basel, Switzerland. I am very grateful to Eric Brousseau for useful comments on the research proposal, and Colin Scott for valuable suggestions on a first draft of the paper. I am also indebted to all members at GRIF for helpful discussions and insights. The usual disclaimer applies.

means of a normative approach. As stressed by Kahn (1988), service quality standards are difficult to specify by means of rules and, where they can be specified, these rules determine controversial results. Even when economists think about economic incentives (developing new and sophisticated quality incorporated incentive mechanisms), difficulties do not disappear.

In our opinion, regulation of service delivery should deserve more accurate investigation, which can not limit to a normative perspective (i.e., the design of exhaustive rules or optimal incentive regulatory schemes): many are the regulatory agencies operating at different levels of governance and at different stages of the regulatory process, pursuing different objectives (depending on the interest of the community they protect), making use of different tools, and continuously interacting among themselves. In this paper, we intend to analyse regulation of service delivery (above all, service quality) in water management under an institutional perspective. We consider such a perspective useful in as much it increases the chance to produce more accurate information for policy-makers: if not, concentrating on one single regulatory goal, device or phase of the process might push researchers to omit some relevant variables (such as the institutional interactions among agencies at different phases of the regulatory process or between different regulatory tools) and lead them to take only a partial and biased account of public sector interventions.

By observing the evolution and the state of the art of the institutional settings behind water management regimes in Belgium, France, Italy, Spain and the Netherlands, we identify a multi-actor/multi-level frame by which public agencies and regulatory tools are integrated and, as much as possible, coordinated. We draw some major insights.

We first derive a generalised movement from one single public agency, to multiple competing agencies, and finally to multiple and (to some extent) coordinated public authorities. Nowadays, it takes place a more or less coordinated institutional structure, what we call “governance”. Despite the many precise definitions often attached to the notion of governance, we interpret it in terms of the organisational structure and administrative process by which regulation is carried out. In water management, multiple agencies implement different regulatory tools and/or carry out different phases of the regulatory process under some form of vertical and horizontal coordination, which allows to better combine policy goals, interests and spillover effects¹.

In current water management regimes, several regulatory agencies (using different tools) are involved at different tiers (EU, national, regional and local level). We develop beyond the analysis provided by Smith (2000) who investigates which tier of governance should have

¹ Along the institutional perspective, see Dixon (1989) and Smith (2000) on multilevel management and utility regulation.

responsibility for regulating utilities. The author elaborates on advantages and disadvantages deriving from decentralisation: differentiation, asymmetric information, opportunities for innovation, optimal scope, spillover effects, expertise, regulatory capture, and so on.

We focus on spillover effects: it is the geographical and temporal dimension of the service quality issue at stake that plays a crucial role in identifying competent agencies and allocating tasks among them. As noted by Smith, even when operations take place solely within a single local jurisdiction, regulatory decisions concerning these could have spillover effects on other local (but also regional and national) jurisdictions; with no doubt, taking a decision on how to regulate effluent discharges into rivers has implications for users located in other local jurisdictions.

The paper is structured as follows. We first describe the relevant theoretical framework. Then, we investigate the evolution and the state of the art of water management regimes in some EU member states (section no. 2) and after stylising the institutional frame (section no. 3) we draw some major insights. In section no. 4, we set some guidelines to evaluate the effectiveness of regulating service delivery and focus on the Italian water sector to substantiate the merit of the approach.

1. The regulation of service delivery in utilities: the theoretical background

Our approach is divergent from two normative theoretical paths tracked in economics: on one side, the literature on the “optimal regulatory design”, by which it is assumed a monolithic entity in charge of designing optimal incentive mechanisms; on the other side, the “multi-principal nature of government”, according to which multiple and rival regulators operate in competition among themselves.

Economic literature on regulation of quality in public utilities originates from the article by Spence (1975), in which the author deals with market problems that arise when a monopoly sets some aspect of product quality, as well as price. In the regulatory context, the problem arises from the question about what is the average valuation of quality over all the consumers in the market. Spence suggests that rate-of-return regulation may have attractive features when quality is a variable. Since its publication, further achievements have been attained by more recent studies.

Rovizzi and Thompson (1992) suggest the following options to regulate service quality: to require the firm to publish quality statistics; to explicitly include quality measures in the price-cap; to set up schemes requiring the firm to compensate customer for poor quality; to specify minimum quality standards in legislation or delegate the task to the regulator.

In designing such schemes and, above all, optimal regulatory mechanisms, complications are never-ending. In a recent survey on the economics of the regulation of quality in utilities, Sappington (2005) acknowledges that the level of service quality provided is often difficult for the regulator to measure precisely. Moreover, the regulator's task of ensuring desired levels can be particularly challenging when neither the regulator nor consumers are able to observe the standards achieved by the regulated firm. Even when all parties can readily observe the level of service quality delivered, the design of service delivery regulation entails many important subtleties: for example, the ideal level of service quality can be quite sensitive to consumer preferences, and these preferences can vary widely among consumers.

By drawing from this normative theoretical pattern, we would not understand the actual issues behind the regulation of quality in utilities, and its real-world implementation. First of all, as well exemplified by Kahn (1988) in his seminal book on the economics of regulation, regulation usually involves more than one single regulator: "the outstanding illustration of divided, conflicting, and overlapping jurisdiction is provided by transportation, where responsibility is distributed among the ICC, the CAB, the Federal Maritime Commission, the FPC (for natural gas pipelines), the Bureau of Public Roads, the Military Transportation Service, the Army Corps of Engineers, and the Department of Commerce, a defect only very partially and imperfectly eliminated by the constitution of the new Department of Transportation" (Kahn 1988, 92).

We decline the idealistic view by which the public sector is basically seen as a monolithic entity² and acknowledge the intervention of several regulatory agencies, each fulfilling a specified objective and performing a limited number of tasks.

To some extent, our study perspective might be closer to the theoretical framework developed by Moe (1986), Baron (1995) and Martimort (1996), by which the government is assumed to have a multi-principal nature. Such view is stressed by Estache and Martimort (1999, 4), who "consider the government intervention as coming from a whole set of different principals, each with its own objective. As a whole, these principals may have for a collective objective the maximization of the same social welfare function as that of a single benevolent regulator. However, each single principal has only a limited mandate to fulfil. For instance, the Environmental Protection Agency is concerned with protecting the environment, which is only one aspect of the consumers' welfare. At the same time, the Utility Regulator is concerned with controlling the rates of return, or the price cap and prices structure of the utility. Each of these agencies has only a partial view of the regulatory stake".

² Public economics assumes the public utility regulator as a single entity, with a perfect ability to commit and endowed with a clear objective function (that is, the maximisation of social welfare).

However, we move away also from the Multi-Principals frame, not only because it is normative (remaining circumscribed at the sole design phase), but also for another reason: it considers multiple regulatory institutions as entities taking only a partial view of the issue at stake, competing between themselves and adopting non-cooperative behaviours. Let take the article by Baron (1995) as particularly representative of the multi-principal agency theory: the author introduces different groups that bear the costs and benefits of abatement with a non-localised pollution externality. In the case of acid rain these groups are, respectively, consumers in the Midwest and pollutees in the Northeast. These groups have conflicting interests that are represented respectively by a Public Utilities Commission and an Environmental Regulator. Baron analyses a model in which the Environmental Protection Agency (acting as a von Stackelberg leader) regulates *pollution*, and the Public Utility Commission regulates the price for a monopolist that has private information about the effectiveness of its abatement alternatives³.

This does not seem to be what we observe nowadays in the real world, at least in modern economies. In our screening of several water management regimes, we find that public agencies are embedded in a hierarchical structure and have to act according to coordinating principles, within the frame of tasks and competences designed by the authority placed at the highest level of the multi-tier governance.

2. Regulation of quality in the water management regime

Regulation of service provision is even more important in those public utilities labelled as environmental, such as the water sector. Here, the notion of service quality usually referred to somehow overlaps with the concept of water resource sustainability, preventing water quality deterioration and water quantity reduction⁴.

³ To give another example, see Martimort (1996). The author investigates the black-box of the government organisation by developing on the theory of multi-principals, which describes how different incentive mechanisms compete with each others. In viewing the set of relationships between several government bodies and the entities they regulate as a set of competing contracts in which the control of the regulatory process is shared among these different regulators, the author addresses the question of the costs and the possible benefits of such structural separation.

⁴ 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 (i.e., microbiological water quality), sewage effluent quality (i.e., sewage treatment plant compliance) and water quantity.

By relying on the results of two wide research projects, entitled *Euawareness* and *Euomarket*⁵, we describe the evolution and the current profile of the institutional settings behind water management in some EU countries: Belgium⁶, France, Italy, Spain and the Netherlands.

2.1. The evolution of the institutional settings behind water management

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 setting behind water resource management: from a very simple institutional structure (i.e., with one single public agency), to a more complex (i.e., with multiple competing public agencies) setting, and finally to a more integrated (i.e., with multiple and, to some extent, coordinated public authorities) governance frame.

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 sustainability, both in terms of quality degradation and quantity reduction. To solve a wide scale of rivalries, also among different institutions and regulatory interventions, a more coherent institutional setting was needed. The process resulted into a more integrated water management, where several and different public initiatives on water were combined, first of all, into a more consistent policy-view.

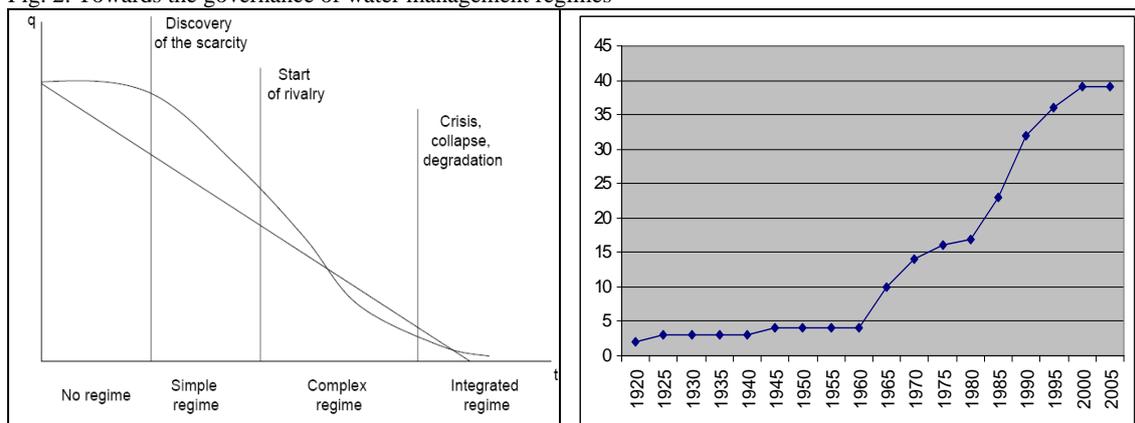
According to Kissling-Näf and Kuks (2004), towards the end of the '80s and at the beginning of the '90s, in some member states the stage of rivalry among different institutions was crossed and a new phase took place, characterised by a more coordinated framework, not only in terms of policy approach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

⁵ Section no. 2 widely relies on the results of two broad research projects, called *Euawareness* (European Water Regimes and the Notion of a Sustainable Status) and *Euomarket* (on Water liberalisation scenarios: An empirical analysis of the evolution of the European water supply and sanitation sectors). 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).

⁶ Distinguishing between the Flanders and the Walloon Region; with no reference to the Brussels area.

Fig. 1: Degradation of natural resources and evolution of management regimes

Fig. 2: Towards the governance of water management regimes



Source (fig.1): Knoepfel, Kissling-Näf and Varone (2001)

Source (fig.2): Own elaboration on data EUWARENESS and EUROMARKET

We mention some of these institutional changes by referring to the approval of a unique water policy planning (pol), the adoption of more integrated legislation (leg), the administrative decentralisation (adm; with resulting fragmentation of competences) and the institutionalisation of some sort of water basin approach (wba; meant as functional decentralisation).

pol: Concerning the approval of a unique water policy planning, Belgium started integrating water policy only recently, in 1995; before that, water management was implemented through other policies, such as agriculture, industry and public health. In Italy, an effective water policy planning started only in 1990, with *Law no. 183/1989*. Spain adopted an integrated water policy approach in 2001, with the *National Hydrological Plan*. In the Netherlands, the first *Water Policy Plan* was adopted in 1968. The *Water Law no. 92-3* can be considered as the starting point of an integrated water regime in France, as created the conditions for the introduction of the ecological planning and management.

leg: Due the problematical federalisation process, Belgium issued more integrated legislation very late. In the Netherlands, the *Water Management Act* adopted in 1989 provided integrative legislation with regard to water management in its entirety. In France, *Water Law no. 92-3* also aimed at creating a unitary legal framework for water. 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.

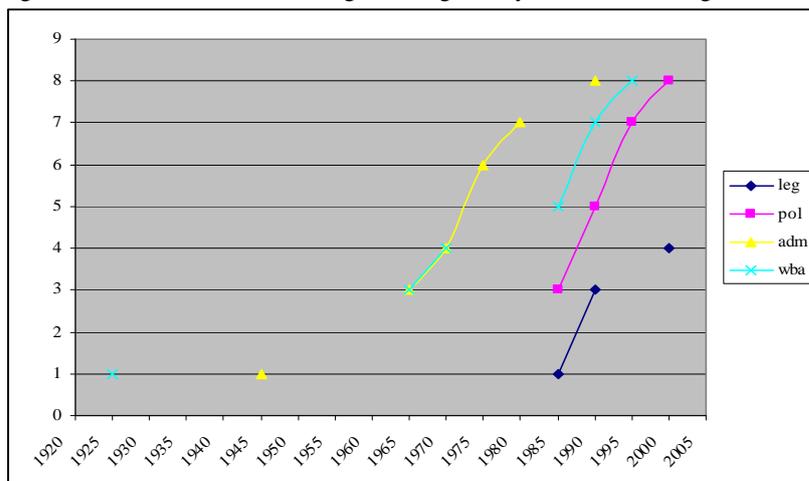
Representing the institutional movement towards administrative decentralisation (adm) and fragmentation of competences is a complex exercise. First, it is not simple to separate such institutional evolution from what we define functional decentralisation (below). Secondly, it is hard to identify the many new administrative bodies created or those to which new and different functions were assigned, and distinguish the many instances in which the reform was issued but, in fact, not implemented.

adm: 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. 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. In the Netherlands, since the beginning of the XX century 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 different. In the Flanders, 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 decentralisation took place.

wba: In Belgium, the institutionalisation of a water basin approach (what we refer to as functional decentralisation) took place in the Flanders, where informal basin committees were set up around 1995. In France, six basin agencies (the so-called *Agences de l'eau*) were already set up in 1964; river basin committees, created in 1992, 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*, in 1992. In Italy, *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 *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.

With regards to the above identified classes of institutional changes, in fig. 1 we highlight the sequence of the main measures adopted in the selected countries in the period 1920-2005.

Fig. 3: Evolution of the water management regimes by institutional change



Legend:

pol: approval of a unique water policy planning;

leg: adoption of more integrated legislation;

adm: occurring administrative decentralisation (with resulting fragmentation of competences);

wba: institutionalisation of some sort of water basin approach (meant as functional decentralisation).

Source: Own elaboration on data Euwareness and Euromarket

2.2. The state of the art of the institutional settings in water management

In this section, we sum up the regimes of water management currently at work in our selected member states. Such a short description is directed to put emphasis on the following main features: the high number of regulatory agencies operating; the many tiers of governance involved; the several institutional interactions between them (see Annex 1). Such an overview is preparatory for section no. 3, in which we focus on the entire regulatory process.

We concentrate on water quality prescriptions and on two economic instruments that affect (even though less directly than prescriptive rules) water sustainability: tariff regulation (as long as it makes people aware about water resource scarcity) and subsidies (turned, for example, to build new and more efficient distribution networks or treatment plants).

As follows, we introduce the public governance of water management in each country at the water distribution stage, identifying competent authorities and regulatory tools.

BE: in the Flanders, the Federal 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 operational 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).

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.

FR: In France, 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, 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.

IT: In Italy, several institutions work at different tiers of governance. *CoViRI (Comitato di Vigilanza sull'uso delle Risorse Idriche)*, below the Ministry of Public Works and depending on the Ministry for Environment, monitors the implementation of the water reform. It also determines and adapts rates and protects customers' interest. 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 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. The so-called *ARPAs (Agenzia Regionale per la Protezione dell'Ambiente)* monitor operators and control over environmental impacts. Water Basin Authorities (*Autorità di Bacino*) 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* designs a plan (*Piano d'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.

SP: The public governance of water 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. 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 (*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.

NL: In the Netherlands, the public governance behind water 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. 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 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. 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.

3. Regulation of service delivery by tiers of governance: rationale and implications

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 provision issues: for example, who determines what level of quality to deliver? Who identifies the community (or the communities) affected by lacking service quality? Who realises to what extent are people affected? How to take into account negative spillovers?

We identify the major rationale behind the multi-actor/multi-tier governance of water management regimes in the spillover effects of service delivery; in other words, it is the relevant geographical/temporal dimension of the quality issue that define the most suitable tier over which to let agencies work.

In this paper, we do not intend to stress the multi-actor aspect; rather, we acknowledge that water quality (i.e., resource sustainability) can be managed efficiently only by making use of more than one single tier, at the condition that these are well coordinated. As seen, water

management is run through an integrated and, as much as possible, coordinated institutional frame that we call governance.

The institutional approach represents a pragmatic starting-point to examine the regulation of service provision and never lose the linkage with the real world practice. Through it, researchers could better take into account existing limitations, operating difficulties and conflicts of interests than simply referring to an *a priori* design of exhaustive rules or optimal incentive mechanisms. As said, it is the actual location of agencies in a given governance regime, and their concrete operations at different momentum of the regulatory process, which determines the overall performance of the regulated sector. If an agency, placed at some local level, with the task of monitoring the actual implementation of a prescriptive quality requirement (set by an authority placed at the national or supranational level) does not perform adequately its mission, the planned regulatory action is compromised. Then, all the efforts provided at the design phase to prepare complete rules and optimal incentive schemes would be fruitless.

In general, quality prescriptions and economic instruments are not self-executing: when these are not correctly implemented, even rules and incentive mechanisms that in principle are valid will prove to be not suitable to neutralise erroneous practices (with regards to the water sector, even “unsustainable” practices; see Bressers and Kuks 2004, 45). However, it might also happen that agencies in charge of implementing policy measures correct (or attenuate) distortions set at the design stage.

First, to investigate the governance behind water management regimes is crucial to identify the underlying principle: it is the existence of actual and potential spillover effects that plays a crucial role in allocating institutional tasks among agencies. Nevertheless, in water management we need to cope with resource sustainability: depending on its scope, different regulators at different tiers of governance have to intervene to address it.

The emerging frame is inspired to a straightforward rationale. Whatever the service issue, the regulatory agency in charge of protecting the interests of a given community will identify a geographical and a temporal dimension: the better (worse) the quality of a given service delivery, the more the positive (negative) effects will favour (penalise) *that* community living in *that* area at *that* time. Moreover, as long as the regulatory agency properly performs its duties, it is likely that beneficial spillovers will arise for others outside *that* community (geographically identified) and *in the future*; otherwise, some negative spillovers would originate.

However, increasing service quality levels do cost. Because of monetary constraints, local public agencies presumably will pursue the minimum level of quality that *its* community is supposed to ask for (i.e., what the community is ready to pay for), irrespective of the potential

negative externalities can arise outside its range of action. The opportunity of making use of several tiers of governance (shifting upward or downward the assignment of tasks according to the spatial and temporal dimensions) requires an administrative and functional fragmentation of competences. If public authorities just care for the social welfare of the (*spatially* and *temporally* defined) community they work for, negative spillover effects can be addressed only at higher levels of governance. Then, public agencies operating within such a hierarchical structure need to be integrated and coordinated, so that the overall regulatory action could result as much as coherent and effective.

From a vertical point of view, the following implications derive: first, the coordinating function is to be carried out by the authority at the highest level. Since often this function overlaps with the stage of policy planning, also the design of regulatory tools fits the agency operating at higher levels, while the regulatory tool is usually implemented at more than one tier of governance, depending on the relevant service quality dimensions.

From a horizontal perspective, following the definition of functional areas of intervention (i.e., the water basins), regulatory regimes will result in as many sub-regimes as necessary, each replicating the hierarchical scheme on the territorial scale.

The insight from such a study perspective is that the potential of every regulatory tool is meant as being affected by the performance of the several agencies involved, each fulfilling at different tiers only a partial task of the entire regulatory process. With regards to the water distribution stage, tab. 1 illustrates the multiplicity of intervening public agencies. We basically look at quality parameters (p), even though a limited representation is also given about tariff regulation (t) and subsidies (s). We stylise the regulatory process into three major phases: design, implementation (including quality monitoring) and enforcement; all these phases, being carried out by several agencies, need to be vertically and horizontally coordinated.

Tab. 1: Regulation of water quality (at the distribution stage) by phases of the regulatory intervention

		Designing	Implementing	Enforcing
BE (FI)	p	1 (S), 3 (NS), 3 (S), 3 (S)	3 (S), 3 (S), 3 (S)	3 (NS), 3 (S), 4 (S), 4 (NS)
	t	3 (NS), 3 (S)	3 (S)	n.a.
	s	3 (NS)	n.a.	n.a.
BE (WI)	p	1 (S), 3 (NS)	3 (NS); 3 (S)	3 (NS)
	t	3 (S), 4 (NS)	n.a.	n.a.
	s	n.a.	n.a.	n.a.
FR	p	1 (S), 2 (NS), 2 (S)	2 (NS), 3 (S), 4 (S),	3 (NS), 4 (NS)
	t	2 (S), 2 (S), 3 (S), 3 (NS)	n.a.	n.a.
	s	2 (S), 3 (S), 3 (NS), 3 (NS),	n.a.	n.a.
IT	p	1 (S), 2 (NS), 2 (S), 2 (S), 2 (S), 2 (NS), 3 (NS), 3 (S), 4 (S)	3 (NS), 3 (S), 3 (S), 4 (S)	3 (NS), 2 (S), 4 (S)
	t	2 (S)	n.a.	n.a.
	s	2 (NS), 3 (NS), 4 (S)	n.a.	n.a.
SP	p	1 (S), 2 (S), 2 (S), 2 (S)	3 (NS), 3 (S), 3 (S), 4 (NS)	3 (NS), 4 (S)

	<i>t</i>	3 (NS), 4 (NS)	<i>n.a.</i>	<i>n.a.</i>
	<i>s</i>	2 (NS), 3 (NS),	<i>n.a.</i>	<i>n.a.</i>
	<i>p</i>	1 (S), 2 (S), 3 (S), 4 (NS), 4 (S)	3 (NS), 4 (NS), 3 (S)	2 (S), 3 (S), 4 (S),
NE	<i>t</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>
	<i>s</i>	<i>n.a.</i>	<i>n.a.</i>	<i>n.a.</i>

- Regulatory tools:
 - o *p* = quality parameters;
 - o *t* = tariff;
 - o *s* = subsidy
- Decentralisation; value of:
 - o 1 if at EU level;
 - o 2 if at national level;
 - o 3 if at regional level (federal, department);
 - o 4 if at local level (municipal; provincial)
- Sector specificity:
 - o *S* = sector;
 - o *NS* = non-sector specific.

Source: Own elaboration on data EUROMARKET

Each regulatory phase can be carried out at EU (1), national (2), regional (3)⁷, and local (4)⁸ level. We also distinguish intervening public authorities according to their sector specificity (S; NS).

Regulating by relying on more than one level of governance serves to address the multi-facets characteristics of service provision in environmental utilities. As said above, in order to be effective too, every regulatory tool needs to be properly designed and correspondingly implemented. An integrated and coordinated management regime has to be coherent in many respects: among agencies and tools, between institutional tasks and adopted measures, along the entire regulatory process (from design to enforcement), etc. In this sense, it is emblematic the contribution by Lynn, Heinrich and Hill (2000a, 2000b), who note that policy programmes are implemented in a sort of network, where several actors play with different assigned objectives. Consequently, they build up a model of governance that takes into account not only the objectives and instruments of policy, but also the process of implementation. Researchers are, then, 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).

⁷ That is, federal and departmental levels.

⁸ That is, municipal and provincial levels.

4. Assessing regulation by tiers of governance: coordination

As well known, it is not straightforward to realise to what degree institutional aspects, such as policy and law variables, affect the performance of a sector. First of all, because it is not easy to precisely and exhaustively identify the effects: with regards to the former typology (pol), Saleth and Dinar (2004) recognise some of its components in the impact of non-sector specific policy measures, in the extent of the linkage between law provisions and policy measures, etc.: we do not have to say that separating every factor and estimating its peculiar effect is a complex exercise. Moreover, too many and too strictly interdependent factors co-intervene: once the regulatory goal has been set and defined, its achievement will depend on the “surrounding” political and legal system, on the level of economic development, on the status of environmental resources (for more details, see Saleth and Dinar 2004, 106).

Despite the acknowledgement of their relevance, still it seems that poor attention has been devoted to institutional aspects: as far as we know, no full investigation has been conducted to evaluate coherence between goals, agencies' operations, tools and different phases of the regulatory frame/process. In this section, we set some simple guidelines to measure the effectiveness of regulating service delivery and, then, provide a focus on the Italian water sector to support the proposed approach. We start from the assumption that a more coordinated governance frame implies better sector performance (i.e., water quality, resource sustainability)⁹. 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).

Hence, we suggest to identify some basic indicators to appraise coordination, such as: the number of intervening agencies, regulatory tools adopted and tiers of governance involved; the extent of the institutional interactions between agencies, tools and phases; etc. This last indicator can be, for example, estimated by realising what is the number of tiers involved per regulatory tool, what is the number of agencies operating at every stage of the process, etc. (see tab. 1). Moreover, it is useful to concentrate on the actual coherence between tools. For example, it might happen that the planned mechanism for calculating tariff levels does not match the overall sustainability goal: how to cope with the trade-off between cost reduction and resource sustainability (both on water quality and quantity)? Often, the price cap provides

⁹ Contra, regulatory regimes with low coordination and coherence will be more likely to lead to poor results (i.e., low service quality levels).

incentives to reduce water quality and increase water supply (to exploit economies of scale): both these imply an unsustainable use of water.

Looking to the overall regulatory coordination, we can better understand the link between institutions and sector performance. From our screening, it emerges as indicative the case of the Netherlands (where strong ties have been created between different actors to increase coordination of activities) on one side, and the case of Italy (where fragmentation of competences and partial overlapping of spheres of action weaken overall regulatory efficacy) on the other.

4.1. A focus on the Italian case: hierarchy, incompleteness and lacking implementation

We focus on the governance set in the Italian water sector to highlight the extent to which institutional interactions can affect the overall regulatory action. In this sense, it is exceptionally useful the report published in May 2008 by *CoViRI*, in which the national Committee identifies all critical issues that determined the late and incomplete implementation of the *Law no. 36/94*, the so-called *Galli Law*.

In section 2.2, we already sketched the main characteristics of the public regime in the Italian water sector. With regards to service quality at the water distribution stage, the number of intervening agencies is quite high, regulatory tools adopted are several (overlapping with the usual prescriptive instruments), and all four tiers of governance are involved. More precisely, it results that all tiers are involved at the design phase, two in its implementation and three tiers for the enforcement of quality prescriptive tools. To note also the high number of agencies operating at the phases of design, implementation and enforcement of each regulatory tool: nine agencies are involved, to different extent, in the design of quality parameters, four in their implementation and three entities are in charge of ensuring their enforcement. All in all, these first insights are indicative for examining the regulation of service quality in the Italian water sector: a case by case analysis is, then, needed to better investigate all emerging institutional inconsistencies and conflicts.

Since 1994, the Italian water sector has been undergoing a radical change. The *Galli Law* was intended to reorganise the entire sector, by introducing entrepreneurial management, integrating water operations, offsetting past under-investments and addressing new and increasing investment requirements. Despite it was approved and emanated fourteen years ago, the reform process is incomplete: the resulting regulatory frame is still lacking and its implementation was

not well coordinated. It is suggestive to provide the following data: at December 2006, out of 92 *ATOs* created, the *Piano d'Ambito (PdA)* was approved in 81 instances and in only 67 cases the *AATOs* proceeded to award the water service concession. This means that, at that date, for a relevant part of the population, around 21%, the reform has not been enacted and the old management schemes were surviving. Also other circumstances gives evidence of the inefficient management of the *IWS*. As remarked by *CoViRI* (2008), among the many reasons that determined such a state, it was relevant the lacking supervision, the weak monitoring activity and the absence of incentive schemes in the enactment of the *Galli Law*.

We identify several problems with regards to both vertical and horizontal dimensions of the institutional setting. To start with the horizontal perspective, we look at the inappropriateness of the *PdA* (as mentioned in section 2.2): a well prepared *PdA* constitutes the fundamental element determining the successfulness of the award of the service concession, since it affects the attractiveness of the competitive tendering for the attribution of the service and represents an essential condition to set feasible objectives and allow good practice in public monitoring. According to *CoViRI* (2008), a situation rather diversified characterises the quality of *PdAs*: it is generally valid in *ATOs* in which the Authority has chosen adequate organisational modes; in all other instances, the *AATO* was not (and did not aim at being) efficient since it just intended to maintain the public (in-house) service provision.

It is to remark also the existing differences between *ATOs* with respect to actual tariffs and realised investments. With regards to the former, it is still observable an excessive number of “tariff basins”, that are *ATOs* in which several tariff schemes continue to subsist. Despite the purpose of the *Galli Law* towards more territorial integration, from a survey carried out by the *CoViRI*, in 56 *ATOs* investigated the number of tariff basins was 356 (355 were localised in Piemonte, Lombardia and Veneto). With regards to investments, through a comparison of the amount of realised investments and the amount of planned investments for the corresponding period, the *CoViRI* finds out that the resulting percentage is rather disappointing: for an average period of 3,3 years, the formers were €2.147 millions, that is 49% of the projected total amount (of €4.831 millions). Such data can be interpreted differently. First of all, along a horizontal perspective, problems originated within the *ATOs* themselves: either *PdAs* contained too positive forecast, or too many difficulties were obstructing the service providers in realising projected investments, and so on. According to the vertical dimension, other elements determined such a state, as well stressed by *CoViRI* (2008): until now, for example, neither procedures nor standards were established to allow a continuous and ordered data collection.

With regard to the vertical dimension, we intend to deal with several issues. First of all, the fact that the national government did not act according to the lines set by EU institutions. When the *Galli Law* took effect, the modes of service concession in all local utilities (included the water sector) were regulated by the art. 22 of *Law no. 142/90*, which provides that municipalities may ensure the performance of these services by way of concession to third parties, or by having recourse to special undertakings, non profit-making institutions or companies in which local public authorities hold the majority of shares. The enactment of art. 22 was difficult and controversial: aside from issues of interpretation concerning the typology of operators and the mode of service management, there was an overall incompatibility with EU legislation and established case-law. Already in November 2000, the EC warned the Italian government for violation of competition principles.

Among the reasons causing such incomplete and imperfect process of regulatory reform, we have to mention the absence of measures, in the progressive implementation of the reform, turned to improve the efficacy and efficiency of the process: above all, the model of governance based on *AATOs* proved to be too feeble and is at the basis of many non-fulfilments, limits and defects. Also it played a role the approval of many “corrective” measures that *de facto* were in contrast with the general regulatory context: these undermined and slackened the process of reform towards more efficient *IWSs*. The normative framework has been characterised by inaction and half-choices (for example, those concerning the modalities of the service award) which determined uncertainty and deadlocks in the functioning of the entire system.

Moreover, the implementation of the *Galli Law* has not been supported by an adequate system of regulation and control, in which the functions of the State, Regions and local entities, together with other Authorities and *AATOs*, were effectively coordinated, by identifying roles and responsibilities assigned to each institutional level. As clarified above, the regulatory frame in the Italian water sector is local in nature, even though it involves and includes institutions at regional and national level. With regards to this latter tier of governance, the *CoViRI* has the task of ensuring and granting users through the control of the correct application of laws and regulatory tasks with regards to the proposition of the tariff method, the establishment of the principles and criteria for the *PdA*, the *Convenzioni-tipo* for the service award, the budgeting of the service management, the measurement of quality. With regards to these issues, according to the Committee itself, *AATOs* had significant problems for the following reasons: the reconnaissance of the state of existing infrastructures was not always accurate and complete, determining uncertainty with respect to the definition of policy measures and objectives; the *PdAs* were inexact, not properly defined and deficient in many respects, without valid mechanisms of revision; the *Convenzioni-tipo* were too generic and lacking of essential aspects,

such as the obligations of the service provider concerning information to deliver to the AATO or the modalities by which to revise tariffs.

As well known, in a context of regulation “by contract” the quality and effectiveness of regulatory activities are linked to the validity of the designed instruments and governance rules, nonetheless to the efficacy of analyses and inspections around several aspects of service management and functioning of the IWS.

Conclusions

In this paper, our purpose was to analyse regulation of service delivery (above all, service quality) under an institutional perspective. The basic rationale behind the observed settings in the water sector is that spillover effects of the service quality play a crucial role in identifying competent agencies and allocating tasks among them. In general, the system is ran by several regulatory agencies involved at different levels of governance, pursuing different objectives (depending on the interest of the community they protect), making use of different tools, operating at different stages of the process, and continuously interacting among themselves.

We investigated the effectiveness of regulating service provision by several tiers of governance: it is the overall coordination and coherence among goals, tools, agencies and phases of the regulatory frame/process that determines the successfulness of the final outcome.

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 water management regimes in some EU member states (Belgium, France, Italy, Spain and the Netherlands), a multi-actor/multi-level setting emerges, by which public agencies and regulatory tools are integrated and, as much as possible, coordinated. We drew some major insights.

We first derived a generalised movement from one single public agency, to multiple competing agencies, and finally to multiple and (to some extent) coordinated public authorities. Nowadays, it takes place a more or less coordinated institutional frame that we call “governance”.

The paper was structured as follows. We first described the relevant theoretical framework. Then, we investigated the evolution and the state of the art of water management regimes in some EU member states (section no. 2), stylised the institutional frame (section no. 3), and derived some implications for the economics of regulation of service delivery. In section no. 4, we set some guidelines to evaluate the effectiveness of regulating service provision and focused on the Italian case-study.

An institutional approach should represent a more pragmatic starting-point by which to examine the regulation of service provision, never losing the linkage with the real world practice. Through it, we could better take into account existing limitations, operating difficulties and conflicts of interests than simply referring to the *a priori* design of exhaustive rules or optimal incentive mechanisms. As said above, it is the actual location of agencies in a given governance regime, and their concrete operations at different momentum of the regulatory process, which determines the overall performance of the regulated sector. If an agency, placed at some local level, with the task of monitoring the actual implementation of a prescriptive quality requirement (set by an authority placed at the national or supranational level) does not perform adequately its mission, the planned regulatory action will be compromised. Then, all the efforts provided at the design phase to prepare complete rules and optimal incentive schemes would be fruitless.

References

- Baron, D. (1985). *Non-Cooperative Regulation of a Non-Localized Externality*. *Rand Journal of Economics*, 16, 269-282.
- Bressers, H., Kuks, S. (2004). *What does governance mean? From concept to elaboration*. In H. Bressers, W. Rosenbaum (eds.), *Achieving sustainable development: the challenge of governance across social scales*. Praeger: New York.
- Bressers, H. Kuks, S. (2004). *Integrated Governance and Water Basin Management: Conditions for Regime Change and Sustainability*. The Hague: Kluwer Academic Publisher.
- Dixon, J.A. (1989). *Multilevel resources analysis and management: the case of watershed*. In G. Schramm and J.J. Warford (eds.), *Environmental management and economic development*, World Bank, Baltimore: John Hopkins University Press.
- Estache, A., Martimort, D. (1999). *Politics, Transaction Costs, and the Design of Regulatory Institutions*, March 1999, PRWP.
- Finger, M., Allouche, J., Luis-Manso, P. (2007). *Water and Liberalisation: European Water Scenarios*. London: IWA Publishing.
- Kahn, A.E. (1988). *The Economics of Regulation: principles and institutions*. 2nd edition. Cambridge: MIT Press.
- Kissling-Näf, I., Kuks, S. (2004). *The Evolution of National Water Regimes in Europe. Transitions in Water Rights and Water Policies Towards Sustainability*. The Hague: Kluwer Academic Publisher.
- Knoepfel, P., Kissling-Näf, I., Varone, F. (2001). *Institutionelle Regime für natürliche Ressourcen Boden, Wasser und Wald im Vergleich*, Basel: Helbing & Lichtenhahn.
- Kuks, S. (2004). *The evolution of national water regimes in Europe. Transitions in water rights and water policies*. Paper for the Conference on *Sustainable Water Management: Comparing Perspectives from Australia, Europe and the United States*, 5-16 September 2005.
- Lynn, L.E., Heinrich, C.J., Hill, C.J. (2000a). *The empirical study of governance: theories, models and methods*. Washington DC: Georgetown University press.
- Lynn, L.E., Heinrich, C.J., Hill, C.J. (2000b). *Studying governance and public management: challenges and prospects*. *Journal of Public Administration and Theory*, vol. 10, april, 233-261
- Martimort, D. (1996). *Exclusive Dealing, Common Agency and Multiprincipal Incentive Theory*. *Rand Journal of Economics*, 27, 1-31.
- Moe, T.M. (1986). *Interests, Institutions, and Positive Theory: The Policies of the NLRB*. Studies of American Political Department.

Robert, A. (2001). *Quality issues for system operators with special reference to European regulators*. Report, Belgian Transmission System Operator (ELIA), Brussels.

Rovizzi, L., Thompson, D.P. (1992). *The regulation of product quality in the public utility and the Citizen's Charter*. Fiscal Studies, 13, 74-95.

Saal, D.S., Parker, D. (2000). *The Impact of Privatisation and Regulation on the Water and Sewerage Industry in England and Wales: A Translog Cost Function Approach*. Managerial and Decision Economics, 21(6), 253-268.

Saal, D.S., Parker, D. (2001). *Productivity and Price Performance in the Privatised Water and Sewerage Companies of England and Wales*. Journal of Regulatory Economics, 20, 1, 61-90.

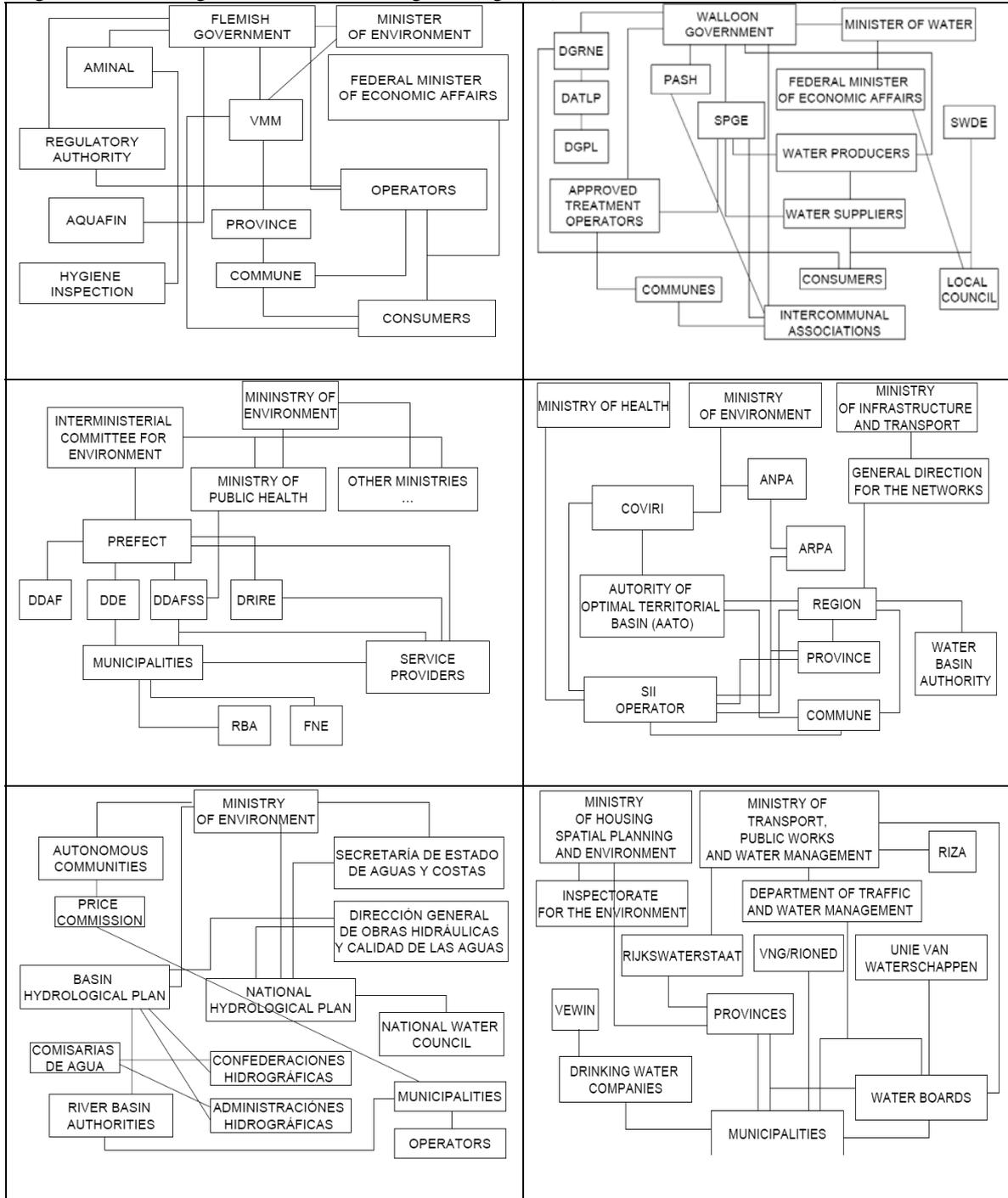
Saleth, R., Dinar, A.M. (2004). *The institutional economics of water: a cross-country analysis of institutions and performance*. Edward Elgar. Cheltenham.

Sappington, D. (2005). *Regulating Service Quality: A Survey*. Journal of Regulatory Economics, 27 (2), 123-154.

Smith, W. (2000). *Regulating utilities: Thinking about location questions*, World Bank Workshop on Market Institutions. Washington DC.

Annex 1

Fig. 4: The multi-tier governance in water management regimes (at national and sub-national levels)



Box 1 (up; left): Belgium, Flanders;
 box 2 (up; right): Belgium, Wallonia;
 box 3 (mid; left): France;
 box 4 (mid; right): Italy;
 box 5 (down; left): Spain;
 box 6 (down; right): the Netherlands.

Source: Own elaboration on data EUROMARKET.