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Water governance: a matrix survey on property rights and regulation in 14 Countries

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Abstract: Water regulation, with particular reference to economic / industrial regulation (tariffs, investments, profits), refers mainly to consumer protection from market incumbent's possible abuses. Indeed, water services are provided mostly in conditions of natural monopoly and/or relevant market failures for the presence of externalities and public goods, and in a context of strong information asymmetries. That is why local regulation is a crucial element in water policy and water resource management. The following paper intends to present a comparative analysis of regulation of domestic water and wastewater services in 14 Countries. The main goal is to outline the importance of setting the right questions to identify water governance structure, in particular on property rights, appointments and different tiers of command. The international comparison shows that challenges in water governance are very similar all over the world, while a wide range of solutions can be put into practice, as demonstrated by the results of this analysis.

Keywords: Water governance, water policy, economic regulation, industrial regulation, water and wastewater services, public private partnership.

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1. Introduction

This paper intends to present the results of a research activity implemented in 2010 – 2011 by Fondazione per l'Ambiente within LORENET – Local Regulation Network, an international network of experts on regulation of local public services launched by Fondazione per l'Ambiente (www.fondazioneambiente.org/lorenet). The idea of launching LORENET project was mainly based on the awareness that there is a lack of networking initiatives at international level on research and dissemination regarding regulation of local public services, and more generally of management and tendering of urban services. The network intends to:

- establish an international network of researchers, decision-makers, research and education institutions, enterprises, and other stakeholders, on the issue of regulation of local public services;
- promote applied research on regulation of local public services;
- build up an international framework and produce guidelines on regulation of local public services;
- provide local public decision-makers and stakeholders with the necessary information and instruments to build up regulatory systems of local public services;
- set the basis for the creation of a stable international network on regulation of local public services.

Fondazione per l'Ambiente and Turin School of Local Regulation are the promoters of the initiative, mainly based on 15-year experience in the Summer School on regulation of local public services that became international in 2009 and hosts 25 participants every year, coming from all over the world. In particular, the Turin School of Local Regulation intends to offer an international high-level educational and capacity-building experience, alongside with a policy-oriented research stream. The School adopts a policy-oriented approach, with the aim of spreading the culture and instruments of regulation at local level.

1.1. The context of the research: theory and practice of water regulation

Water policy objectives can be grouped under four main issues: water as a human right, environmental and health quality, consumer protection, affordability.

Water regulation, with particular reference to economic / industrial regulation (tariffs, investments, profits), refers mainly to consumer protection from market incumbent's possible abuses. Indeed, water services are provided mostly in conditions of natural monopoly and/or relevant market failures for the presence of externalities and public goods, and in a context of strong information asymmetries. That is why local regulation is a crucial element in water policy and water resource management.

In the last decade the debate on local public services constantly concentrated on liberalization and privatization. Nevertheless, the two processes have only partially concerned local public services, where local authorities keep strong control strategies, goods and assets.

For large network services (e.g. telecoms, energy) regulation is well-established, at least in OECD countries, and it is normally operated by independent national authorities. Industrial economics and the theory of regulation has strongly developed since seminal papers appeared [1, 2, 3], led to mechanism design and game theory instruments [4]. On the contrary, at local level an equivalent framework for urban-scale services does not exist, even though they produce a non-negligible share of the GDP and contribute significantly to people's wellbeing. The dissemination of the culture, the instruments and

the opportunities of the theory of regulation produced at academic level would therefore bring a real added value in proper and efficient local governance and coordination and comparison at international level is important to this extent being regulatory problems common to different geographical contexts.

Reflection on water governance and property rights is also deeply connected with the current wave of social thinking summarized in the motto "water as a common good". The wave seems to date back to 1998 (Lisbon, World Water Contract) and is animating the public opinion at international level, while its academic origins can be identified in the rich literature produced on common-pool resources and culminated in the 2009 Nobel Prize in economics to Elinor Ostrom, with her famous work "Governing the Commons: The Evolution of Institutions for Collective Action" [5]. The mobilization for the 2011 Referendum in Italy, the revolt of Cochabamba in Bolivia [6] and other initiatives in South America inspired by that event represent some examples of this international movement. It is interesting to quote here the very recent case (September 2011) of the Municipality of Naples, Italy, that transformed the previous public joint-stock company in charge of management of water services into a totally public company [7], with a Board of Directors where two out of the five members are representatives of environmental associations.

1.2. General goal of the paper and presentation of contents

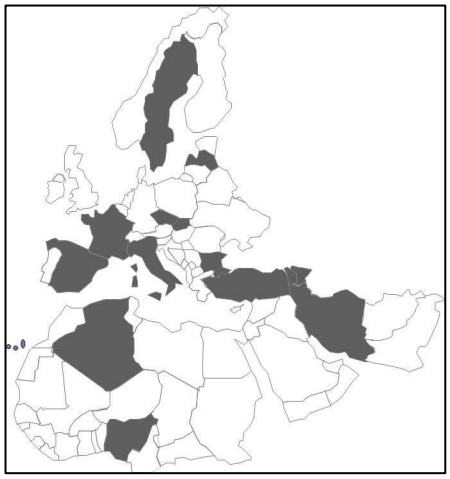
The paper intends to present a model of analysis matrix developed in order to produce a comparative analysis of regulation of domestic water and wastewater services in different Countries. It is meant to disseminate the first milestone result of an on-going research activity, and to provide a perspective for further analysis.

The main goal at this stage is to outline the importance of setting the right questions to identify water governance structure. This is in line with the strand that gives priority to examination of aspects such as policy design, property rights, roles and relations between stakeholders, incentive system as a basis to animate discussion on water governance and policy design. The reason for an international comparison derives from the strong belief that challenges in water governance are very similar all over the world, while a wide range of solutions can be put into practice. The objective is therefore neither to identify "best practices" in regulation, nor to assess effectiveness of different forms of regulation in terms of efficiency of service provision. Indeed, assignment of regulatory functions is likely to consider the Country's socio-economic, political and law systems and different jurisdictions can use quite different organizational structures to perform similar functions [8].

A description of how questions have been defined and why they are considered particularly relevant is therefore provided in the next paragraphs. A first level of keys to interpretation in the selected group of Countries is also suggested, to be further tested once the scope of the research will be enlarged, including new selected Countries.

The Countries analyzed (14) at this stage are (in alphabetical order) (see Figure 1): Algeria, Armenia, Azerbaijan, Bulgaria, Czech Republic, France, Iran, Italy, Latvia, Nigeria, Slovakia, Spain, Sweden, Turkey. Amongst them, we find 5 Mediterranean Countries (Algeria, France, Italy, Spain, Turkey), 8 EU-members (of which 4 "new" member States, entering after 2004) plus one Candidate Country (Turkey), 8 Countries listed in the group of emerging and developing economies by the International Monetary Fund [9].

Figure 1. Countries analyzed in the survey



2. Methodology

2.1 Water regulation: the right questions

The first step of the research was the definition of an analysis matrix with three main aims: to enable readers to go straight to key aspects of local regulation of water and sanitation services; to collect very brief and precise answers; and to allow easy comparison between Countries analyzed.

Firstly, the experience gained by Fondazione per l'Ambiente thanks to continuous training and capacity building activities in the domain of local regulation led to the identification of key points to be highlighted in the survey: policy design, property rights, roles and relations between stakeholders, incentive systems and revenues. Four factors seem crucial: who owns the water assets, who owns the service provider, who is responsible for delivering services, how the owner exercises control over the utility's management [8]. The following list specifies the outlined factors:

- regulatory policy design;
- compensations/subsidies;
- ownership of assets;
- services assignment modes;
- services management;
- regulation;
- structure of revenues.

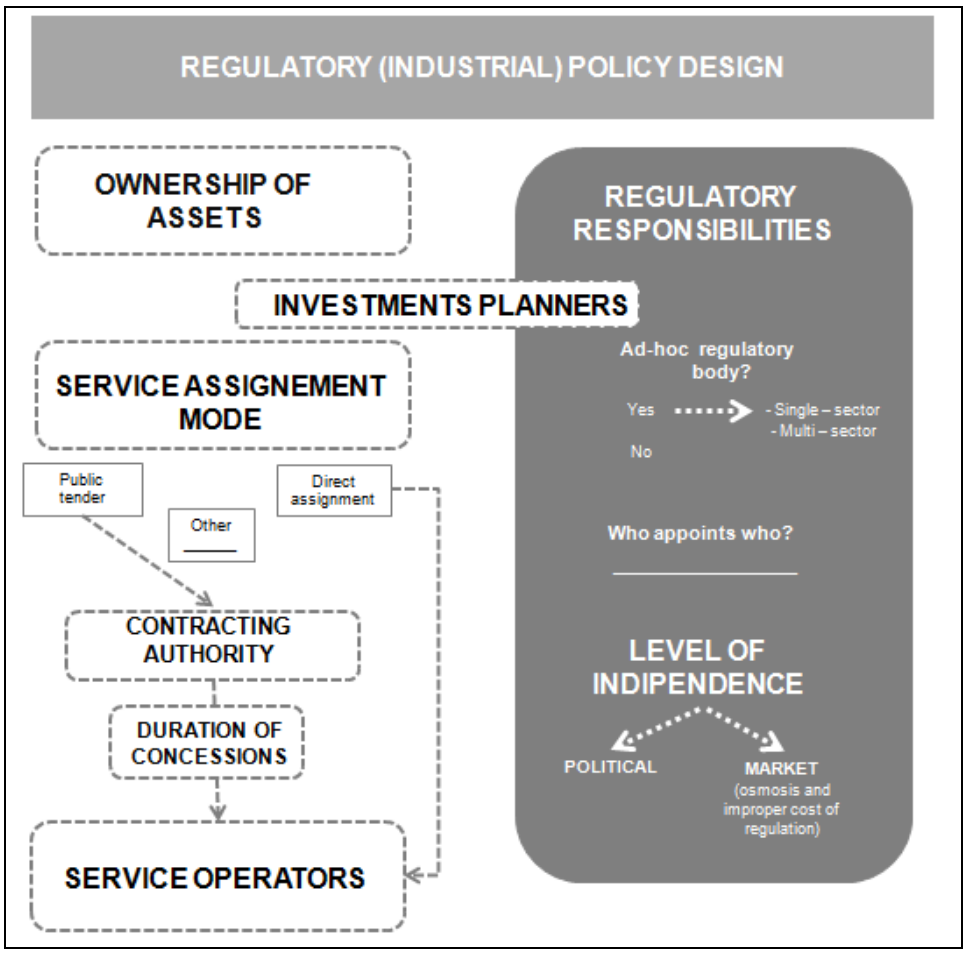
Secondly, on the base of key aspects to be considered, a first set of questions was formulated to lead to a draft analysis matrix. Then, this draft was circulated amongst a selected group of experts at different levels: academy, regulatory agencies officials, local governments officials, professionals / financial officials, utilities managers and officials, and from different geographical areas.

Comments and integrations were collected in order to compose the final version of the matrix. This part of the research was particularly important. Indeed, thanks to the involvement of contributors with different expertise and different geographical provenance, new aspects were identified, which could

appear negligible for some Countries but were important for others. To make an example, a preliminary question to verify if public provision of urban water exists or if urban water is provided by private providers (water wells owners) was added at this stage, upon suggestion of experts from developing Countries, where the situation of provision by private providers is often common. Moreover, comments from experts of different Countries allowed to propose some "forced-choice" questions aiming at a better comparison. In other cases, the grouping of answers under a limited set of categories was done ex-post, on the basis of all answers collected.

Here below we present the questions composing the final version of the matrix, with some comments on the reasons why such questions are considered relevant in order to have a satisfactory overview of the regulatory framework in different Countries. This scheme was used by Country Experts to provide information about their Country. Some notes have also been included, highlighting any critical point connected to some specific questions, arising ex-post, on the basis of the answers provided by different Country Experts involved. Figure 2 summarize the interconnections between the different questions.

Figure 2. Scheme of interconnections between questions composing the survey on water and wastewater services management and regulation carried out under LORENET project.



Preliminary question: Does public provision of urban water exist or is urban water provided by private providers (wells)?

As anticipated, this questions was included taking into consideration that in some Countries, especially developing Countries, public provision or urban water does not exist or is very limited and accompanied by private provision. In the case of solely private provision contributors are only asked what kind of relationship exists between private providers and the State are (in terms of e.g. grants, rates, compensations). It is worthy specifying that for private provision here we mean the responsibility of providing and organizing water services in the broadest sense and not only the operation of the service.

Who is responsible for regulatory (industrial) POLICY DESIGN at national and local level?

This question aims to highlight the relation between policy functions and regulatory functions. Ideally these functions should be separated. Indeed, policy design begins by identifying clear objectives in the water supply and sanitation sector. Once the objectives are set, the most suitable regulatory and policy instruments to achieve these objectives can be identified. This task should be upon policy makers rather than for regulatory bodies [8]. Nevertheless, in collecting answers to this question, we realized that it is subject to ambiguity, as the distinction between policy and regulatory levels is not always clearly defined. More precise formulation is advisable in future analysis.
The specification "national and local level" was included in order to discover whether only central/local or both levels are engaged in regulation of water services.

Is there any compensation provided for local communities and municipalities that host the captation plant on their territory?

The existence of forms of compensation for local communities strongly influences the structure of incentives under the point of view of investments and impact of investments on local communities. The question is culturally interesting as it raises concerns about property rights of the common water reservoirs.

Who has the ownership of waterworks and plants?

The following choices were proposed: State, Local governments, Companies owned by the State or local public bodies, Private entities, Mixed private / public. The aim was to bring out the level (central or local) of ownership, and its nature (public, private or mixed).

How is the service assigned?

The EU legislative framework on public procurement [10] was used as a basis for formulating this question and the choices proposed: Public tender, direct assignment, other (to specify). The decision to add an option "other" was due to the fact that the research does not cover only EU Countries. By the way, while processing the information gathered, some concerns about possible differing interpretation of the answer "direct assignment" arose. Indeed, according to EU legislation direct assignment is applicable when services are assigned by the contracting authority to wholly owned and controlled companies (so-called "in-house" assignment) but with reference to answers from non-EU Countries this aspect needs to be further investigated in order to verify if this assignment mode is applied only towards in-house companies or also third-party operators (included private operators). This question does not apply to cases where public entities provide the service by own resources (e.g. through their internal water department) in such a way that no contract for pecuniary interest is concluded.

If applicable, who is in charge of tendering the services (or waterworks/plant ownership)?

This question is meant for those Countries were public tender is the mode of assignment of the services from the organizing authorities to the operators. The specification in brackets is addressed to those Countries where private ownership of waterworks and plants exists. This question allows also to point out who is the organizing authority, which was not subject of a specific separated question.

What is the average duration of concessions? Can they be re-negotiated?

This question is considered fundamental for the theory of incentives. Through the second part regarding the re-negotiation, it aims to verify the severity of rules. In 2004 renegotiation in water concessions happened in 79% of case studies, and on average only 1,5 years after the beginning [11]. Initially the question was meant to be limited to situations where the whole service is assigned through concessions. By the way, as we received answers also from Countries were more limited forms of delegation are put into practice (e.g. service contracts), at this stage some inconsistency could be noticed in some Countries between the answer to this question and the one related to assignment of services and service management.

Who manages the services involved in integrated urban water management?

This question intends to investigate who are the water and wastewater services operators. At the initial stage this was an open question. The analysis of the answers led to the definition of the following choices: local governments, local public-owned companies, State-owned companies, private companies, public-private companies. This question is a key question to define the local specificity of the water and wastewater services.

Is Public-Private Partnership (PPP) a common Practice in the Country?

The following question intends to explore the level of involvement of private operators in the water service sector. In general, the term public-private partnership ("PPP") refers to forms of cooperation between public authorities and the world of business which aim to ensure the funding, construction, renovation, management or maintenance of an infrastructure or the provision of a service (European Commission, 2004).

The following elements normally characterize PPPs:

- the relatively long duration of the relationship, involving cooperation between the public partner and the private partner on different aspects of a planned project;
- the method of funding the project, in part from the private sector, sometimes by means of complex arrangements between the various players;
- the important role of the economic operator, who participates at different stages in the project (design, completion, implementation, funding). The public partner concentrates primarily on defining the objectives to be attained in terms of public interest, quality of services provided and pricing policy, and it takes responsibility for monitoring compliance with these objectives;
- the distribution of risks between the public partner and the private partner, to whom the risks generally borne by the public sector are transferred. However, a PPP does not necessarily mean that the private partner assumes all the risks, or even the major share of the risks linked to the project.

By the way, after the collection of the answers, we realized that, as it is formulated, it is subject to different interpretation according to some aspects, in particular risk sharing, capital structure and financing. Therefore, some further specification on the level of involvement of private operators could be useful. A useful tool of schematization is this list of the 7 major types of private involvement [12]:

- the service contract;

- the management contract;
- the lease contract “Affermage”;
- the Build Operate Transfer;
- the concession contract;
- the joint venture;
- the divestiture.

accompanied by a scheme of the degree of involvement of the private partner for each of these seven modes, presented in Table 1.

Table 1. Forms of private involvement in water supply

Option	Setting performance standards	Asset ownership	Capital investment	Design and build	Operation and maintenance	Commercial risk	Oversight of performance and fees	Duration (years)
Service contract	Public	Public	Public	Public	Shared Public/Private	Public	Public	1-2
Management contract	Public	Public	Public	Public	Private	Public	Public	3-5
Lease contract "Affermage"	Public	Public	Public	Public	Private	Shared Public/Private	Public	10-12
Build-Operate-Transfer	Public	Private Bulk services	Private	Private	Private	Private	Public	20-30
Concession contract	Public	Public	Private	Private	Private	Private	Public	25-30
Joint Venture	Public	Shared Public/Private	Shared Public/Private	Shared Public/Private	Shared Public/Private	Shared Public/Private	Public	Indefinite
Divestiture	Public	Private	Private	Private	Private	Private	Public	Indefinite

Source: Table adapted by E. Pérard from Bradford Gentry, Yale-UNDP Collaborative Programme, 1998.

Therefore a further question on the degree of involvement of private partners could be added and the seven types of public-private cooperation proposed as “forced-choice” answers.

Who regulates tariffs, profits/revenues and so on?

The following question intends to examine which is the authority in charge of setting tariffs and implement regulatory tasks. The answers collected led to the splitting of the question into sub-questions for the analysis of results:

- is regulation made at central or local level?
- does an ad-hoc regulatory body exist?
- if yes, is it a water-specific regulatory body or a multi-sector regulatory authority?

This last sub-question is suggested by the phenomenon of incorporation of the water regulation tasks into the responsibilities of national multi-sector regulatory agencies which is on-going in some of

the Countries analyzed (e.g. Latvia in 2009, Italy in 2012) and the current international debate on this topic (see for example I.N. Kessides, 2011 [13]). By the way, in future collection of information from new Countries, the idea is to maintain the initial formulation of the question as we noticed that it can lead to very fruitful identification of new aspects to be analyzed, which could be lost in an already selected set of choices for the answer.

Who plans investments?

Investment planning is strictly connected to regulation and consumer protection objectives as it produces direct effects on securing consumer service levels and standards, regardless of the characteristic of the service operators. The inclusion of this question aims to verify if investment planning responsibilities stand upon the same entities that own the water service infrastructure and/or the entities in charge of operating the service. Co-existence of regulatory and investment planning tasks upon the same authority is also verified.

If a regulatory body exists (authority / agency / department), who appoints who in its governance?

This question is strictly connected to the next one and it allows some cross-check about a very sensitive topic such as the one of independence of the regulatory body.

What is the level of independence of the regulatory body from the government?

In theory, any regulatory agency has to be independent by its status for transparency reasons. In practice, this is not always the case. This is the only question that, for its formulation, was subject to a certain extent to the personal view of the contributor. We acknowledged that more specific information should be requested to allow an evidence-based comparison. In particular the following independence indexes could be considered:

- institutional independence (who appoints who? Is re-appointment possible? Do the terms of office of the government and the terms of office of the President/commissioners of the regulatory body overlap?);
- financial independence (what are the sources of revenue of the regulatory body?).

Moreover, in a future perspective the level of independence could be also verified in relation to the market and not only to the government. This aspect would lead to explore problems like osmosis and revolving doors phenomena that undermine the independence from regulated companies and generate improper costs of regulation, in particular at local level [14].

What is the structure of revenues (e.g. customer bills, subsidies, revenues from energy production)?

Water tariffs vary widely in their structure and level between Countries and cities. They can be set below costs, at the level of cost recovery without a return on capital, or at the level of cost recovery including a predetermined rate of return on capital.

Historically, between the 19th and the 20th Century, with the need of expanding the water networks to serve enlarging cities, the management of water services was taken over by public authorities nearly all over the world. In most cases costs were covered through taxation [15]. This trend has undergone a turnaround since 2000, at least within the European Union, after the entering into force of the European Water Framework Directive, that introduces economic principles and methods for the management of waters in Europe. In particular, Article 9 of the directive calls for the recovery of the costs of providing water services, pushing for the adoption by Member States of the “full-cost recovery method” in setting water tariffs. The new legislative framework led to reforms in the structure of

revenues of water and wastewater services in all EU Countries. When formulating the question differences were therefore expected between EU and non-EU Countries.

To complete the description of the methodology for the creation of the matrix for the survey, it is important to note that previous or parallel comparative analysis on these topics elaborated by other authors were also taken into account in the definition of the questions, namely:
- a survey on local public companies in the 25 Countries of the European Union conducted by Dexia and Fédération des SEM in 2004 [16];
- the OECD Survey on Water Governance conducted in 2009-2010 and culminating in the Study "Water governance in OECD Countries. A multi-level approach" published in 2011 [17];
- a research on the water sector in 9 Countries coordinated by the CIRIEC International Scientific Commission "Public Economy, Public Services" [18].

The peculiarity of the analysis presented in this paper is the strong focus on economic regulation, while generally other studies tends to enlarge the scope of the analysis to governance of water services in a broader sense, allocation of responsibilities for water management and co-ordination across levels of government, including e.g. stakeholder participation, demand of services, quality of the services, environmental regulation, territorial accessibility, affordability. Table 2 and Table 3 intends to make a comparison of the four surveys concerning Countries and topics covered. The text of some questions was adapted in order to make comparison between the surveys.

Table 2. Countries covered by the four surveys:
Fondazione per l'Ambiente/LORENET, DEXIA, OECD, CIRIEC.

	LORENET	DEXIA (1)	OECD	CIRIEC (P.Bauby)
Algeria	■			■
Armenia	■			
Australia			■	
Austria		■		■
Azerbaijan	■			
Belgium		■	■	■
Bulgaria	■			
Canada			■	
Chile			■	
Czech Republic	■	■		
Denmark		■		
Estonia		■		
Finland		■		
France	■	■	■	■
Germany		■		■
Greece		■	■	
Hungary		■		
Iran	■			
Ireland		■		
Israel			■	
Italy	■	■	■	■
Japan			■	■
Korea			■	
Latvia	■	■		
Lithuania		■		
Mexico			■	
Netherlands			■	

New Zealand				
Nigeria				
Poland				
Portugal				
Slovakia				
Slovenia				
Spain				
Sweden				
Turkey				
U.K. (England and Wales)				
U.S.A. (Colorado)				

(1) DEXIA Survey deals with Local Public Companies in the 25 members Countries of European Union in 2005. Cyprus, Luxembourg, Malta, Netherland, Portugal and UK are not considered in this table because water services are operated only by private companies.

Table 3. Questions included in the four surveys:
Fondazione per l'Ambiente/LORENET, DEXIA, OECD, CIRIEC

Topic	Question	LORENET	DEXIA (1)	OECD (2)	CIRIEC (P.Bauby)
Policy	Legal framework				
	Body responsible for policy design				
	Compensations for hosting captation plants				
	Body responsible for the allocation of different uses				
	Body responsible for water quality				
	Relationship operator/policy designer				
Assets	**Ownership of assets**				
Regulation, Control and Information	Body responsible for the environmental enforcement				
	Body responsible for monitoring/evaluation				
	Existence of a regulatory body				
	Who appoints who in the regulatory body				
	Level of independence of the regulatory body				
	Incentives (rules, reward and sanction mechanisms)				
	Structure of revenues				
	Water demand				
	Body responsible for water information				
	Who plans investments				
	Amount of investments				
	Who regulates tariffs				
	Tariffs structure				
	Full cost recovery				
	Relationship private provider/State				
	Territorial accessibility				
Services assignment / management	**Service assignment mode**				
	Contracting authority				
	Duration of concessions				
	Operators of integrated water management services				
	Legal forms of local public companies				
	Capital structure of local public companies				
	Territorial boundaries for operation of local public companies				
	Public-private partnerships				
Quality of service	Water quality				
	Customer satisfaction				
Stakeholders and capacity building	Representation, participation				
	Difficulties to horizontal and vertical co-ordination				
	Mechanisms for co-ordination				
	Tools and obstacles for capacity building				

(1) DEXIA Survey is limited to local public companies; (2) OECD Survey duplicated questions for both the central level and sub-national level.

The comparison with the results of these studies can be a mutual enriching experience as it allows – for common Countries – better contextualization of the outputs.

2.2 Information gathering

After the definition of the matrix of questions, a group of experts have been involved to collect information for 14 Countries. Amongst the participants to the LORENET network, experts were selected and invited to contribute to filling-in the table with information about their Country. 14 experts accepted to take part to the initiative. Experts were asked to provide a 2-level answer to each question: the first level consisted of a very short answer to be inserted in a table enabling immediate comparison amongst Countries; the second level required was more detailed in order to allow readers to go into further details. Considering the intentional general scope of some of the questions, a mid-term review was fixed in order to verify the articulation of the answers provided by each expert and elaborate a scheme to obtain some homogeneity in terms of details provided and articulation of the answer. Experts were also asked to attach to the last version of their sheet a letter from a senior expert referee. This step was meant to ensure trustfulness of information provided, considering the difficulty of making cross-verifying between peers due to language barriers in consulting official sources, deriving from the variety of Countries involved. Nevertheless, some literature was used in processing the information gathered for some checks and slight integrations [19-29].

This paper contains in attachment the Table showing the results of the level-1 answers provided for 14 Countries.

2.3 Methodological limits of the approach

While working on this survey, some methodological limits were acknowledged. Some of them were already pointed out at the beginning of the research, others emerged during the analysis of data collected. Their acknowledgment led to the identification of some possible corrections that contributed to the research outlook described in the last paragraph.

The first limit we identified is that the survey concerns a still fragmented sample of Countries, to be further enriched. Therefore there different systems are not equally represented if we consider:

- geographical position;
- socio-economic situation;
- law system;
- historical patterns;
- EU/non-EU Countries;
- industrialized / emerging / developing Countries.

Indeed, the objective of this first stage of the research was to test the relevance of the matrix proposed and identify possible keys to interpretation to be further explored. This justifies the lack, at this stage, of contextualization and completion of the information gathered with more general information on the law, administrative, socio-economic situation of each Country, as well as general water governance structure. By the way, such contextualization will be necessary when enlarging the

range of Countries analyzed in order to lead to identification of common development patterns in regulation of water and wastewater services.

Furthermore, as relatively few and, for certain aspects, general questions have been defined, the consequences are twofold: on one side they allow immediate comparison using also graphical forms as the synoptic table attached or representation through maps; on the other side it leads to the risk to collect general questions or to have different interpretation of the question itself, losing precision in details. At this stage the research team considered the possibility to easily compare answers more relevant to the final scope of the research and worthy to losing some degree of detail. Nonetheless, questions will be revised for the following phase of enlarging the number of Countries covered, in order to partially overcome this limit. Indeed, at this stage some "grey areas" could be pointed out in some answers.

3. Results and Discussion

The intermediate output of the survey is a comparative table showing answers for each Country and for every single question described in the previous paragraphs. The phase of collection of the results was followed by a review of all the answers. In some cases they have been formally revised in order to make them more easily comparable with the other Countries. In other cases the processing of the results led to aggregation of the information around a few standard typologies, referring to the level-2 answers for more precise details.

This paragraph presents the most relevant remarks that came out from this first phase of the survey, trying to identify common aspects between Countries, spot situations, particular case-studies, suggestions for further steps in the research.

For the purposes of this survey, the following definitions are used when summarizing answers related to the level of government in charge of different responsibilities:

- National or Central level: central or federal government;
- Regional level: state (n case of federal governments), region, province, canton, or autonomous community government;
- Local level: mainly municipalities / local governments.

The definitions are taken from the OECD Survey on Water Governance (2009-2010) in order to make comparison possible with the final report generated [17].

The first point that clearly emerged is that out of 14 Countries surveyed, no cases of identical governance and regulatory framework have been identified. Even in cases of Countries where similarities were expected, we registered strong differences: see for example the case of Czech Republic and Slovakia, where a similar system could be assumed due to their union until 1992. Slovakia set an ad-hoc regulatory agency (multi-sector), services are managed by municipality companies, instead Czech Republic does not have an ad-hoc regulatory body and private operators are involved in water services management. This first evident aspect supports the hypothesis that a "model" of regulation does not exist and the regulatory framework is instead tailored on the peculiar situation of every single Country, taking into account its dimension, administrative organization, institutional and law tradition, historical background.

To stress this point, another aspect that can be pointed out is that no particular similarities have been identified in the Mediterranean region as well. On the contrary, very different models exist in the 5 Countries analyzed.

Some similarities have been identified amongst Algeria, Iran and Nigeria. All of them are characterized by a relevant State control on the whole chain of the water and wastewater services cycle (direct or indirect). In these Countries we find a central body setting branches at regional level, mainly in charge to manage the services. Some differences exist in terms of allocation of responsibilities at national level or regional / local level, concerning asset ownership, investment planning and regulation.

Moving now to the single topics of the survey, we summarize here some particular situations observed.

Concerning first of all the question related to the existence of public provision of water services, the only case where the territory is fragmentarily covered by public provision is Nigeria, where private providers operate alongside State Water Agencies.

By the way, it is worthy noticing that a particular case has been registered in Spain, and in particular in the Canary Island, where a system for providing water privately has been in place since the nineteenth century, through a capillary system of private wells [30]. In this particular context, water belongs to whoever extracts it and can be bought and sold freely on a market.

Concerning compensations provided for local communities and municipalities hosting captation plants on their territory we found three situations: in some cases compensations are directly provided (Bulgaria, Italy, Iran). For example, in Bulgaria water operators pay fees for water usage to local municipalities for abduction of water from water basins. In other cases, indirect forms of compensation exist. See the case of the French Water Agencies (Public establishments under State supervision), who are in charge of the resource conservation policy and levy different water related charges (effluent emissions taxes and extraction charges). These charges are then allocated (partially) to municipalities in order to subsidize different kind of investments: improving and conserving water resources, pollution abatement, resource management facilities. Forms of indirect compensation exist also in the Czech Republic. In all other cases compensations have not been observed.

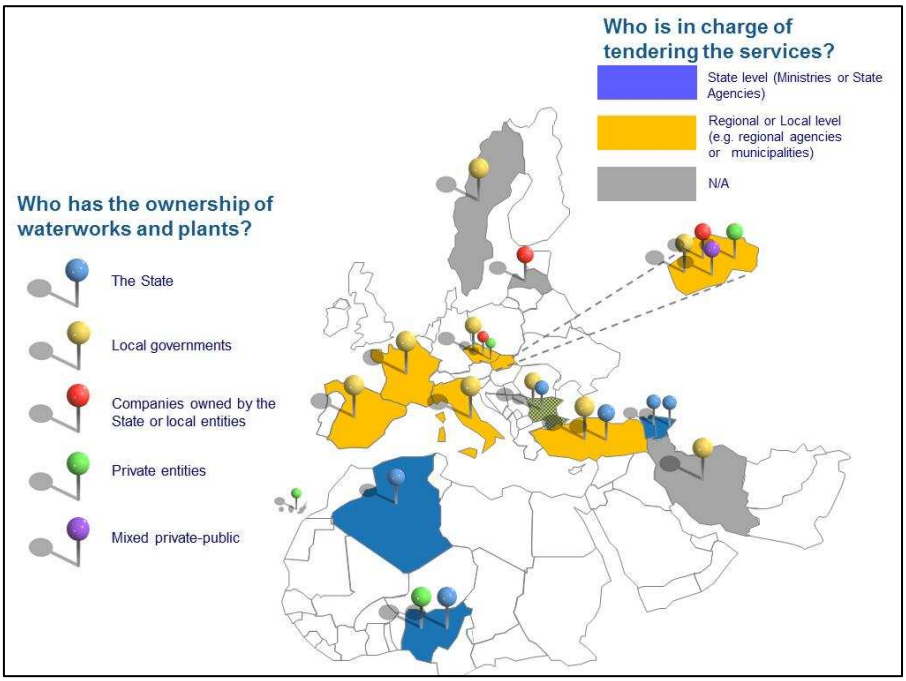
Regarding asset ownership we noticed a clear predominance of public property, in most cases at local level. The only two cases where some limited forms of private ownership exist are the Czech Republic and Slovakia. An hypothesis (to be verified in the future with further analysis) is that this situation is inherited from the complex process of State asset privatization after the collapse of planned economies.

The modes of service assignment have been grouped into 3 categories: public tender, direct assignment and other (to be specified). In Countries where the service is mainly or solely managed by private companies public tender is the usual mode of assignment (in particular Armenia, France and Spain). In Countries where services are managed by both public and private companies both forms of assignment are observed and generally public tender is used to select private operators while direct assignment is made toward public-owned companies. In three Countries (Iran, Latvia and Nigeria) direct assignment is the sole solution being the service managed mainly or exclusively by State- or

municipality-owned companies. In Sweden the question is very limitedly applicable as most services are supplied by local governments by their own resources.

Very scattered answers have been collected on tendering responsibilities: contracting authorities vary from regulatory agencies to municipalities or the State. In one case one actor that is not involved in other phases of the water cycle management appears: indeed in Azerbaijan the State Agency on procurement is in charge of tendering the services. Some relations were identified between the answers regarding asset ownership and tendering responsibilities as in many cases they are set at the same level (national or local). (see Figure 3)

Figure 3. Map overlapping asset ownership and tendering responsibilities



Regarding the duration of concessions, most Countries fall within the group of concessions with an average duration of 20-30 years. France in this case is an exemption: indeed, while the maximum duration set by law is 20 year, average concessions last 5-12 years. There are some cases where duration is set by law but concessions have never been implemented.

Operators of the water and sanitation services can be grouped in the following categories: local (or regional) governments, State public companies, local public companies, private companies, mixed public-private companies. Local and regional governments as operators of the service are the most common solution in Sweden and Turkey. In France and Italy we find sometimes local governments managing directly the service, but this is not the common solution (in France 80% of the market share is served by private companies, while in Italy management by public companies (total, or mixed) covers about 90 % of the population). Public companies (national or local) are the only existing or main solution in 7 out of 14 Countries, while private companies in 4 Countries. Public-private partnership is common in France and Italy, it is gradually becoming common in Nigeria and Algeria, while in the other Countries it does not exist or it is not a common practice.

Concerning the structure of the revenues of service operators, we can distinguish between Countries where customers bills are the only revenue (9 Countries out of 14) and Countries were water services are subsidized by State subsidies and/or investments are supported by EU or international banks' funds. In analyzing the results it is clear that in all EU-15 Countries revenues correspond solely to customer bills and this is clearly linked to the EU legislation introducing the full-cost recovery principle [31]. Amongst EU Countries acceding after 2004, we find Latvia and Slovakia where the full-cost recovery principle is also implemented, while in Bulgaria and Czech Republic some investments are still supported by national or EU funds. At this stage no information was available for Armenia and Azerbaijan, therefore comparison amongst non-EU Countries is difficult and needs to be postponed to a second phase. It is worthy noticing that in Algeria water services are heavily subsidized by the State.

Analyzing information gathered about regulation, an interesting aspect to consider is the third party status of regulators, that is to say if the authorities setting tariffs coincide with the services operators. In three Countries this is the case (Nigeria – State water agencies, Sweden and Turkey – local governments). In France and Spain this situation happens only when services are managed directly by local governments. In all cases we find coincidence between a public operator who is also in charge of setting tariffs. Italy is a hybrid case in relation to local regulation. Indeed, the Authorities of Optimal Territorial Areas (Autorità d'Ambito Territoriale Ottimale, AATOs) are formally ad-hoc bodies created for regulating the service and distinguished by service provides [32]. By the way, the composition of the body (where all the municipalities of the area are represented) results in a fable distinction of roles when the services are provided by municipalities or municipality-owned companies.

Existence of ad-hoc regulatory bodies have also been explored. Ad-hoc national regulatory bodies exist in 6 Countries out of 14. Only in Algeria the regulatory body is exclusively in charge of the water sector. In the other Countries regulatory bodies cover more than one sector. In Bulgaria and in Italy water regulation is a task of the national regulatory agency of energy and gas sector, while in the remaining 3 Countries we find multi-sector agencies. Moreover, it is worthy noticing that (where such information arose from the collected answers) in some Countries the inclusion of water regulation amongst the responsibilities of multi-sector agencies is very recent (See for example Italy, 2011 [33] and Latvia, 2009 [34]). The Algerian regulatory agency was also established in very recent times (2008). This information demonstrate that there is an on-going tendency towards the creation of ad-hoc regulatory agencies at national level. A possible key to interpretation of this phenomenon is the hypothesis of pressure by international organizations and development banks in developing Countries to move for privatization and creation of regulatory authorities (a stable regulatory framework is important for direct foreign investments in the sector) as well as a process of adoption of the *acquis communautaire* in new EU member States stimulating these processes.

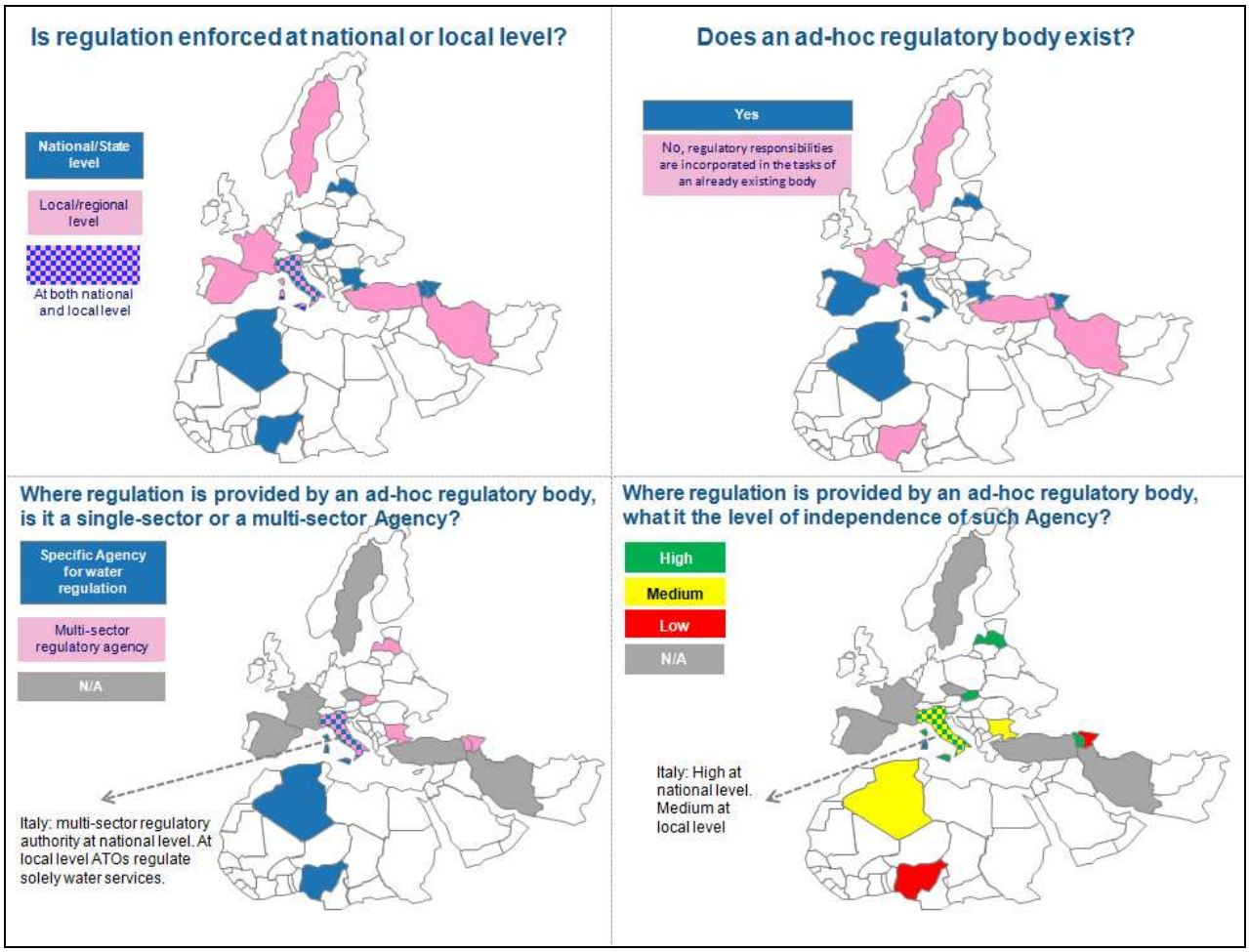
The tendency towards the establishment of regulatory agencies at national level raises also the question of how to enforce regulation at local level in Countries where the territorial dimension and complexity makes it very hard to manage regulation at national level. It is worthy noticing here that amongst 14 Countries Italy is the sole Country where ad-hoc regulatory bodies at local level exist, alongside with the National Authority. By the way this situation is likely to change from 2013, as the

abolition of AATOs has been recently decided [35] and future allocation of responsibilities to other authorities is not yet defined by all Regional governments.

The investigation on regulatory responsibilities was completed by the check of the level of independence from the government. Countries where such independence was defined as "high" are Armenia, Latvia, Slovakia. In Italy a good level of independence is recorded at National level while the independence is limited at local level where services are provided by companies owned by local governments (as local governments are represented within the local regulatory agencies). There are cases where contributors attest a good level of formal independence but a weaker independence in practice.

Answers about the different aspects analyzed about regulation are summarized in Figure 4.

Figure 4. Maps summarizing distribution of regulatory tasks



To conclude, it can be useful to list a number of very peculiar situations that have been identified during the analysis:

- Italy: the sole Country where ad-hoc regulatory bodies at local level exist;
- Armenia: Water services managed by private companies, selected through public tenders, under the control of a national regulatory body with high level of independence;
- Sweden: governance / management / regulation by local governments. Absence of ad-hoc regulatory bodies; similar situation in Turkey (with some more responsibilities upon the State);

- France: PPPs common practice, no ad hoc regulatory body, the regulation instrument is the contract between municipalities and service operators;
- Latvia: considered a best practice in terms of independence of the regulatory authority (multi-sector, water included very recently);
- Algeria: strong State control in governance / management / regulation. It is the only Country having a national ad-hoc regulatory body devoted solely to water.

4. Conclusions

As anticipated in the introduction, this paper reports the first results of a research that is still in progress. In this first phase the main focus was on setting the right questions to allow a comparative overview of regulatory frameworks in different Countries. To this extent, the research highlighted possible amendments of questions, in particular regarding:
- property rights on water as a good;
- the independence of the regulatory bodies (not only from the government but also from the market) including also a question on the sources of their budget;
- the payment of any concession/franchising grant to owners of the infrastructures by service providers to use public pipes and plants.

Another possible improvement is the integration of the list of questions with the collection of some general data on the sample Countries analyzed, to allow better contextualization, in particular in terms of socio-economic situation, water scarcity and governance forms, historical patterns, law system, colonial background, corruption index. The phenomenon of arrears in water service could also be investigated. This would allow to elaborate keys to interpretation of the different regulatory models.

Besides the integration of the questions it seems promising to enlarge the number of covered Countries, selecting new ones according to some specific characteristics, e.g. continents still not represented (North and South America, Asia), balanced representation of OECD / non-OECD Countries, more emerging and developing Countries, law systems (civil law, common law, Islamic law, etc.). Secondly, a comparison with other sectors would bring high value-added to the research. As the survey has been parallely conducted in other sectors, in the future a comparison of the results with other local services could be proposed, allowing cross-fertilization of the research.

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Conflict of Interest

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