

**Access to Water Resources in Belgium:
Strategies of Public and Private Suppliers¹**

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Abstract

Water suppliers adopt a variety of strategies to gain access to and control water resources. In contrast to the theoretical approaches that assert that the status of ownership determines water supplier strategies, we argue that supplier strategies depend on the activation of property rights and the specific public policies applied to the resource. These two components of the institutional water regime are thus more important factors to explain the suppliers' strategies than the intrinsic characteristics of the water operator. We thus present two case histories of aquifer exploitation for drinking and mineral water production; we compare two companies in Belgium, one publicly and one privately owned. This comparison shows that the operator strategy is identical in both cases, regardless of whether the ownership status of the water supplier was public or private. Both companies attempted to privately appropriate the resource in order to maximize its security over the resource and its supply. In each case, the winning strategy consisted in gradually excluding all direct or indirect users of the resource such as competitors, farmers and residents. The aquifer was then effectively protected in quantity and quality over time, however this state of affairs does not necessarily entail sustainability of the resource in a broader sense, as social and economic aspects were not directly considered.

Keywords

Water resource management, institutional water regime, property rights, water policies, Belgium

1. Introduction

The increased demand for water resource-based goods and services for production (e.g. industrial processes), direct consumption (e.g. drinking water) or ecological services (e.g. habitats for fauna) has resulted in competing uses, increasing scarcity and reduction of resource renewability. Recent studies have highlighted a growing problem – the degradation of water bodies, particularly, drinking water aquifers (Gleick, 1993; Postel, 1997; European Environmental Agency, 2003; World Water Development Programme, 2003).

Water management is influenced by institutional rules and social norms, which create both constraints and opportunities for rival water appropriators. Thus, the overuse or the preservation of water resources is the direct consequence of institutional incentives. In this sense, resource patterns are the expression and consequences of existing regulations.

This article focuses on two types of institutional rules, which set behavioral incentives in one direction or in another: the formal property rights (PR) on specific water bodies and the public policies (PP) regulating sector-specific exploitation or protection of water resources. We analyze the influence of these two types of rules – which together constitute an “institutional water regime” (Knoepfel, Kissling-Naef & Varone, 2001; Varone, Reynard, Kissling-Naef & Mauch, 2002; Kissling-Naef & Kuks, 2004) – on the development strategies of public or private water operators that produce drinking water from an aquifer. We focus in particular on the ability of water suppliers to mobilize the rules of the institutional water regime to secure exclusivity of water provision.

In this article, we address the following research questions: Does the ownership status of the water supplier determine a particular strategy of access to the resource? Do different types of

suppliers mobilize property rights and public policies in similar ways? What is the impact of ownership status on water resource exploitation, the exclusion of competing users and, finally, resource sustainability?

Such questions trigger intense political debate about the liberalization of water services or the privatization of water suppliers (Finger & Allouche, 2002). In many studies on water management, the nature of the ownership of the water supplier and the status of the resource are often confused. The privatization of the operator is often extended to the privatization of the resource and a public status of ownership over a resource is often attributed based on the public status of the operator. The proponents of water supply privatization hold that public bodies are unable to manage the resource efficiently (Winpenny, 1994; Brubacker, 1995; Anderson & Hill, 2001). When considering the resource, they argue for a system of tradable water property rights, but when they refer to drinking water supply, they forget that the operator, be it public or private, must have guarantees on resource access. The advocates of public water management also confuse the nature of ownership of the operator with the status of the resource insofar as they hold that only a local public authority is able to effectively protect the resource (Petrella, 2001; Shiva, 2002). They forget that the public status of a water supply does not necessarily mean that the resource is public property.

Does the legal and ownership status of the water operator matter for the strategic mobilization of institutional rules? The traditional literature on public versus private (water) operators has not addressed this question very systematically. It has focused essentially on the intrinsic characteristics of the water operators, and the main arguments refer to the direct implications of the type of ownership on management and output efficiency (Vickers & Wright, 1989; Hodge, 1999). These theoretical postulates are correct to some extent; but they must not hide

the actual institutional mechanisms (both property rights and public policies) that guarantee access and exploitation of the resource by the water operators and the rival water appropriators.

The purpose of this study is thus to more closely examine the widely held belief of a direct link between the status of the supplier and the status of the resource. It calls for a deeper, historically informed, analysis of the operators' strategy towards resource access according to ownership status. Furthermore, these questions also inform the theoretical debate about the effectiveness and efficiency of resource regulation through tradable property and use rights, regulatory policy instruments (e.g. permits, bans) or voluntary tools (e.g. negotiated agreements).

In order to provide preliminary answers to these questions, our research method is based upon historical institutionalism (Hall & Taylor, 1996; Thelen, 1999; Skocpol, 1985). Two case studies are compared over a long period with a look at mobilized rules from 1880 onwards and the resulting outcomes on resource access and protection. We analyze the strategies of a publicly-owned (Brussels Water Company) drinking water supplier and a privately-owned company (Spa Monopole) producing mineral water within the same institutional environment (Belgium). We suppose here that the strategies of resource access and protection would not differ between both cases, contrary to the postulates of several scholars and policy makers. We argue that the components of the institutional water regime in place are strong factors that lead to a convergence between the suppliers' strategies, despite the different type of water uses and the legal and ownership status of the supplier.

To assess the relative importance of institutional rules on the production of drinking and mineral water, we first introduce the concept of an institutional water regime. Then, we present two of our concrete cases of aquifer exploitation in Belgium over the last century: drinking water production by the publicly-owned Brussels Water Company and mineral water production by the private company Spa Monopole. A comparison of these two historical case studies sheds a new light on the limited influence of the suppliers' ownership on resource use and sustainability. As a main empirical conclusion, we discover that the suppliers' strategies are identical: they both attempt to privately appropriate the resource. The key objective of both suppliers is to maximize their security in resource provision by systematically excluding all other users through the mobilization of identical institutional rules. This empirical result reveals the importance of certain challenges that states must face when designing institutional water regimes.

2. Institutional water regime: water rights and groundwater policies

A single aquifer can provide a variety of goods and services (e.g. drinking water, water for irrigation, water for industrial processes) and it is very common for users to compete over these goods and services. In order to address resource competition and resource scarcity, several institutional mechanisms have been gradually defined and implemented by government administrations or have been directly negotiated between water users themselves. Therefore, it is crucial to identify these rules-in-use (Ostrom, 1990) and to examine their impact on water users and resource sustainability. Our approach has been informed by important contributions from institutional economics and policy analysis on this issue. We suggest that a public or private water supplier can activate, combine, or even create various institutional rules (property rights and public policies) to exclude competing users from aquifer exploitation. Furthermore, the sustainability of the resource depends upon the

effectiveness and efficiency of the institutional mechanisms used to exclude rival resource users. Figure 1 summarizes the causal links between the mobilization of institutional rules by the water suppliers and the sustainability of the drinking water resource.

Figure 1: Generalized strategy of water suppliers and its impact on the drinking water resource

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2.1. Property rights on aquifers

Property rights must be clearly regulated to enable effective and efficient use and management of resources – a fact long recognized in the field of water management (Barraqué, 1998). Property rights are usually defined as social relations between two or more competing users of the same natural resource. Thus, property is not an object such as a water body (e.g. an aquifer), but a right to benefits derived from the resource (e.g. water for irrigation, drinking water), usually guaranteed by a government. This right is secure as long as the duties of all the other (potential) users respect the conditions that protect the benefit stream (Bromley, 1992: 2). Thus, property rights are best conceptualized as triadic social relations involving the benefit stream, right holders and duty bearers. A water rights system could be regarded as a system with communication vessels of claims and duties: allowing a specific water use to one actor (e.g. drinking water production) implies a restriction on the behavior of another user (e.g. irrigation by farmers). Accordingly, the first virtue of a property right is to exclude non-owners and rival appropriators from the use of the resource. It is therefore obvious that the acquisition of water rights represents a first possible strategic target for public or private water operators.

In Belgium, property and use rights (PR) on natural resources were formally set in the Civil Code (CC) of 1804. Based on the absolute principle of individual private property, the Civil Code defines the property rights and determines who the formal owner is and what their related disposal and use rights are (Art. 554 CC). As far as water is concerned, it ties groundwater ownership to land ownership. According to the "accession principle" (Art. 552 CC), groundwater is private water (Art. 641 CC), once extracted by the landowner.

It is obvious that the absoluteness of this organization of property rights would hamper water use by non-owners. The Civil Code actually limits private property rights on water by means of easements (Art. 637 CC) introduced for “public utility” reasons. Furthermore, public laws and sector-specific regulations might restrict some disposal and use rights of the resource owner (Art. 544 CC). In spite of drastic changes in knowledge regarding and increased competitive pressure on the resource, the global organization of property rights on water set in the Civil Code is still in force today in Belgium.

2.2. Public policies related to exploitation and protection of aquifers

Although we consider the evolution of the water rights from a resource perspective, insofar as the resource itself is taken as the starting point for the identification and allocation of property and use rights, we define public policies from a (policy) problem perspective. Thus, a public policy is defined as a set of intentionally coherent decisions or activities taken or carried out by different public actors - whose political power, institutional allegiances and interests vary - with a view to resolving in a targeted manner a socially and politically recognized problem (e.g. pollution of aquifers through pesticides). This series of decisions and activities aims at modifying the behavior of social groups presumed to be at the root of the collective problem to be resolved (e.g. farmers as target groups) in the interest of the

social groups or the broader environment who suffer the negative effects of the problem in question (e.g. drinking water suppliers as the final beneficiaries). Five dimensions can be analyzed empirically in order to describe in details the content of a public policy: objectives, instruments, institutional arrangement, target groups and, last but not least, policy outputs and outcomes. Based on a rationale for the causal chain behind the collective problem to be solved, policy instruments give content to a government's interventions (e.g. ban on spreading of manure, tax on industrial discharges and/or permits for housing) with a view to affect the behavior of the target groups (e.g. farmers, industrials and/or households) identified as the source of the problem. Hence, the target groups are influenced in such a way as to achieve the defined aims of the policy (Knoepfel, Larrue & Varone, 2001; Schneider & Ingram, 1988).

A water supplier might invoke a sector-specific policy to limit the direct or indirect exploitation of the aquifer by the (politically designated) target groups of the relevant public policy. Note that such a strategy is possible even if the target groups are the owners of the aquifer: the legal definition of property rights (Art. 544 CC) clearly indicates that property could be limited – with financial compensation in cases of expropriation (takings) – by public laws and regulations. De facto, public policies distribute specific (sometimes exclusive) use rights to the actors. Thus, even if property rights have no longer been formally questioned since the adoption of the Civil Code in 1804, their material content is restricted by public policies that have been gradually adopted afterwards.

In Belgium, groundwater management policies concern both exploitation activities and protection measures. The policies date back to 1889 when the law on the protection of mineral water extraction was first applied to Spa. The underlying policy rationale can be summarized as follows: *If we set a protection perimeter around a spring with limitations of*

use inside, then we will guarantee its preservation. Beginning in 1907, a public water supply policy was developed, based on the practical assumption that *If we allow towns to collectively organize, then we will supply drinking water to all and eliminate water-borne diseases.*

Water management is in fact subject to a complex web of public policies, which have been accumulating over time (for a historical analysis of the evolution of water policies in Belgium, see Aubin & Varone, 2004).

In summary, a drinking water producer can activate a property right and/or a public policy in order to gain an (exclusive) access to the water resource. Water supplier strategies, which we investigate in detail in the two case studies below, focus on mobilizing the rules of the institutional water regime in place. As mentioned above, we hypothesize that the ownership status of the water operator does not have a decisive influence on the type of strategies taken towards resource access and protection. On the contrary, we argue that the type of institutional rules offer similar constraints and opportunities to either a public or a private water operator. By comparing here the two extreme types of cases (a private company producing bottled water as a private good *versus* a public company producing drinking water defined as service of general interest), we proceed to a critical test of this research hypothesis.

3. Historical development of water production in Belgium: the cases of CIBE and Spa Monopole

In Belgium, the major aquifers are located in Wallonia, the southern and French-speaking region. Wallonia provides for 55% of the national needs in drinking water (supplying Flanders and Brussels), although it accounts for only 37% of the population. A persistent tension occurs between the high pollution levels in most water bodies and the need for drinking water. Pollution is due both to domestic wastewater discharges and diffuse pollution

from manure disposal. The two historical cases presented below address the issue of drinking and mineral water production. Each case study discusses the aquifer characteristics, the ownership status of the water operator, the strategy put into action from 1880 onwards and the effects on the exclusion of rival users and resource sustainability.

3.1. Drinking water production by the Brussels public water company (CIBE)

The *Compagnie Intercommunale Bruxelloise des Eaux* (CIBE) is a *limited risk public company* whose shares are exclusively owned by boroughs of the Brussels urban area. It was created in 1891 by four of these boroughs, after a first project of a public-private company involving a private entrepreneur in Modave was abandoned in the 1880s, partly because many politicians firmly condemned private sector involvement and profit-making in a public health project with social goals (Cornut, 2003).

In 1899, the ‘Spontin catchment’ supplied the four associated boroughs with 35,000 m³ per day of fresh and high-quality groundwater channeled through a slow slope aqueduct. Today, CIBE counts 38 associated boroughs in its capital and many ‘*customer municipalities*’: all in all, it produces *approximately 140 million cubic meters (m³) per year from many sources* and supplies about 2 million people.

The first water catchments of CIBE were located in the Condroz region, approximately 100 km southeast of Brussels in Spontin (the 1890s) and Modave (the 1920s). These aquifers, though of high quality and plentiful, are vulnerable as their permeability is based on large passages between fragmented limestone rocks. Hence a pollutant can quickly migrate into the gallery and the whole basin must be carefully monitored.

Table 1: Timeline of the suppliers' strategies of resource access and protection (1880 onwards)

Phases	Events	
	CIBE	Spa Monopole
1. 1880-1945 (1888-1967 for Spa)	<u>First settlements in the Condroz region: Spontin and Modave:</u> - Surrender of a private-public project in Modave (1880s) - Creation of CIBE, a public inter communal association (1891) - Negotiation with the village of Spontin and landowners (1892). Interest in buying land - Authorization from the government to settle in Spontin (1894) - Ability to conduct "public utility" expropriations - Financial compensations to landowners and industrial users of surface water - Spontin catchment in operation (1899) - Settlement in Modave (1910) - Compensations to industrials - Modave catchment in operation (1920)	<u>Securing of industrial development:</u> - First concession of the communal springs of Spa to a private company (1888) - Setting up of a monopoly - Creation of Spa Monopole (1921), after several re-negotiations of the concession contract - First protection perimeter (1889) set up by law (34.6 ha) - Law on the quality of mineral water (1924) - Creation of the Henrijean Institute (1931) - Control on resource and products quality - Law on the quality of drinking water (1933) - Second protection perimeter (1937) extended by the law (3,409 ha)
2. 1945-1990 (1967-1990 for Spa)	<u>Expansion and diversification combined with mobilization of planning procedures:</u> - Progressive enlargement of land purchase to the whole percolation basin - Plantation of trees on these lands - Monitoring of water workers within the catchment area - Exploitation of the new (land-use) planning laws (1947)	<u>Expansion of production:</u> - New concession contract (1974-2039) after negotiations with the municipality - Exclusion of municipal drinking water supply from the springs - Purchase of the farm of Berinzenne (1972) - Interruption of agricultural activities - <i>Modus operandi</i> with the National Forestry Office (DNF) (1978) - Priority to water supply in forestry management, limitation of pine trees
3. 1990 onwards	<u>'Legalization' of CIBE's water protection strategy:</u> - Legalization of the protection zones strategy by the regional law (1990) incl. monitoring measures - Subsidization of protection measures by a tax levied on water suppliers (1995)	<u>Reserve of production:</u> - Legalization of the protection zones strategy by the regional law (1990) incl. monitoring measures - Hydrogeological studies above the protection perimeter (1990s) - Third protection perimeter (2001) extended by the law (13,177 ha) - Severe restrictions of all activities - Additional (private) land purchases - New <i>Modus operandi</i> with DNF (2001)

The strategy used by CIBE to build its 'water empire' was complex and developed gradually over a long period. However, we can distinguish three major periods in the history of CIBE: settlements in the Condroz region (1890-1945), expansion through the mobilization of planning

procedures (1945-1990), and legalization of CIBE water protection strategy (from 1990 onwards).

Phase I (1890-1945): In 1892, CIBE negotiated with the village of Spontin and private landowners to buy land on which many springs emerged. According to the Civil Code, landholding included the property of the groundwater. So the company exchanged shares in real-estate property with landowners in order to exploit Spontin groundwater. At the same time, it asked for an authorization from the Belgian Government both to extract water from Spontin springs and to buy the necessary lands. The Government granted the authorization in 1894, in exchange for a firm commitment of CIBE to give fair compensation to landowners². The authorization also included the ability for CIBE to carry out “*public utility*” expropriations if negotiations failed with landowners.

As Spontin water didn’t suffice, CIBE went back to Modave. This time, CIBE not only had to give fair compensation to local landowners to get the Government's authorization, but also had to compensate industrial riparian users downstream³, and to build a sewer along the river for industrial discharge⁴. Despite the arrangement, not all Modave residents were satisfied. In particular the hamlet of Petit-Modave was almost wiped out.

It has to be noted that CIBE always tried to avoid direct conflict with local residents, even if it had acquired all of the legal rights to extract groundwater. CIBE always favored fair deals in land purchase and avoided going to court to use its expropriation rights. It also supplied water for free to local inhabitants and hired local labor to manage its local infrastructure.

² Royal Execution Decree of 10 June 1894 about "Public sanitation; Brussels urban area; Water supply; Bocq project" (M.B., 25-26 June, p. 1997).

³ The catchment of Modave’s springs was actually endangering the flow of the local river, which was still used downstream for industrial purposes.

⁴ Royal Execution Decree of 19 March 1910, about "Public sanitation works; Inter Communal Water Company of Brussels; Derivation of Modave springs" (M.B., 2 April, pp.1883-1885).

These measures were essential to make the local communities and authorities accept the presence of a ‘foreign’ company.

Phase II (1945-1990): The second period shifted from a property rights-based approach to a policy-based one. The strategy of land purchase continued to be pursued in order to secure the largest possible part of the percolation basin, however, the purchases proceeded in an opportunistic way. Most of the time, trees were planted on these lands in order to both enhance the percolation quality of the soil and to create a physical and psychological barrier against potentially polluting human activities.

The mobilization of public policies was mainly based on the quality of underground water, undoubtedly because the quantity aspects were already guaranteed through property rights. First, CIBE trained specific water workers to watch all human activity that could endanger water quality or quantity: construction, agriculture, oil tanks, etc. Water workers warned the person in charge of potentially harmful activity about the danger their actions posed for the catchment and reminded them of their legal (hence financial) liability for any pollution caused to CIBE's water. This monitoring was gradually ‘codified’: using geological tools, informal protection perimeters were traced around each catchment (in fact three concentric zones with less stringent observation criteria as the distance from the catchment decreased).

Second, CIBE adapted its procedures to new planning laws adopted in 1947. Each new construction or economic activity depended on permission, which included a public inquiry. CIBE's water workers could thus ask the planning authority to add specific constraints in the permission to prevent pollution of groundwater (e.g. the double envelope of an oil tank). Thus CIBE did not have to buy as much land to protect its resource given the opportunity to

intervene in the planning process (although the planning authority could decide not to consider the remarks of CIBE, or the owner could disregard planning rules).

Phase III (1990 onwards): The third period saw the Walloon Region setting up new legislation on water protection, very similar to (and in a way, legitimizing) CIBE's protection zones strategy. CIBE's preservation strategy was generalized to all drinking water producers, especially the monitoring measures: landowners located in the aquifer basin are legally obliged to adopt water preservation constraints on their potentially polluting activities. CIBE's financial resources, formerly used to secure its access as well as protect the resource, have been largely reduced as the region has levied a tax on water extraction since 1995 to finance all protection measures imposed on local residents. In return, though, water producers can ask for regional subsidies for the implementation of protection measures around their catchments.

3.2. Mineral water production by the private-owned company Spa Monopole

The region of Spa benefits from a very unique landscape. The '*Fagnes*' are high plateaus that form a collection of peat bog marshes supplied by abundant rainfall. Spa water percolates from the *Fagnes* through quartz rocks, and emerges downstream in the slopes of the valley, thanks to deep faults or impermeable primary rock. More than 300 springs occur in the Spa area, of which 59 are exploited as mineral water springs.

Since the late 19th century, Spa water has been industrially exploited. In 1888, the Spa municipal authorities gave a monopoly of exploitation of its springs to the *Compagnie fermière des Eaux de Spa*, which became *Spa Monopole* in 1921. Today, Spa Monopole is the Benelux leader in mineral water with a turnover of EUR 240 million and 600 million liters

bottled each year. Spa Monopole mainly exploits the municipal springs, under a concession. According to the contract, it pays the town a royalty of EUR 0.01 per liter (EUR 5.1 million in 1999). The company keeps negotiating with the town to reduce ‘cash drains’.

Both for the consistency of quality required by the mineral water label and because of the age of the aquifer rock, the aquifers must be carefully protected over large areas (the percolation basin is estimated at 13,000 hectares). As the company is vitally dependent on the resource, it has developed a complex strategy to protect it, based on securing access and excluding alternative uses.

Spa Monopole’s strategy is to guarantee access to the resource and to preserve the resource. This strategy fits with the status of the resource (public-owned) and its particular vulnerability (the *Fagnes* wetland ecosystem). We distinguish three different phases: first, a securing of the production since 1888; second, the enabling of a boom in production; and finally, the constitution of a growth potential.

Phase I (1888-1967): The *Compagnie fermière des Eaux de Spa* renegotiated its concession for the springs several times. A monopoly was created in 1921 when the company began its industrial development. During this period, the town faced debts that forced it to sell the land above the aquifers to the state but, due to the existence of the concession contract with Spa Monopole, kept ownership of the springs. Thus, in the early 20th century, the forests and the *Fagnes* belonged to the state, the springs to the town and the disposition rights (concession) on water to Spa Monopole. The ownership structure affecting the resource did not evolve much after the 1920's.

During the same period, Spa Monopole relied on public law to protect the resource. In 1889, a protection perimeter (the first in Europe) was established by law around the main mineral water spring⁵. Prospecting and exploitation of mineral water, as well as digging, were prohibited all around the 34.6-hectare perimeter. The law thus conferred a monopoly on the exploitation of the springs. The protection perimeter was progressively extended to the other Spa springs (3,409 ha in 1937). The production of mineral water became more and more regulated⁶. Any public work that could alter the flow and quality of mineral water was strictly forbidden, as well as the trade of mineral water without authorization. Competition was restricted, which limited risks of over-exploitation, and the resource was thus subject to protection measures.

Phase II (1967-1990): The rise in the capacity of production was organized around the exclusion of other uses, particularly drinking water supply. Up to this point, the town had kept a drinking water provision for the springs of Spa. The situation led to a confrontation between the town authorities and Spa Monopole at each renegotiation of the concession. In 1974, a new concession was signed for a period of 65 years (1974-2039), which entailed the exclusion of drinking water supply from the springs. Since then, the regional water company (SWDE) has operated in the town of Spa with water from the Eupen reservoir, located 25 km away in a neighboring river basin. The long-standing rivalry between mineral water production and drinking water supply was solved through an exclusive concession⁷.

⁵ Law of 31 July 1889 about the protection perimeter of Spa springs.

⁶ Law of 1 August 1924 about the protection of thermal and mineral waters (M.B., 22 August) and Law of 14 August 1933 about the protection of drinking waters (M.B., 31 August, p. 4326).

⁷ Also, Spa water is no longer used in the industrial process of Spa Monopole (for bottle rinsing). The company signed an additional agreement with the town to extract surface water from the Warfaaz lake.

In the same period, Spa Monopole expanded its strategy of protection of the aquifers. It paid particular attention to activities going on around the *Fagnes* and put pressure to limit their potential effect on the resource. In 1972, Spa Monopole bought a farm to avoid any risk of manure or pesticides being spread. With regards to communal forests, Spa Monopole signed a *modus operandi* in 1978 with the forest manager, i.e. the National Forestry Office (DNF). The agreement gives priority to water protection on forestry and limits the planting of pine trees.

Phase III (1990 onwards): In recent times, Spa Monopole conducted hydro-geological studies above the protection perimeter in order to search for new mineral water springs. The survey led to the adoption of an extended protection perimeter (13,177 hectares) in 2001, applying the regional law of 1990⁸. The law more severely restricted activities inside the protection perimeter. Digging activities were prohibited as well as any activity that could affect the springs. In closer perimeters, all activities were severely restricted. In addition, Spa Monopole gives advice to the town in the permission of building or exploitation. The company patrols the public forests, visits individual properties and informs the owners about their duties, particularly concerning oil tanks. This strategy is coupled with land purchases. Spa Monopole buys springs formerly in private hands, and currently owns one third of the wells. This enables them to ask for a re-negotiation of the concession and royalty decrease. Spa Monopole also renewed the *modus operandi* with DNF in 2001.

Finally, the community ties of Spa Monopole have facilitated negotiation and bargaining with the local authorities. Spa Monopole has succeeded in securing both the constant quality of the

⁸ Regional Law of 30 April 1990 about the protection and exploitation of potential drinking waters (M.B., 30 June).

mineral water that it exploits and its growth potential in a highly competitive market. Such an environment was created to the disadvantage of other local, be they indirect, water users. Many activities ceased or were put under restrictions to guarantee the viability of the resource. However, substitution solutions were found and the mechanism of transfer of property rights seems to be efficient for the community.

4. Comparison of the case studies

The problems that both suppliers faced, as well as the objectives they attempted to reach, were similar. Initially, both wanted to obtain (exclusive) access to an aquifer they did not own and, afterwards, they wanted to secure their access and preserve resource renewability, to guarantee the economic growth of the company.

However, several points distinguish the two cases: the status of the operator (public for CIBE and private for Spa), the nature of the good produced (drinking water for CIBE and mineral water for Spa), as well as the initial ownership status of the aquifer (private for CIBE and public for Spa). In addition, a difference persists between suppliers with respect to subsequent mobilization – whether it is a part of a strategy of accumulation (which was the case for Spa) or for reproduction and use-value purposes (the case of CIBE). These contrasting characteristics suggested that the strategies of the two operators would diverge if attention were focused only on the intrinsic characteristics of the operators, thus neglecting the rules of the institutional water regime.

However, the comparison of both cases shows a rather high convergence in the chosen strategies (see table 2). Similarities clearly appear in the analysis:

(1) CIBE and Spa Monopole both mobilized property rights as well as public policies. These two categories of rules must then be combined in an analysis of users' behavior, as already underlined by previous studies on the impacts of institutional resource regimes on water, soil or forest uses (Varone *et al.*, 2002).

With regards to property rights, CIBE has become the formal water owner. It bought the land above the aquifer, with the authorization of the State to expropriate for reasons of "public utility". In the case of Spa Monopole, the company did not seek formal property on water, as the village of Spa is the single (public) owner. Rather, Spa Monopole signed a concession contract that granted them the (exclusive) disposition and use rights on the communal resource. Land purchases of individual landowners came much later and remained residual in the supplier's strategy. As a result, both suppliers acquired exclusive appropriation of the resource. Another common point is that quantity problems of water management were solved with a mobilization of property rights (Bressers & Kuks, 2004).

With regards to public policies, voluntary practices of both CIBE and Spa Monopole that set protection perimeters around springs and wells were turned into public laws. These practices constituted "local laboratories" for the elaboration of exploitation and protection policies. Also, it clearly appears that voluntary protection measures, as well as the mobilization of institutional rules, evolved with the development of scientific knowledge about the aquifer. Finally, we note that the mobilized public policies contributed mainly to water quality issues.

Table 2: Development phases of CIBE and Spa Monopole water productions

	Phases	Strategy (mobilized institutional rules)	Limitations and exclusions (of goods and services)	Impact on the local resource
CIBE	1. First settlements in the Condroz region: Spontin and Modave (1880-1940)	PR - <u>Purchase</u> of communal and private lands -Expropriation of lands with declaration of public utility -Financial compensations to users of surface water flow downstream, including the cost of a sewer for industrial discharges	Agriculture: removal of farms Construction: destruction of private houses Production: industrial process and power Purification: self-purification in the river	<i>Quantity:</i> Decrease of the river flow <i>Quality:</i> Prevention against any aquifer pollution in the close catchment area; preservation of minimal surface water quality for industries downstream
	2. Expansion and diversification combined with mobilization of planning procedures (1945-1990)	PR -Geographical extension of land <u>purchase</u>	Agriculture: removal of farms Construction: building prohibition on supplier's land	<i>Quality:</i> Prevention against any aquifer pollution in the catchment area
		PP -Systematic use of public inquiries and consultation provided in land-use planning procedures -Legal responsibility of polluters in case of pollution of the resource	Agriculture: punctual pollution sources Discharges: industrial and domestic Mining: limestone and sand Oil tanking: farms, SMEs, housing, petrol stations	<i>Quality:</i> Prevention against any pollution risk in the larger aquifer
	3. 'Legalization' of CIBE's water protection strategy (1990 onwards)	PP -Definition of <u>official protection zones</u> around water catchments -Systematic use of public inquiries and consultation provided in land-use planning procedures -Legal responsibility of polluters in case of pollution of the resource	Agriculture: diffuse and punctual pollution sources in the larger perimeter Discharges: domestic and industrial Production: respect of the "code of good agricultural practice" Gardening: careful use of pesticides Car parks: restriction on car parks (>5 vehicles)	<i>Quality:</i> Prevention against any pollution risk in the larger aquifer
SPA	1. Securing of industrial development (1888-1967)	PR: - <u>Concession</u> on the communal springs: monopoly in exploitation of the mineral water production	Production: Exclusion of alternative mineral water producers	<i>Quantity:</i> No depletion risk due to competing extraction
		PP -Protection perimeter and springs declared of public utility	Construction: limitation of public works in the city center (prohibition to dig)	<i>Quality:</i> Prevention against pollution risk <i>Quantity:</i> Depletion due to public works
	2. Expansion of production (1967-1990)	PR -Renewal of the <u>concession</u> contract: Springs reserved to the production of mineral water -Monopoly on the aquifers -Purchase of a farm	Drinking water: provided from the Eupen dam for the community (excluded from spring use) Agriculture: stop of activities	<i>Quantity:</i> Whole flow to mineral water production. Renewability secured <i>Quality:</i> no risk of manure spreading
	3. Reserve of production (1990 onwards)	PR - <u>Purchase</u> of land and new wells -Demand of a re-negotiation with the commune of the royalties attached to the concession contract	Oil tanking: SMEs and housing (tightness/ thickness of oil tanks)	<i>Quantity:</i> Exploitation of the full potential of the aquifers <i>Quality:</i> Avoid settlements above the aquifers
		PP -Geographical extension of the perimeter of protection and strengthening of the restriction measures	Discharges: stricter measures Construction works: limitations Oil tanking: Small businesses and housing	<i>Quality:</i> preserve renewability

Besides property rights and public policies, the strategies of CIBE and Spa Monopole were implemented with additional mechanisms. First, contractual agreements with the locals improved the effectiveness of institutional rules (e.g. the *modus operandi* on forest management in Spa, free water supply for locals in Spontin), and contributed to the social acceptability of the economic expansion of the two suppliers (e.g. hiring local people for CIBE). Second, the suppliers adopted tight monitoring and control programs. Their own “private patrols” guaranteed respect of the protection laws in force (e.g. participating in all public enquiries) and even substituted for the role of the police or public administration.

(2) Convergences between the strategies of both operators are also quite obvious in terms of the exclusion of competing users and the sustainability of the resource use. Both operators adopt “winning” strategies, as all other users are deliberately excluded from any appropriation or (even indirect) use of the aquifer: farmers, individual landowners wishing to construct, industrial users downstream, etc. The systematic exclusion of all potential competing uses, based on a mobilization of property rights and public policies, allowed both CIBE and Spa Monopole to manage ‘their own’ resource very rationally, relative to their own (homogeneous) use. As these two companies are highly dependent on the renewability of the aquifer to assure their economic growth and survival, they carefully avoid any over-exploitation of the resource. This situation has led to a very high environmental sustainability of the resource use, but the economic (efficient allocation) and social (equality in access) aspects of sustainable development may be less satisfactory.

(3) The generalization of these results must be tempered by the strong local rootedness of the suppliers. Both are vitally dependent on the local resource, a situation that is a pre-condition for sustainable resource management (Ostrom, 1990). In both cases, places of production and

distribution are local. Any depletion, particularly in the case of Spa Monopole would push the company to bankruptcy⁹.

5. Conclusion

In this comparative study, the legal status and ownership of the (public versus private) water suppliers did not influence their respective strategies for resource access and protection. In fact, neither the types of institutional rules (property rights and public policies) mobilized, nor the pressure put on the resource, significantly differ between CIBE and Spa Monopole. The mobilization of water rights by both operators depends more on the initial ownership of the land where the resource flows. Furthermore, we observed a "private appropriation of the resource", whatever the status of the supplier. Also, in both cases, the local community was dispossessed of the resource, even if compensation was provided. Thus, the necessity to distinguish analytically (as well as from a political point of view) between the supplier's status and the resource property has been confirmed.

Moreover, the behavior of the operators is not more or less sustainable given their public or private status. Both guarantee optimal protection to the resource as they vitally depend on it. The public ownership structure of CIBE does not make it more sensitive to political pressure in favor of a diversification of the resource use. In contrast, Spa Monopole responds favorably to local demands, e.g. about the development of tourist activities on communal land, such as walks in the forests and visits to the famous springs of Spa. As a result, the

⁹ Such a situation, which leads them to secure their water provision, is perhaps not the case for multi-national (e.g. Ondeo-Suez) and multiple-brand water companies (e.g. Nestlé and Danone), which are so diversified that they can abandon a production location or an activity in case of problems, without much prejudice for the company's finances (e.g. Ondeo-Suez, which resigned from water distribution supply in Atlanta).

public supplier does not manage the resource in a more or less efficient way than the private one.

In conclusion, this research confirms that "more attention needs to be paid to the relationship between property rights regimes and natural resources management" (Klug, 2002: 693). Of course, it seems crucial to investigate the scope and influence of water rights to understand how water is managed and distributed among users (Heikkila, 2003; Dyrnes & Vatn, 2005), as well as the institutional dynamics specific to the water sector, notably those arrangements favoring an integrated management (Jaspers, 2003). Nevertheless, a combined analysis of water rights and water policies allows for a thinner description and understanding of the users' behavior and questions the overall coherence of the broad institutional environment (or regime). In addition, one should not restrict the analysis to water laws as water users are regulated by different sets of legal dispositions usually designed on a sector-specific basis (e.g. agriculture, public health, land-use management) and producing contradictory outputs. More co-ordination should then be required between the institutional rules in an integrated resource management perspective (Varone *et al.*, 2002). Without a combined analysis of public policies and property rights effects, we are not able to understand the strategic interactions between resource users.

The fact that the suppliers operate as monopolies is a contextual element that in a way limits the scope of the conclusions. Liberalization of water services, and thereby of the resource access, would hamper the strategies presented above. These strategies are only effective and profitable when there is a monopoly on the resource. Actually, the creation of a monopoly was the key point of the suppliers' strategies. CIBE searched for unexploited aquifers and, as far as Spa was concerned, the elimination of the competition was a pre-condition to its

industrial development. In a competitive environment, users can hardly self-regulate in order to collectively assume resource sustainability (Libecap, 1989). They fall in a public choice dilemma that is hard to overcome without additional governmental intervention.

Finally, from the point of view of the resource, we can ask if attaining renewability is possible while at the same time respecting the principles of sustainable development. In the cases considered, the water suppliers pursue security in their provision of drinking water, as they would not survive any resource depletion. Water use is renewable, but not really sustainable if sustainability includes economic and social aspects. Reaching sustainability within the same good or service is far from obvious. Could we not rather create complementarities between different goods and services, from an inter-resources perspective, to transform these renewable (but exclusive) uses into more sustainable practices?

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