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SUSTAINABLE WATER TARIFFS IN MEGAPOLES: HOW TO RECOVER THE FULL COST

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KEYWORDS

Full cost recovery; Europe; tariffs, taxes and transfers; internal / external governance; mutualised service fees

ABBREVIATIONS

UWWD: Urban waste water Directive; WFD: Water framework Directive; WSS: water supply and sanitation; AGBAR: Aguas de Barcelona; OECD: Organisation for Economic Cooperation and Development

ABSTRACT

In Europe, the Water Framework Directive largely changed the picture of sustainable water and sanitation services, in particular in large cities: like other water users they are asked to initiate their governance from the aquatic environment recovery, i.e. from territorial approaches first, rather than end-of-pipe technology. This is translated into article 9 which requests to compare the price paid for these services with the full cost, including environmental and resource costs. But adding these external costs to the pricing of water in bills might make the result unaffordable and politically unacceptable.

Considering that even OECD admitted the need of 3 T's (tariffs, taxes and transfers) for funding water services, we show how declining water consumption triggered them together with the 3 E's (triple bottom line, environment-economics-ethics) approach of sustainability in the water services sector; it calls in turn for new governance mechanisms for a global sustainability, addressing the potential divergence between the three E's and balancing their targets. We distinguish internal and external governance, each calling for new scientific approaches to support good decision making about sustainable tariff design. We then develop a specific analysis of the recovery of environmental and resource costs when water services face water resources considered as common pool: authorities in charge of water services should pay mutualized service fees like the other water users, and pass them on either citizens or customers. In France, the liberal state tradition makes this difficult to implement, leading to incoherent and unfair water tariffs.

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1 INTRODUCTION

The E.U. Water Framework Directive (WFD), in its article 9, supports the recovery of the full cost of the services rendered by water. This raises two issues: what is this 'full cost' of water services? And should all costs be covered through the tariff, or also through taxes and eventually some transfers? The aim of this paper is to present the way these issues are tackled in various European Union (EU) member states, and to discuss the choices in a perspective of institutional economics.

Full cost recovery indeed both comprises more than O&M and investment payback, and is not easy to calculate. As Peter Rogers & al. put it in a paper for the Global Water partnership (Rogers et al, 1998), on top of O&M and investment depreciation, which add up to make the full supply cost, beneficiaries of the service should also contribute to two other costs, namely the opportunity cost, and the economic and environmental externalities (fig.1). In the case of water services, it can be assumed that the first one relates to a potential rivalry for quantities of water, while the second relates to water quality problems. In other words, if there is not enough water for the users in a given territory, economists would recommend to allocate this water primarily to the user giving it the highest value, but also that other users should be compensated (which is difficult to assess); and if a city discharges in a river pollution loads that impair downstream uses, it should either pay damages to the impacted users, or alternatively invest in sewage works in such a way as to reduce the discharge to a point considered acceptable by those users. Altogether this could add up to a much higher price than the full internal cost.*

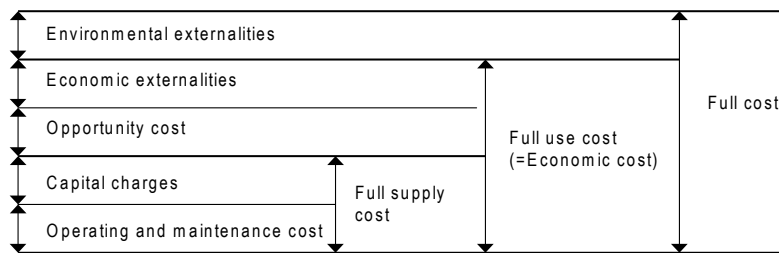


Figure 1. Full cost pricing components (Rogers, Bhatia, Huber, 1998)

But all these costs need not necessarily be charged onto customers of water services. It is well known that in many developing countries, only O&M costs are eventually charged to customers, while investments are covered by government funding or transfers, so as to let water prices at an acceptable level given the social conditions. OECD now considers this. But, even in Europe, the picture of costs' allocation between tariffs and taxes or transfers is contrasted and complex: it is frequent to introduce taxes in water bills, and to transfer on customers the levies corresponding to environmental and users' costs that are due by utilities' authorities or operators (case of France).

2 METHODS

In this paper, after presenting the variety of charging systems in European countries, we discuss what should a sustainable tariff encompass, to satisfy the triple bottom line or, the 3 E's of sustainability³; then we address the governance needed to arbitrate between these 3 E's, distinguishing internal and external governance issues. Before concluding, we review the possibility to compensate environmental costs and users costs in the relationship between water supply and sanitation (WSS) services and water resources, when the latter are considered a common pool, and how the incapacity of French elites to make room for this notion in their constitution led to an incoherent and unsustainable evolution of WSS tariffs. Governance is missing what we call a

³ 3 E's : economics, environment and equity in the case of water services.

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mutualized service fee, which was invented a century ago in the Ruhr (see below), but was not accepted in France. Yet it could still be adopted, in particular through newly created catchment-level institutions: *Etablissements Publics Territoriaux de Bassin* (EPTB).

3 COST RECOVERY SYSTEMS IN EUROPE

Indeed the WSS charging systems in use in Europe display a wide variety as a result of history. In most countries, WSS costs are covered by volumetric tariffs, which frequently also include waste water collection and treatment (France and Germany, since the 1960's only). But historically, water services were initially covered by flat fees, or by rates, i.e. by housing or land taxes without connection with water consumption. Today still almost half of British households and a larger fraction of Irish ones pay by rates (Bresnihan, 2015). This may be the result of the precocity in the development of WSS in England (before meters were in use), or the abundance of freshwater in Ireland. It may also be due to the survival of the notion of 'common wealth'.

In other European countries, meters were available when drinking water services were developed, but they were costly and not precise, so the tradition was to have only one meter per building or per property, and to split the bill between residents on the basis of apartment or family size. More recently in large housing units, the introduction of sub-metering allows splitting the collective bill in proportion of the volumes consumed by each family and not the surfaces: incentive to conserve water is improved, while it remains cheaper for residents than having to pay each a separate bill including a fixed part⁴.

In the Netherlands the situation is relatively complex, since water supply is paid by metered volumes to 10 water companies, all belonging to a mix of municipalities and the local province; but people pay for sewerage through housing taxes, and they pay for sewage treatment together with flood defense infrastructure and drainage through a simple family tax (all households pay for 2.5 persons except single persons who pay for 1) to one of the 21 *waterschappen* (waterboards): these former tiny rural communities managing the polders were progressively consolidated a infra-regional scale after WW2 (OECD, 2014). In other countries which do not have this type of institutions for quantitative water management, it is tempting to pass drainage and stormwater costs onto the sewer bills, in particular where sewer systems are combined; but it is not legal: costs related to rainfall control should be covered by housing or land taxes, and there should be a transfer from the general budget to the sewer budget.

There is some coherence in the Dutch charging system: drinking water is considered as a commercial service, so it is charged by volume; sewage collection is not, it is imposed for health reasons so it is paid by a tax; and the relationship to water resources, both in quantities (drainage and flood control) and in qualities (sewage treatment) was kept in a long tradition of common pool management and are paid through mutualized service fees charged on families (but also on industry and agriculture). These three forms of cost recovery could be related to three different statuses of water, as we'll see below: club good, public good, common pool.

In Mediterranean countries of Europe, individual metering of apartments in condominiums is more frequent, but there was little tradition to recover the costs of investments in the tariffs, and as a consequence, water services remained under-funded, in particular sewage collection and treatment. Some countries benefited joining the European Union, since they received cohesion and regional funds helping them to upgrade services without sharp bill increases. In Italy, ineligible to these EU funds, investments were instead subsidized by national or regional governments. The modernization

⁴ Usually the fixed part in a French subscription follows the diameter of the meter. But, once divided by the number of apartments, subscription to a larger meter costs much less than the sum of the subscription fees of individual meters.

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reform proposed by the Galli law of 1994 was expected to seriously impact the prices of WSS (Massarutto, 2012), but an interpretation towards privatization met stiff resistance and resulted in a referendum where 90% votes rejected the participation of private companies and even the remuneration of invested capital.

In the end there is a wide array of cost recovery systems using tariffs, taxes and transfers over Europe, but it is not obvious that they manage to cover the full cost as was defined above. In any case, when costs are not recovered from the beneficiaries of the services, they are, willingly or not, transferred on other stakeholders, or on the same water users but on a different basis. The redistributive effects of various forms of cost recovery are not really studied by economists: improving the social dimension of sustainability often requests some data that are difficult to obtain. And we need to recall here that an equitable but sophisticated tariff is costly, since needed information is sometimes difficult to collect. In the end, the additional information cost could offset the rebates offered in social tariffs (Barraqué, 2018).

4 THE 3 E'S OF WSS SUSTAINABILITY

In many European countries, in particular in down-town areas, water consumption is declining, and what is good news for water resources isn't so much for water utilities which recover less money from tariff systems (Barraqué, 2011b; for Spain, March, 2017; for Nordic countries Katko, 2017; for Germany ATT & al., 2015). With declining water volumes sold in many European cities, an additional issue was indirectly raised, i.e. the affordability of the services: the specificity of WSS assets (fixed costs representing above 80% of the total) implies raising the unit price to compensate the decrease in revenues. In turn, higher prices might hit large poor families, which cannot invest in water-saving technologies; all the more so when wastewater collection and treatment is added on the water bill, which roughly doubles it. Added to the needed compromise between economic and environmental dimensions, this social dimension opened the reflection in terms of sustainability, which the Eurowater 21 projects, funded by the European Commission and co-ordinated by professor F.N. Correia from Lisbon, expressed with the 3 E's formula (Barraqué, 2003):

- Economics: does the tariff allow to upkeep the infrastructure and replace the ageing parts?
- Environment: how much more should be raised to upgrade environmental performance?
- Equity: is such a tariff socially sustainable and affordable?

Finding a balance between these 3 axes is a political decision on the governance of the services: in the triple bottom line of sustainability, the three dimensions are not always compatible (Barraqué, 2011). First, as we mentioned above, with volumetric tariffs, water conservation is contradictory with the maintenance of assets characterized by heavy fixed costs. Second: full cost pricing could get unaffordable to large poor families, and incentive tariffs like with growing blocks might have unsuspected negative social effects. To limit these impacts, one requests information which is costly, so that sophisticated tariffs incur high administration costs (Rajah & Smith, 1993). We have repeatedly found that consumer justice (pay as you use tap water) does not equate social justice (a fair share of revenue to access an essential good).

The new situation of WSS services in Europe (and surely in other developed countries, e.g. Beecher & Chesnutt, 2012) calls for improved knowledge in all three dimensions, like understanding why water consumption declines, what link there is with future environmental and public health performances, are there alternative WSS technologies which could reduce the fixed cost on the long

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run, and what are the redistributive effects of any tariff system, including the impact on bills in arrears as is the case presently in France⁵.

In turn this improved knowledge should lead to a better governance of WSS services. But possibly there is a causal loop, and new forms of water services management with better multi-level coordination are in fact a prerequisite to building up improved knowledge. In the end, better governance of WSS should result in a rational allocation of the costs to be recovered between tariffs, taxes and transfers.

And here we need to distinguish two forms of governance: internal and external. Internal governance concerns the development of new relationships between the authorities in charge of WSS services, technical operators and service customers or users. External governance is about improved relationships between a given WSS management unit, and exterior partners like neighboring utilities, regulating authorities, water resource managers, public works and consulting companies etc.

5 INTERNAL GOVERNANCE AND SUSTAINABILITY

The time when the only relationship between the operator and water services beneficiaries was limited to the meter (billing and paying the bill) may be behind us. Real time monitoring allowed by smart metering can support new relationships based on permanent exchange of information, e.g. typically operator informing/questioning the customer when there is a sudden change in consumption pattern (for instance when a leak is detected). However, refining the tariff to adapt to each specific customer may end up both costly and inefficient, e.g. with the case of budget rating (Beecher, 2012).

New modes of public service procurement could also rely on non conventional technologies in specific areas like low density ones. Is it possible to disconnect the notion of public service from the technology of networked infrastructure? Can authorities and operators help customers to self manage decentralized or semi-central WSS systems, eventually through some technical assistance relying on remote-control monitoring? Can they also control the trend of some customers drilling their own well or harvesting water, and assess their consequences on overall water resources abstraction, on water quality (backwater flows) and on reduced funding of public services (e.g. unpaid wastewater discharges) while facing increased demand peaks?

More generally, informing customers implies more transparent tariff setting, and therefore opening with them a debate on the equity of the tariff. But this is a vast new issue, given the complexity of the factors at stake in tariffs. In fact there is absolutely no tradition of operators and authorities checking the redistributive effects of a tariff change in practice, after it is implemented and practiced by households of various sizes and revenue levels. And first, typically in Europe, water consumption is all the more inelastic to price and to revenues since it is moderate and even low in some countries. As a result, any progressive (blocks) tariff should be very carefully designed to avoid negative social impacts as principal outcome. The Barcelona 'water war' of the 1990's is illustrative of this (Domene, 2012). Designing a social tariff system is both a complex and debated issue (Barraqué & Montginoul, 2015): will rebates for low income families be covered through an increase in other customers' bills (for instance through waving part of the fixed part, or cheaper first block), or through general budget support, 'outside the bill'?

Indeed, when water is metered the issue is to find a balance between the fixed and the variable parts. On the one hand, since most of the WSS costs are fixed costs, the fixed part should

⁵ In France, individual metering at household level was supported as a prerequisite to incentivise water conservation through pricing; but implementing the right to water led to ban any disconnection for non-payment. As a result, the amount of bills in arrears is steadily growing since.

represent most if not all of the bill (not mentioning flat rates or rates related to housing values)⁶; but economists would then argue against the corresponding absence of incentive to conserve water. In France, a balance was found in the law, with a topping of the fixed part at 30% of a yearly water bill for 120 m³ water consumption. Touristic areas with variable populations are allowed to raise the fixed part percentage to 40%.

But the average yearly consumption at 120 m³ is itself questionable, since it roughly corresponds to a family of 4, while the average household size in European cities is now around 2, and in some cities or countries (Paris, Germany, Netherlands) even lower. For these small households, the fixed part may represent more than half of the bill, and it is not their interest to have an individual subscription instead of sharing the meter with neighbors. In down town areas in general in France, there is collective metering and billing at condominium level, and splitting the fixed part makes the total bill cheaper⁷. In turn, refining the information system to make the tariff system fairer in terms of consumer justice, may end up being very costly for all residents, in particular large poor families, with yet unclear effects on water conservation. Typically, in the case of Paris, experts convinced the council not to encourage individual metering and billing, since consumption was already going down steadily with no conservation campaign; instead it was decided to develop smart metering at building level to be able to inform in real time building managers of unusual water consumptions.

Of course this is less a problem in countries where metering was developed at each apartment level: in Portugal for instance, individual billing allows to set up special tariffs for large families. In other countries operators refuse to address this complex issue despite individual billing. They rightly point how difficult it is to identify those who should benefit from rebates (AWWA, 2004). Many people either ignore or refuse the social support they are offered.

This leads to a more general observation about tariff governance: many utilities think that a good tariff will encompass all the dimensions of sustainability, so that they wouldn't have to care anymore. They are wrong. Setting tariffs is a political decision with allocation issues and social impacts; and anyway within the new modes of WSS services provision, utilities should establish more permanent relationships with customers. They also should check the impact of proposed tariff changes on water bills in particular when paid by large poor families: who pays more than 3% than their revenue to access water, and will the new tariff reduce or increase the percentage of impacted people (Fitch & Price, 2002)

We can conclude this section on internal governance by emphasizing the need for more refined analyses of water consumptions and elasticities: frequently these studies are done by economists at the scale of several WSS units, which is probably a too 'macro' scale and misses part of the determinants of real consumption: for instance they cannot take the age/reliability of meters or the weather conditions into consideration; which might explain why econometric results are not very significant and elasticities are low (in Europe). This problem might be alleviated by more 'micro' studies, e.g. at the scale of blocks or census tracts, allowing to include more consumption factors including human ones (Martins et al, 2016).

6 EXTERNAL GOVERNANCE AND COST RECOVERY

What we term external governance has to do with how any utility or WSS service relates with stakeholders who regulate or share water resources, and knowledge and know how: neighboring

⁶ In the Avoriaz ski resort for instance, each apartment has to pay a 100 € yearly fixed part, and since people usually come for less than a month altogether in winter, they end up paying more than 9 €/m³. But otherwise who would cover the fixed cost of the infrastructure?

⁷ The fixed part frequently increases with the diameter of the meter, but once divided by the number of apartments, it is very small compared with the fixed part of a separate meter for each flat.

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utilities of course, but also regulators of service provision, consulting and public works partners, upper tier institutions which may bring subsidies and/or impose water resources allocation rules, etc.

While the public vs private debate has been on the forefront since privatization was supported by IFIs as an alternative to poor service provision by governments in the 1990's, our many years' experience teaches that this issue is not raised separately from two other debates: centralization vs decentralization (and more broadly upscaling/downscaling); and integration vs separation with other services (e.g. water + wastewater, or water + electricity, etc.). In England for instance, WSS services were first regionalized at river basin level for a better articulation with water resources management. But criticisms on Regional Water Authorities being both 'poachers and gamekeepers' led the Thatcher government to privatize the WSS services infrastructure, while developing a National Rivers Authority on the other, the latter being later merged with other regulatory offices into the Environmental agency. In that case privatization went along increased centralization. Conversely in 19th century Germany, importing British know how in piped water supply did not lead to privatization, and WSS services were developed directly by municipalities (Barraqué & Kraemer, 2014); later water supply was merged with other services to form the *Stadtwerke* which often became private companies owned by local authorities. Some mergers took place but no centralization as occurred in England and Wales.

More recently, due to decreased consumption and revenues, or conversely due to risks of scarcity and resource overdraft, there has been a general trend in developed countries to upscale part or all of WSS. Upscaling is advocated for the sake of economies of scale, and tariff harmonization. In some countries like Italy there was a clear will to suppress water supply at small commune level (*l'acqua del sindaco*) and replace it by 'optimal size territories' (ATO), which were frequently considered to be the province level (Massarutto, 2015). But this reform, which sought to modernize WSS through adopting the British tariff model developed by OFWAT to regulate private utilities, was hotly contested because it led to dramatically increase tariffs towards full cost, which was associated with unacceptable commodification. In Portugal the reform was more flexible, with the creation of a public national water company offering neighboring local authorities having problems to create mixed public companies to produce all drinking water and treat all waste water in the consolidated area, while each commune would remain in charge of their WSS pipe systems (Correia, 2013).

In the Netherlands, municipal water supply was progressively consolidated at regional level with the development of private law companies owned by a mix of communes and provinces. They are now only 10 (OECD, 2014). In France, where WSS services were extremely scattered, an ongoing reform initiated in 2014 aims at dividing the number of utilities by ten (Barbier, 2018). This consolidation might change the picture for the delegation of water services to private companies, due to better control and regulation capacity of the new intermunicipal institutions. But, even before this reform, public-private partnerships in France were put under scrutiny after a few corruption affairs were disclosed in the 1990's (Grenoble). A couple of laws then compelled private operators to yearly report on a number of performance indicators to the local authorities, and the latter to produce a yearly performance report for their citizens. In the end, in France like in many other countries, WSS services are more and better regulated than they were in the past (Canneva, 2018): there are technical regulations (environmental and health, quality of water and of the service), institutional regulations (rules on the public service definition, on the management models), economic regulations (budgetary, tariff-setting, benchmarking), and social-ethical regulations (democratic / citizen information and control). This should bear fruits on the sustainability of water tariffs and their acceptability.

This frequent move to upscaling WSS services is not the only recent outcome: there are also downscaling moves, as illustrated in the above section on internal governance; another possibility for utilities is to develop innovative technological solutions to adapt a changing context. This is for instance the case in Australia, where regional bulk water transfers companies were created, separated from local distribution companies; at the same time in some cities, new housing developments were encouraged to systematize grey water recycling to alleviate water resource shortages; and in some coastal cities, desalination plants were set up.

This is also what happened in Barcelona: the city feared that the central government would not authorize a water transfer from the Ebro or from the Rhone in France, to meet a potential deficit due to population growth. The city then built an important desalination plant to be operated in scarcity periods. Soon after, the water company AGBAR set up a plant with the same membrane technology to treat waste water from the sewage works, and recharge the alluvial aquifer of the Llobregat upstream from the drinking water plant. This technology sophistication allows solving scarcity issues without having to bargain for more water resources away from the city, and without having to modify the relationship with water customers; i.e. with minimal upscaling and downscaling. But in general, upscaling, downscaling and technology-based solutions can be combined.

An important part of external governance in terms of cost recovery has to do with the relationship between WSS services and water resources, namely for environmental and users costs. The problem is how to charge for these additional costs? And a related question is whether the cost recovery should take the legal nature of the resource into account.

7 INTEGRATING THE AQUATIC ENVIRONMENT IN THE FULL COST

As we wrote above, full cost of water services includes environmental and resource costs. But should these costs be paid by customers of the services in their bills, by citizens via taxes, or else by users of a common pool resource? In the first case, payment might correspond to looking for a market-based solution to environmental problems. In the second case, taxation and government implication could support the idea of water as a public good. And in the third case, the common pool definition of water resources would call some form of community based water management. We would like to exemplify the discussion with the levies of French *Agences de l'eau*, compared with the German Ruhr waterboards model that they tried to follow 60 years later (Barraqué & al., 2018). The idea was to create two levies on water users: one on water abstraction to fund water resources mobilization and avoid scarcity (e.g. additional winter storage); the other on pollution discharge to fund the construction of sewage works and improve river quality for the benefit of downstream users (fig.2). These two levies are a way to represent users' costs and opportunity cost in case of scarcity, and environmental costs in the case of pollution discharge impacting society (fig.3).

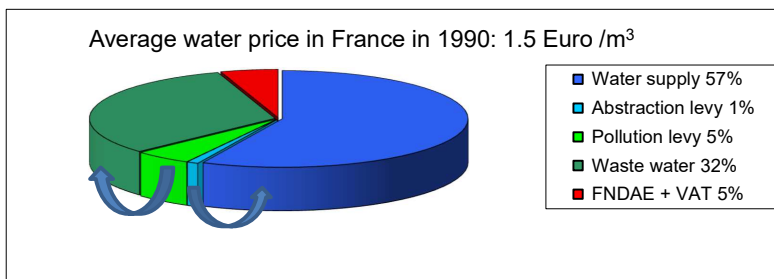
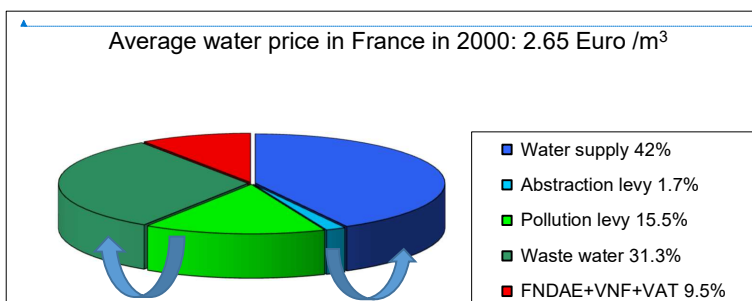


Figure 2. breakdown of average water price in France before the UWWTD⁸



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Figure 3. breakdown of average water price in France 10 years after the UWWTD, showing the impact on the sewer part, via a dramatic increase of the pollution levy paid to the Agences de l' eau. Adding again light green to dark green we can see that long term price of the sewer part surpassed the drinking water part (as soon as 1996). The levies paid to the Agences also give an image of the passage from full internal cost (dark blue plus dark green) to full cost recovery, with light green for environmental cost (internalizing resource quality management), and light blue for users' cost and opportunity cost (internalizing quantity management costs)

But the issue is how to implement the recovery and use of these levies. In the initial model of the Ruhrgebiet, to solve the dramatic pollution problems due to rapid industrialization and urbanization at the end of the 19th century, cities and large industrial corporations of the Ruhr area got together and obtained the right to transform free-willing local water boards into co-operative unions called *Genossenschaften*. They were entitled to force stakeholders to pay levies so as to fund the needed infrastructure in a mutual fashion (Kneese, 1968; Korte, 1990). Interestingly enough, a subsidiary and community spirit prevailed upon political opposition between conservative steel and coal barons on the one hand, and left-wing cities on the other.

This river basin institutions' creation was the first in contemporary Europe. Their budgets were made up with taxes decided and allocated equitably between members, namely industry representatives of various branches, cities, rural districts. *Genossenschaften* were in charge of building the dams and the sewage works, and they never handed the money back to members, who were not entrusted to build their own separate / competing infrastructure. Once they paid their levies to the basin institutions, cities and other public partners would obviously pass the costs onto their citizens, usually through increasing the water bills; but more recently some *Genossenschaften* developed new roles on improving the aquatic environment and biodiversity, or flood control, and in that case additional levies paid by local authorities could not be passed on water bills anymore, and were instead charged on citizens via local (housing and land) taxes.

When in 1964 Ivan Cheret imported this model to create the French *Agences de l'eau*, he and his partners thought it would be no problem to do the same. Yet several reasons made it impossible: chiefly, under French constitution, public money must be collected and spent under the control of elected representatives, so that having representatives of industry in the *Comités de bassin* closed the possibility for the Agences to directly build and operate infrastructure. They could only subsidize projects carried by stakeholders willing to invest. So, the levies were created as service fees, which allowed avoiding to subject the *agences'* budgets to the vote of parliament every year. In addition, stakeholders were initially reluctant to pay the levies, and in particular some local authorities refused to be taxed by institutions they considered less legitimate than themselves. And soon the levies were transferred directly on water bills, under the argument that it was the citizens and not their local authorities which polluted (ignoring the distinction between initial and final discharge).

But the problem in France is that a public institution can levy a service fee only on those who benefit directly from the investment that is funded. On other stakeholders in the concerned area, according to a decision made in 1959 at the beginning of the Vth Republic, it has to be a tax. It is very interesting to recall the economic rationale of this split in two sorts of parafiscal levies. The then prime Minister, Michel Debré, wanted to clarify the typology of taxes which were multiplying in this Keynesian period. It was decided that if the levy corresponded to a public intervention in the economy, it should be a service fee, handled by an institution (industrial and commercial) under private law, and with litigation arbitrated by civil courts; in all other cases where the levy did not correspond to a service, it should be an *'imposition de toute nature'* (a tax), be handled by an institution under public (administrative) law, with parliamentary budget reviewing, and with litigation arbitrated by the administrative court system. Note that this is a typical translation of liberalism in the Civil code legal system: either commercial-market, or administrative-State.

To make things even more complex, when asked in 1967 if the levies of the *Agences* were service fees or taxes, the State Council (equivalent to a supreme administrative court) answered that it wasn't a tax, although all water users had to pay, and it wasn't a service fee, because there wasn't a

direct relation between the payment and the service provided by the Agency; he then proposed to set the abstraction and pollution levies into a third category *sui generis* without defining it further. They obviously did not know Elinor Ostrom who had just finished her PhD, but now we could give these levies of a third type a name: mutualised service fees for the collective management of common pool resources. We could indeed argue that in a watershed, those who only pay their levies still benefit indirectly from the improvement of the aquatic environment made by other stakeholders.

Instead in 1982, the Constitutional court, contradicted the 1967 opinion of the State Council and considered that the *Agences'* levies were taxes and should be subjected to Parliament review. The water policy community resisted as long as possible, but it never managed to obtain the creation of additional levies which would support the implication of the *agences* in under-funded policies like flood control. Instead, starting 1996, the ministry of Environment was allowed to take a small part of the abstraction and pollution levies to fund various policies (flood maps, water police, fishing police). And in the end, the 2006 water and aquatic ecosystems law, while redesigning the levies into 8 different topics, subjected the *Agences'* budgets to yearly parliament review. Law makers promised they would not touch the budgets, but this promise was not kept by the next governments and since then, the Treasury takes 10%, or else tops the budget, and at the same time the *Agences* have to fund the Biodiversity agency, the office in charge of hunting control, and the national parks' employees. They have a wider scope of intervention, while their staff is now capped.

The French high ranking officers and political class progressively brought the original financing system created in 1964 to a complete incoherence: in the name of their State vs Market world vision, they accepted that the levies would be taxes and not service fees, without realising that for the same reason these levies should not be collected on water bills, which correspond to a service! The fundamental reason for this incoherence is in our opinion the incapacity of many in this Civil Code country to really understand what common pool is about and which specific funding system it requests.

CONCLUSIONS

There is a way out of the present incoherence, drawing from our comparative European experience: first there should be no principle problem to cover the cost of water supply and waste water collection in volumetric bills, provided the tariff system is kept simple and equitable (but, as we saw above, designing it is not so simple). But facing water resources quality and availability, then it is the local authorities in charge of WSS services and flood control which should pay the levies to the *Agences* (or other watershed institutions when needed), and not the domestic users. In turn, local authorities should recover what they paid from domestic users either through an addition to water bills or through local taxes: water bills if the support of the *Agences* is needed to improve the WSS services, local taxes if it is for protecting the aquatic environment, water-related biodiversity, flood control, etc. In France there is a new possibility to do this: a 2014 reform to consolidate local authorities in general gave the opportunity to the Government to decentralize at that level, new responsibilities on the aquatic environment management and flood control (*Gestion de l'Eau, du Milieu Aquatique et Prévention des Inondations* - GEMAPI). And local authorities are allowed to levy on residents a GEMAPI tax (up to 40€/cap/yr) to fund their actions. This could help rebalance the allocation of full cost recovery from the water bills to housing and land taxes. And it is all the more important that local taxes are usually more progressive than the water billing system: it is quite wrong to think that poor people use much less water than rich ones, since the income elasticity is weak. So, at this moment when we discover that some water and waste water tariffs have become unaffordable for part of the population, it is just about time to 'think outside the bill' (AWWA, 2004) and to consider covering part of the full costs in a way corresponding to the common pool nature of water resources.

Beyond the specific case of France and its river basin institutions, this paper considers that implementing the Water Framework Directive, aiming at recovering the quality of the aquatic environment, does not necessarily impose a jump in WSS tariffs in the form of billing, but will need a

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combination of tariffs, taxes, mutualised service fees including possible transfers between categories of users sharing the same water resource, e.g. payments for environmental services.

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