Urban water conflicts: an ecological-economic approach[1]

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1. Introduction

Urban water services (UWS) have undergone a radical transformation in the last 20 years in most developed countries (de La Motte et al., 2005; Finger and Allouche, 2006; Massarutto, 2006). Just to recall the most important axes: from local management to regional integration; from public subsidies and public finance to full cost recovery and market finance; from direct management of local authorities to various forms of independent and professional water industry, often (although not solely nor necessarily) with the involvement of the private sector[2]; from the dominance of water supply and urban network to the one of water resources management at the river basin scale and the growing emphasis on cleanup, treatment and conservation of resources; from simple, discretional and benevolent regulation to more sophisticated, controversial and adversarial regulatory systems; from sectoral water policy focused on infrastructure development to integrated management focused on sustainability.

This modernization is driven by powerful forces. To use a famous image by K.Boulding, human societies are learning a new way of managing water, from the "extensive" model of the "cowboy" economy, where natural resources do not represent a limit to growth, provided that enough investment is put in place; to a "spaceship" model, in which finiteness of resources requires careful management aimed at reproducing them locally in the long term.

On the other hand, modernization also implies complex and unwelcome outcomes that go largely beyond the water management sphere. Rising costs of water management pose issues of affordability and challenge the basic social rights. Integrated management forces local communities to give up control over their local territory in order to share resources (and problems) with other communities on a larger territorial scale. Water uses that have been established during centuries may be forced to give up in order to allow space for new emerging societal demands. Increased corporatization (if not privatization) of water service operation implies a loss of control and a strong delegation of power to professionals "water experts" and profit-oriented organizations, whose faithfulness to the general interest of the community has to be proved.

To put it in a different way, sustainability of UWS is not only and simply a technical, managerial and economic problem; it requires instead a thorough adaptation of the institutional, political and social spheres. The outcome of transformation cannot be reduced to different technological solutions; it should be able to reproduce the basis of cohesion, trust, legitimacy, consensus; what on its own implies that patterns of allocation of costs and benefits (or, more generally, negative and positive outcomes) is perceived as fair. And

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[2] Private sector involvement (PSI) is intended here in its widest meaning; it involves regulated private monopoly with full divesture (eg England and Wales), full or partial delegation via competitive tendering (eg France), outsourcing of activities from public entities, various forms of private-public partnerships for operation

much more than that, since this perception also has its roots in common "cultures" and "rules of reason" that need to be developed and shared through an open participation (Swyngedouw et al., 2002). In this perspective, the transformation of UWS can be described as a problem of governance (Hanf and Jansen, 1998; Picciotto, 1997), whose solution cannot be demanded to the interplay of individuals within the given set of cultures and institutional rules, but rather implies a reconstruction of both (Amin, 1997).

This transformation has a particular meaning in European Mediterranean countries, where the tradition of municipalism and local management has been historically stronger than elsewhere, public subsidies still represent today a substantial part of UWS finance and government policies have traditionally been biased towards infrastructure not only for UWS but also for irrigation and industry.

The paper starts with a brief overview of the ecological economic approach to water sustainability that enlightens the crucial importance of UWS (par. 2); this is followed by an analysis of the present trend of UWS management and the crisis of the supply-side approach (par. 3). Pressures arising from this change towards private sector involvement and full-cost recovery are then discussed in general terms (par. 4).

2. Water conflicts as an indicator of carrying capacity

The reason why UWS modernization might arise conflicts is not obvious. After all, in everyday life people have often to choose between alternatives that are mutually exclusive, and this does not necessarily imply conflicts, provided that the rules followed in the decision are agreed and perceived as legitimate, fair and reasonable. Allocation of a scarce resource implies that some social demands will have to remain unsatisfied: this is intrinsic in the very meaning of the word "scarcity". Allocative choices imply trade-offs, whose solution might or might not arise a conflict, depending on the capability of the existing set of rules, property rights, management systems to solve the related issues in a way that is both socially acceptable and sustainable in the long term. Conflict arises, in turn, when the institutional setting is unable to provide the adequate setting for required technical solutions to occur.

In pure mainstream neoclassical economics, conflicts do not exist, since the market is the universal engine providing solutions to trade-offs in a way that ensures the maximum of benefits. If a would-be user of a scarce resource has to remain unsatisfied, it depends on the fact that his demand is not worthy enough compared to other competing demands. Welfare economic theory has provided a coherent framework to deal with trade-offs when they entail an economic dimension – that is, when the values at stake are commensurable with each other. Cost-benefit analysis states that a given alternative is better than another (from a social welfare point of view) if its total cost is lower than its total benefits; where "costs" mean the "opportunity costs", that is the economic value of alternatives that are sacrificed. Since society is an aggregate of individuals and groups that are affected by costs and benefits in a different way, this test can be refined by introducing compensation for the "net losers": if total benefits are larger than costs, distribution of outcomes can be re-arranged in order that all concerned groups gain.

However, in the real world this is not necessarily taking place: first, because redistribution of outcomes does not actually occur, or cannot occur in a given institutional framework (Johnston, 1996; Saleth and Dinar, 2004); second, because trade-offs are not always and not only economic – in other words, values can not always be expressed in the same unity of measure (eg monetary values) allowing them to be evaluated in a coherent way (Martinez-Alier et al., 1998); third, because the net losers could be future generations (Ekins, 2000). The theoretical framework of ecological economics has developed the concept of *strong sustainability*, according to which values that cannot be traded-off require the definition of specific constraints and threshold values to be achieved in order to achieve sustainability; this occurs in particular whenever "critical natural capital" is at stake – namely, environmental resources that cannot be substituted for the provision of valuable functions that society cannot accept to give up.

The water sector is an excellent one for applying these concepts, due to its multifunctionality. Water sustainability involves ecological dimensions (because it is a scarce and fragile natural resource, basic underlay for ecological life), as well as an economic (because it is a scarce valuable input having an economic value) and a social one (because it represents a basic need to be guaranteed as social right and shared in an equitable way). Water provides a large set of valuable environmental functions (EFs), entailing economic as well as non-economic values (Fontana and Massarutto, 1995); many of these functions are critical ("water needs" to be satisfied at any cost; "social rights" to be guaranteed, etc), while others can be

even in principle traded off ("water demands" whose value can in principle be compensated by other economic values).

In a narrow sense, an economic approach to water policy issues can deal with the concept of "water intended as an economic good", i.e. considering only those values that belong to the economic sphere (Dalhuisen et al., 2001). In a broader meaning, economics of water should be able to understand the multiple dimensions of scarcity that arise both from economic and non-economic sphere (Green, 2003). Following this latter perspective, an economic approach – "applying reason to choices", in Colin Green's own definition – is not incompatible with the recognition that some demands are not to be evaluated in terms of economic efficiency, but rather in terms of social justice, ecological soundness, political acceptability etc.

On the other hand, the water domain is also characterised by some degrees of substitution between man-made and natural capital: at some (finite) cost the production and transfer of freshwater can be made in virtually any desired quantity[3]. This is true at least for some EFs, especially those in which economic values are predominant[4]. The social choice problem here is whether this cost is worthwhile (i.e. if the value of water demands is higher) and if it is acceptable for users to pay for it. This consideration is fundamental, since it enlarges the spectrum of trade-offs (and potential conflicts): these do not regard only appropriation and use of water as a natural resource, but also the inter- and intra-generational allocation of the costs of artificial water systems; in the same way, sustainability does not only regard intergenerational aspects of natural resources management, but also includes economic and financial viability of the UWS industry (de Carli et al., 2003). To put it in another way, both natural and man-made capital belong to the category of "critical capital" and require therefore strong sustainability criteria (Massarutto, 2005).

Figure 1 here

In terms of figure 1, governance issues arise when there is a mismatch between social demands and availability. Given the multidimensional nature of water values, governance issues can arise from many different "mismatches" between available and demanded EFs. We have identified the categories reported in table 1.

From the above discussion, water availability is constrained by physical scarcity, depending on hydrologic factors (opportunity cost of water) as well as by costliness of water services (opportunity cost of labour and capital) and by the set of institutional rules, property rights and shared cultures that, in any given historical context, frame the spectrum of available alternatives.

For example, a community can be simply too poor to afford UWS; or the cost of UWS could be higher than the value of additional environmental functions; or, finally, people might be unwilling to pay higher taxes or higher water prices for ideological reasons.

The effectiveness of the management system provides a further dimension to understand. Achieving sustainable water use implies that it is managed by specialised organizations able to attract adequate resources (human skills, technology, capital etc) and is able to cover the related cost and remunerate them in order to remain attractive. This means that professional water companies, possibly profit-orientedand having an industrial standing, should take the place of traditional management systems. This transformation is again not straightforward: it requires appropriate regulatory systems (being the water industry a natural monopoly with very limited opportunities for competition) as well as social and political attitudes (acceptance of "privatization"), institutional mechanisms and so on.

The institutional setting represents the ultimate constraint, determining in the short-medium term what governance issues are capable of being solved (Saleth and Dinar, 2004). In this sense, scarcity might result from institutional reasons, because existing institutions are not able to achieve an acceptable solution to certain governance issues (Massarutto and Verga, 2005). For example, the existing set of water rights might be incapable of solving a given problem (eg overexploitation of an aquifer); but the setting up of a new

[3] At a given cost (high, though finite) it is possible to produce any quantity of water. Desalination, that can be considered as the backstop technology, has reached costs in the order of 0,5 – 1 € /m3 (Lora et al., 2003)

[4] Although these uses do not exhaust the spectrum of water-related EFs, it should be noted that they represent by large the greatest source of water abstraction and impact on water bodies.

institutional framework is not possible because a political agreement cannot be found.

Table 1: Governance issues in the water management sphere

TYPOLOGY	DESCRIPTION	DIMENSION	CRITICAL ASPECTS
Access	• who has the right to use the resources? • what criteria are used for allocating water rights? • are those that cannot have access to water being compensated in some way? And by whom?	Sectoral Territorial Economic	Property rights allocation / tradability Historical rights Planning criteria
Segregation of uses	• some users' actions make water unusable or unaccessible to other users • some users generate externalities that are suffered by other (potential) water users or by society as a whole	Sectoral Territorial Economic	Externalities Regulatory institutions Planning criteria
Status and identity	• local communities fear to become "the garbage can" of other communities or • to be forced to share resources and problems with other communities; • local communities lose control over what they perceive as "their" territory and resources	Territorial Social Political	Balance of power (central / local) Planning dimension Finance of new infrastructure
Democracy	• the increased technical complexity of decision forces the community to delegate decision to professionals and "experts" and to subtract power to the individuals and the community; • users with large political or market power can weigh more in the political decision	Social Cultural Institutional	Participation Tranparence Representation of interests Tradition Social conflict Regulatory institutions
Ecology	• conservation of NC for the next generation is not guaranteed because conflicting demands tend to overuse it and next generations are not represented • Resilience of water management systems and capacity to adapt to future challenges • Basic ecological functions of water systems threatened by economic and urban development	Intergenerational	Research Investment Collective understanding of water as a constraining factor
Artificialization	• Is development of water infrastructure worthwhile? • Allocation of costs should be fair and not jeopardize affordability • Water management systems should remain economically and financially viable; • Deterioration of assets should be compensated by depreciation	Intergenerational Fiscal Economic	Efficiency of financial markets Public/private relationship and patterns of PSI Is economic growth rapid enough for guaranteeing affordability of WSS the future?
Allocation of costs and economic risks	• Is the allocation of costs (between individual users / sectors of use / territorial regions) fair ? • Are some users excluded because they cannot afford the water bill ? • Is the allocation of costs between users and taxpayers compatible with the constraints on public budget and with the need to avoid perverse incentives ? • Is the allocation of economic risks coherent with the remuneration received ?	Fiscal Economic Regulation Equity	Instruments for cost equalization Economic balance between "users" and "taxpayers" Risk-sharing mechanisms

The incapacity to develop an appropriate set of property rights can be driven back to the situation known in the public choice literature as "tyranny of the status quo", that typically arises when the decision rule requires unanimity of consensus (Mueller, 1990); North (1990) and Bromley (1991), in turn emphasize that the process of institutional building does not occur mechanically, but rather through a "trial and error" in which communities that are more able than others to develop appropriate institutional settings will be able to solve environmental problems; the process of institutional change is constrained by rent-seeking of economic actors and transactions costs of change (Johnston, 1996). Massarutto and Verga (2005) argue that a "tyranny

of the status quo" might arise even if the policymaker has the formal power to decide (with a majority rule), but is unable to exert power over the implementation chain because of information asymmetries of lack of control over essential resources. As Saleth and Dinar put it, "… water scarcity, whether quantitative, qualitative or both, originates more from inefficient use and poor management than from any real physical limits on supply augmentation" (Saleth and Dinar, 2004, p.1).

We can affirm that a carrying capacity threshold has been reached – and a conflict is likely to take place - when one of the above scarcity limits has been violated. This poses a "limit to growth" to environmental functions that can be satisfied by the existing set of water and economic resources; reaching this limit means that a trade-off between social demands has to be managed and solved; and if it cannot be solved in the existing framework, this raises a sustainability issue and ultimately generate a conflict.

The limit is not set once forever: an income improvement may enable the community to pay for UWS that would previously be unaffordable; technological improvements might render UWS provision possible (or simply cheaper); new governance institutions might cope with political incapability to decide; social learning processes might generate new cultural frameworks enabling the community to accept previously unacceptable solutions. But in the short term the individuation of a carrying capacity limit leads to considering water resources – at that particular territorial scale – as a CNC, and thus to pose an upper limit to their consumptive use.

This discussion also enlightens the importance of UWS for sustainability. Water sustainability does not only regard natural water resources, but also the long-run viability of the management systems, the capacity to renovate artificial assets and finance its long-term maintenance and operation. For this reason, the assessment of cost-recovery is crucial for sustainability. It is not necessarily to be intended in neoclassical economic terms as the need to ensure optimal allocation of resources through marginal-cost pricing, but rather to assess the long term capacity of the community to raise the financial means that ensure its viable operation, no matter if through prices or taxes, or which equalization measures are actually put in place (Green, 2003; Massarutto, 2005).

3. Development, sustainability and water management paradigms

This simple conceptual model helps us understand the evolution of water policies in past and recent times. Economic development in the long term affects the relation between water and society in two different directions. On one hand it increases the capacity to finance WSS expansion and positively affects innovation; on the other hand it causes demand growth (especially for those EF that are income-elastic) and causes increasing external effects. The final effect on sustainability is thus ambiguous. Sustainability of actual patterns of water use require that GDP will grow more rapidly than the cost of WSS induced by demand expansion and/or depletion of natural capital.

In the literature, the optimist attitude is shared by those believing in an "Environmental Kuznets curve" (namely, a positive relation between economic growth and sustainability). In the case of water, for example, many indicators seem to show that last century's growth patterns have been sustainable, since GDP has grown more rapidly than deterioration of water capital, thus allowing for investment in WSS that have ultimately ameliorated both supply and water quality. As a result, in most developed countries, water quality as well as river ecosystems are much better now than 100 years ago. On the other hand, the very belief that this trend will not be reversed in the future cannot be based on any empirical evidence. Water being a CNC, a precautionary principle might therefore be invoked.

The dominant model of the last two centuries (what Arrojo et al., 2005, have referred to as "structuralist" model) can be described as follows:

- Substantial growth of demand for EF that has been for a long time correlated with economic growth and urbanization; as a result per-capita water demand and per-capita pollution loads have been increasing over the last two centuries much above the "natural" carrying capacity of water environments
- This demand growth has been compensated by a dramatic increase in artificial WSS; this can be shown for example by the continuous increase of the per-capita cumulated investment in water assets, that was made possible both by the significant improvements of civil works engineering and economic growth.
- In a first phase, social investment in WSS expansion has just been improving the supply of EF,

complimenting those furnished by the NC; in a following phase, NC itself has been deteriorating (because of increased pollution loads and over-abstractions), and WSS expansion has been required also for compensating this loss.

- Much of the supply increase has been made possible through the development of public services with substantial investment costs carried on by the public budget

The crisis of the structuralist model arises from many different sources of unsustainability:

- Emerging of new social demands for water quality: while "traditional" demand, focussed on quantity, has reduced its growth, demand for environmental quality cannot be easily satisfied through a simple expansion of WSS
- Deterioration of NC has reached critical levels and hampered further critical EF
- Evidence that at least some uses have been greatly subsidized, and this subsidization is unjustifiable at present days since they hardly belong (anymore) to the "merit" uses category
- Evidence that further expansion in WSS (at least for water supplies) is often unjustified in economic terms
- Crisis of public finance and requirement for involving users in the financing of WSS, in the context of rapidly increasing costs of service provision

The Water Framework Directive (WFD) can be seen as the turning point that starts a new European water policy focused on sustainability (Barraqué, 2004; Kallis and Nijkamp, 2000). Among its basic principles: conservation of natural capital at a good ecological status; prevention of further deterioration; economic assessment aimed at implementing an efficient allocation; full-cost recovery aimed at avoiding that artificial water assets are developed beyond the social willingness and ability to pay; public participation in order to ensure that all social stake are duly taken into account.

Transferred into the analytical framework outlined in par. 2, crisis of the structuralist model can be interpreted on the base of the increasing costs that society has to face (and consequently share). This is particularly true for external costs.

As far as UWS are concerned, Barraqué (2005) has argued that the supply-side approach at some point starts to run as a vicious circle: increasing social demands call for further artificialization and further delegation of power and responsibility to the "experts" and the technical structure; this causes further costs (both in terms of financial costs and externalities that are generated on other water users) and calls for further pressures to develop the artificial system. This vicious circle generates conflicts through the tension between social demand for water services and need to allocate the underlying increasing costs.

Further forces drive to conflictual outcomes. this process also entails growth in territorial scale (and thus increasing *physical* distance between citizens and decisionmakers), increasing professional specialization (and thus increasing *cultural* distance) and finally increasing pressure to become economically efficient, what usually ends up in the acquisition of a business-like mentality of water operators if not full privatization (and thus increasing *motivational* distance between profit-oriented water companies and local political stakes).

All of these factors erode the basis of consensus and legitimacy of the dominant model of managing UWS and generate the pressure towards new solutions.

4. Pressures towards modernization of UWS

Figure 2 summarizes the main forces that drive modernization of UWS (Massarutto, 2006); .

Pressures for change arise from the water policy sphere and are started by the appearance of new governance issues (eg new stakeholders bringing in new dimensions of demand; degradation of water quality causing the impossibility of traditional water management and regulation to carry on providing the same environmental functions as before); however, governance issues are not relevant as such, but rather are filtrated by the water policy network.

On one hand, we can thus individuate those actors in the policy community having the capacity to make pressure on policymakers: "water experts" recognize problems and propose solutions, scientific community provides means for appreciating issues, water industry develops technologies and declares its capability to solve problems, water users make pressure in order to have more water available, environmental pressure

groups ask for improved water quality etc. Of course, there might be a close interaction between these actors: for example, scientific research can be influenced by the water industry financing it; the appreciation of some problems and issues might by strongly conditioned by investment already made by the water industry and by its perception of what can or should be done.

On the other hand, we can find factors that constrain water policy action: availability of financial resources, readiness to pay by consumers, as well as geographical and institutional factors (eg localism, efficiency of the public administration, relative weight of water-related issues in the political arena).

Altogether, these factors shape and determine new water policies putting pressure on UWS, eg increasing quality standards and/or promoting new water investment. As we have argued before, a significant change has occurred in recent decades, causing a shift from traditional "extensive" towards more "intensive" water policies.

New water policies impact on the equilibria of the water industry basically through five channels, each putting in crisis traditional forms of public management and pushing towards innovative forms, either implying the involvement of the private sector or at least the development of more independent and business-oriented public systems.

First, UWS require fixed costs that are for the most part sunk; these costs grow as far as UWS provision becomes more difficult and demand (arising both from service users and from environmental policy) is more exigent. This represents a formidable pressure to growth of the territorial size of water undertakings (in order to share these costs on a larger base of customers) and outsourcing of activities implying economies of scale or high labour costs (eg public works, customer services, billing, emergency management, project and design, RTD etc).

Second, the increase of technical complexity of water management forces local water management systems to delegate decisions to professionals having the necessary expertise. This leads to the creation of specialized water management organizations, whose belonging to private or public sector follows a good deal national paths and traditions. Specialization and complexity also means that less and less critical inputs can be produced "on site" and more and more are incorporated into "technological objects" that local operators will select and purchase on the market. Therefore water operators are required to be in the best position to dialogue with external suppliers of technology, and this in the end might represent a strong incentive towards corporatization of water service operators and an increasing recourse to the market for the provision of inputs. The value chain of water services includes more and more value added that is produced by specialized firms on the market.

This does not necessarily mean that water operators will themselves be privatised, at least not in the forms of delegation or full divesture: Italian and German municipally-owned water companies, as well as the Dutch water companies or the British Water Authorities before privatisation are well-known examples of water industry developed within the public sector, though with some sort of entrepreneurial autonomy. At a certain point, however, these pressures might become strong, either because of a more general policy trend in this direction, or because autonomy becomes so strong that public control becomes very weak. The need to engage in heavy sunk costs (eg for R&D) also requires larger scale of operation and thus weaker control of individual municipalities. The sale of shares to the market, often forced by budget constraints, completes the process, until companies finally behave as private companies, even if formally owned by the public sector.

In other countries, the need for professional skills has led quite early to delegation of operation to private companies, instead than developing the same skills in-house. Peculiar institutional mechanisms might influence this development; for example, in the French case, delegation to private companies was often made necessary by the difficulties that the French law opposes to the creation of local publicly-owned companies and by the difficulty for municipalities to have access to credit (Barraqué, 1995).

The third channel is the financial one. The increasing cost of water services in the present phase is paralleled by the crisis of public finance, therefore ending the traditional way of financing through the public budget. Self-finance through full-cost recovery starts to become necessary; on the other hand, tariffs and prices paid by consumers will serve as a cash flow for sustaining market-based finance, for which the water operator becomes the intermediator.

Once again, this does not necessarily lead to private operation of services, since public companies might have as well the capacity to access financial markets; on the other hand, given the high capital intensity of the water industry and the very long depreciation schedule of water assets, the financial reputation of operators is a crucial aspect in order to reduce the cost of capital and finally the cost of water to final

consumers. Even if remaining under public control, many water companies have engaged in enlargement of capital to new investors, buyouts and other financial operations opening their property to external investors.

Moreover, the decision to privatise can be "political", in the sense that governments and local authorities might wish to sell property in order to give a signal that eventual losses in the future will not be transferred again on the public budget; privately-owned companies, from this point of view, will need to achieve a good balance between revenues and costs and therefore will not engage in new expenditure unless they will be able to finance it through prices paid by consumers[5].

In some other cases, the decision to privatise operators might be in a way or the other imposed by financial institutions, especially in developing countries, where the financial rating of local firms, the trust of international agencies such as the World Bank as well as the lobbying capacity of western water transnational firms were all factors conditioning the lending of capital to the delegation of operation to private companies (Hall, 2001; Finger and Allouche, 2001).

The fourth channel regards the "division of competences" between UWS operation and regional water policy. In the traditional model, water management could remain "local" and "simple" as far as external subjects (the state) carried on the necessary actions through public works aiming at making water available at the local level. "Water plans", carried on at the state, basin or regional level, were the policy instruments in which this role of the public sector was materialized.

As a result, the water industry is required to play a more important and responsible role, with substantial degrees of freedom; one important consequence is that local water management cannot be considered anymore as a "simple" task within the frame of a publicly-controlled water plan; the water operator itself has to become "a planner", and therefore acquire both suitable geographical scale and vertical integration.

In other words, the task that water service operators have to deliver has more and more to do with decisions with higher degrees of autonomy. While in the "traditional" model public planning provides solutions and decides facilities and investment, in the "new" model asset management, project of solutions, gathering of consensus is more and more delegated to operators, while river basin plans mostly limit themselves to indicating the desired environmental functions (eg final quality of the river), leaving water users high discretion regarding the means to reach these objectives.

Finally, the fifth channel regards the need of water service management to interact with a larger number of conflicting stakeholders, with stronger emphasis to be put on the demand side rather than on the displacement of new assets and technology. In the "new" water policy network, the ranking of public water services, though still in some way predominant against the others, has lost the centrality it could have in the past. It is not obvious whether "what is good for water services is also good for water policy"; urban water users become one among the stakeholders of water policy.

Governance in the water sector becomes more and more a complex exercise, the meaning of the "public interest" less clear and univocal. In many countries, the trend towards privatisation also means the search for a new model of regulation, based on "arm's length" distance between water regulation and planning versus water service operators, seen as a counterpart rather than as a partner[6].

What is special with urban water ?

We have argued in this paper that water management systems and water institutions represent the

[5] The history of British Water Authorities is enlightening. When they were created in 1973, they were required to operate on a cost recovery base; however, charges used to be kept low for political reasons, while significant new investment had to be carried on; so the WA experienced a substantial rise of their debt, what was possible only because financial markets treated this debt as if was warranted by the central government. At the moment of privatising the Water Authorities in 1989, the British government had to write off this debt and absorbe it into the public debt, otherwise the whole operation would be a failure (Barraqué, 1995; Rees and Zabel, 2001)

[6] This does not necessarily imply that independent regulatory authorities are created, as in the British case; rather, it underlines the fact that as far as UWS undertakings become more autonomous and concerned on water service provision, definition and enforcement of water policy requires a more adversarial and formalized regulatory system.

most important limiting factor that poses a carrying capacity problem to urban and economic development. Urban growth requires increasing quantities of water and impact on the water environment, what generates increasing opportunity costs in terms of sacrificed environmental functions and impact on other communities and uses. The alternative is represented by an increasing sophistication of the WMS and related need to face financial costs and delegate decisions.

Both alternatives imply governance issues and potential conflicts. In the urban domain, therefore, we can distinguish many typologies of conflicts that we can easily trace back to the above discussed categories:

- Those regarding urban areas vs. other communities and water uses, typically regarding appropriation of water, segregation of water and land uses both upstream and downstream, status issues that concern the need to share problems at the river basin dimensions and increase the degree of centralization of water policy
- Those occurring among urban water users and regarding issues such as cost sharing and setting priorities for infrastructural development
- Those occurring among water service clients and management systems, especially concerning issues such as delegation of power and acceptability of admitting business-like approaches for managing public services
- Those regarding society as a whole and related to the boundary between social rights, solidarity and appropriation of economic rents. A typical case is represented by conflicting definitions of equity embedded in the polluter-pays principle and in the progressive taxation principle
- Those regarding present and future generations, with particular respect to the set-aside of adequate resources for compensating assets' deterioration and the many lock-in effects implicit in the development of urban networks, arising a non-reversible system whose capacity to adapt to future exigencies is limited.

An hypothesis that emerges from the works presented in this volume is that the first two typologies are more frequent in developing countries and wherever economic growth is related to massive urbanization processes. In a more advanced phase, urban growth becomes slower or even negative; suburbanization and connected sprawl-effects generalize the requirements for urban water services, while the possibility and political feasibility of further expanding the "water ecological footprint" of the city on the rest of the basin reduces. Thus priorities are shifted (the aim becomes making the best and most efficient use of available resources instead than searching for new ones), complexity of management and technical sophistication increases, financial costs become higher.

An important policy lesson can also be derived. In the first phase, costs are represented by externalities (on other communities) and by the construction of network systems; while in the second phase they are mostly related to improve the quality of the management system. In the first phase, typically, local resources are left deteriorating and water ecology constrained: enlarging the footprint looks easier and cheaper. In the second phase, in turn, costs of supply-side approaches grow suddenly higher or even infinite. The UWS has to adapt its strategy, once the deterioration of its assets is already significant and very difficult to invert. This lesson learned by developed countries – having now to adapt at very high costs their development trends in order to keep urban water use sustainable – shows that it has been myopic to indulge in supply-side approaches, while it would have been much more efficient, even in economic terms, to account for maintaining local water environmental functions and make provisions for it early enough.

Finally, contributions in this book show that the importance of social, political and institutional dimensions of urban water management is an important limiting factor, even though quite neglected so far. In a view to water policy that is dominated by engineering and economics, solutions may appear straightforward, once they are technologically feasible, economically sound and provided that the market is put in the condition to operate. This very outcome, however, is facing unexpected reactions and difficulties that cannot be simply dismissed as displays of Nimby syndromes, anti-market ideological stakes and Luddism. Dealing with this kind of conflicts is increasingly becoming

the emerging issue that water institutions will have to solve in the future. Since institutional change and social learning require time and are based on trust, legitimacy and ultimately on "social capital" this arises in a further important lesson: while it might seem little important in the short term to invest on this – through public participation and direct involvement – returns of this investment will appear much more valuable in the future.

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Figure 1 – An ecological economic framework for understanding urban water conflicts

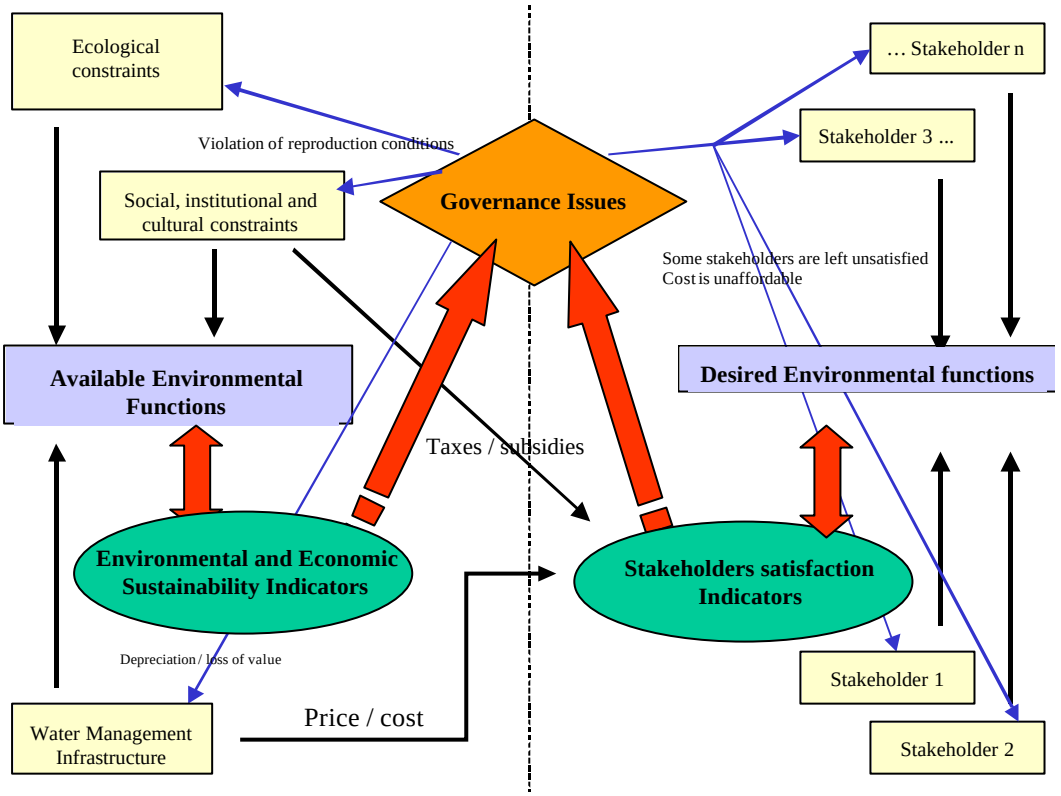

Figure 2 – Drivers of corporatization of water undertakings and private sector involvement