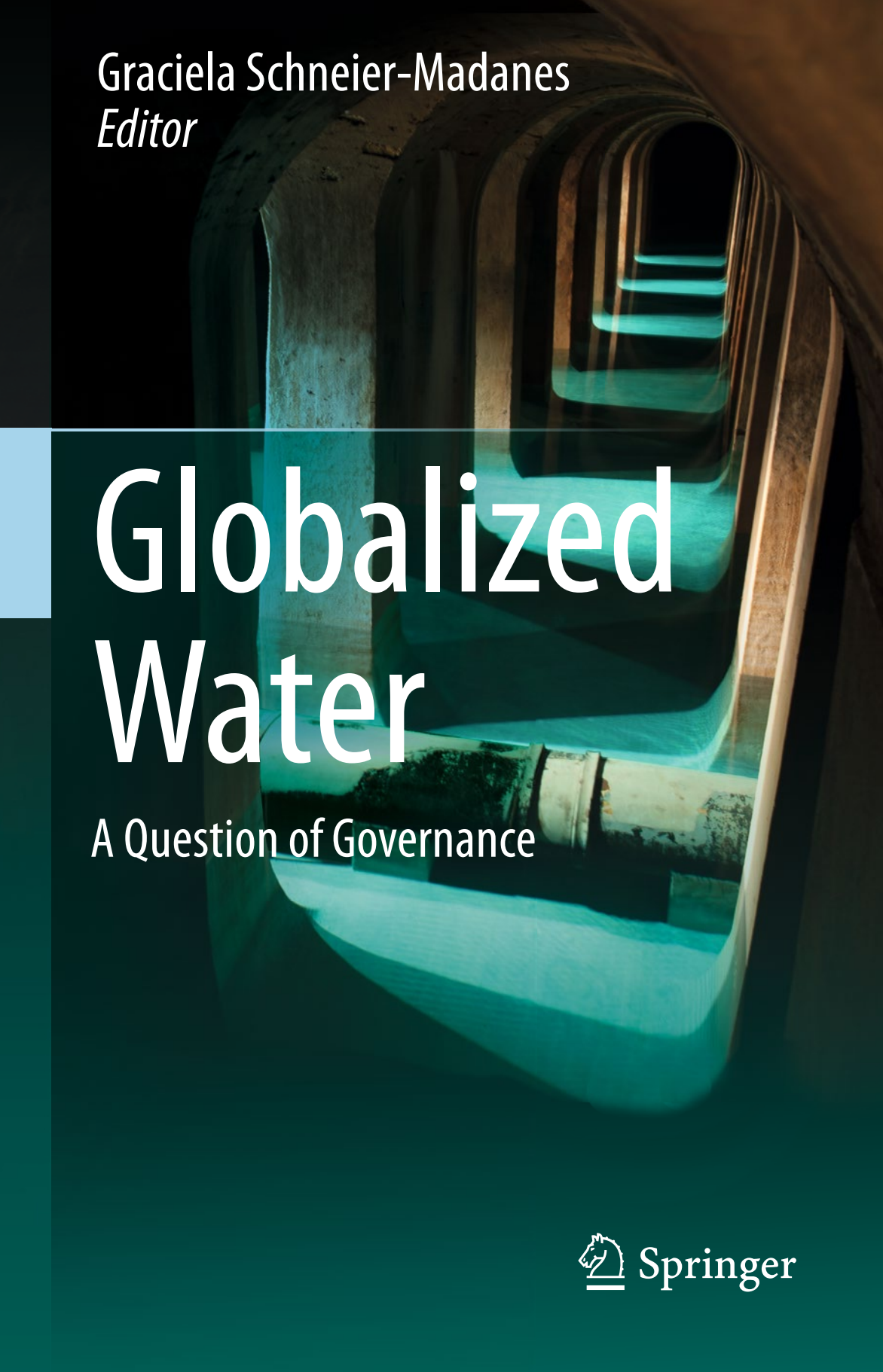
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Editor
Graciela Schneier-Madanes
CNRS Professor Emerita
Urban Water Research Network "rés-EAU-ville"
Paris, France

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ISBN 978-94-007-7322-6 ISBN 978-94-007-7323-3 (eBook)
DOI 10.1007/978-94-007-7323-3
Springer Dordrecht Heidelberg New York London

Library of Congress Control Number: 2014933530

Cover image caption: Montsouris Water Reservoir in Paris © GRUNBERG/MAIRIE DE PARIS

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

Amid all the books on water management, *Globalized Water* stands out for its originality in simultaneously addressing subjects that are normally considered separately. It deals not only with the management of the resource, but also with urban water and sanitation services, analyzing situations in Europe, India, the Middle East, the United States, and Latin America. It might be imagined that such an approach could run the risk of producing a kind of patchwork quilt of a book, in which the diversity of themes addressed and the variety of points of view expressed work to the detriment of any form of thorough analysis. But *Globalized Water* is by no means incoherent, a fact to which readers who are able to see the sudden emergence of essential similarities between themes will readily attest. Indeed, the approach makes it possible to import into specific fields of analysis elements of diagnosis, interpretation, and action from other, completely different fields.

Let us take the example of governance. The subject is omnipresent in this book, a fact that reflects, beyond the diktats of any putative academic fashion, its decisive importance in contemporary scientific and political agendas. This question, which has come to the fore relatively recently in the field of urban services, has long been central in terms of the management of the resource. After all, it is the same resource that is used by farmers for irrigation, tourists for bathing, energy companies for producing electricity, and local authorities for delivering drinking water. This situation has led to an increase in the number of disputes over both the quantity of water available for specific uses and the quality of a resource altered or threatened by being used for other purposes. From the technical, social, and economic points of view, the actors involved differ greatly from one another. They operate in separate spheres, enjoy equal legal status, and have no power of constraint over one another. Consequently, to avoid a scenario based entirely on the balance of power between various players, we must develop mechanisms for sharing water (such mechanisms have been used throughout the world in all historical eras) and protecting its quality (a more recent phenomenon). Such mechanisms presuppose shared diagnostics and common strategies. The more intensely the resource is used, the more interdependencies between users develop and the more central the question of governance becomes. As Chap. 2 in this book

recalls, it was in France in the 1970s that pollution of the water table gave rise to the patrimonial approach, the objective of which was to provide actors involved in disputes over water with a method of negotiating at the local level. The approach is still being applied, and Chap. 17 includes a description of current projects to develop instruments for shared analysis. Indeed, there is a broad consensus today about the importance of an integrated approach to water management and a participative management approach similar to the river basin agencies in France.

Apparently, the problem is entirely different for drinking water. In most cases, drinking water is delivered through services developed by public authorities. The roles of the various actors involved are defined in advance, and there is a degree of clarity in the way in which responsibilities are apportioned and hierarchies established. The public authority assumes responsibility for the service, defining its parameters and regulating it; the operator, in most cases working on its own, manages transport, treatment, distribution, and commercialization; and consumers expect to receive a high-quality service (drinkability, pressure, continuity) at a reasonable and affordable price. Thus, when problems arise there is a temptation to opt for an equally simplistic solution: if one of the actors fails to respect the role assigned, all that needs to be done is to bring it back into line. The consumers don't pay? We'll cut off their supply. The operator isn't efficient? We'll replace it. The public authority is at fault? Strict rules must be introduced to ensure that it functions more effectively. It seems that the drinking water sector is the industry par excellence of one-dimensional diagnostics and simple answers: "All we need to do is . . ." This attitude has encouraged a dogmatic approach to debates on the public-private issue (all that is required is to replace the inefficient public sector operator with a private sector operator, or to replace an exploitative private sector operator with a public sector operator), and on the issue of regulation (the decisions made by the public authority are inadequate and must be made subject to the authority of an independent regulator guaranteeing the objective rules of a good service). It can be observed that, in these debates, the institutional aspect of the problem is always emphasized far more than the issue of governance, even if, on occasion, the term "governance" is used to give a sheen of sophistication to policies defined exclusively by the reforming technocratic elite.

Spilled Water: Institutional Commitment in the Provision of Water Services, the emblematic book on this phenomenon, was published by the Inter-American Development Bank (Savedoff and Spiller 1999). As we have seen above, the process commences with the search for a scapegoat. Blame is laid at the door of governments, which succumb to the temptation to keep prices low, leading to poor quality, an insufficient expansion of services, inefficiency, and corruption. Now, "institutional structures" (it always seems to be institutional structures) "fail to ensure that governments do not behave in an opportunistic manner." To resolve this problem, Savedoff and Spiller suggested that the application of a "number of alternative institutional arrangements have been tried without success, but others hold promise including fragmentation, competition, and privatization."

Now, as several chapters in *Globalized Water* explain, these miracle cures have come to naught. Ironically, Savedoff and Spiller's book was published at the same

time as such approaches, which had been praised to the skies throughout the 1990s, began to unravel. It was no longer possible to believe that water services, constituted as an industry, were able to isolate and manage themselves like any other branch of industry once technical and financial responsibilities had been allotted among the dominant actors.

It was then that, in the drinking water and sanitation sector, concepts, methods, and practices of governance were imported from the field of the management of the resource. These concepts, methods, and practices included management and responsibility, cooperation, the implementation of continuous and adaptable processes, and the participation of all the stakeholders in complex decisions (Chap. 11).

Of course, these changes were partially associated with a growing interdependence between water users, which obliged urban services to become involved in the protection of the resource, negotiate with the actors concerned, and negotiate with the institutions responsible for waste disposal, spatial planning, etc. As Gottlieb and Fitz-Simmons (1991) demonstrated, this was one of the main reasons why private water companies in California altered their management approaches, thus branching out from the logic traditionally underpinning their offer. Chapter 5 of this book shows how the vital task of preserving the resource calls into question the dominant paradigm based on curative approaches and treatment (and on the integrated network: see Chap. 9). This task undermines the technological rent from which private companies benefit, thus potentially modifying relations between the public and private sectors, and promotes an interactive approach to organization that changes the role and place of consumers. Large private companies in the sector that have attempted to focus on integrated management by monitoring added value throughout the chain have understood this dynamic (see Chap. 4).

But the failure of privatization policies as well as of policies designed to promote the integral self-funding of the service also played a decisive role in this evolution. This failure can be attributed to the fact that the income generated by the approach was insufficient in terms of attaining two essential objectives, both of which were, at least theoretically, priorities: the universalization of access to the service and the sustainability of the economic model. What was called into question was not such and such a recommendation taken individually, but the very manner in which these policies were developed and implemented and the model of governance on which they were based. This could clearly be seen in cases in which the termination of a concession contract failed to solve the problem initially imputed to the operator, signaling instead the beginning of a laborious process involving the development of another form of public action.

It is in this context that approaches taken to managing the resource were first applied to urban water services. One text in particular provides a good illustration of this evolution: the report published by the working group set up in France by the Institute for Delegated Management (representing the sector's major companies), entitled *Contractualization, A Key to the Sustainable Development of Essential Services* (AFD 2008). What the report described is not a contract between a public authority and a private sector company responsible for delivering the service, but rather a gradual process of contractualization among all stakeholders with a view to

"escaping the vicious circle of commitments made and not respected, poorly negotiated compromises and exaggerated compensations" when a government "which has lost credibility due to not delivering on its promises decides to embark on negotiations" and "finding ways to create a dialogue and implement procedures that enable each of the parties involved to make themselves heard and move forward." When the government, the local authorities, the operators, and the users "are incapable of elaborating a common project, the contractualization process must involve all these stakeholders. Elaborating new strategies to furnish access to all these services calls for a change in the governance structure."

It would be worthwhile to examine the characteristics of water management and the solutions it suggests one by one to see how they are imported into the field of the management of urban services. That is why the rapprochement between the two fields provided by this book is so fruitful.

The approach is based on taking into account the multiplicity of interests at stake and the actors involved.[1] First and foremost, this includes local authorities—sidelined in terms of the decision-making process in many previous models—and consumers. Of course, since the early 1990s, many authors and institutions have insisted on the need to involve these actors in the decision-making process and the implementation of various programs, but most of the approaches applied in reality have not done so. The originality of the resource management approach is that it not only acknowledges a broad range of different interests, but also encompasses a variety of representations and legal systems. And one would search in vain for a consensus based on a single scale of measurement reflecting, of necessity, the moral and financial values of the dominant actors. As a result, the economic theories and methods applied to assess projects have been called into question, as "the diversity of social relations implies a multiplicity of processes of evaluation of and deliberation about the criteria on which values and prices should be based" (Vivien 2009). It is from this perspective that environmental and patrimonial economists developed their critiques of standard economics. In the field of urban water services, a number of practical critiques have been made of the methods used to assess projects economically, but no solid theoretical foundation for such critiques has yet been developed.[2] It should nevertheless be noted that this book is characterized by, among other things, a large number of references to institutionalist and conventionalist theories—previously a rare phenomenon in the field.

[1] The notion of the "stakeholder" was defined in the early 1980s in terms of a dichotomy between the power of shareholders and that of the many actors concerned by the strategies of corporations, which, according to stakeholder theory, are entitled to a say in the decision-making process. The notion was quickly taken on board in the management of water resources (see Chap. 18), and is now emerging in the field of urban services. For example, Suez Environnement holds work meetings with stakeholders in New York and Paris.

[2] These lacunae become evident, for example, whenever the subject of the right to water is raised. If the rapprochement with water management is pushed to its limits, we should one day ask ourselves if we should adopt, concerning urban services, the kind of discount rates applied by Nicholas Stern in *The Stern Review on the Economics of Climate Change* (2006).

Another characteristic of approaches to the resource is their insistence on negotiation, understood as a process defining not only projects, but also, and above all, the rules of the game, rules which are not set in stone beforehand. The actors are only entirely constituted, in terms of their identity, autonomy, and objectives, by the process itself. It is for this reason that terms such as "process," "learning process," "co-production," and "evolutive solutions" are to be found in every chapter on the management of the resource. However, these terms appear just as frequently in literature on urban services (Chap. 8 and AFD 2008). Such approaches are, therefore, the exact opposite of the kind of normative, turnkey models so dominant in the 1990s, which defined the preconditions of good governance and described how they should be implemented. Those models included a strict hierarchy of actors and a series of well-defined, stable, and unquestionable rules. Their emblematic figure was that of the regulator, an entity independent from all other actors and capable of resolving conflicts on a rational basis. And if the regulator were tempted to succumb to external pressures, limits would be imposed on its "embedded discretion" and strict rules of behavior drawn up by means of a highly detailed "regulation contract" so that the government, subject to criticism, could credibly maintain, "It is beyond my control" (Bakovic et al. 2003).

Although dissenting voices could be heard (Corrales 1998), for a time those models appeared to be beyond criticism, even if daily experience demonstrated that whenever they were implemented their practical results differed from those predicted in theory. As Jaglin (2010) observed, decentralization, "often adopted under external pressure exerted by the international community and providers of funds, but everywhere reappropriated, hybridized, and finally subjected once more to the approaches of individual companies, in practice bears only a passing resemblance to the normative approaches described in numerous documents." The same could be said of PPPs (public-private partnerships) promoted in the 1990s, or of the figure of the regulator. In Mali, as Blanc explained (AFD 2008, p. 43), "the key concept of the regulator (the Commission for the Regulation of Electricity and Water) has been understood in a variety of ways: sometimes as the body responsible for correcting the imbalances between the North and the South, sometimes as the defender of consumer interests, sometimes as a neutral observer, sometimes as the guarantor of government positions, and sometimes even as the body which anticipates the positions of the President." And it is amusing to observe, in Chap. 7, that even the famous French model promoted around the world has little to do with how services are really managed in France. The dominant paradigm of the 1990s was based on a series of myths.

The key word today is "negotiation." Understood in the sense defined above, it is anything but the horse-trading that traditionally goes on prior to the signing of a contract. Even if the result of the process takes the form of a contract—which is often the case—when it does so, the notion itself takes on a radically different meaning. In effect, traditional contracts presuppose that the identity of the actors involved, the rules of the game, and the overall objectives already have been established. "[T]he key success factors, vital if the model is to be reproduced effectively, are the prior existence of a transparent, stable, and established

regulatory and institutional framework, as well as of partnerships between public and private actors in which all the parties fully assume their roles vis-à-vis their respective missions" (Heuraux 2008). What we observe in reality are arrangements that lack outlines for relationships between different actors, immutable commitments associated with potential sanctions, and legally equal partners. The result is not just one contract, but a multitude of contracts that differ widely from one another. The chapters in the second section of this book, Governance, Conflict, and Participation, clearly demonstrate that this is the case in terms of the management of the resource, but exactly the same ideas are to be found in the chapters on urban services, and in the AFD document, in which the term "contract" was replaced by "contractualization process," a process which gradually generates a network of commitments that are very different from each other, exist side-by-side, and complement one another "according to a strategy focusing on gradual improvements (levels of service, actors involved, their degree of involvement)" (AFD 2008, p. 20). Not only are there many different kinds of contracts, but different contracts are drawn up not only in terms of the various phases of works to be carried out, but also in function of the involvement of the actors: "the role of the actors, and their degree of involvement in guaranteeing access to services must be evolutive" (AFD 2008, p. 172). The process is a long-term one which, because it implies transformations affecting society as a whole, is by no means smooth or linear.

We are thus far from the simplistic debates—simplistic because they are one-dimensional—over the public or private sectors, national or local water management, contracts or regulation, integral self-funding or a free service, and the quest for a miracle cure. The real issue at stake is the social construction of a collective approach to the provision of basic services. It remains to be seen when and how such collective action will become possible.

The Limits of Consensus

When applying approaches developed in the water management sector to urban services, we are, in effect, confronted by the limits observed in the former and the questions raised by the latter. The criticism frequently leveled at the patrimonial approach is that it is based on an idealized vision of social relations in which everything is worked out by consensus, and on a process in which actors supposedly learn how to cooperate with each other and reconcile their respective interests, none of which are asymmetrical. The figure of the regulator is replaced by that of the mediator. However, this model tends to be apolitical. And, as we know, political concerns are omnipresent. Many of the chapters in this book examine unresolved conflicts, both in terms of approaches to water management (Chaps. 12 and 13) and to services (Chaps. 14 and 15). Then there are the reforms that are only applied after 10 or more years of debate and conflict, as was the case, for example, in France. This means that the balance of power between various actors is a decisive factor and

that compromises are sometimes impossible to reach. When talking about a project to install paying water stations in the city, a spokesperson for a Mumbai political party complained: "they [bureaucrats] have come up with one policy for all and that is what we are opposing" (Chap. 14). And there is no shortage of examples of authorities preferring to close their eyes to people in poor areas illegally siphoning off water from the local network, rather than acknowledging the existence of the practice and legalizing it. Presumably they prefer to keep up the pressure on inhabitants of those areas by ensuring that their behavior remains illegal. In the working class neighborhoods of towns and cities in developing countries, the issue of water immediately implies that of the place of poor people in the urban space, a question that by no means attracts a consensual response. How can shared conclusions be reached in cities characterized by an especially high level of inequality in terms of income, access to basic services, and exposure to pollution?

A number of articles in this book feature analyses of access to water in neighborhoods deprived of it. For example, Chap. 14 demonstrates that the inhabitants of working class neighborhoods are unaware of the normative and anonymous supplier/client relationship and live in a world of governance based "on informal compromises and clientelist practices often routed through local elected representatives." In India and elsewhere, relations between the people dwelling in shantytowns and local politicians who represent them have little to do with the model of patrimonial negotiation. Indeed, those relations are characterized by the kind of populism that is so disparaged in that model. Elsewhere, the systematic politicization of the debate provides a way of altering the balance of power, a necessary goal since the kind of symmetry required for the negotiation model to work does not exist.

In yet other parts of the world, political arguments ably apply the notion of the right to the city and its services either to justify the siphoning off of water and electricity or to demand compensation from the state. The shantytown identity, which is both ambivalent and changing, is often evoked in an attempt, in the name of defending the weak against the strong, to legitimize a wide range of practices depending on the relationship between local inhabitants and those responsible for running the system. This relationship is never entirely defined by sectorial issues (water) and rarely provides the kind of conditions that encourage cooperation.[3] On the other hand, in residential neighborhoods, debate about the collective environmental issue often descends into a NIMBY (not in my backyard) scenario in which a kind of exclusive communitarianism benefits the strongest.

The issue is an especially thorny one in that the patrimonial model focuses to such a large degree on promoting a local management approach in which the actors work together to deal with problems where they arise. Indeed, the approach

[3] Zaki (2009) provided a remarkable analysis of this subject. It should be noted that, in his article, as in Chaps. 8 and 15 of this book, the observation was made that the introduction of a private company substantially modifies the rules of the game and considerably changes this kind of relationship.

is often implemented within a community development framework in working class neighborhoods bereft of infrastructure. Local action, the diversity of technical and organizational solutions, adaptability, the direct responsibility of stakeholders, and the empowerment of inhabitants are the key concepts. As Chap. 14 demonstrates in an analysis of the situation in Mumbai, these concepts are already applied in local solutions cobbled together in working class neighborhoods. These solutions are characterized by extreme diversity not only in terms of organization, management, and funding, but also of the actors involved.[4] But isn't it at this scale that we obtain an overall view of the service delivered in major cities and are thus able to elaborate a technical, organizational, and financial strategy capable of managing and coordinating diversity?

Of course, the advocates of the patrimonial approach insist on the need for a global analysis enabling all actors involved to position themselves within a framework that takes into account factors beyond their immediate interests and to acknowledge the existence of interdependencies and the attendant problems that need to be addressed. Interlinking scales of analysis making it possible to think both locally and globally at the same time and procedures effectively articulating those scales have yet to be developed. This is the subject tackled in Chap. 3.

Problems also persist in terms of defining appropriate methods of sharing costs between all of the actors.[5] Many chapters in this book address the question of the universalization of access to the service, which remains profoundly unequal in a large number of countries. The justified insistence on recovering investment and operational costs in the long term was often translated in the 1990s in the ideology of full cost recovery, the objective of which was to recoup from every user the totality of the marginal costs imputable to them in terms of cubic meters consumed based on implacable analytical accounting procedures.[6] It seems that we have not fully taken to heart the lessons of the water management approach, based as it is on compromises making it possible to recover all costs by means of a diversified and evolutive ensemble of funding instruments and approaches to distribution informed by a logic of cost sharing. And neither have we sufficiently taken into account the historical experience demonstrating the crucial role of budgetary funding in terms of the generalization of access to water (Chap. 7).

[4] Indeed, we can only marvel at the infinite subtleness of the creative approaches to collective management and the imagination by which they are underpinned, characterized as they are by borrowings, derivations, and hybridizations of all kinds, which have little or nothing to do with canonical models.

[5] It should be noted in this regard that the wealth of studies on the subject of full cost recovery is reflected by the paucity of studies on how, and over what period of time, costs are distributed between all the actors in the service. The results of such studies may be surprising. The AFD has initiated an exploratory study on this subject.

[6] Even in France, the principle of full cost recovery based exclusively on the number of cubic meters of water consumed is currently being called into question. Indeed, historically, this approach to pricing was abandoned in all network services when it was realized that they had to be understood in terms of systems (Mueller 1993).

The appearance on the international agenda of the task of making the service universally accessible, and the struggle to give concrete expression to the term "the right to water,"[7] have had the effect of increasing the number of calls for new funding instruments and price structures. It would be difficult today to imagine a concession contract that failed to provide, as was the case in Argentina, any measures in favor of the least well-off users in terms of prices or access to the network (Chap. 8).

Gabon, for example, has three kinds of intertwined subsidies: between services, with electricity subsidizing water; between classes of users, with the better off compensating for the lack of ability to pay among the less well off; and between territories, with cities subsidizing rural areas. Measures of this kind were explicitly prohibited in the dominant doctrine of the 1990s:

- Equalization between services, even though the examples provided by Germany and Colombia demonstrate how the approach can, at least in certain circumstances, be successful by providing a transversal and integrated vision of urban services rather than a purely sector-based perspective.
- Equalization between consumers,[8] although Posner (1971) demonstrated this was an approach that was equally effective as—if not more effective than—other methods of redistribution.
- Equalization between territories, which should be considered for a moment because the question is raised in many chapters in this book and is intimately linked to the issue of governance. We find this type of equalization in all countries in all eras, despite the fact that it was pictured in the 1990s as a dunderheaded strategy. The current insistence on local management means that the question has once again become vitally important; as Graham and Marvin (2000) pointed out, an over-emphasis on the approach involves a risk undermining the unity of the city, with the wealthiest areas becoming autonomous, leaving the poorest to fend for themselves. Indeed, a number of existing equalization mechanisms are under threat.[9] On the other hand, experience teaches us that a centralized approach, on the national level for example, by no means guarantees territorial equity. It would be well worth conducting an in-depth study of the development of new mechanisms and new scales of cost sharing, either explicit or implicit, in agglomerations and regions and at the national scale.

[7] See the Colombian bill (Ley 047/08).

[8] To discredit this solution, a number of caricatural examples were used, for example the endlessly quoted case of Guayaquil in Ecuador, where 90 % of households pay subsidized rates, and Mumbai (Chap. 14) where industry, which consumes 20 % of the water produced, generates 80 % of the income of the service.

[9] Even in France, the hidden mechanism employed by private companies to equalize their profit-making and loss-making contracts is threatened by a growing demand for transparency in terms of individual contracts. This equalization mechanism was largely perverse, but its disappearance has made it necessary to invent other approaches in a similar vein that have not yet been developed.

It is also unclear what exactly we are talking about when we call for consensus. The International Organization for Standardization (ISO) has examined the question and come up with the following definition. Consensus is "a general agreement, characterized by the absence of sustained opposition to substantial issues by any important part of the concerned interests and by a process that involves seeking to take into account the views of all parties concerned and to reconcile any conflicting arguments" (ISO/CEI Guide 2 1996). Does this definition, which makes it possible to certify so-called good practices, correspond to what the history of water services teaches us? It is enough to think of the Marxian Oriental despotism of hydraulic societies or civilizations such as China to doubt that this is the case.

At certain times in history, water management was marked by stability in the rules of the game, or, in other words, the rules of the distribution of responsibilities, tasks, and funding models. But that can happen in very different social, economic, and political configurations. In Spain, a solid coalition based on an authoritarian regime made it possible, over a long period of time, to implement an ambitious policy for transferring huge quantities of water between river basins. When the coalition, whose approach focused entirely on the service that it was delivering, fell apart and became obsolete, the policy was abandoned (Chap. 13). In regard to India, Chap. 14 describes a consensus within the state apparatus made up of civil servants and governors that reflects the interests of the elites. These configurations are associated with very different approaches to sharing costs and profits: some services have the effect of excluding much of the population by essentially targeting economic activities and the upper echelons of society, sometimes exclusively funded by the income generated by the service itself, sometimes publicly funded. Everything depends on the coalition that supports them, on its cohesion and its capacity to maintain the same balance of power and the same hegemony. Is it capable of resisting the pressure exerted by the popular classes struggling for access to the city and its services, or will it be able to come to a compromise enabling it to manage that pressure and retain its advantages? Is it capable of finding alternatives to public funding, which has dried up in the recession, or to a price structure that is no longer sustainable, while at the same time keeping up its investments?[10]

If it is not capable of this, then the existing model enters into a crisis and ceases to be sustainable over time technically, economically, or politically. It is, therefore, the nature of this crisis that must be analyzed (what made the previous model unsustainable, and why is the existing coalition unable to adapt?) if we are ever to overcome it. If many institutional and financial solutions can be found for practical problems, a new question emerges: Which new coalition will be able to promote, legitimize, and defend them? A number of cases could be mentioned in which such crises are never resolved, a situation that engenders a gradual and cumulative

[10] In the terminology used in convention theory, this would be referred to as cooperation as a collective capacity for adaptation.

deterioration in the service eventually affecting those who profited from it the most.[11] In such circumstances, numerous individual and collective attempts are made, often in an ad hoc fashion, to ease the crisis. Unfortunately, most of the time, they only end up making things worse. Sometimes, the previous coalition falls apart and new configurations of the public policy community arise. These new configurations can either usher in a period of stability or reveal themselves to be too contradictory and fragile to be effective. Sometimes heteroclite coalitions are formed, capable of blocking reform but not of creating the conditions required for a stable agreement based on a new model.

In the 1970s, authors like Jean Lojkine, writing on France, and Samuel Jaramillo, writing on Colombia, attempted to identify the nature of these basic services and the contradictions that developed within them with a view to understanding their dynamics. But over the last few years, researchers have placed too much emphasis on the ideological debate between management models without paying sufficient attention to the corresponding issue of how public policy communities have changed—an issue addressed by authors working on the telecommunications and energy sectors. In the article on contractualization mentioned above (AFD 2008), a number of authors insisted on the eminently political character of the procedure adopted, "a political approach providing structure at the level of a country or a local territory" that helps "all the actors become aware of the fact that their chances of successfully carrying out their functions and attaining their objectives depend on the degree to which other partners are integrated into the approach" (AFD 2008, p. 30). It is clear to see that, depending on whether they are applied to the management of a local patrimony (resource, network) or to the creation of new national rules, these observations have neither the same content nor the same meaning. A question runs through the pages of this book: How does a society define a long-lasting approach to managing the resource to deliver essential collective services? Before we ask how collective action becomes possible, we must first ask ourselves whether the cooperative paradigm can, on its own, take into account the reality of the situation.

Professor Emeritus and Sociologist Henri Coing
Institut d'Urbanisme de Paris, France

References

AFD (2008) La contractualisation, une clé pour la gestion durable des services essentiels. AFD, Paris
Bakovic T, Tenenbaum B, Wolf F (2003) Regulation by contract. Energy and Mining Sector Board Discussion Paper, No. 7, World Bank
Corrales ME (1998) La regulación en períodos de transición: el caso de los servicios de agua potable y saneamiento en America Latina. In: Barrionuevo Filho A, Lahera Parada E (eds) Qué hay de nuevo en las regulaciones? Telecomunicaciones, electricidad y agua en América Latina. Eudeba/Clad, Buenos Aires

[11] This is the impasse in which water policy in Argentina was trapped, a situation described in Chap. 8.

Graham S, Marvin S (2000) Splintering urbanism: technology, infrastructure networks and the 21st century city. Routledge, London
Gottlieb R, Fitz-Simmons M (1991) Thirst for growth. The University of Arizona Press, Arizona
Heuraux (2008) L'électrification rurale des pays en développement. In: AFD, La contractualisation, une clé pour la gestion durable des services essentiels. AFD, Paris
Jaglin S (2010) Services d'eau et décentralisation en Afrique de l'Ouest : réflexions à partir de petites villes du Bénin. In: Schneier-Madanes (ed) L'eau mondialisée, la gouvernance en question. La Découverte, Paris, pp 199–218
Mueller M (1993) Universal service in telephone history, a reconstruction. Telecommunications Policy, No. 18-19
Posner RA (1971) Taxation by regulation. Bell J Econ 2(Spring):22–50
Savedoff W, Spiller P (1999) Spilled water: institutional commitment in the provision of water services. IDB, Washington, DC
Vivien FD (2009) Pour une économie patrimoniale des ressources naturelles et de l'environnement. Monde en Développement 145(1):17–28
Zaki L (2010) Electrification temporaire des bidonvilles marocains. Politique urbaine 120(December): 45–56

Acknowledgments

Globalized Water never would have been possible without the tremendous commitment and contributions from the authors. I hope all of them found the experience of preparing this collective book rich and fruitful and that this effort proves an important step for them towards future research, interdisciplinary knowledge, and international collaborations. Originally published in French, this revised English version was necessary to disseminate the outcomes of our work and expand the basis for French scientific collaborations in water and social sciences in Europe and the world. One of the aims of the book is to demonstrate a particular avenue for building interdisciplinary research through interactions in social science disciplines.

This book is first and foremost the product of the Centre National de la Recherche Scientifique (CNRS) Urban Water Research Network "rés-EAU-ville."[12] Contributors from Europe's Sustainable Water ActioN (SWAN) program[13] and other organizations were also invited to add to the water dialogue, and I would like to express my gratitude to all of the researchers and scientific teams who helped make the book a reality.

As director of the "rés-EAU-ville" and editor of *Globalized Water*, I especially would like to thank a number of others whose help and contributions were critical to the publication of the book.

I gratefully recognize Henri Coing, professor emeritus at the Institut d'Urbanisme de Paris and member of the Conseil d'Administration of Eau de Paris; Marie-Françoise Courel, professor and former president of the École Pratique des Hautes Etudes and former director of the CNRS Social and Human Sciences Department; and Richard Hanley, editor of the *Journal of Urban Technology* and

[12] The "rés-EAU-ville" Groupement de Recherche GDR 2524 du CNRS, first published in French as Schneier-Madanes G (ed) (2009) *L'eau mondialisée, la gouvernance en question*. La Découverte, Paris.

[13] Europe's first INCO (International Cooperation) grant in the U.S. was awarded in 2012 to the 4-year program Sustainable Water ActioN (SWAN), which is made up of a team of U.S. and European Union scientists.

English professor at New York City College of Technology of the City University of New York, who offered their enduring support.

In addition, the peer reviewers played a fundamental role; their remarks and the time they generously dedicated helped improve the quality and content of the chapters and the potential dissemination of the book. The peer review team included Jeremy Allouche, University of Oxford (UK); David Aubin, Université Catholique de Louvain (Belgium); Horacio Capel, Universidad de Barcelona (Spain); Henri Coing (France); Pierre Cornut, Université Libre de Bruxelles (Belgium); Richard Hanley (USA); Pierre-Yves Jacopin, Université Paris 3 (France); Jules Lamarre, Université de Laval (Canada); Emanuel Lobina, University of Greenwich (UK); Velayodum Marimoutou, CNRS Institut Français de Pondichéry (France); Géraldine Pflieger, Université de Lausanne (Switzerland); and Frédéric Varone, Université de Genève (Switzerland).

Anne Le Strat, president of Eau de Paris; Klaus Nutzenberger, head of the European Bureau of German Cities and Municipalities; and Pierre-Frédéric Tenière-Buchot, governor of the World Water Council, were the first to embrace the idea of publishing the book in English to contribute to the European and international conversation.

Thomas Maddock III, professor and former head of the Department of Hydrology and Water Resources at the University of Arizona; Katharine Jacobs, assistant director for climate adaptation and assessment, Energy and Environment Division, White House Office of Science and Technology Policy; Mario Gandelsonas, director of the Center for Architecture, Urbanism and Infrastructure at Princeton University; László Hayde, senior lecturer in irrigation engineering at the UNESCO-Institute for Water Education; Ghislain De Marsily, professor and member of the French Academy of Sciences; and Pierre Ribstein, professor and head of Sisyphe research unit, CNRS and Université Pierre et Marie Curie, provided invaluable exchanges and insight during the preparation of the English edition.

Stephanie Doster, an editor at the University of Arizona, was the most creative, thorough, and professional assistant editor I could have asked for.

Laura Carre-Diaz, liaison between editors, authors, peer reviewers, and the publisher, proved instrumental in monitoring the book's progress and ensuring a smooth editing process.

I also extend my thanks to the two publishers, François Gèze, director of Editions La Découverte, who enthusiastically approved the idea of the English edition, and Margaret Deignan, publishing editor, Environmental Sciences Unit at Springer in Dordrecht, the Netherlands, whose guidance and patience saw us through the project.

Caroline Tompkins played a key role in preparing the submission for the English edition. Michael Lavin translated the majority of the texts and helped ensure the accuracy and fluidity of each chapter. The City of Paris kindly provided the photograph on the book cover.

Finally, this work was possible thanks to support and advice from several institutions: the CNRS Institute for Human and Social Sciences; the CNRS Institute of Ecology and Environment; the Joint International Unit on Water, Environment

and Public Policy, UMI 3157 CNRS and the University of Arizona; the "Governance of Water in the Americas" CNRS International Network (GDRI); and the CREDA Centre de documentation sur les Amériques, CNRS and the Université Paris 3 Sorbonne Nouvelle, where the "rés-EAU-ville" was established.

Contents

Contributors

Authors

Pierre Bauby Political Scientist and Professor, Université Paris 8, Paris, France

Lise Breuil Engineer and Project Officer, Agence Française de Développement, Paris, France, and AgroParisTech-Engref, Joint Research Unit "Water Management, Stakeholders and Uses," Paris, France

Alexandre Brun Geographer and Assistant Professor, Université Paul-Valéry (Montpellier 3), Montpellier, France

Iratxe Calvo-Mendieta Economist and Assistant Professor, Université Lille Nord de France and Université du Littoral-Côte d'Opale, Dunkerque, France

Pascal Chauchefoin Professor and Economist, Centre de Recherche sur l'Intégration Economique et Financière, Université de Poities, Poitiers, France

Henri Coing Professor Emeritus and Sociologist, Institut d'Urbanisme de Paris, France

Felipe Correa Architect and Associate Professor of Urban Design, Department of Urban Planning and Design, and Director, Urban Design Degree Program, Harvard University Graduate School of Design, Somatic Collaborative, New York, USA

Bernard de Gouvello Engineer and Urban Planner, Centre Scientifique et Technique du Bâtiment, Laboratoire Eau, Environnement et Systèmes Urbains, Ecole Nationale des ponts et Chaussées, Université Paris-Est and AgroParis Tech, Marne La Vallée, France

Leandro del Moral Ituarte Professor and Geographer, Departamento de Geografía Humana, Universidad de Sevilla, Sevilla, Spain

Cécile Féré Urban Planner and Researcher, Agence d'Urbanisme pour le Développement de l'Agglomération Lyonnaise, Institut d'Urbanisme de Lyon, Lyon, France

Jean-Marc Fournier Professor and Geographer, Universite de Caen, Caen, France

Stéphane Ghiotti Geographer and CNRS Assistant Professor, Laboratoire Acteurs, Ressources et Territoires dans le Développement (Art-Dev), Université Montpellier 3, Montpellier, France

Lætitia Guérin-Schneider Water Management Scientist and Researcher, Institut National de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture (IRSTEA), Montpellier, France

Hoshin V. Gupta Professor and Hydrologist, Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona, USA

Nuria Hernández-Mora Researcher and Economist, Departamento de Geografía Humana, Universidad de Sevilla, Sevilla, Spain

Nick James Geographer and Associate Lecturer, Open University, Cainscross, Stroud, UK

Abel La Calle Lawyer and Professor, Fundación Nueva Cultura del Agua, Zaragoza, Spain

Francesc La-Roca Economist and Professor, Department d'Economia Aplicada, Universitat de València, Spain

Emilio J. Lentini Associate Professor and Economist, Centro de Estudios Transdisciplinarios del Agua, Universidad de Buenos Aires, Buenos Aires, Argentina

Sylvie Lupton Economist, NEGOCIA Research Center on Trade, Paris, France

Olivier Petit Economist and Assistant Professor, Université d'Artois, Arras, and Researcher, CLERSE (CNRS/Université Lille 1), France

Sylvain Petitet Urban Engineer and Innovation Director, EGIS France Group, Lyon, France

Franck Poupeau Sociologist, CNRS Assistant Professor, and Director, iGlobes Joint International Unit, CNRS/University of Arizona, Tucson, Arizona, USA

Anne Rivière-Honegger Geographer and CNRS Professor, "Environnement-Ville-Société" (CNRS/Université de Lyon), Lyon, France

Annabelle Sauvent Economist and Assistant Professor, Centre de Recherche sur l'Intégration Economique et Financière, Université de Poities, Poitiers, France

Franck Scherrer Geographer and Director, Institut d'Urbanisme, Université de Montréal, Montréal, Canada

Guido Schmidt Environmental Engineer, Fundación Nueva Cultura del Agua, Zaragoza, Spain

Aleix Serrat-Capdevila Hydrologist and Assistant Professor, International Center for Integrated Water Resources Management (ICIWaRM-UNESCO), Alexandria, Virginia, and Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona, USA

Chad Staddon Geographer and Senior Lecturer, Department of Geography and Environmental Management, University of the West of England, Bristol, UK

Juan B. Valdés Professor, Department of Hydrology and Water Resources, University of Arizona, Tucson, Arizona, USA

Franck-Dominique Vivien Economist and Assistant Professor, UFR Sciences Économiques, Sociales et de Gestion, Université de Reims Champagne-Ardenne, Reims, France and Laboratoire des Sciences Economiques de Reims – REGARDS" (EA 6292), Reims, France

Fabienne Wateau CNRS Professor, "Laboratoire d'Ethnologie et Sociologie Comparative – LESC" (UMR 7186, CNRS/Université Paris Ouest Nanterre La Défense – Paris X), Nanterre, France

Marie-Hélène Zérah Economist and Researcher, Centre de Sciences Humaines and Institute of Research for Development – IRD, New Delhi, India

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Chapter 1
Introduction

Graciela Schneier-Madanes

In the abundant literature on the topic of water, *Globalized Water* offers an original contribution to the discourse: a collective and contemporary analysis of water resources and supply from a perspective clearly grounded in the social sciences.

The underlying idea of this book is that, in terms of water, we are facing a turning point characterized by changes in scale and time that are causing (and will continue to cause) major conflicts and modifications to management systems, public policy, and living conditions. This defining moment has occurred in a context of economic, political, and cultural globalization that have transformed the nature of water and the functions attributed to it. Several formerly cutting-edge ideas have either been sidelined or lost their luster, and new power relations in water governance have emerged.

The goals of this book are to analyze globalized water, outline the way in which its governance structures are organized, and examine the paradoxical way in which management approaches continue to be governed by local and regional concerns. The book does not provide a tome on water in the twenty-first century, but rather it offers an original perspective on the subject. It is not the aim of the book to cover the entire field of water and the social sciences or to provide a platform for all the researchers working in the sector. Instead, *Globalized Water* focuses on the scientific questions that shed light on mechanisms that dictate how the sector operates now.

Understanding this phenomenon and bringing elements of knowledge and interpretation to bear on short- and long-term changes within the sector involve the combined analysis of a number of themes that are usually studied separately such as water resources and supply. The multiplicity of approaches developed in the following pages provides a way of deconstructing and explaining the established

G. Schneier-Madanes (✉)
CNRS International Research Network on Governance of Water in the Americas, Urban Water Research Network "rés-EAU-ville" (GDR 2524 CNRS), and the Joint International Unit on Water, Environment and Public Policy (UMI 3157, CNRS/University of Arizona), CNRS/CREDA, 28 rue Saint Guillaume, Paris 75007, France
e-mail: graciela.schneier@univ-paris3.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_1,

discourse on water while revealing its underlying logics, contradictions, fault lines, lacunae, and, of course, successes.

There is near universal agreement that water is one of the major issues of the twenty-first century. Researchers, managers, opinion makers, political activists, and CEOs active in the market all acknowledge the fact that we are facing a "water problem" or even a "world water crisis" (Matsuura 2007). From this multiplicity of voices, a degree of consensus has emerged concerning the priority that should be given to water to safeguard our common good. Elsewhere, however, sometimes radical differences of opinion have become apparent, either in terms of philosophical presuppositions, objectives, methods, or even the meaning accorded to specific terms.[1] This is due to the fact that over the last 20 years, the foundations of local and national water systems have been rocked by a wave of changes: globalization, the continuing development of the European Union (EU), the liberalization of the services sector, the privatizations of the 1990s, the inevitable growth of counterpowers at the local level, the still-embryonic recognition of user opinion, and the integrated approach promoted by the advocates of sustainable development.

Confronted by the mosaic of ideas, actors, practices, and systems that characterize the question of water, this book focuses on a specific and fundamental aspect of the problem, namely the effects of globalization on the sector. This objective derives its legitimacy from the backgrounds of the authors, independent researchers and scholars affiliated with the Paris-based Centre National de la Recherche Scientifique (CNRS) Urban Water Research Network "rés-EAU-ville" (GDR 2524).[2]

1.1 Constructing a Scientific Field: Water and Society Interactions

Water establishes a fundamental social relationship.[3] To the degree that human beings cannot live without it, water obliges us all to gather together.[4] This is true for every type of environment (arid, tropical, urban, and rural). Water is at once a factor

[1] A frequently evoked false argument focuses on the abundance or scarcity of stocks or reservoirs of water that may one day run out, like oil. But since the volume of available water on the planet is practically constant, scientists prefer to think in terms of the perpetual cycle of freshwater (evaporation, condensation, precipitation, flow) (De Marsily 2009).

[2] "Rés-EAU-ville" Groupement de Recherche du CNRS (Centre National de la Recherche Scientifique)/CNRS Urban Water Research Network.

[3] Freshwater accounts for approximately 2.5 % of the Earth's water (rivers, groundwater, oceans, and ice caps). But water useful to humanity is to be found in water flows, which are a source of re-circulated freshwater (an annual 43,000 km^3) (Margat and Andréassian 2008). Globally, the freshwater used by mankind for agriculture, energy, industry, towns, and cities accounts for less than one-tenth of annually available, renewed water, or, in other words, 3,800 km^3 per year. Of the volume taken from natural sources, 10 % is used for human consumption (drinking water/domestic water) and a further 10 % is definitively consumed (not returned to the natural environment after use).

[4] Water is conditioned by its environment (climate, geomorphology), which dictates the amount of time required to obtain it. Certain properties of water have a decisive influence in terms of social

of social and territorial cohesion and a source of conflict. The availability and quality of the resource largely determine the form and development of given societies. Reciprocally, the nature of society determines the function and value accorded to water, as well as the modes of access to and uses made of it.[5] From a historical point of view, such interactions exist in all societies that can be differentiated on the basis of the way in which they access water, regardless of whether they possess a centralized state.[6] Choices concerning techniques, management approaches, and the allocation of water to various sectors (agriculture, industry, energy, and human consumption) reveal much about the societies and individuals who make them (Schneier-Madanes and de Gouvello 2003). Considered from this point of view, the study of water reveals the way in which societies function and does much to illuminate a number of aspects of the process of globalization. This is the perspective that informs the work of the "rés-EAU-ville" and, naturally, *Globalized Water*.

But what are the preconditions of the emergence of a scientific field combining water and the social sciences? From a social science point of view, the field has emerged against a scientific background divided "between globalization and the subject" (Wieviorka 2007) in a context characterized by the fragmentation of major theories (Fassin 2010) and by a dramatic increase in the number of problems, sites, and regions studied in societies. In the 1980s, water was appropriated as a field of study by a number of disciplines, including economics, political science, sociology, and anthropology. Each discipline applied its own methods and analytical categories. Within this perspective, readers will notice that several of the chapters in this book make use of the theory of international relations and the nation-state (water and Europe). Others refer to major social theories (Marxism, structuralism), take inspiration from various theories of the notions of conflict and power, or draw on analyses opposing the primacy of the system to the individual strategies applied by actors. Concepts derived from the discipline of geography are also central to the book's approach and the book presents, beyond naturalistic notions (river lines, watersheds), historical and social aspects of the question before moving on to examine the issue of the territorialization of public policy.[7] Meanwhile, engineering—a discipline integral to the distribution of water and the provision of wastewater disposal services—has contributed a number of concepts and paradigms, including the "network model,"[8] which is central in many chapters.

Today, water research in social sciences is structured around distinct water objects corresponding to specialized fields with few links between them. Among

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and spatial organization. Its fluidity makes it an ideal transporter; its direction of flow establishes what is upstream from what is downstream, etc. (See also CNRS 2009).

[5] The paradox of agricultural irrigation in Nepal—"an abundant resource, carefully distributed"—can primarily be explained in reference to social and familial relations (Aubriot 2004).

[6] For the impact of the development of water distribution systems on the emergence of the centralized state, see the debates over the work of Witfogel (1942) and Palem and Wolf (1972).

[7] See Chap. 3.

[8] For a summary of the network approach, refer to Chaps. 7 and 9.

these are water as a resource, water distribution services, and the economics of water (and natural resources).[9] But whatever its objects of study—the functioning of water companies, territorial management, individual values, or social movements—most of this kind of research attempts to elucidate the relations between society and its actors. Needless to say, the list is not exhaustive.

The question of water often generates ambiguous situations in which social sciences research plays the role of an auxiliary of management.[10] Indeed, research sometimes occasions decidedly negative reactions. Thus, the mediating function attributed to the social sciences has contributed significantly to the development of water as an object of study.[11] In fact, management issues and objects of research constantly interact with one another.

Within social sciences, which gradually have delved into water, three major influences—water sciences, the global vision of water, and world public opinion—have contributed to the definition of this new field of water and society. First, the social sciences perimeter of work is strictly delimited by the highly structured field constituted by the "water sciences," a field that includes hydrologists, hydrogeologists, hydraulic engineers, chemists, meteorologists and climatologists, and, more recently, management scientists (Vauclin et al. 2008; Lawford et al. 2003). The relationship with the water sciences constitutes a major issue for social scientists that involves defining the conditions in which relationships with other disciplines can be established, and vice versa.[12] The question of "interactions between social systems and natural systems" (CNRS 2006) has generated a new perspective on the way in which different registers of knowledge—notably knowledge about nature on one hand and society on the other—should be articulated (Morin 1977; Lascoumes 1994; Latour 1999; Pickett et al. 2007; Robbins 2004). Within this perspective, the study of the interactions between human and social factors and the logics of the living world can lead to the emergence of new ideas. Indeed, from the point of view of the interaction between two types of science—experimentation and observation—and of their formalization, it is clear that the intellectual times in which we are living offer researchers a number of exciting opportunities (CNRS 2009). This is especially true in that water has become a sphere of dialogue between disciplines and a site for the construction of a resolutely interdisciplinary approach.

[9] Definitions of these different forms of water (resource, supply, network) can be found throughout the book.

[10] Chapter 17 represents an effort to advance the combination of hydrological and social sciences approaches.

[11] The management of a population hit by natural catastrophes (floods, etc.) or water-borne epidemics, for example.

[12] The challenge for social sciences is to be recognized as a science with its own scientific objectives and methodologies. In terms of water sciences, social sciences refer to the human dimension associated with governance, policy, and management.

The second and defining influence is that of a global vision of water. This vision has gradually been created by international agencies, governments, lenders, and private operators (most of them European, and, more specifically, French),[13] as well as the media and multiple bodies and networks exerting scientific, political, and economic influence.[14] This international doxa shapes contemporary approaches, professional practice, and national and local policy. Since Stockholm,[15] Earth summits, water forums, and international conferences such as those held at Mar del Plata, New York, Rio de Janeiro, Dublin, Marrakech, The Hague, Bonn, Johannesburg, Kyoto, Mexico City, and Istanbul have brought this vision into focus.[16] We thus have observed the emergence of a consensus, either tacit or explicit, built on the foundations of this doxa and shared by actors informed by very different worldviews, including sustainable development as a world philosophy and water as a commodity,[17] with its corollary of privatizations. Original concepts such as mutual responsibility and affordability[18] (Frérot 2009), "good governance" (World Bank 1992), and arbitrage as an international legal system (Dezalay and Garth 1996) also have emerged. Environmental issues such as integrated water management (Maksimovic et al. 2001), preservation of the resource, and global water governance also have become central (Saunier 2009).

Finally, the growing public perception of the strategic importance of water has influenced the redefinition of the role of social sciences in the water question. In the

[13] Of the 10 multinational water companies, nine are European (the two largest, Suez and Veolia, are French). The French "majors" are the Compagnie Générale des Eaux, now Veolia Environnement, and the Société Lyonnaise des Eaux, now Suez Environnement, a subsidiary of GDF Suez. SAUR is another major group but is less active in the water sector. The world's two largest bottled water companies are also European. In addition, Europe boasts the world's largest private investment funds specializing in the water sector as well as the most dynamic water infrastructure construction firms (dams, processing and desalination plants, artificial islands, etc.).

[14] World Bank, IMF, OECD, WTO, United Nations/UNESCO International Hydrological Program, World Health Organization, various lobby groups and networks, Global Water Partnership (GWP), Académie de l'Eau, Aquafed, European Water Partnership, RIOB (Réseau International d'Organismes de Bassin), etc. The European actors in the water sector (France, the Netherlands, Sweden, and Germany) define the agenda in a number of different ways and play a central role in driving the process forward.

[15] United Nations Conference on the Human Environment, 1972.

[16] Notably thanks to the organization of the Water Decades: International Hydrological Decade (1965–1974); International Drinking Water Supply and Sanitation Decade (1981–1990); International Year of Freshwater (2003); International Decade for Action "Water for Life" (2005–2015); United Nations Decade of Education for Sustainable Development (2005–2014); and a designated World Water Day on March 22.

[17] Two major events occurred in 1992 that effectively laid the foundations of the international doxa: the Earth Summit at Rio de Janeiro, where it was declared that "a global management of freshwater is . . . absolutely indispensable to any action in the decades to come . . .", and the Dublin Water Conference, which established that "water in all its competing uses . . . should be recognized as an economic good."

[18] Affordability is a new concept in the business world reflecting the link between a good or service and the income of the household that wants to buy it.

1990s, the sector was hit by two shockwaves. The first was a dramatic increase in the number of anti-globalization movements and conflicts over water, including struggles to defend public services and management in Europe (Lobina and Hall 2008; Le Strat 2008; Finger et al. 2007)[19]; the fight against privatization in Latin America, including the water wars in Bolivia, for example (Jouravlev 2004; Prinwass 2002); and conflicts in the water sector in the United States and Canada (Glennon 2002). The second shockwave was the institutionalization of local water associations, non-governmental organizations (NGOs), and a global solidarity market. At the same time, in the context of largely globalized conflicts, we witnessed the emergence of counterpowers, anchored in civil society and focusing on a new culture of water[20] (Aguilera Klink 2008), and social forums and participatory countermodels—water as a world public good, water as a human right, and the Water Manifesto (Petrella 2001). It is this last influence that converges to create today's water and social sciences research field.

Thus, to approach the subject of the globalization of water, we first need to take into account the relations, disconnections, and telescoping of several different levels (local, regional, national, and international) and the interdependencies of a wide range of actors (stakeholders) operating at those levels and examine the social dynamic of an extremely complex system. The expression "globalized water"[21] serves as a synthesis of these approaches, which although always different from and sometimes opposed to one another, all nevertheless converge on one point. *Globalized Water* proposes a metaphor of a water arena in which "concrete strategies of different actors defined by their position, their properties and their interests" interact.[22] The various interdependencies between the actors operating in this arena will be described in the book by means of the term "governance." The concept will be introduced, developed, modified, and explained (and even denigrated) by the authors, using a wide range of theoretical frameworks. With this in mind, the book is organized into two main topics—Water Management Models and Globalization and Governance, Conflict, and Participation—each of which are divided into two parts.

The chapters that make up Water Management Models and Globalization present an overview of globalization implications in the management of water resources and urban supply. The chapters explain how management models have evolved in recent years in terms of vision and values of water, scope, regional and institutional contexts, and organizational and technological changes. Main themes are contemporary water

[19] Europe plays a key role in the evolution of the international doxa through the water industry and the network of public European companies providing new management approaches.

[20] Originating at the University of Zaragoza in Spain, the "Nueva Cultura del Agua" (New Water Culture) movement proposes a new management paradigm: water as an eco-social asset, management on demand, and the unity of the river basin, with no transfers between basins and no dams. See Chap. 13.

[21] The expression was decided collectively during the preparation of the book in Paris (January 2008).

[22] See Pierre Bourdieu, "Préface" (Dezalay and Garth 1996).

debates (commodity versus patrimony, privatizations, the end of the network model), the global actors, and the water Europeanization process, all focusing on local interactions at different levels.

The chapters that fall under Governance, Conflict, and Participation aim to improve understanding of the social dynamics involved in water resources and supply management. Focusing on different interactions among stakeholders, case studies explore contractual agreements, participation programs, and consensus building as well as water wars, protests, and political competition. These international case studies from France, Portugal, Spain, Latin America, India, the U.S. and the UK open to a large discussion on governance issues.

The chapters in the book, all based in research, include comparative analyses of technical objects (dams, water transfer systems, and networks) and social dynamics (dialogue, conflict, and resistance). Authors outline different approaches to specific themes and problems. For many authors, politics is an explanatory factor. Some authors employ descriptive styles, some prefer an analytical approach, while others opt for more of a narrative. Some target a lay public, while others are more technical. Many situate the scientific questions with which they deal by speaking in terms of the international debate and evoking the collective aspect of their research.

The book provides a state-of-the-art report on water management and governance, covering research paradigms; water as an economic good or commodity or as a universal common good; liberalization or privatization (two notions that are frequently confused); technical networks; public services (services of general interest, services of general economic interest) and universal and local services; and water transfer systems and major construction projects.

Lastly, the fact that the book is divided into two main topics does not mean that the chapters it contains cannot be read and compared from other perspectives. Readers will find in these pages complete analyses of certain themes, such as the contemporary debate on public-private partnerships (PPPs) seen from the viewpoint of the public water service and resources. The book also contains analyses of water management systems and services in a number of metropolises—approaches that lend themselves to a comparative reading. *Globalized Water* can be seen as a coherent synthesis of many different points of view expressed by economists, geographers, political scientists, urbanists, engineers, anthropologists, sociologists, specialists in management science, and hydrologists who have taken advantage of the platform provided by the book to work and disseminate on a shared subject.

1.2 Water Management Models and Globalization

Water Management Models and Globalization is organized into two parts: the first presents French water management, its history, organization, and challenges under both Europeanization and globalization, which are closely related. The second

reviews the so-called French model of water supply[23] and its export worldwide through privatizations during the 1990s.

The objective of the first two chapters in the book is to examine the development of ideas about water resources and aquatic milieus and, in so doing, reappraise the analytical consequences of those ideas on paradigms of resource management and water distribution in Europe and beyond. The critical analysis of the theoretical issues of standard economics, for which water is a commodity like any other, immediately places the reader at the heart of the principal contemporary debate about water: namely, whether it is a market good or a common patrimony. French water policy serves to illustrate the potential of the patrimonial approach as a new analytical tool (Chap. 2), and it also serves to reassess conceptualization of the commons, including water.

Expanding on this chapter, the application of the European Water Framework Directive, which aims to achieve "good status" for all surface waters by 2015, illustrates the potential of water management reforms. An original and constructive aspect of this trend to reform management approaches is the gradual transition from a sector-based vision focused on regional uses of water to a trans-sector vision integrating various sectors using water at the river basin level and taking into account relations between the water cycle and the spatial distribution of human activities. In a context characterized by the growing complexity of relations between inter-communal dynamics, institutional levels, management, and decision-making territories, water policy in France faces a turning point. Integrated management, cost recovery, and the participation of citizens will, in the future, be the three pillars of the new governance of water. A constant has emerged: due to its focus on the river basin, the territorialization of the water sector has become a category of analysis of public action (Chap. 3).

Whether in terms of the management of the resource and its uses (agriculture, energy, industry, domestic) or in terms of the water distribution service, the French water management system has, due to its efficiency, been internationally recognized as having provided what is known as the "French school of water"[24] or the "French model" (Chap. 7). Whenever water services managed by local authorities[25] (delegated management), or water resource management (water agency management), are mentioned, the French model is the obligatory point of reference. Those models have the advantage of being both highly structured and adaptable to various local, regional, national, and international contexts.

Due to the international market share of French private operators, changes in France and Europe impact the water market in other parts of the world. But the clue

[23] Water model describes a system of relations between techniques, economics, and management.

[24] This expression is used to describe the technico-institutional system and the water management culture by which it is characterized in France: decentralized management based on river basins, delegated management, etc.

[25] In the book, "water service" or "urban service" also refers to local public water distribution and sanitation services.

to understanding the implications of globalization in today's water world, particularly in water supply and sanitation, is the presence of two French multinationals, the water "majors," which dominate the water and wastewater sector and offer environmental services.[26] Worldwide, decision makers, water managers, and urban planners interact with them (Chap. 4), which explains why it is pertinent to speak about the multiple impacts of water globalization. Technology and innovation, for example, play an essential role in the dynamics of the water sector and over time constitute an advantage for the expansion of these majors and other companies. This point, rarely underlined in the literature, represents a key question in the regulation of delegated management agreements (PPPs) worldwide and is a fundamental factor in the globalization process. The new trend toward integrated water management, which changes technical and organizational paradigms, offers a possibility to review current regulations of PPPs and the imbalance of power between stakeholders (Chap. 5).

In France, the water distribution service is traditionally based on a delegated management model involving alliances between private companies, public institutions, and municipalities. The dynamism of the French model is today confronted by changes in the EU. These changes, however, should be all the easier to face in that the EU has not transformed water into a single market, unlike other services in the general interest (telecommunications, energy, transport). Indeed, there appears to be no intention to create such a market. At the moment, in the water sector, Europe is content to intervene at the margins, limiting itself to issue qualitative, economic, sanitary, and environmental laws and decrees for water services, or to demand a good ecological state for its rivers and lakes. However, this regulatory framework induces an adaptation in legal, organizational, and territorial systems. This is why the analysis of the French case is of interest (Chap. 6). European countries must not only take competition rules into account, but must also think about ways of encouraging solidarity and regulating monopolies. These approaches have made it possible to develop water services in France and Europe.

This analysis of French water services and resources management processes provides an insight into the major evolutionary trends within the sector. In the 1990s, major private operators, international investors, and national governments played a central role in transforming the French model into the globalized model (Chap. 7). This model was exported throughout the world with the primary aim of providing access to water for all. The model benefitted from international financial resources,[27] agreements concerning the protection of investments, and a system for resolving conflicts that did not rely on national structures.[28]

[26] See Footnote 13.

[27] Antoine Frérot, CEO of Veolia, correctly highlights that "the private sector has a reputation for being more efficient than the public sector [and] offers access to a wide range of sources of funding . . ." p. 92 op.cit.

[28] The ICSID, the International Centre for the Settlement of Investment Disputes, is the World Bank's arbitration body in Washington, DC.

In many countries, privatization was considered extremely positive in that it enabled the major water companies to use their concessions to apply their expertise to supplying the cities. From the late 1980s, in most developing countries, the failure of the public sector to fund the service and ensure universal access led to calls for reform that, to a large degree, focused on the public or private status of the operator. International organizations initially promoted privatization as a response to a thirst for efficiency before claiming that it was the most effective way of ensuring that poor neighborhoods were supplied.

Summarizing the success or failure of these privatizations—privatization being the magic word of the 1990s—is a complex task. Does the withdrawal of international private operators from major cities across the world imply that the model was a failure? Focusing on Argentina, one of the emblematic cases of privatization in the water sector, Chap. 8 offers an explanation for the failure of a model based on delegating water and sanitation services to private international consortia. The authors seek to demonstrate that, regardless of what the political actors had to say, the deprivatization of the water service did not necessarily consist of a return to public management, but rather was based on characteristics inherited from the previous management approach.

Chapter 9 builds on the idea of the all-network and the post-network era in different urban contexts. Deconstructing the completed network paves the way for a critical reappraisal of the principles and relations underlying this paradigm, which is torn between technology and management laws and decrees that imply that access to water through networks will never be universal. The promotion of a new, post-network paradigm is carried out without the community of experts on urban water asking questions about this reversal of values, a reversal that means that not being connected, once a symbol of social and territorial archaism, is now the nec plus ultra of sustainable urban water distribution.

1.3 Governance, Conflict, and Participation

At all levels—local, regional, national, and global—sharing water between uses and modes of management provides a fruitful field of experimentation to approaches to governance. The analysis of disputes and critical and participatory movements reflected in discourse and practices demonstrates how multiple ideas about governance overlap and sometimes oppose one another.[29] This is at the core

[29] To move forward on the question of governance, it is useful to review the discourse on the global water crisis, which establishes an implicit link with, as well as some confusion about, the growing scarcity of resources. The discourse also raises two critical issues: the imbalance between water resources and needs and the lack of access to drinking water (or clean water). Water resources are unequally distributed around the world. An analysis of water consumption reveals that agriculture—especially irrigation—uses more water than any other sector, including energy and industry. About one billion people living in developing countries, approximately a sixth of the world's population, have no access to clean drinking water and sanitation (purifying domestic

of the two parts that make up Governance, Conflict, and Participation, which present an overview of the current European and international governance agenda.

The advent of water governance based on local structures, the main purpose of which is to ensure that consumers in a given territory can set up a dialogue between one another, is best characterized by contracts focusing on rivers, bays, lakes, or water tables. Through river contracts, for example, various water stakeholders (towns, industrial companies, and farmers) can—if they want to—pool their resources and set common objectives at the scale of the watershed. As discussed in Chap. 10, river contracts are one of the tools promoted by international agencies to further integrate resources management but have thus fallen short of environmental objectives. For the time being, however, commitment to such an approach is only moral. Within the process of building negotiation among water stakeholders, Chap. 11 presents a unique example of traditional landowner associations in the French Mediterranean region that reflects the European Water Framework Directive's call for decisions to be made "at a level as close as possible to the place in which water is used."

Several chapters (12, 13, and 17) focus on technology in Spain, Portugal, and the U.S., analyzing approaches to the offer model[30]—dams, transfers, irrigation techniques—and their interaction with society from a number of different perspectives (anthropology, economics, geography, and hydrology). In many cases, technical debates have morphed into social protest, massive demonstrations on the part of civil society, and the elaboration of a movement questioning major European decisions and international water companies. Governance is studied in this context as a way of addressing politics and management by analyzing the system and interactions between actors, as well as discourse and practices.

In the part on mechanisms of power, the study of controversies, conflicts, protests, and participation programs allows us to understand social and cultural dynamics and their potential for management. Access to water and sanitation are important objects of analysis in regard to questions about the theoretical and operational aspects of governance. The authors explore the potential for applying different reference points and emphasizing either the role of institutions and management (public/private/associative/informal) or technical or economic approaches. In these

wastewater before disposing of it in the natural environment). There is little correlation between this situation and the issue of scarcity. Indeed, water is particularly abundant in central Africa, south Asia, and Latin America.

[30] The offer model refers to the economic, technological, and management system developed worldwide since the end of World War II against a background of rebuilding, economic development, and colonial expansion. It implies that large-scale infrastructure projects sprung up all over the world: dams, irrigation systems, canals, hydroelectric plants, pumping systems, the rerouting of rivers, the transfer of water between river basins, and efforts to dry out marshland. Famous engineering schools are at the basis of the development of this model: École Nationale des Ponts et Chaussées (France), Colegio de Ingenieros de Caminos, Canals y Puertos (Spain), U.S. Army Corps of Engineers, etc. The model has since been called into question by the advocates of sustainable development.

conditions, it is hardly surprising that access to water in cities serves as a veritable laboratory of social experimentation in governance.

Drawing on case studies from Mumbai, India, and cities in Latin America, Chaps. 14, 15, and 16 analyze ways in which governance is engineered in terms of access to water. Building on the idea of governance to describe interdependencies between the actors operating in the water arena, the authors show how politics are central to urban water governance issues and focus the discussions on the role of political actors and the manner in which they carry out their actions on various scales, from the city to the locality. Encouraging access to drinking water in non-regulated neighborhoods is central to the concerns of investors and urban public policies. The process of expanding the PPP model that began in the 1990s reflected a desire to articulate economic efficiency in infrastructure management with social equity and access to water. In this context, the participation of local people constitutes a principle of good governance in regard to attaining Millennium Development Goals. The promotion of participative programs by states, municipalities, and private operators mirrors a desire on the part of developing countries to establish this approach.

Rounding out the book are two chapters and an appendix that explore emerging research and management trends: interdisciplinarity between physical and social sciences, the implications of new paradigms for research and management, and the urban form as a link between urban planning and water governance.

Chapters 17 and 18 shed light on sustainability and the role of stakeholder participation as a key component in facing the water management challenges of the future. Chapter 17 discusses the ability of integrative science and multi-resolution models to provide the basis for a decision support system, drawing on two case studies in the U.S. Southwest. Through a policy literature review, Chap. 18 explores how a new paradigm—water security—has emerged linked to the idea of sustainable water while gradually gaining geopolitical urgency.

Finally, the Appendix, Water Urbanisms: A Visual Illustration, highlights how water as a medium has been a critical agent in shaping settlements throughout history and across the globe. Through a selection of extreme case studies, the graphics and figures reveal the relationship between water and urbanization and underscore the role of urban form and its formative process as a critical component in environmental studies.

1.4 Conclusion

We have to recognize that the great debates about water that characterized the turn of the last century have lost much of their impetus and that, unlike climate change, desertification, and biodiversity, there are no international agreements

providing a framework for how water should be managed. Globalized water has the particularity of not being protected. Indeed, the water arena is, like navigation, fragmented among national and international regulatory systems.

The book *Globalized Water* examines sustainable management, the institutional dimension, PPPs, and the universal question of consumer participation in terms of their roles in the elaboration of new ways in which to imagine the public space at a new scale—in other words, at the global level. Today, the sustainable development model is demonstrating its capacity to incorporate and adapt to the primacy of the environment, the overriding concern of the twenty-first century. The trend toward an integrated urban water management approach that is designed to conserve the resource is gradually gaining ground. This approach focuses on conservation, equitable distribution, and restrained consumption and encourages the active management of pollution and wastewater and the integration of various stakeholders into the system. The legacy of these dynamics raises critical questions about management and gives clues for action toward more comprehensive and environmentally and socially concerned water management.

Should we thus surmise that nothing changes in the water sector? A tacit compromise between multiple actors operating on several different levels guarantees that water governance is global. The edifice is the result of long-term globalization, but the fact that its foundations rest in local and regional bedrock means that it is both conservative and stable. Indeed, in the final analysis, if we look beyond the intellectual and social movements that provide raw material for research, water is a central subject in the social sciences in the sense that it constitutes an important marker of the dynamic of globalization. It also provides a testing ground for approaches to governance and fresh insights into the role of research in society.

Finally, beyond the promotion of a deconstructive approach that is the primary objective of the book, the interdisciplinary perspective employed serves as a way of questioning the governance of water and the actors operating in the field: governments, private operators, associations, and residents. This is especially true in that, in this field more than in others, researchers are faced with issues affecting the lives of millions of people, placing them in a role somewhere between that of the "intellectual" and that of the "expert."[31] Researchers are constantly prevailed upon by the media, the education system, economic actors, political parties, and alternative movements. They are obliged to walk the line between their academic vocation and the pressures of social demand. As Michel Serres has commented, "it is, today, absolutely necessary for scientists to be involved in the life of the city."

[31] Schneier-Madanes, G. "L'eau objet social complexe" in Saragosse 2007, Catalogue de l'Exposition Internationale.

References

Aguilera Klink F (2008) La nueva cultura del agua. Los libros de la catarata, Madrid
Andréassian V, Margat J (2005) Allons-nous manquer d'EAU? Le Pommier, Paris
Aubriot O (2004) L'eau miroir d'une société, irrigation paysanne au Népal central. CNRS Editions, Paris
Barles S (1999) La ville délétère, Médecins et Ingénieurs dans l'espace urbain, XVIIIe – XIXè siècle. Éditions Champ Vallon, Paris, 372p
Bauer CJ (2004) Siren song: Chilean water law as a model for international reform. RFF Press/The Johns Hopkins Press, Washington, DC
Bourdieu P (1994) Raisons pratiques. Seuil, Paris
Briscoe J (2003) The water strategy of the World Bank. World Bank, Washington, DC
Briscoe J (1992) Clean water and sanitation. In: World Bank (ed) The world development report on the environment and development. World Bank, Washington, DC
Camdessus M, Badre B, Cheret I et al (2004) Eau. Robert Laffont, Paris
CNRS (2006) Programme interdisciplinaire Mousson, rapports de recherche 2006–8. Available in http://mousson.complexica.net
CNRS (2009) "L'eau", FOCUS, No. 5, May. Available in www.cnrs.fr/fr/organisme/docs/espacedoc/eau_fr_web.pdf
Coutard O (2009) Placing splintering urbanism. Geoforum 39(6):1815–1820
De Marsily G (2009) L'eau, un trésor en partage. Dunod, Paris
De Mattos C, Figueroa O, Orellana A et al (eds) (2005) Gobernanza, competitividad y redes: La gestión en las ciudades del siglo XXI, Colección Rideal EURE-Libros. IEUT/PUC, Santiago, 533p
Dezalay Y, Garth B (1996) Dealing in virtue: international commercial arbitration and the emergence of a new international legal order. University of Chicago Press, Chicago
Fassin D (2010) La raison humanitaire. Seuil, Paris
Finger M, Allouche F, Luis-Manso P (eds) (2007) Water and liberalisation. European water scenarios. IWA, London, pp 34–53
Frérot A (2009) Water. Towards a culture of responsibility. Ed. Autrement, Paris (non-commercial publication)
Gaudin JP (2007) Gouverner par contrat. Les presses de Sciences Po, Paris
Groupement de recherche GDR 2524 CNRS "rés-EAU-ville" (2002/2005/2006/2009) Rapports scientifiques. CNRS, Paris
Glennon R (2002) Water follies. Groundwater pumping and the fate of America's Fresh Water. Island Press, Washington, DC
Howe CA, Vairavamoorthy K (2011) Sustainable water management in the city of the future. UNESCO-IHE, Delft
Jouravlev Y (2004) Los servicios de agua potable y saneamiento en el umbral del siglo XXI. CEPAL/NU, Santiago
Laimé M (2003) Les dossiers de l'eau, pénurie, pollution, corruption. L'épreuve des faits. Seuil, Paris
Lascoumes P (1994) L'écopouvoir. La Découverte, Paris
Latour B (1999) Politiques de la nature. Comment faire entrer les sciences en démocratie. La Découverte, Paris
Lawford RG, Landwehr JM, Sorooshian S et al (2003) International hydrological science programs and global water issues. In: Lawford R, Fort D et al (eds) Water: science, policy and management. AGU, Washington, DC
Le Strat A (ed) (2008) Manifestes pour l'eau publique. Syllepse, Fondation Copernic, Paris
Lobina E, Hall D (2008) The illusions of competition in the water sector – a response to the OFWAT/Cave consultations on introducing competition in the water sector in England and Wales, PSIRU Reports

Maksimovic C, Tejada-Guibert A, Roche PA (2001) Frontiers in urban water management. Deadlock or hope? UNESCO-International Hydrological Programme, Paris
Margat J, Andréassian V (2008) L'eau. Le Cavalier Bleu, Coll. Idées reçues, Paris
Marin P (2009) Public-private partnerships for urban water utilities, vol 8, The World Bank trends and policy options. The World Bank, Washington, DC
Matsuura K (2007) Signons la paix avec la Terre. UNESCO, Paris
Morehouse B (2011) Heritage, public trust and non-market values in water governance. The University of Arizona, The Institute of the Environment, Tucson
Morin E (1977) La methode 1. La nature de la nature. Seuil, Paris
OMS/UNICEF (2004) Atteindre les objectifs ODM en matière d'eau potable et d'assainissement. Evaluation des progrès à mi-parcours
Ostrom E (1990) Governing the commons: the evolution of institutions for collective action. Cambridge University Press, New York
Palerm A, Wolf E (1972) Agricultura y Civilizacion en Mesoamérica. Sepsetenta, Mexico
Paquerot S (2005) Eau douce. La nécessaire refondation du droit international. Presses de l'Université du Québec, Québec
Petrella R (2001) The water manifesto. Arguments for a world water contract. Fernwood, Ottawa
Peña H, Solanes M (2003) Effective water governance in the Americas: a key issue. Third Water Forum, Kyoto
Pickett STA, Kolasa J, Jones C (2007) Ecological understanding: the nature of theory and the theory of nature, 2nd edn. Academic, New York
PRINWASS (1998–2002) Barriers and conditions for the involvement of private capital and enterprise in water supply and sanitation in Latin America and Africa. The European Commission. Cambridge. Available in www.prinwass.org
Robbins P (2004) Political ecology: a critical introduction. Blackwell, Hoboken
Rogers PP, Jalal KF, Boyd JA (2005) An introduction to sustainable development. The Continuing Education Division. Cambridge, Harvard University and Glen Educational Foundation
Saunier ER, Meganck RA (2009) Global environmental governance, a dictionary & introduction. Earthscan, London
Schneier-Madanes G, Courel MF (eds) (2009) Water and sustainability in arid regions: bridging the gap between physical and social sciences. Springer, Dordrecht, 349p
Schneier-Madanes G, de Gouvello B (eds) (2003) Eaux et réseaux: les défis de la mondialisation. IHEAL/La Documentation Française, Paris, 346p
Serres M (2009) Temps des crises. Le Pommier coll. "Manifestes", Paris
Vauclin M et al (2008) Bilan et prospective SIC Surface et Interfaces Continentales 2006–2011. CNRS/INSU Institut National des Sciences de l'Univers. Available in http://www.insu.cnrs.fr/a2652,prospective-sic-2007.html
Witfogel (1942) Le despotisme oriental. Minuit, Paris
Wieviorka M (ed) (2007) Les sciences sociales en mutation. Editions Sciences Humaines, Paris
World Water Council (2005) L'eau, une affaire pour tous. World Water Council, Washington, DC

Part I
Water Management Models and Globalization: The "French Model" and Europe

Chapter 2
Patrimonial Economics and Water Management: A French Case

Iratxe Calvo-Mendieta, Olivier Petit, and Franck-Dominique Vivien

2.1 Issues at Stake in Contemporary Water Economics

Applying traditional economic tools to water resources poses many problems for economists because, like most natural resources, water resources do not lend themselves to market exchanges, given the multiple factors that affect their use and management. Nonetheless, since the 1950s, a growing body of literature has been dedicated to water economics, attesting to the serious problems that managing this resource presents both qualitatively and quantitatively. Now, instead of considering water as a specific asset—simultaneously a production factor, a final consumption good, an element contributing to the identity of a user community, and an ecosystem life support—economists have undertaken to mobilize the categories of neoclassical economics and re-qualify certain non-market characteristics of water in terms of the market economy. On the international scale, this undertaking has contributed to the

I. Calvo-Mendieta (✉)
Université Lille Nord de France and Université du Littoral-Côte d'Opale, MRSH, 21 Quai de la Citadelle, BP 5228, Dunkerque, Cedex 59383, France
e-mail: i.calvo@univ-littoral.fr

O. Petit
CLERSE (UMR 8019, CNRS/Université Lille 1), Université d'Artois, UFR EGASS – Université d'Artois, 9 rue du Temple, BP 10665, Arras, Cedex 62030, France
e-mail: opetitfr@yahoo.fr

F.-D. Vivien
Laboratoire des Sciences Economiques de Reims – REGARDS" (EA 6292), Université de Reims Champagne-Ardenne, UFR Sciences Économiques, Sociales et de Gestion – Université de Reims Champagne-Ardenne – 57 bis, rue Pierre-Taittinger, Reims, Cedex 51096, France
e-mail: fd.vivien@orange.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_2,

recognition of water as an economic good.[1] Today, this recognition guides numerous programs supported by development agencies and international donors.

However, starting in the 1970s, international environmental law invested natural resources with another dimension that recognizes a patrimonial nature, which was sometimes presented as a counterpoint to the market dimension. In this context, patrimonialization processes refer to social constructions aimed at identifying material or immaterial objects, often inherited from the past, which have to be protected, managed, and transmitted to future generations. It was from this perspective that the anti-globalization movements, referring to the notion of "common heritage of mankind," have underscored the dangers of water commodification, at least since the end of the 1990s. Sometimes without knowing it, their arguments echo research conducted in France over several decades. In fact, patrimonial management, a research trend initiated by research/intervention operations in the mid-1970s, tries to reconcile stakeholders in conflict by proposing a local negotiation process. More recently, a group of economists have tried to reconsider economic analysis, establishing patrimonial economics as a new interpretative framework, an alternative to the market framework.[2]

Thus patrimonial and commodification dimensions, often seen as antagonistic, are two recurring aspects in freshwater management and water services fields.[3] Stakeholders often forget this ambivalence of water policies, where those two dimensions coexist, contributes to the definition of varied governance forms, which can be concretely observed on every scale.

The main lessons from the two simultaneous trends of commodification and patrimonialization highlight the need to go beyond the neoclassical economic approach, which alone is insufficient for understanding the patrimonialization processes. In fact, neoclassical economists have gradually assimilated water as a market good, ignoring culture, identity, territorial specificities, and other variables that are critical to understanding water management policies. In contrast, patrimonialization processes are clearly taken into account by management and

[1] According to Principle 4 of the Dublin Statement on Water and Sustainable Development (Dublin Statement 1992).

[2] The overview of the commodification and the patrimonialization of freshwater and water services constitutes one of the guiding principles of the CNRS Urban Water Research Network "rés-EAU-ville." This research group has organized several multi-disciplinary scientific conferences in France on water commodification (Paris, March 2003) and on water as a common patrimony (Arras, March 2007). These events resulted in two collective publications (Baron 2005; Petit 2009). This article permits us to reposition the terms of the debate from an economic perspective.

[3] The terms "legacy," "heritage," or even "patrimony" refer, in English, to notions that cannot properly circumscribe this notion of "patrimoine." The expression refers to legal systems inherited from Roman law, away from common law traditions. The authors have chosen the last expression (patrimony) because of its similarity with the French term "patrimoine" (and even "patrimonio" in Spanish). But the notion of patrimony is beginning to spread; Morehouse (2011) applied it when discussing public trusts in the USA.

economics through a new analytical framework for patrimonial dynamics that can be demonstrated using the example of French water policies.

2.2 The Standard Economics of Water Resources

After World War II, many water infrastructure projects were carried out all over the world. These projects involved engineering know-how for obtaining, diverting, and storing water for human needs, including dams for irrigation or hydropower, networks for conveying drinking water, and flood control. Engineers and economists applied the principles of cost-benefit analysis to measure the impact of these large projects. As Eckstein (1958, p. 1) highlighted, "As the economy has developed, the need for these activities has also increased. The value of properties susceptible to flooding increased, the demand for energy doubled and doubled again, the traffic on our rivers expanded greatly, the need for water became more critical in many regions, and even the recreational uses of our lakes and rivers multiplied over the last few years." Thus, the economic value of water was recognized, and a set of relatively sophisticated methods was mobilized to calculate the augmentation of well-being these development projects produced.

The books by Kneese (1964) and Kneese and Bower (1968) ushered in an important stage in the formation of (neoclassical) water economics. Extending the work of Pigou (1920), these authors recommended addressing the problems of water pollution by setting up a tax or a subsidy, determined so that the externalities would be internalized. Thus, to overcome the difficulties of entering water into the framework of the market economy, the idea is to focus on the price of water so that it reflects the consideration of non-market phenomena. The search for efficiency remains the primary objective and guides the way the neoclassical economists understand these problems. However, if certain principles derived from these propositions are today institutionalized in a number of public water policies, internalizing the externalities is rarely total (Commissariat Général du Plan 1997), and their measurement is conditioned by hypotheses on the potential costs of the damages, which only take into account very imperfectly long-term phenomena.

Both types of research mentioned above gradually led to the creation of water resources economics, a sub-discipline that even has textbooks. To be resolutely prescriptive, Shaw (2005) and Griffin (2006) adopted a microeconomic viewpoint—producer and consumer theories and theorems of welfare economics, for example—as their theoretical perspective. The fundamental criterion is Pareto efficiency: an efficient allocation takes place when any change improving at least one individual's well-being implies reducing any other individual's well-being. The issues of equity are considered marginal because these economists believe the search for equity is political. However, despite this restriction of the field of investigation, some analytical problems soon appeared.

Thus, Shaw (2005, p. 35) observed that, if the basic microeconomic approach is to be followed, it is preferable to pretend water is a private property. This often is not the case, as he himself admitted. In fact, in the water domain, property rights issues are complex. In general, several appropriation systems coexist and are even superposed on each other, including within the same region or the same country. In addition, contrary to what can be read in certain general environmental economics textbooks, which adopt the point of view defended by Hardin (1968), the neoclassical theoreticians of water economics recognize the existence and legitimacy of common property regimes.[4]

Furthermore, although these authors have a marked tropism toward market mechanisms, they remain very prudent as to the creation of water markets, simply transposing standard economic theory, especially the Coase theorem: if trade in an externality is possible and supposing no transaction costs, negotiation will lead to an efficient outcome regardless of the initial allocation of property rights.[5] They are well aware that the externalities are not simple to manage and the transaction costs are generally high. In fact, the expression "water markets" is misleading. The form that market institutions take makes them look like a public policy instrument more than a perfectly competitive market, as they are depicted in microeconomics textbooks (Dales 1968).[6] As numerous studies have shown (Aguilera-Klink and Sánchez-García 2005; Bauer 2004), the transactions that take place within these exchange systems are far from the ideal described by the adepts of "free market environmentalism" (Anderson and Snyder 1997).

Thus it is not astonishing that, in the end, the authors of contemporary water economics textbooks want hybrid institutional arrangements. Griffin (2006, p. 240) asserted that "managing all these things efficiently is a considerable challenge and compels us to construct a mixed system of rules—some market oriented, some not, all intertwined." However, what are the appropriate normative references that will

[4] Griffin (2006, p. 102) thus wrote: "In any case, one cannot conclude that certain institutions are inefficient merely because they constitute common property, as the phrase 'tragedy of the commons' insinuates."

[5] Shaw (2005, p. 29) observed: "In fact, economists may oversimplify things when they advocate 'moving' from lower to higher economic uses. Some water economists have concluded that the potential for markets has been overestimated, and now recommend slight modifications to conventional water pricing schemes to achieve efficiency."

[6] In his seminal article, Dales (1968, pp. 803–804) wrote: "It should be noted, finally, that the market in pollution right is not a 'true' or 'natural' market. In natural markets, price creates two-way communication between sources of supply and demand and affects amounts supplied as well as amounts demanded [...] My market provides only one-way communication. It transmits the government-owner's decisions about the use of water to the users of the asset, but there is no feedback from the users to the owner [...] The price signals that this government gets from the market are 'false', in the sense that they are largely echoes of its own arbitrary decision about the supply of rights. The market proposed in this paper is therefore nothing more than an administrative tool."

allow us to evaluate the efficiency of these institutional arrangements? This question deserves to be asked because the fragility of the neoclassical reasoning, including the Pareto criterion, is well known. The authors of the above-mentioned textbooks remained most circumspect about the fact that general equilibrium stability and convergence have not been demonstrated.[7] In fact, the opposite tends to be true. In other words, the market mechanisms are missing in the analytical framework proposed by Arrow and Debreu (1954).

2.3 The Reference to a Common Patrimony

By considering water as an economic good like any other and conveying externalities that must be internalized using monetary incentives, neoclassical water economics transposes the supposed laws of the market economy to the management of a resource whose characteristics are not well suited to this type of exchange. This way of conceptualizing the water economy discards its nature of common patrimony and leads to denying water's specificity: it is both a potential exchange resource and an asset to be preserved for the production and reproduction needs of human communities. For the past 30 years, this reference to a common patrimony has supported sizeable research that questions the neoclassical economic analysis of water resources.

2.3.1 Patrimonial Management

Patrimonial management was born in the 1976 study conducted by Bertier, de Montgolfier, and Ollagnon about the Alsatian aquifer in northeastern France. This study was supported by the Office of the Rationalization of Budgetary Choices (RBC) of the French Agricultural Ministry. Originally, this office was involved in creating mathematical models applied to decision making, leading to cost-benefit economic valuations (La Branche and Warin 2006; Mermet 2007). However, this initial study marked a methodological turning point (Ollagnon 1979).

In fact, this study questions the central hypothesis of the neoclassical economic approach, which holds as true the idea that it is the monetary underestimation of the relationships between environmental objects that causes the management problems encountered—agricultural pesticides polluting wetlands, conflicts on water allocation in dry regions, etc. The researchers in the RBC office observed that economic valuation often tends to exacerbate conflicts of interest that structure environmental

[7] The general equilibrium model is a model of the large-scale behavior of market economy stating that with some assumptions and under certain conditions, there exists a set of equilibrium prices (economy is in equilibrium when prices are set so that supply equals demand in each market).

problems because it privileges certain objects, certain activities, or certain stakeholders who are more accustomed to the procedure or are faster than the others to understand the market logic and the monetary indicators. More generally, for the authors of this study, who based their reasoning on combining the systemic approach and organizational sociology,[8] it is a question of exceeding the monolithic framework of the broad decisional-approach types that then prevailed—the economic approach, which gives a central position to market relationships; the ecological approach; and the technical-administrative approach. These authors proposed a "new framework for thinking" about natural resource management that takes the common patrimony as a frame of reference (Ollagnon 1979).

Managing a common good such as water already was the subject of debate. On one hand, the neoclassical economic approach, based on Hardin's developments (1968),[9] denied any possibility of the efficient management of a common good, considering that "what belongs to everybody ends up belonging to nobody" and generates such behaviors as "first come, first served." On the other hand, economic anthropologists and institutional economists (Ciriacy-Wantrup and Bishop 1975) highlighted that common property is one of the most credible methods of resource appropriation and management for which many convincing examples are known, particularly in developing countries.

This patrimonial management approach, which is the interface between research and public action, follows the latter opinion. Patrimony must be understood as "the set of tangible and intangible elements that contribute to maintaining and developing the identity and the autonomy of its holder over time and space by adapting to an evolving environment" (Ollagnon 1989, p. 265). The holder in question is the "patrimonial group," which must establish itself around the natural resource to be managed. The emphasis is then put on some organizational principles, which must lead to the implementation and the smooth running of this group. In fact, patrimonial management is a collective management process that requires negotiation between the various stakeholders concerned, such as the representatives of public authorities, economic world, and population.[10]

[8] A systemic approach considers a system in its totality, its complexity, and its own dynamics and studies interaction between the diversity of elements linked together within the system. This study leads to the determination of rules that can modify the system or design other systems.

[9] In his famous article, "The Tragedy of the Commons," Hardin states that common property management leads inescapably to the over-exploitation of the resource. He has been strongly criticized, however, because he confuses "common property" with "open access."

[10] In addition, this patrimonial perspective is constructed in comparison to the 1964 French Water Law. According to Ollagnon (1979, p. 50), "by creating consultative structures, by calling the users and the local authorities to negotiate," this law "considerably increased the efficiency of administrative action." It offers the framework that makes it possible to implement the patrimonialization process, which Ollagnon called for when he considered the Alsatian aquifer. More precisely, he wanted to create a water patrimonial institution, which in his opinion would enter into the framework of the 1964 law under its Article 11. This would be a regional administration composed of elected officials responsible for developing a water policy by making the different stakeholders negotiate.

2.3.2 Patrimonial Economics

This patrimonial approach seemed to slow down at the end of the 1980s with the publication of the work edited by de Montgolfier and Natali (1987). However, the reflection was launched again by the publication of Godard's article (1990), which proposed a conventionalist interpretation of this approach that mobilized the "cités"[11] analytical framework put forth by Boltanski and Thévenot (1999, 2006). This reflection led environment and natural resources economics to the arena of decisional legitimacy and justice criteria. In fact, nature suffers from a lack of legitimacy because of the diversity of the principles that are invoked when nature is managed or protected.

While Ollagnon (1989, p. 260) spoke of the need to develop a "meta-language" in the context of patrimonial management, Godard (1990) analyzed the patrimonial approach as an emerging compromise—obviously still fragile—that would make it possible to go beyond these oppositions of legitimacy. Thus, if the patrimonial approach is highly rooted in the cité domestique (domestic world) because of the importance of patrimony transmission, other cités can be found: the cité industrielle (industrial world), because of the significant recourse to scientific notions and the desire to plan for the long-term management of the given resources, and the cité civique (civic world), because everyone who feels concerned about a given natural patrimony has the legitimacy to be involved in the debate. The gamble of an environmental manager is that the plurality of legitimacy systems recorded in the center of the notion of natural patrimony does not appear as an obstructive element (Godard 1990). On the contrary, it creates a dynamic between the different frames of reference and results in the stakeholders negotiating the modalities of long-term natural resource and environmental management and committing to these modalities.

Godard's article offered another research perspective. In neoclassical economic analysis, patrimony is often reduced to all the assets held by an agent. However, Godard (1990, p. 230) highlighted the economic specificity of patrimony, citing Barel (1984), who affirmed that capital is managed to increase it, whereas patrimony is managed to transmit it. In this way, the economic analysis of patrimony was launched again in the twenty-first century around the relationships that are formed between market regulations and non-market regulations (Barrère et al. 2005, 2007).

[11] Boltanski and Thévenot (2006) proposed a sociopolitical model based on six "orders of worth" or "common worlds" ("cités" in French). This model describes the conventions (or languages of coordination) used by stakeholders in the majority of ordinary situations or conflicts. Neoclassical economics resembles one of these conventions: the "market world." However, there are other conventions to define the "common good": the "industrial world" and the "civic world," for example.

From an institutionalist perspective close to the one sketched by Polanyi et al. (1957), one of the structuring hypotheses of this research program (Barthélemy and Nieddu 2007; Barthélemy 2007) is that market relationships can only work because they are based on non-market relationships, and vice versa. These non-market relationships are based on patrimonial relationships because they aim to ensure the persistence and the reproduction, over time and space, of the elements that are considered to be the initiators of existence and perpetuation of human communities.

Taking the spatial and temporal dimensions into consideration means that, contrary to the neoclassical economic theory,[12] patrimonial economics highlights the importance of both patrimony's historic and territorial roots, even a form of relativism that contrasts with the universalist vocation of neoclassical economics. Patrimonial economic relationships, which aim to produce and distribute the patrimonial goods and/or objects, assign specific resources through institutions, standards, and rules appropriate for patrimonial logic adopted by the given groups. These groups define the allocation methods and particular payment modalities, leading to the consideration of patrimonial values and prices, which differ from market values and prices.

This comes back to the lessons of the old institutional economics (Commons 1934), which posited that the multiplicity of social and economic relationships implied a multiplicity of evaluation and deliberation processes. The idea is not to assume the superiority of patrimonial relationships over market relationships, but to bear in mind that these two types of relationships designate institutions that cannot survive without one another. Putting market relationships and patrimonial relationships in conflict allows us to better understand the institutional transformations that can be observed concretely in certain domains of natural resource management (Barthélemy et al. 2005). Thus, the development of this new patrimonial economics helps us envision a number of public policies, highlighting the mutual influences of private property and common patrimony in the definition and implementation of these policies, such as the one related to water management in France (Barthélemy et al. 2004, 2005).

2.4 Water Management in France: A Progressive Integration of Patrimonial Logic

While the arguments used in the 1960s to justify water fees in France were based on the neoclassical economic reasoning, the institutions and practices progressively established in water management at the different territorial scales also illustrate a process of patrimonialization of this common resource. In other words, the rational

[12] This theory generally proposes a vision of reversible time—that is, a historic—and a vision of space based on distances and cost differences such as production and transport costs.

Table 2.1 An overview of the water legal framework in France

Year	Main purposes and definitions
1964 French Water Law	Decentralization of water management: six basin agencies (later called water agencies) responsible for regional-scale management at the watershed level (Adour-Garonne, Artois-Picardie, Rhin-Meuse, Loire-Bretagne, Rhône-Méditerranée and Corse, and Seine-Normandie)
	Fees collected are used to subsidize water protection investments and operating costs[a]
1992 French Water Law	Further decentralization: new tools for water planning at watershed level (SDAGE: Master Plan for Water Resource Management and SAGE: Local Water Management Plan) to reinforce the protection of water resources (quality and quantity)
	Water defined as "common patrimony of the Nation"
2000 European Water Framework Directive (WFD)	Achievement of "good ecological and chemical status" for all waters bodies by 2015
	Water is defined both as a commercial product and a patrimony: "a heritage which must be protected, defended and treated as such"
	Three focus areas: integrated management, full cost recovery, and public participation
2004 Transposing Law of the European WFD	Application and observance of the WFD is the responsibility of France
	Recognition of the need to combine approaches to managing water with approaches to managing space
2006 French Law on Water and Aquatic Environments (LEMA)	Update of the French legislative framework and administrative reorganization
	Territorialization of the French government's approach to water management based on the notion of river basin: reinforcement of the role of water agencies, strengthening of the binding character of the SAGE, encouragement for the establishment of EPTBs (Public Territorial River Basin Establishments)
	Creation of the ONEMA (French National Agency for Water and Aquatic Environments)
	Improvement of water management transparency

Source: Authors

[a]Note the Rhône-Méditerranée and Corse Water Agency is responsible for two river basin committees: the Rhône-Méditerranée River Basin Committee and the Corse Basin Committee. The latter was created in 2002.

optimizing agent, without totally disappearing, had to deal with patrimonial communities responsible for managing water.

In 1959, in a general context of high interventionism, at a time when pollution was emerging as a new problem, France's Commissariat Général du Plan (CGP)[13]

[13] General Commissariat for Economic Planning.

Fig. 2.1 The six French water agencies (Source: Brun and Lasserre 2012)

created a Water Commission whose work resulted in the 1964 Water Law (Table 2.1). This law created basin agencies, later called water agencies (WAs). These agencies were public institutions responsible for collecting the fees that were supposed to finance the public works projects to improve water quality at the large river basin scale (Fig. 2.1). Based on a basin committee that represented users, territorial authorities, and the national government, this agency system is often presented as a reference in terms of applying Pigovian economic analysis[14] and the polluter pays principle (OECD 1997, 2005).

Nicolazo (1997), who participated in the implementation of the WAs, affirmed that welfare economics inspired the fee system, especially the research of Kneese (1964). Still, the market justification, more than a source of inspiration, seems to be an ex-post argument because "in the context of an economic management of water,

[14] State intervention by means of taxation to avoid externalities.

it is essential to take into account the temporal and spatial conditions and thus hydrological data of each basin" (Nicolazo 1997, p. 54). However, the recommendations of the neoclassical economic theory are supposed to be optimal, independent of the temporal and spatial variables.

In fact, what is presented as the application of market logic to water resources can be interpreted in terms of patrimonialization. The collective management of water in each river basin is inspired from English or German examples, and although the fees have been established, they have never really played the role of Pigovian internalization instruments (Barraqué 1997). In addition, in its 1997 report evaluating the water agencies, the CGP observed several inefficiencies. It found, for example, that the fees are too low and insufficiently differentiated between territories, that hardly any arbitration occurs with respect to the efficiency of the invested funds, and that little attention is paid to agricultural pollution. The CGP (1997, p. 21) no longer recognizes the polluter pays principle in a system that actually redistributes the burden between users, compensating the different stakeholders in the perspective of solidarity, and thus is more representative of the polluter policyholder principle than the polluter pays principle.

More than 25 years after the promulgation of the 1964 Water Law, the assessment of the national water conference held in Paris in 1991 showed insufficiencies remained, especially in the domain of environmental protection. Natural resource protection and pollution problems were found at the center of numerous use conflicts. It was in this context that the 1992 Water Law affirmed that "water is a part of the nation's common patrimony." In addition, it underlined the objective of a "balanced management of water resources," trying to reconcile the different uses and establish more basin-scale solidarity.

The negotiated planning measures concretely reinforced the process of patrimonialization, not only at the level of large river basins, where the basin committees already were elaborating a Master Plan for Water Resource Management (SDAGE),[15] but also at the local level, with the creation of local water boards. These boards bring together the representatives of users, territorial authorities, and the national government and define the "new rules of the game" through a "dialogue designed to establish a planning system of the legitimate uses of water,"[16] taking the form of a Local Water Management Plan (SAGE). The administrative memo for implementing the SAGE decree reveals the evolution in the reasoning because in this document, the "major innovations" of local planning are, first, "the conservation of the aquatic environments and the ecosystems, in the same way and at the same level as the protection and development of water resources and their uses," then "the importance of public dialogue aiming at the collective acceptance of

[15] SDAGE: Schéma Directeur d'Aménagement et de Gestion des Eaux. SAGE: Schéma d'Aménagement et de Gestion de l'Eau.

[16] According to an administrative memo of October 15, 1992 (Circulaire du 15 octobre 1992 relative à l'application du décret n° 92–1042 du 24 septembre 1992 portant application de l'article 5 de la loi n° 92–3 du 3 janvier 1992 sur l'eau, relatif aux schémas d'aménagement et de gestion des eaux).

choices," and finally "the legal impact of these plans." The priorities of this territorial water policy were far different than the market logics announced in the 1964 Water Law. Legitimacy, acceptance, and public debate all refer to the indispensable variables taken into account when a community collectively manages a patrimonial resource.

Beyond the intentions expressed in the wide-ranging water resource laws, the patrimonial dynamic can be observed concretely in the creation and implementation of the SAGE. The water policy specifics are not dictated by law; instead, the details are left in the hands of local stakeholders, organized in the local water boards. Thus, water resource management is the result of a deliberative process, in which local stakeholders must define, rank, and arbitrate the different options for public action. This often means drawn-out procedures, mostly due to the time needed to organize the use conflicts. In fact, in many water basins, the local water boards form the primary meeting place for users who often do not know each other well, if at all (Calvo-Mendieta 2005).

Thus, the local water boards encourage stakeholders to share a space in which the different representations as well as the potential conflicts can be expressed. In this sense, these boards appear as the place where a common cognitive framework can be elaborated, encouraging the support of the stakeholders participating in this common representational space. This said, like all collective action measures, these "territorialized forms of water resource governance" (Barthélemy et al. 2004, p. 349) are not exempt from the power struggles and power relationships that influence the decision-making process. The collective construction of rules requires building compromises between the various self-interests.

The evolution of the legislative framework at the beginning of the twenty-first century does not represent an upheaval of the founding principles of the French water policy. The European Water Framework Directive (WFD), which has as one of its main advantages the harmonization of a multitude of sector-based directives, was adopted in 2000. This directive precipitated the French legislative reform, which was threatened after the bill was abandoned in 2002. The preamble of the WFD, which states "water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (EC 2000, p. 1), underlines the ambivalent nature of this resource: it is both a commercial product, though not like any other, and a patrimony.[17]

This ambivalence is treated in the WFD by an injunction of participation and by the need, repeated many times, to use economic instruments, with the objective of "full cost recovery." A specific law transposing this framework directive in France was adopted in 2004, but it was the 2006 French Law on Water and Aquatic Environments (LEMA)[18] that updated the legislation, proposing a necessary administrative reorganization. In addition, the principle of negotiated territorial planning

[17] The WFD uses the term "heritage," whereas the authors use the word "patrimony."

[18] LEMA: Loi sur l'Eau et les Milieux Aquatiques.

was affirmed and strengthened, as the local plans are now enforceable against a third party.

This overview of water policies in France underlines the patrimonial dynamics that make it possible to explain the way in which water stakeholders construct their institutions and how they interact within them. These interactions do not take place in a context dominated by market logic, although French water policies were for a long time presented as an ambitious attempt to implement an internalization of externalities, in the sense of neoclassical economic theory.

2.5 Common Patrimony: A New Paradigm for Water Policies?

Water occupies a special place in international debates because, unlike climate change, desertification, and biodiversity, no international convention supervises its long-term management. Multi-national companies in the water domain have invested this empty space at the initiative of institutions such as the World Water Council or Global Water Partnership. These institutions were founded on public-private partnerships and, over the years, have acquired certain legitimacy in putting the most relevant questions on the agenda. The recognition of water as an economic good, which was a subject of debate at the beginning of the 1990s, is today a fait accompli in the consecutive World Water Forums.[19] This change in status highlights the influence of the dominant economic approach in the water domain. This approach is equally influential in international institutions such as the World Bank.

However, at the same time, these institutions affirm the necessity of setting up a dialogue or user participation, especially at the local level, to manage water resources, thus recognizing their patrimonial dimension.[20] Reconciling these two logics—market and patrimony, sometimes presented antinomically—is nonetheless difficult from a theoretical perspective. Having recourse to only the neoclassical economic approach is insufficient to understand this dynamic. In fact, this approach tends to systematically reduce the non-market dimension to the market dimension, resulting in the deviation of the intrinsic common patrimony characteristics. The contributions of patrimonial management and Godard's conventionalist work have pointed out the limits of this standard economic approach, illuminating the notion of patrimony as a compromise.

Patrimonial economics pushes this reasoning even farther by providing the foundations of a paradigm that permits us to analyze the patrimonial dimension more autonomously, liberating the analytical frameworks from the market frame of reference. The evolving French water policies are a good illustration of this

[19] The World Water Forum is organized every 3 years by the World Water Council and aims to put water issues on the international agenda. The last one was held in Marseille, France, in March 2012.

[20] The first World Water Forum in 1997 had for its primary theme "Water: The World's Common Heritage."

analytical transformation, one that permits us to understand these policies as a result of the tension between market and patrimonial influences. It also allows us to insist on the necessity of renewing the analytical framework about such common goods as water.

References

Aguilera-Klink F, Sánchez-García J (2005) Water markets in Tenerife: the conflict between instrumental and ceremonial functions of the Institutions. Int J Water 3(2):166–185

Anderson TL, Snyder PS (1997) Water markets priming the invisible pump. CATO Institute, Washington, DC

Arrow KJ, Debreu G (1954) Existence of an equilibrium for a competitive economy. Econometrica 22:265–290

Barel Y (1984) La société du vide, Seuil, Paris (coll. "Empreintes")

Baron C (2005) Société civile et marchandisation de l'eau. Expériences internationales, vol 64, Sciences de la société. Presses Universitaires du Mirail, Toulouse

Barraqué B (1997) Les Agences de l'eau et la question du patrimoine commun, en France et en Europe. Rapport pour le Commissariat général du Plan, Paris

Barrère C, Barthélemy D, Nieddu M et al (2005) Réinventer le patrimoine. De la culture à l'économie, une nouvelle pensée du patrimoine ? L'Harmattan, Collection "Gestion de la culture", Paris

Barrère C, Barthèlemy D, Nieddu M et al (2007) Formation et gestion des patrimoines. Économie appliquée 60(3):7–282

Barthélemy D (2007) Économie identitaire versus économie marchande. Économie appliquée 60(3):57–84

Barthélemy D, Nieddu M (2007) Non-trade concerns in agricultural and environmental economics: How J.R. Commons and Karl Polanyi can help us. J Econ Issues 41(2):519–527

Barthélemy D, Nieddu M, Vivien FD (2004) Externalités ou production de patrimoines ? Les enseignements de travaux récents sur l'agriculture et l'environnement. Géographie Économie Société 6(3):331–352

Barthélemy D, Nieddu M, Vivien FD (2005) Économie patrimoniale, identité et marché. In: Barrère C et al (2007). pp 121–150

Bauer CJ (2004) Siren song: Chilean water law as a model for international reform. RFF Press/The Johns Hopkins Press, Washington, DC

Boltanski L, Thévenot L (1999) The sociology of critical capacity. Eur J Soc Theory 2(3):359–377

Boltanski L, Thévenot L (2006) On justification. Economies of worth (English trans). Princeton University Press, Princeton

Brun A, Lasserre F (eds) (2012) Gestion de l'eau, Presses de l'Université du Québec

Calvo-Mendieta I (2005) L'économie des ressources en eau : de l'internalisation des externalités à la gestion intégrée. L'exemple du bassin versant de l'Audomarois, Ph.D. dissertation, USTL, Villeneuve d'Ascq, 345p

Ciriacy-Wantrup SV, Bishop RC (1975) 'Common-property' as a concept in natural resources policy. Natural Resources J 14(4):713–727

Commissariat Général du Plan (1997) Évaluation du dispositif des Agences de l'eau: rapport au gouvernement. La Documentation Française, Paris

Commons JR (1934) Institutional economics. Its place in political economy. Macmillan, New York

Dales J (1968) Land, water and ownership. Can J Econ 1(4):791–804

de Montgolfier J, Natali JM (eds) (1987) Le patrimoine du futur. Approche pour une gestion patrimoniale des ressources naturelles. Économica, Paris, 250 p

Dublin Statement (1992) The Dublin Statement on Water and Sustainable Development. Available via http://www.wmo.ch/pages/prog/hwrp/documents/english/icwedece.html#p4
EC (European Commission) (2000) Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy, Official Journal L 327/1, Brussels, 22 Dec 2000
Eckstein O (1958) Water-resource development. The economics of project evaluation. Harvard University Press, Cambridge, MA
Godard O (1990) Environnement, modes de coordination et systèmes de légitimité: analyse de la catégorie de patrimoine naturel. Revue économique 41(2):215–241
Griffin RC (2006) Water resource economics. The analysis of scarcity, policies, and projects. The MIT Press, Cambridge, MA
Hardin G (1968) The tragedy of the commons. Science 162:1243–1248
Kneese AV (1964) The economics of regional water quality management, resources for the future. The Johns Hopkins Press, Washington, DC
Kneese AV, Bower BT (1968) Managing water quality: economics, technology, institutions. Resources for the Future, The Johns Hopkins Press, Washington, DC
La Branche S and Warin P (2006) La "concertation dans l'environnement", ou le besoin de recourir à la recherche en sciences sociales, Programme Concertation, décision, environnement, Ministère de l'écologie et du développement durable, Rapport final, vol 1, mars, 101 p
Mermet L (2007) Projets, tentations et fantasmes hathrôlogiques: le syndrome patrimonial. Paper presented at the 10th session of the RES cycle Recherche Environnementale sur la Société, ENGREF, Montpellier, 2 February. http://www.rgte.centre-cired.fr/reel-rgte/
Morehouse BJ (2011) Heritage, public trust and non-market values in water governance. Policy Soc 30(4):323–334
Nicolazo JL (1997) Les Agences de l'Eau, Éds. Johanet, Paris, 223 p
OECD (Organisation for Economic Cooperation and Development) (1997) Environmental performance reviews: France. OECD, Paris, 237p
OECD (Organisation for Economic Cooperation and Development) (2005) Environmental performance reviews: France. OECD, Paris, 248p
Ollagnon H (1979) Propositions pour une gestion patrimoniale des eaux souterraines. L'expérience de la nappe phréatique d'Alsace. Bulletin Interministériel pour la Rationalisation des Choix Budgétaires, 36p
Ollagnon H (1989) Une approche patrimoniale de la qualité du milieu naturel. In: Mathieu N, Jollivet M (eds) Du rural à l'environnement. La question de la nature aujourd'hui. ARF Ed./L'Harmattan, Paris, pp 258–268
Petit O (ed) (2009) La 'mise en patrimoine' de l'eau, Mondes en développement, no 145, De Boeck, Brussels
Pigou AC (1920) The economics of welfare, 4th edn. Macmillan, London
Polanyi K, Arensberg CM, Pearson HW (1957) Trade and market in the early empires. Economics in history and theory. The Free Press, New-York/Glencoe
Shaw WD (2005) Water resource economics and policy. An introduction. Edward Elgar, Cheltenham

Chapter 3
The Water Framework Directive: A Challenge for French Territorial Management

Stéphane Ghiotti

3.1 Water Territory and the WFD: An Introduction

The long path to the European Water Framework Directive (WFD) (Kaika 2003), part of evolving European water policies (Barraqué 1995; Nicolazo and Kaczmarek 1996; Van des Brugge and Rotmans 2007), represents an attempt to harmonize the water sector. The WFD, published in October 2000, sets an ambitious objective for all European Union (EU) member states: to achieve good water status[1] for all inland and coastal waters and rivers across the EU by 2015. The directive also aims to ensure the principle of non-degradation—that is, to ensure that waters are kept clean. But its implementation raises a number of questions about the organizational and territorial processes governing the management of water in Europe, particularly in France. While rules and objectives are defined at the European level, their application and observance remain the responsibility of individual member states, which have to designate a Competent Authority (Green and Fernandez-Bilbao 2006). This authority has to prepare and implement a river basin management plan (RBMP) for each river basin district.

To apply these measures, France relies on its traditional agencies, including river basin agencies and local authorities. All of these actors are directly influenced by a series of reforms that have redefined modes of governance and decision-making processes, among them the Law on Water and Aquatic Environments (LEMA)

[1] "Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy" (Official Journal of the European Communities) defines good water status as low pollution levels and healthy ecosystems.

S. Ghiotti (✉)
Laboratoire Acteurs, Ressources et Territoires dans le Développement (Art-Dev),
CNRS UMR 5281, Université Montpellier 3, Site Saint-Charles – Rue Henri Serre,
Montpellier 34090, France
e-mail: stephane.ghiotti@univ-montp3.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_3,

of 2006. Because the system as a whole has yet to stabilize, the institutional and financial landscape is difficult to read in terms of competences and responsibilities.

However, one aspect of the process does seem to be universally accepted. The notion of water territory, or more specifically, that of the river basin, has been acknowledged as an appropriate tool for achieving the goals of rationalization, democratization, and efficiency. This is a very important issue, because even if the French state prepares the RBMPs, implementing them often involves local authorities and economic actors. To reach the European aims, the territorialization of water policies and the implementation of the WFD are strongly intertwined. From this perspective, an important question arises: how does the territorialization of water policy effectively contribute to the goals of the WFD?

To answer this question, two issues must be addressed: the manner in which the governance of water is organized to obtain healthy river basins, and the evolution of the relationship between society and the aquatic environment (representations, practices, management approaches, etc.). An exploration of these issues reveals how the implementation of the WFD involves local authorities, especially at the regional scale, with projects based on water supply that often are at odds with the principles of integrated water resources management (IWRM) and with European water management aims.

3.2 The Territorialization of Public Water Policy

Much research has demonstrated the central role of water in the organization and appropriation of space, in the construction of collective and individual representations, or in the construction of social and economic relations within local societies (Marie 1982, 1983; Drain 1998; Bethemont 2000). Hydraulic territorialization (Béthemont et al. 2003) is defined as the articulation of three constitutive elements: the objectives of the policy pursued (productive hydraulic logic versus strategic hydraulic logic); the type of strategy (rigid or flexible procedures/tools); and the quality of resources that are used (infrastructure or management processes, new laws, rules, etc.).

The implementation of water policies consists of both simultaneous processes of deterritorialization and reterritorialization. New social interactions with regard to water emerge and develop, while others decline, resulting in new uses and new forms of resource sharing associated with economic and social exclusion processes. The territorialization process is defined as the simultaneous appropriation of space via material and symbolic means (Lecourt and Baudelle 2004) by a social group or institution. This appropriated space becomes a territory, "a site for the elaboration of an ever more influential collective of norms[2] that are increasingly pervasive… which contribute to the manner in which it [the space] is structured"

[2] In this chapter "norms" refer to laws and decrees.

(Maggi-Germain 2008). The territory becomes the site where new rules and norms to access and share water resources are constructed.

The territorial approach focuses on power relationships at work in interactions between the hydrological cycle and societies. In this sense, the territorial approach resembles political ecology, as it highlights and analyzes the spatial component of these interactions. Within the territorial approach, this spatial component is called the territories of water. These provide the space where problems, interactions between water and society, and governance are all located. As such, the territorial approach to water resembles that of waterscapes (Molle et al. 2009). In water territories such as river basins, two of the main issues for stakeholders are how to manage aquatic spaces and land planning and how to ensure cohesion and complementarity of various territories (urban, rural, upstream, downstream, etc.) in terms of accessing and monitoring resources. The balance has to be found between collective and fragmented sectoral management actions.

Thus constructed and objectivized, the territory becomes a central component of governance, an operational framework. In the field of water management, one of the main difficulties actors will have to face is the integration of transversal issues associated with the management of aquatic spaces and land planning. This precondition raises the issue of the cohesion and complementarity of territories in terms of accessing and monitoring resources in a situation in which rules concerning allocation are being redefined. In the twentieth century, the trend toward the specialization and fragmentation of fields of knowledge and the economic interests associated with water all conspired toward the adoption of the river basin—considered a tool of development and overarching knowledge—as a management framework (Molle 2009).

Since the passage of the Water Law of 1992, which developed this territorialized approach for water policies, such rules generally have been used to favor a policy focusing on the division of a specific volume of water among users in a specific river basin district rather than on a supply-based policy geared to meeting use requirements. Furthermore, the rules include environmental imperatives (minimum reserved flows), which impact the hierarchy of uses and modify the social and spatial division of costs and benefits between the various social groups (Molle 2007). These measures will not automatically give way to a balanced territorial system satisfying all stakeholders. Questions of distribution and reallocation may generate pronounced tensions concerning the use of a number of rivers. In effect, water management is currently characterized by an extreme territorial complexity and by competition between territories and development projects, and the actors who run them.

3.3 The Long Path Toward the WFD

Starting in the 1970s, the European Commission (EC) increasingly used directives as a tool for its water policy, issuing about 30 directives in as many years (Nicolazo and Kaczmarek 1996). Unlike European law, which applies wholly to the member

states, a directive provides room to negotiate the tools and resources states prefer to use. Consequently, a directive must be transposed into national law and into a political, institutional, economic, and funding framework for implementation. In France, the directives gave rise to two main problems: the proliferation of different approaches related to drinking water, health, and shellfish culture, which resulted in conflicting interests and played against the integrated water approach, and the continuing emphasis on qualitative issues such as the fight against pollution. Some experts posit that European water policy "is, in fact, no more than a political community of water quality. Nothing on water resources, on flooding and natural hazards related to water, on drought" (Kaczmarek 1997).

These issues impelled the EC to unify its water regulation within a single directive, the WFD. As this process unfolded, two factors shaped the course of the WFD. First, water policy grew progressively distinct from environmental policy in response to changing issues and challenges related to the management of water resources. New economic activities and social practices emerged, making it necessary to include water quantity issues in addition to water quality ones. Second, the 1995 assessment conducted by the European Parliament in response to the proliferation of sectorial directives demonstrated a discrepancy between the early goals of European law and those existing in 1995. Newer EU members faced different water issues than those faced by early EU member states.

In February 1996, the EC presented a proposal on European water policy that became, 1 year later, a first draft of the WFD (Page and Kaika 2003). The WFD was finally adopted in 2000. Although the directive clarifies and simplifies the European system, it was heavily criticized as soon as it was published. Detractors pointed at the discrepancies between the professed goals and the directive's instruments (Drobenko 2000, 2004). The WFD had failed to integrate any consideration of water quantities, and it left out both water scarcity and floods—characteristics of the Mediterranean hydrological regime—which were supposed to be addressed by other directives. Although the EU had expanded to include Mediterranean members, the WFD catered to northern members' concerns. The EU's only response to criticisms concerning water scarcity issues was to launch a debate in July 2007 on the way in which the EU could solve the problem of water scarcity and droughts within the context of climate change.

3.4 The WFD: Constraints and Challenges in France

As the WFD compels member states to achieve good ecological status for surface waters by 2015, European states have to prevent further deterioration of the status of all bodies of surface waters, prepare river basin management plans, and set up actions to promote environmental restoration. The WFD has three targets: pollution, particularly diffuse pollution from agriculture practices; water resource management to reduce water scarcity in several local river basins; and the physical restoration of aquatic environments to preserve conditions necessary for fish

reproduction and existence. Exemptions exist for extending deadlines for good status (2021, 2027), on condition that applications for such extensions be duly explained and justified in reference to economic concerns. Member states that fail to conform face substantial financial penalties.

The WFD severely constrains the water policy that France, in particular, may now develop, as European law supersedes national laws. In France, the vast majority of environmental law is of European origin, often resulting in an ill fit between the two legal frameworks and administrative, institutional, and territorial conflicts (Borzel 2000; Falkner et al. 2005). Thus, for example, French water policy has long been structured in terms of actors, tools, and levels of intervention and the implementation of EU directives are not carried out in apolitical territory.

The sweeping scope and the great number of EC directives make their implementation difficult for states, which must report on their activities to the EC. Implementation of European directives, when effective, is costly, time-consuming, and controversial. Furthermore, analyses of success in terms of meeting directive objectives often reveal disappointing results (Levasseur 2003).

In France, the WFD imposes greater constraints, such as an obligation of results and cost recovery in all water sectors and public involvement. Its implementation raises several issues about French water sector organization and territory:

- Any progress on an issue requires a consensus and political will at the national scale.
- When the directive involves several jurisdictions, particularly in the field of environmental policy, determining who leads and coordinates the various ministries is a thorny institutional and administrative issue.
- The costs of transpositions are often underestimated or poorly assessed.
- Implementation often involves local scale and economic actors, who are steered toward new strategies such as lobbying. The central issue remains the social and geographical distribution of costs and benefits associated with the new situation.

3.5 What Strategies Can Be Used to Achieve Good Status?

The WFD is now triggering a territorial reorganization in France. Actors across local to national scales are latching onto the opportunities the WFD offers to extend their power over resources they did not control previously. In France, the WFD is implemented by water agencies (WAs) at the basin level and by local governments at the local level. The state-operated WAs were created by the 1964 Water Law, which divided France into six distinct hydrographic areas.[3] Each area is managed by a water agency composed of a legislative body and an executive body. The legislative body, the basin committee, is made up of locally elected representatives, state representatives, and water-user representatives. The executive body, curiously also called a water agency, is made up of civil servants. Seven river basin

[3] See Chap. 2 for more information on the hydrographic areas, water agencies, and river basin committees.

committees now exist. These committees provide a forum where all the water stakeholders at the river basin level—representatives of administrative authorities, principal water users, and relevant government departments—meet to decide water policy. Within the water agencies, the basin committees coordinate the implementation of the WFD on behalf of the French government.

The WAs implement the guidelines set by the basin committees, which are state-owned, financially autonomous bodies responsible for levying abstraction and pollution charges on water users. They collect fees based on the polluter pays and taker pays principles. Revenue is also collected from domestic and industrial water bills, which include a pollution tax and a resource withdrawal tax. The revenue raised is used to fund subsidies and technical assistance that the WAs provide to local authorities and water users.

This strengthening of the WA system should be put into context: in fact, although they have been granted new areas of competence (flooding, urban/rural solidarity), the agencies have not been provided with any extra funding. This evolution likely will lead, at least initially, to finding new ways of distributing funds, the vast majority of which have, up until now, been targeted at drinking water and sanitation rather than the protection of aquatic environments. In a second phase, the agencies' interventionist approach is likely to favor local development projects. This orientation may create competition between local development projects for access to funding, a situation that may gradually undermine the previously existing logic of solidarity.

Focusing on water quantity, especially in the Mediterranean region, is critical to gaining good ecological status given the area's highly fluctuating river flows. Therefore, the WAs are aiming to increase minimum flow requirements, reduce the withdrawals from rivers, and focus on water economy and efficiency. These measures most strongly impact agriculture.

The choices or the trade-off thus engendered could lead to a pronounced politicization of policy debates and policy decisions—a situation that could, in turn, have dire effects on the operational capacity of bodies often presented as a shining example of participatory democracy (Flory 2003). A balance needs to be achieved among three categories of actors: local authorities, who must refrain from increasing water prices for political reasons; large water companies, which are anxious to keep their assets and their dominant position in certain river basin districts; and the state, which is accountable to the EC for ensuring good status of water quality.

Over the last few years, in the French decentralized context, local authorities have invested heavily in the water sector despite the fact that it was not one of their obligatory responsibilities. This is all the more surprising in that, at a time when local authorities have been pressured to concentrate their budgets and policies, they have continued to invest in the water sector, sometimes even increasing their levels of investment. Indeed, the general councils at the département level[4] spent 4.72 billion

[4] A département is a territorial and administrative division of France. There are 96 départements in metropolitan France and five overseas. Each is administered by a Conseil Géneral (general council), whose members are elected by the population of the département.

euros on the environment from 1996 to 1999, compared with a total investment of 948 million euros by the regional councils at the regional level (IFEN 2002, 2003, 2005).[5] The regional councils spend 33.4 % of their environmental budget on the water sector; the general councils dedicate 65.3% to this sector (IFEN 2005).

The process of granting increasingly more responsibility for water management to the départements (Grandgirard et al. 2009) may seem out of step with an integrated water management based on river basins. However, it is, in fact, a major innovation in a system that has been long criticized for its anachronism and conservatism.

In requesting audits and taking responsibility for infrastructure (dams, canals, etc.), the regional councils are also becoming increasingly involved in water management issues (Barraqué 2007). Their growing involvement in the field of water management goes hand-in-hand with their established role in land-use planning, economic development, and the environment. Since the nineteenth century, the régions have been the main point of reference for the development of water infrastructure on the national level. An example of this phenomenon is the expression "hydraulic region" (Pritchard 2004). Whereas départements are perceived by the state as archaic, extending their competence over territories whose relevance is obsolete, régions are perceived as suitably modern actors and have thus been a focus of public policy reforms. Water policy has become increasingly less national in character, with regionalization becoming the order of the day. Furthermore, regional politicians have benefitted from the opportunity afforded by the 2004 law on local freedoms and responsibilities to introduce new legislation.[6] Public-private initiatives made possible by this law enabled some Mediterranean regions (Languedoc-Roussillon and Provence-Alpes-Côte-d'Azur, or PACA) to acquire large hydraulic infrastructures (Ghiotti 2011).[7] Control over such assets is very important to local authorities facing demographic pressures. Languedoc-Roussillon, for example, is experiencing strong population growth. Associated urban sprawl near cities and along the Mediterranean coast and increasing tourism have resulted in the degradation of natural resources and high pressure on the water sector, including wastewater and drinking water.[8]

In terms of water demand, the two regions now have the power to turn on the tap. By deploying extra resources, especially supplying untreated water via the development of major water transfer projects,[9] they can perpetuate a specific development model of unbridled demographic growth and sprawling urbanization. They

[5] There are 22 régions, another chief administrative division, in metropolitan France, each administered by a Conseil Régional, whose members are elected by the population of the région.

[6] Law No. 2004-809 of August 13, 2004, on Local Freedoms and Responsibilities. *Journal Officiel*, August 17, 2004.

[7] Infrastructures belonged to two state companies: the Bas-Rhône-Languedoc Company and the Société du Canal de Provence.

[8] For more information on the Languedoc-Roussillon, see Chap. 11.

[9] The Aqua Domitia water transfer project in Languedoc-Roussillon region and the Verdon/St-Cassien water transfer project in the PACA region.

also can free themselves of the environmental constraints of the Law on Water and Aquatic Environments and the WFD and consolidate their political clienteles and extend their political influence. Supporting regional-scale projects of such a sensitive nature strengthens the regions' legitimacy in a geographical space that has become a center of power over the last 20 years.

These new resources do not fundamentally challenge preexisting, and often uneconomical, practices and management approaches. Such projects represent a development tool but also a risk of locking the actors in a supply management approach. In the absence, up until this point, of structured alternatives, and bearing in mind demographic pressures, it is legitimate to ask whether outright opposition to the project would be possible, especially in view of the combined strength of political, scientific, and economic interests. It would perhaps be more effective to introduce safeguards to guarantee that new water supplies are available at peak times and that the issue of costs does not degenerate into a situation characterized by internal losses, incurred by the local authorities, and external profits, benefiting private sector companies.

3.6 New Water Territory Issues

WFD goals impact water territories. The territorialization process oscillates between the need to take into account local specificities and the requirement to respect a national and European framework. Attempts to find a balance between these two poles may result in the emergence of management principles that run counter to the kind of global, integrated management approach that the WFD is supposed to introduce. Although the ambitious objectives concerning the good status of water are defined at a European level, they are almost exclusively implemented by local authorities at the local level. Although local authorities receive political support, they are, financially speaking, highly fragmented and extremely vulnerable due to the obligatory costs associated with their areas of competence. The new governance of water is an attempt to create a balance between an assertion of the role of the state, which is responsible to the EU, and the RBMPs, which must take into account the development needs of various local authorities.

Water management implies the need for an articulation between different levels of management and the implementation of systems of governance of finance and power, notably between national and local levels, especially insofar as it seems hard to believe that the objectives outlined in the WFD will be met in their entirety by means of a top-down approach. Perhaps a bottom-up approach would be a more appropriate solution. However, such a perspective is not based on a homogeneous whole. The various levels of local authority are committed to different, sometimes conflicting, water management strategies. Appropriate levels of management (Mermet and Treyer 2001), the nature and application of governance structures, and the sharing of costs are important issues for all of them (Hérodote 2003; Ghiotti 2007).

The reconciliation of social, economic, and environmental objectives requires political and financial decisions about the way in which water resources are shared and rendered accessible. In the future, the transparency of decision-making processes will be necessary for social and geographical solidarity to be perceived as socially acceptable. Whereas the 1990s saw the emergence of an approach to managing the aquatic environment based on dialogue, a global perspective, and the notion of heritage, the 2000s brought a devastating blow to those efforts, ushering in an age where approaches based on infrastructure and offer-based policies predominated once again.

In the WFD framework, the river basin approach integrates new constraints, especially environmental ones, as witnessed by the obligation to ensure good water status. The WFD is binding for all EU states, including France. If application and observance remain the responsibility of the French state, implementation is based on French local authorities and private actors. They have to bear considerable costs, which they are little inclined to pay. This new order will generate costs that should be distributed in an equitable manner, socially and geographically. Such are the issues now facing the new emerging water territories and the modes of governance associated with them. Compliance with the WFD aims can sometimes occur through winding paths where sustainability and democracy might be absent. Given the current EU economic crisis and its social and environmental implications, these questions are more important than ever.

References

Barraqué B (ed) (1995) Les politiques de l'eau en Europe. Ed. La Découverte, collection Recherche, Paris, 301p

Barraqué G (2007) Les Agences de l'eau et le contexte de la régionalisation. Responsabilité et environnement 46:73–80

Bethemont J (2000) Géographie de la Méditerranée, Paris, A.Colin, Coll. U Géographie, 313p

Béthemont J, Faggi P, Zoungrana Tanga P (2003) La vallée du Sourou (Burkina Faso). Genèse d'un territoire hydraulique dans l'Afrique soudano-sahélienne. l'Harmattan, Paris, 230p

Borzel AT (2000) Why there is no 'southern problem', on environmental leaders and laggards in the European Union. J Eur Policy 7(1):141–162

Chiassérini V, Pons-Serradeil M (2007) Les nouveaux schémas d'aménagement et de gestion des eaux: de l'orientation à une subtile contrainte? Bulletin du Droit de l'Environnement Industriel 12(supplement):11–17

Drain M (ed) (1998) Régulation de l'eau en milieu méditerranéen risques et tensions. Territoire en mutation, no. 3, March, 263p

Drobenko B (2000) Directive eau: un cadre en trompe l'œil? Revue européenne de droit de l'environnement, no. 4, pp 381–402

Drobenko B (2004) De la pratique du minimalisme: la transposition de la directive-cadre 'eau', Revue juridique de l'environnement, no. 3, pp 241–256

Falkner G, Treib O, Hartlapp M et al (2005) Complying with Europe. EU harmonisation and soft law in the member states. Cambridge University Press, Cambridge, 418p

Flory JCL (2003) Les redevances des agences de l'eau. Enjeux, objectifs et propositions d'évolution dans la perspective de la réforme de la politique de l'eau. Report drawn up for the Prime Minister and the Minister for Ecology and Sustainable Development, 180p

Ghiotti S (2011) La directive cadre sur l'eau (DCE) et les pays méditerranéens de l'union européenne. Une simple question de ressources en eau? Pôle Sud, Politiques de l'eau 2(35):21–42
Ghiotti S (2007) Les territoires de l'eau. Gestion et développement en France. CNRS Editions, collection Espaces et milieux, Paris, 264p
Grandgirard A, Barbier R, Tsanga Tabi M (2009) Le Département, un acteur clef de la politique de l'eau. Gestion de l'eau en France Acteurs et politiques publiques, Economie rurale 309:22–33
Green C, Fernández-Bilbao A (2006) Implementing the water framework directive: how to define a 'competent authority'. J Contemp Water Res Educ 135:65–73, Universities Council on Water Resources
Hérodote (2003) Les pouvoirs locaux, l'eau, les territoires, vol 110. La Découverte, Paris, 188p
IFEN (2002) Les dépenses des Départements en matière d'environnement, les données de l'environnement no 79, 4p
IFEN (2003) Les dépenses des Régions en matière d'environnement, les données de l'environnement, no 82, 4p
IFEN (2005) Les dépenses d'environnement des Départements et des Régions (1996-2002), Les dossiers no 2, 24p
Kaczmarek B (1997) La politique communautaire de l'eau. In: L'Europe de l'environnement, Aménagement et Nature. Ibis Press, Paris, March, no. 124, pp 25–36
Kaika M (2003) The water framework directive: a new directive for a changing social, political and economic European framework. Eur Plann Stud 11(3):299–316
Lecourt A and Baudelle G (2004) Conflits d'aménagement et proximité sociale: une reevaluation. Int J Sustain Dev, 15p. In: Quatrièmes journées de la proximité. [ref. 3 Mar 2005]. Available in http://139.124.177.94/proxim/viewpaper.php?id=197
Levasseur M (2003) La mise en œuvre de la directive cadre européenne sur l'eau n°2000/60/CE en France: quelle pertinence pour quels résultats ? Droit de l'environnement 114:259–263
Maggi-Germain N (2008) La territorialisation du droit: l'exemple des politiques de l'emploi et de la formation professionnelle continue. Droit et société 69(70):441–477
Marie M (1982) Un territoire sans nom: pour une approche des sociétés locales. Paris, Librairie des Méridiens, Coll. Sociologie au Quotidien, Paris, 176p
Marie M (1983) Pour une anthropologie des grands ouvrages. Le canal de Provence. Les Annales de la recherche urbaine, no. 21, pp 5–35
Mermet L and Treyer S (2001) Quelle unité territoriale pour la gestion durable de la ressource en eau? Les outils d'une bonne qualité de l'eau, Annales des Mines. Edition ESKA, Coll. Responsabilité et Environnement, Paris, pp 67–79
Molle F (2007) River basins and spatial justice: distributing benefits, costs and risk. In: Paper presented to the international conference on spatial justice, 2–14th of March 2007, University of Paris X-Nanterre, Paris, 9p
Molle F (2009) Water, politics, and river basin governance: repoliticizing approaches to river basin management. Water Int 34(1):1–9
Molle F, Mollinga PP, Wester P (2009) Hydraulic bureaucracies and the hydraulic mission: flows of water, flows of power. Water Alter 2(3):328–349
Nicolazo JL, Kaczmarek B (1996) L'Europe de l'eau, de Bruxelles à Paris : enjeux, directives et réalités. Continent Europe, Paris, 174p
Page B, Kaika M (2003) The EU Water Framework Directive: Part 1. European policy-making and changing topography of lobbying. Eur Environ 13:314–327
Pritchard BS (2004) Reconstructing the Rhône: The Cultural Politics of Nature and Nation in Contemporary France, 1945–1997. French Historical Studies 27(4):765–799
Van Der Brugge R, Rotmans J (2007) Towards transition management of European water resources. Water Resour Manag 21:249–267

Chapter 4
Water Globalization: The Strategies of the Two French "Majors"

Pierre Bauby

4.1 The Two French "Majors": A Snapshot

Water management in Europe varies widely depending on the histories, traditions, institutions, and cultures of the different countries. But until the 1980s, water was directly managed by public authorities in all of Europe except France, which has largely delegated water management to private companies since the mid-nineteenth century. Under the French approach, municipalities own the infrastructure but outsource the management of the service through concessions, leases, and similar means.[1]

Two large French companies, the so-called majors, are the international leaders of the water and wastewater sector: Compagnie Générale des Eaux, which became Veolia Environnement, and Société Lyonnaise des Eaux, which became Suez Environnement.[2] Over time, Veolia Environnement has extended its activities to other sectors—waste, energy, and transportation—and is now the largest water services company in the world, operating in 77 countries (Table 4.1). A sampling of Veolia's activities includes managing the water production and distribution contract for the Parisian suburbs; waste management and recycling in Westminster, London, and the cooling network in Singapore's Marina Bay. It is also responsible for the power and electric systems and communications equipment in the traffic signals on the Øresund Bridge between Denmark and Sweden and manages biomass facilities in Pécs, Hungary. In addition, Veolia manages and operates the urban bus system in Phoenix, Arizona, in the United States, and urban and school

[1] See Chaps. 5, 6, and 7.

[2] This chapter refers to these two groups by both Lyonnaise des Eaux (or Lyonnaise) and Générale des Eaux (or Générale), or their current names, Suez Environnement, subsidiary of GDF Suez since the 2008 merger with Gaz de France, and Veolia Environnement.

P. Bauby (✉)
Université Paris 8, 48 rue du Rocher, Paris, France
e-mail: bauby.pierre@orange.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_4,

Table 4.1 Turnover from Veolia Environnement's three main activities, 2011

(In billions of euros)	Water	Sanitation	Energy services	Consolidated total
Europe	**8.7**	**7.0**	**6.5**	**22.3**
France	4.5	3.3	3.5	11.4
Germany	1.5	1.2	0.009	2.7
England	0.8	1.6	0.1	2.6
Rest of Europe	1.8	0.8	2.8	5.5
United States	**0.7**	**1.2**	**0.3**	**2.2**
Rest of the world	**3.1**	**1.4**	**0.4**	**4.9**
Middle East	0.2	0.1	0.09	0.4
Oceania	0.2	0.7	0.04	0.9
Asia	1.5	0.2	0.1	1.9
Others	1.0	0.3	0.1	1.6
TOTAL	**12.6**	**9.7**	**7.2**	**29.6**

Source: Veolia Environnement (2012)

bus services in Perth, Australia. It also operates three rail lines connecting Munich to Rosenheim in Upper Bavaria and Austria.

Suez Environnement, now a branch of the group GDF Suez, is the second largest private company in the world market of water and wastewater services and is active in 36 countries on five continents. The company manages the drinking water supply in Sydney, Australia; the wastewater recycling plant in New Delhi, India; and the Newtown wastewater treatment plant in Connecticut in the U.S. Suez also develops heating from waste treatment in Levallois-Perret, France, and oversees the design, construction, financing, and operation of an energy-from-waste unit in the county of Suffolk in the United Kingdom, the restoration of drinking water and sanitation services in Port-au-Prince, Haiti, and the extension of the wastewater treatment and recycling plant in Doha West, Qatar.

In 2011, Suez Environnement's revenue was 14.8 billion euros; 44 % of that revenue comes from the Waste Europe division, 28 % from Water Europe, and 28 % from the international division (Table 4.2). As of the end of 2011, 80,450 employees worked for the company (Suez Environnement 2011).

The very existence of Veolia and Suez is rooted in eighteenth and nineteenth century French history, and their integration and internationalization strategies helped reinforce their success. These strategies can be analyzed from two perspectives: "industrial organization" (Mason 1979; Bain 1956, 1959), particularly failures of the market, mergers and natural monopolies, and oligopolistic competition, as well as the technical and economic specificities of the water sector.

4.2 Générale des Eaux and Lyonnaise des Eaux: A History

In France, the municipal[3] responsibility to organize the provision of water services dates from the French Revolution. Several laws and regulations in the nineteenth and twentieth centuries reinforced this responsibility; decentralization laws of 1982

[3] Rural and urban communities.

Table 4.2 GDF Suez turnover and employees, 2011 *(turnover in billion euros)*

					Suez Environnement			
	Energy	Gas and LNG[a]	Infras-tructure	Services business	Waste	Water	Total turnover	Total employees
Europe	**37.8**				**10.6**		**72.3**	**191,300**
					6.5	**4.1**		
France	13.5						31.1	108,300
Benelux and Germany	13.9						41	83,000
UK	3.4							
Rest of Europe	7.0							
International	**12.3**				**4.1**		**18.3**	**27,600**
South America	3.6 (Latin America)					0.8	4.6	4,500
North America	4.8					0.8	5.7	6,100
Middle East, Turkey, Africa (META)	1.1				0.8		7.0 (Asia, Middle East, Oceania)	17,000 (of which 5,250 are in Africa)
Asia	1.7				0.5		0.9 (Africa)	
Australia	0.8				1.0			
Total turnover	**50.1**	**9.9**	**1.4**	**14.2**	**14.8**		**90.6**	**–**
Total employees	**61,250**			**77,200**	**80,450**		**–**	**218,900**
	~61 % (~17 % France)	**~9.5 %**	**~29 %**					

Source: GDF Suez (2012a, b)
[a]LNG: liquified natural gas

confirmed it (Bauby 2011). Large differences in the size of the municipalities shaped the organization and regulation of water and wastewater services. More than 36,000 municipalities exist in France. More than 30,000 of them have fewer than 2,000 inhabitants, comprising 25.3 % of the total French population, while 102 municipalities have between 50,000 and 200,000 inhabitants (14.4 % of the population) and 10 have more than 200,000 inhabitants (8.9 %).

Today, the municipalities can choose between two main modes of water management: direct management through public operators, or régies, which provide water to 21 % of the population and treat wastewater for 47 % of the people, or delegation contracts to private firms, which can span 7–20 years and involve a tender process.

The French municipalities were long prevented from engaging in commercial activities, including water provision. They were in charge of public fountains and exerted control over water carriers—men who streamed water to users. The first water distribution networks were built and exploited by private entrepreneurs in the mid-nineteenth century, rooting water management delegation and services provision in the control of private companies (Breuil and Pezon 2005; Haghe 1998). If most operators were satisfied to intervene locally by managing the water service of only one municipality, some of them had national ambitions and sought to manage the water services for a growing number of municipalities. Thus, two groups, called majors, emerged: Compagnie Générale des Eaux was created on December 14, 1853, by Napoleonic decree,[4] and the Société Lyonnaise des Eaux et de l'Eclairage (SLEE) was founded in 1880 (Pezon 2000). The aim of SLEE was:

> To obtain, purchase, lease, and operate, in France and abroad, all concessions and companies relating to water and lighting, more precisely drinking water supply, wastewater, irrigation, establishment of the water dams and reservoirs, public and private lighting, and heating. It also gives itself means of buying patents and for taking part in existing companies. (Author translation. De Meritens-Fabry 2001)

In 1939 the turnover of Lyonnaise in energy was five times more than in water; in 1914 the two were equivalent. At the turn of the twentieth century, the Conseil d'Etat (the French Administrative Supreme Court) acknowledged the municipalities' right to certain economic activities, provided there is a proven failure of private initiatives. Whereas the construction of water supply networks had been extended, municipal initiatives based on public responsibility were developing. Gradually, in the first half of the twentieth century, municipalities struck a relative balance between public and private management. At the beginning of the twentieth century, delegated management through concession, which represented the main mode of management of water services in France, was progressively replaced by lease contracts (Pezon 2000).

Early in the aftermath of World War II, a series of transformations occurred that influenced the orientations of the private groups: the reconstruction after the war, the growth of the cities and the development of a consumer society; the nationalization

[4] Its founders had two objectives: to irrigate the countryside and supply urban water. http://www.veolia.com/fr/groupe/historique/1853-1900/

Table 4.3 From Lyonnaise des Eaux et de l'Eclairage to GDF Suez

1880	Creation of Société Lyonnaise des Eaux et de l'Eclairage
1946	Nationalization of the electricity → Lyonnaise des Eaux
1967	Compagnie Financière de Suez becomes a shareholder
1970 (years)	Purchase of Sita (urban waste management) and Degrémont (wastewater)
1990	Merger with Dumez → Lyonnaise des Eaux-Dumez
1997	Merger with Compagnie Financière de Suez → Suez-Lyonnaise
2001	The group takes the name Suez
2002	Sale of activities BTP and communication. Acquisition of Tractebel (Belgium)
2008	Merger with Gaz de France → GDF Suez
	Subsidiarization of Suez Environnement

Source: Data compiled by the author

of electricity and gas in 1946—but not of water—and decolonization. Water increasingly became an added-value trade: consumption exploded, increasing pollution, which in turn generated legislation enforcing wastewater treatment. Hence, the interest of Lyonnaise des Eaux in water purification companies like Degrémont, which it acquired in 1972 (Table 4.3).

4.3 The Development of Delegated Management in France

Unlike most other European countries, which long preserved the public management of water, French elected officials made extensive use of delegation management from the 1960s until the end of the 1980s. A third national-scale operator, SAUR, emerged during this time. In 1984 it was acquired by the Bouygues Group, a large building and public works (BPW) firm, but it remained too small to truly compete with Générale des Eaux and Lyonnaise des Eaux.

The development of the delegation process was due to a convergence of interests between elected officials and service companies. First, the production of water and water supply required increasingly complex treatments to meet public health requirements and quality standards; a growing number of municipalities, particularly small and medium-sized municipalities, encountered difficulties in developing the necessary techniques and competences, whereas the private groups provided broad solutions of design, creation, management, maintenance, and know-how for a series of other local services. With insufficient public funds, delegated management also seemed to be a means to secure private capital to finance infrastructure. It also allowed for the introduction of market-oriented approaches instead of administrative operations and the discharge of elected officials from their management responsibilities.

Despite progress in productivity, the increasing quality requirements of water and wastewater treatment, pushed by the European Union (EU), have led to increasing costs and user fees. Moreover, delegated management makes it possible for elected officials to escape responsibility for these increases to their constituents.

Table 4.4 Delegation contracts in France (2000–2001)

	Générale des Eaux		Lyonnaise des Eaux	
		% population		% population
Number of contracts	8,000		2,900	
Consumers served (million)	45[a]		23[a]	
Drinking water	26	43	14	23
Water treatment	19	31	9	15

Source: OIEAU (2002)

[a]Some consumers are counted twice, when they are served by the same operator

In addition, delegated management is supposed to combine the advantages of the monopoly (throughout the contract) and of competition (at the end of the contract, for its renewal).

Indeed, delegated management addressed the challenges of innovation and technical quality, management flexibility, and economies of scale. But in the absence of public funds, delegated management was an important means of financing French political life and electoral campaigns, which encouraged, in certain cases, corrupt practices. This situation changed with the Sapin Law of 1993, which was designed to prevent corruption and improve transparency in economic activities, public procurement, and public funding of political activities.

Delegated management accounted for 47 % of the water market in France in 1980 and 73 % in 1989 and accounts for 79 % today. Thus, the number of contracts managed by Lyonnaise des Eaux, for example, spiked from 1,300 in 1979 to 2,500 in 1988 and 2,900 in 2000–2001 (Table 4.4). Although some big cities have retained direct management of their water and wastewater services, the delegation system initially was developed for large cities, whose elected officials were confronted with increasing complexities of management.

In the 1970s these companies gradually became multi-service groups. Their technical and managerial skills and expertise allowed them to participate in each stage of the production, water supply, and wastewater process: research, marketing, plant exploitation, infrastructure construction, and activities linked to the use of water, such as treatment of industrial water and wastewater. At the same time, they extended their activities to encompass other urban services, including transportation, waste, parking, and school canteens. Productive, territorial, and commercial synergies exist between all these activities today.

The French system of delegation of water and wastewater brought obvious gains in quality and effectiveness to the sector, particularly with the increased technological advances in water treatment, distribution, and wastewater. Even so, the French system is characterized by the existence of deep imbalances stemming from the structural asymmetry of knowledge and expertise that exists between delegating organizing authorities and delegated companies. Operators used the room to maneuver within the system to gain strong profits, based on the possible existence of monopoly rents. They developed vertical and then horizontal integrations, which led to the existence of oligopolistic competition.

In response, France passed a series of legislative and managerial reforms, beginning in the 1990s, which increased organizing authorities' orientation, control, and regulation in terms of reinforcing competition, improving transparency, and creating expertise at their disposal but did not eliminate the structural asymmetry.[5] In some cases, public management was reintroduced or is envisaged (Paris in 2010, Bordeaux by 2018); in others, organizing authorities became large enough to better exert their role of regulation and control.

4.4 Strategies of Integration

The fact that the two majors constitute an oligopoly that structures the market does not prevent them from innovatively seeking strategies of integration and diversification. The groups have proved an astonishing plasticity, seeking extremely varied synergies depending on circumstance (Lorrain 1995b). One can identify three tendencies, which follow one another or overlap over time, especially from the 1980s until the 2000s (Bonin 1987; Lorrain 2005): horizontal, diversifying and expanding activities to have a large coverage of urban services; vertical, controlling all of the steps in the production cycle (from resources to management) in a certain sector; and environmental, introducing into their activities concerns about sustainable development (resource protections, biodiversity, etc.).

4.4.1 Horizontal or Multi-Service Integration

Close and long-term relationships with local authorities are at the heart of the water trade. As a result, there is a propensity to offer these communities a range of services. This phenomenon is long-standing; Suez is the heiress of SLEE, which, until 1945, provided gas, electricity, and water.[6] From the 1960s to the 1990s, with the development of the delegated management of a growing number of local public services, this multi-service model gradually extended to waste, heating and cooling, urban networks, energy, parking, public transport (for Veolia Environnement), funeral services (for Suez), and the management and maintenance of buildings, fire protection, and other services.

In the 1990s, the companies' ambition grew, extending to video communication wiring (Générale des Eaux became French international media conglomerate Vivendi in 1998), the management of school canteens, leisure parks, prison infrastructure,

[5] These reforms included the Sapin Law on the prevention of corruption and the reinforcement of competition and transparency; the Barnier and Mazeaud laws on the improvement of transparency; the development of incentive mechanisms; and the involvement of users in the regulation process.

[6] After the nationalization of electricity industries in 1946, SLEE became Lyonnaise des Eaux.

Table 4.5 From Générale des Eaux to Veolia Environnement

1853	Creation of Compagnie Générale des Eaux (SGE)
1970 (years)	Absorption of SGE, which became the Group Vinci
1983	Participation in the creation of Canal+ (television) and of SFR (telecommunications)
1998	Merger with Havas (communication and press) and transformation into Vivendi (new name)
1999	Merger with Universal (U.S. group of communication)
2000	Break-up in Vivendi-Universal and Vivendi-Environnement
2003	Vivendi-Environnement becomes Veolia Environnement

Source: Data compiled by the author

building surveillance, and elevator maintenance (Table 4.5). The groups sought to offer a complete range of services and become indispensable partners of the local public authorities. The city of Toulouse, for example, delegated the majority of its local public services to the same group, Générale des Eaux.

4.4.2 Vertical Integration

Vertical integration sought the control of the entire product chain, including hydraulic pipes and projects; manufacturing of pumps, valves, and treatment equipment; and electric works. BPW plays a privileged role in this strategy because projects by water companies always involve this building and public works sector and ensure employment to a myriad of subsidiaries. At the end of the 1980s, this strategy gained importance with the buyout of large companies engaged in building and public works. At the same time, Bouygues, the large building and public works company, bought out SAUR in 1984, thus landing in third place in the sector. Competences that these groups gradually acquired went well beyond vertical integration. The objective was to constitute large groups able to deal with any project by ensuring the design, construction, financial backing, engineering, and even the operation. In 1994, BPW became more important than water in the turnover of the two groups (28 % BPW and 26 % water for Vivendi and 35 % and 22 % for Suez, respectively): "The physical production of cities constitutes a vast unified market by the strategies of some private large multi-sector companies" (Lorrain 1990). From this point of view, the traditional links between these groups and the banking sector (Société Générale for Générale des Eaux, Banque Nationale de Paris (BNP) and then Suez for Lyonnaise des Eaux) have become more important (Morin 1996).

The two horizontal and vertical integration models, when combined, constitute several groups involved in many sectors, from construction to operation. It was the tendency in the 1990s, where one saw them engaging in personal services such as the hotel industry, restoration, residences for elderly people, and medical

institutions, to become real conglomerates, involved in telecommunications. The creation of Vivendi Universal, the first world communications group, encompassing cinema, media, and telecommunications, is the result of a strategy of both horizontal and vertical integration. This strategy reached its apex in the 1990s but exploded between 1998 and 2001 with the breakup of Vivendi and a severe debt crisis of Suez from 2002 to 2005.

4.4.3 Environmental Integration

Companies refocused on their traditional core activities during the 2000s. To a certain extent, that represents a return to the multi-service model because the know-how involved in operating strongly territorialized local public services lies at the heart of the business by tying long-term relations with public decision makers. Veolia Environnement, for example, created in the aftermath of Vivendi, remains active in transport, energy services, and waste, in addition to water and wastewater. But beginning in the 2000s, the overall diversification of the 1990s left room for a strategy centered on what the two large groups call services to environment: water, wastewater, transport, and waste. Thus Bouygues sold SAUR, which still retains concessions, such as that of the city of Mendoza in Argentina[7] and some cities in Africa. From the 2000s, the word "environment" became more than a marketing platform or cause du jour. It became a new way to acquire know-how for the future. It unites water and waste; indeed, the two majors sought both diversification and control of the entire production chain in these two fields.

In terms of diversification, new services and technologies appeared, often related to legislative changes, particularly in the fields of treatment and decontamination of water, maintenance and rehabilitation, water production or waste recycling, resources protection, energy saving, etc. The environmental topic is a very dynamic factor in the invention of new trades and services offered to public authorities and companies and facilitates a move toward the definition of regulations (Lupton and Bauby 2008) and public policies.

Today, the control of the value chain rests more on engineering. This old form of vertical integration is specific to France (Drouet 1987). Independent engineering from manufacturers and operators dominates elsewhere but has acquired greater prominence: Dégremont at Suez and the wastewater undertaking by OTV[8] at Veolia Environnement are essential assets for the competitiveness of the groups and the penetration of new markets. The two groups use expressions such as "comprehensive solutions" when referring to the whole cycle of water. They propose "to apprehend largely and according to a common approach, the management of

[7] See Chap. 8 for more information on the privatization of water and sanitation services by international consortia in Argentina.

[8] OTV is an engineering group within Veolia specializing in water engineering activities.

actions with an environmental impact, as well as the development of solutions allowing interactions and optimization between these services" (Veolia Environnement 2006). It is in services to industrial and service companies, which tend to outsource the management of their fluids, water, and effluents, that the following dynamic is best seen: whereas the groups formerly provided only the engineering and the construction of the installations, today they propose to assume their integral management and optimization. Veolia Environnement extends its services, for example, to waste management, energy services (steam, industrial heating and cooling), and even to rail transport; the range of services can thus include management and real estate maintenance.

One finds the multi-service approach in the overall efforts to reduce the impact of the activity on the environment. For the two groups, this market is rapidly growing, and it is this same environmental management approach that they try to develop with local authorities. Thus, one speaks today about water management in the city, including the management of rainwater resources (Veolia Environnement 2007). When Suez Environnement speaks about the control of the value chain, it explicitly refers to the cycle of water (Suez 2007). The two majors followed similar integration processes, and environment today has become the strategic integrator of their "production value."[9] Environment is the key element of Veolia's still more diversified activities, whereas Suez places more focus on two pillars, water and energy, granting an increasingly central place to the latter (see infra). As of December 2011, Veolia was moving toward a recentering of its three activities, water, environment, and energy, and was trying to sell its stakes in transportation.

4.5 Strategies of Internationalization

Originally, the water sector was designed and organized in Europe at the local level according to the characteristics of the available resource; wastewater management was also organized at this level. Thus, the first operators were born from local initiatives. The phenomena of vertical and horizontal integration that gave rise to the large companies active today appeared only gradually. Initially, this integration took place within each country but expanded beyond the national borders beginning in the early twentieth century. The internationalization of the two majors is related to the specific history of each group and the opportunities that opened to them to use their competences, starting with the traditionally strong water and wastewater sector, which propelled the French model of delegation.

[9] According to their names "Veolia Environnement" and "Suez Environnement," and corporative statutes. See Articles 3 of their corporative statutes http://www.finance.veolia.com/docs/Statuts-au-03-aout-2011.pdf; http://www.suez-environnement.fr/wp-content/uploads/2012/01/Statuts_SUEZ_ENVIRONNEMENT_Company1.pdf?9d7bd4

4.5.1 A First Internationalization

The example of Lyonnaise des Eaux is particularly significant. The company developed services—electricity, in particular—in the French colonies of North Africa (Tunis, Morocco); central Africa (Togo, Congo); and the Pacific (New Caledonia). After the nationalization of electricity in France in 1946, Lyonnaise des Eaux restructured its activities. In the 1950s, it was present in many African countries: Algeria, Morocco, Tunisia, Madagascar, Guinea, Congo, Center Africa, Senegal, and Togo. In 1959, Africa accounted for 80 % of the company's mortgage portfolio value and 15 % of its benefits (De Meritens and Fabry 2001).

Between 1959 and 1973, colonized countries gained independence and the national authorities in the countries concerned stopped the credits of the subsidiaries of Lyonnaise des Eaux. In some cases, Lyonnaise des Eaux succeeded in continuing to ensure a technical presence within the new management companies. However, because the company retreated to France, it lost its expertise in working in foreign contexts. Compagnie Financière de Suez became the main shareholder of Lyonnaise des Eaux in 1974. The consolidation of the water supply business and diversification of city services—water, sanitation, heating, energy, safety, and funeral services—followed. In 1997, Lyonnaise des Eaux merged with Compagnie Financière de Suez to become a "world group of community-based services" (De Meritens and Fabry 2001).

4.5.2 The 1980s to the 1990s

The development of Lyonnaise des Eaux and Générale des Eaux in the 1960s and the 1970s occurred in France through the rapid growth of delegation (see supra). But the risk of progressive saturation of the French market appeared. The companies ensured themselves a fast growth rate by seeking new activities, thus reinforcing their character of multi-service groups, and by conquering new markets in the field of water and wastewater. This second internationalization went hand-in-hand with the transformation of these companies into multi-service groups.

Thus, during the 1970s, Lyonnaise des Eaux tried to enter the Spanish market, a pathway to Latin America, by recovering the historical link that existed with Aguas de Barcelona through its participation in the holding group AGBAR[10] (De Meritens and Fabry 2001). Between 1980 and 1990, Lyonnaise des Eaux's strategy consisted of widening its international expansion. The countries of the European Community and North America were "privileged for their economic political stability and those of Asia and the Pacific for their rapid growth" (De Meritens and Fabry 2001).

[10] Construction, local public services, health, communication, and all that relates to water in Barcelona.

In the United Kingdom under Margaret Thatcher, Lyonnaise des Eaux became significantly involved in three water companies. After the fall of the Berlin Wall, the Eastern European countries discovered the model of delegated management proposed by the French groups.

The groups centered their strategies on the export of their technology, expertise, and the French system of delegation-concession, the so-called French model, "which is recognized in most of the world as a rational, effective, and efficient mode of management" (De Meritens and Fabry 2001). This strategy converged with one developed at the same time by international agencies, impelling structural reforms, in particular the transformation of the management of public services, including cost recovery policies and the use of the private sector to manage and finance infrastructure (World Bank 1994). The French firms had been actively cooperating for the development of these doctrines by promoting the merits of the French model of delegated management and the regulation by concession contracts and its advantages over the English model of privatization and regulation by independent commissions. But, whereas delegated management in France primarily took the form of lease contracts, developing countries generally advocated concession at the end of the 1980s and the beginning of the 1990s, including financing the investments or total privatization.

In 1990, the merger with a construction company with broad international exposure helped Lyonnaise gain entry into new markets. Lyonnaise sought to meet the requests of megacities that "expected broad offers from companies (construction, maintenance, management of the services)" and it became the leader of construction, town planning, and environmental services (De Meritens and Fabry 2001). In the water sector, Lyonnaise des Eaux obtained significant contracts abroad: in Buenos Aires, Mexico City, Cartagena, Sydney, and Chengdu (China) in 1993–1994 and in Johannesburg, Jakarta, Manila, La Paz, Budapest, Maribor (Slovenia), Casablanca, and Medan (Indonesia) in 1997; thereafter, in Casablanca and Santiago, the latter of which was a total privatization. In particular, a 1993–1994 contract with Buenos Aires served as a "leading experiment" on which to base a common reference on good practices regarding privatizations in the water sector (Lorraine 1995b). In this new phase of internationalization, Lyonnaise des Eaux also invested in industrialized countries, including the United Kingdom, the United States, and Spain. Consequently, it developed joint ventures with local companies, particularly in China (De Meritens and Fabry 2001).

Générale des Eaux and Lyonnaise des Eaux enjoyed spectacular growth and obtained a critical size at an international level in the 1980s. The situation began to change around 1990 with shifts in the worldwide economy and the redefinition of the strategies of the groups. Two apparently contradictory processes developed: Lyonnaise and Générale consolidated their leadership position in water supply and extended their activities in other sectors, primarily in those considered to be more profitable or less risky—in particular energy for the Lyonnaise company and communication for Générale.

4.5.3 Changes and Strategic Redeployments of the 2000s

The context has clearly changed since the end of the 1990s. A series of macroeconomic, financial, sectoral, and social shifts strongly modified the majors' perspectives of investment profitability and led to the strategic adjustment of their multilateral organization.

According to a study of 34 significant World Bank cases, concessions in the water sector appear relatively less attractive. Thus, 40 % of the water concessions in Latin America prove to be "non-attractive." The same study stressed that concessions were considered risky at the end of the 1990s (Sirtaine et al. 2005; Foster 2005). As Guasch noted (2004), "In the sectors of water and transport, the needs for investments were the highest, but, at the same time, the recovering of the costs by the tariffs was difficult because of social and political reasons." In addition, macroeconomic shocks influenced the rates of exchange in Mexico in 1994, Brazil in 1999, and Argentina in 2001 (Schneier-Madanes and de Gouvello 2003). Political changes, as well as mobilizations of populations particularly sensitive to water challenges, also played a role in these companies becoming less attractive (Sierra 2006). Thus, the strategy that had emerged in the beginning of the 1990s revealed its weaknesses and even its strategic errors (Estache 2006). At the same time, the accelerated development abroad (privatizations, concessions) generated a debt rate that was difficult for these groups to reabsorb.[11] The level of debt called for large investment withdrawals and greater selectivity.

Each particular failure cannot be analyzed separately from this context: the disengagement of Suez from Buenos Aires or Jakarta, for example, concerns not only local causes but a strategic redeployment, because the group imposes for all its activities and on each branch the obligation to finance its expenditures (Hall et al. 2011). That strategy reduces the capacity of expansion in water and forces majors to choose contracts that minimize investments and fixed assets (e.g., standard lease contracts). Undoubtedly, in each case, there are specific factors that lead to the decision making, but a general strategic framework also is at work: Suez was not only withdrawing from Argentina but also from countries like Indonesia and Malaysia to center itself in particular in Europe.

At that time, Suez seemed to disengage somewhat from water and carry out multi-utility diversifications, especially in energy, which appeared to be more profitable and less risky. One can analyze the redeployments that were developed at the beginning of the 2000s, such as the search for an activity that could replace water as the principal business. Water gave way as "the first trade of the group" in the two majors. In 2005 the energy sector accounted for 75 % of the turnover of the Suez-Lyonnaise des Eaux group; the group was the second provider of electricity in France with 8 % of the market shares, the fifth in Europe with 14 million customers,

[11] Veolia Environnement had 3.6 billion euros in assets for 12.9 billion euros in debts; Suez had 26 billion euros in debts in 2002, which fell to 13.9 billion euros with the transfer of 11 billion euros in assets, but the debt still exceeded the value of the assets.

Table 4.6 Suez merger with GDF

(%)	Europe	North America	South America	Others
Turnover Suez 2005	78.6	10.0	5.0	6.4
Turnover GDF Suez 2011	81.7	6.4	2.9	8.9
Employees GDF Suez 2011	87.4	2.8	2.0	7.7

Source: Suez, *Document de référence* (2006). GDF Suez, *Document de référence* (2011)

and the 10th in the world. It was the sixth largest gas operator in Europe. It had 80 million customers worldwide and 65 million sanitation customers, but only 5.6 million for electricity and 2.1 million for gas. It carried out 78.6 % of its turnover in Europe. The merger between Suez and the French public enterprise Gaz de France confirms this strategic reorientation (Table 4.6).

From 2005 to date, the changes of the Veolia Environnement-Générale des Eaux Group are less pronounced. In general, the number of operators in the international water market fell with the dawn of the 2000s. Générale des Eaux withdrew from Tucumán (Argentina), the Bechtel Group from Cochabamba (Bolivia), and Azurix from the Province of Buenos Aires. Other operators pulled out of Malaysia, Mexico City, Cancun, and Monterrey. For example, Anglian Water withdrew from China and Thailand, and Suez from Northumbrian Water in Britain. The attempts at new concessions failed, as did the search for operators to replace the departing ones (Cochabamba, Province of Buenos Aires, and Tucumán).

At the beginning of 2006, the German RWE Group decided to center its activities on energy and give up the multi-service operator model, which had led it to be simultaneously the largest producer of electricity in Germany, the second producer of gas, and the third world operator in the field of water, with two principal subsidiaries, Thames Water (Great Britain) and American Water (USA). Likewise, other operators of electricity, such as the Spanish Iberdrola, Endesa, or Union Fenosa, withdrew from the water sector one after the other.

The companies developed a specific approach to portfolio management, resulting in a permanent re-evaluation of the interest of each activity, asset, and contract as the volatility of the delegated companies (concessionaires) grew. A shift from the traditional formula of less capital-intensive service contracts occurred. The new slogan became a development model: "Less capital consumed, more cash-flow generated" (*La Tribune* 2004).

The merger methods between Suez and Gaz de France, with the subsidiarization of the activities in the field of water and environment (*La Tribune* 2007), as well as the Shareholders Pact between the principal shareholders of this subsidiary, confirm these main tendencies. The first steps of this merger date to the beginning of the 2000s.

The strategy of the French officials in the framework of the Europeanization of electricity and gas, marked by a double process of liberalization and constitution of large European operators forming an oligopoly, rested on the progressive constitution, beside EDF (Electricité de France), of a second large energy group based in France (Bauby and Varone 2007). The merger encountered a series of obstacles

before the 2007 French presidential election. As a precondition for the merger, the then newly-elected President Nicolas Sarkozy specified that the industrial project and the activities of the new GDF Suez group would be centered on energy, separate from water and environment activities. Suez Environnement, which encompassed water activities, waste, sanitation, and environment, remained a subsidiary of GDF Suez. But the new shift of Lyonnaise des Eaux seemed to correspond to a strategic recentering on energy. One century after the company was formed, one rediscovered the basis of the Société Lyonnaise des Eaux.

4.6 What Strategic Redeployments?

This retrospective on the two large French water groups can give the impression of an inevitable development; they became multi-service, multinational groups present on nearly every continent. Today, they certainly compete with each other and with other operators, but they form an oligopoly that structures the water markets and is not sheltered from income phenomena, markets sharing, or influence in some regions.

They knew to develop themselves on the basis of increasing needs for quality, environmental protection, and public health, and to propose their expertise and delegated management in a sector with no market competition. They wove their webs, without any legal or institutional constraint for organizing authorities—generally local public authorities—to open their markets or to privatize.

However, the increasing sensitivity of populations to the current and future challenges of the water sector, its essential character as a public good and a fundamental right, and the abuses of delegated management revealed these colossi to have clay feet. A strong public regulation is needed to prompt governments to seek access to water and the quality of the service; to try to fill the structural asymmetry of information and expertise from which the groups profit; and to develop transparency, raising the moral standard and preventing risk of dominant position abuse. Service groups tend to be innovative, seeking new means of development, and propose to offer local authorities necessary expertise and innovative projects. But their search for sources of economic added value and higher profits increasingly bumps up against requests for public control and public regulation, which can reduce the groups' room to maneuver and lead to difficult strategic redeployments, particularly between core activities and regional priorities.

References

Bain JS (1956) Barriers to new competition. Harvard University Press, Cambridge, MA
Bain JS (1959) Industrial organization. Willey, New York
Bauby P (2011) Service public. Services publics. La Documentation Française, Paris

Bauby P, Varone F (2007) Europeanization of the French electricity policy: four paradoxes. J Eur Public Policy 14:1048–1060
Bonin H (1987) Suez, du Canal à la Finance 1858–1987. Economica, Paris
Breuil L, Pezon C (2005) Une analyse comparée de l'évolution du modèle concessif en France au XIX^{e} siècle et dans les pays en développement à la fin des années 1990, Systèmes de régulation du service public de l'eau". In: Paper presented at the CNRS GDR "rés-EAU-ville" seminar, 10 et 11 février 2005, 8 Saint-Denis University, Paris
De Meritens P, Fabry J (2001) La Lyonnaise des Eaux (1880–2000). Suez-Lyonnaise des Eaux
Drouet D (1987) L'industrie de l'eau dans le monde. Presses de l'ENPC
Estache A (2006) Infrastructure: a survey of recent and upcoming issues. World Bank. Available in: http://siteresources.worldbank.org/INTDECABCTOK2006/Resources/Antonio_Estache_Infrastructure_for_Growth.pdf
Foster V (2005) Ten years of water service reform in Latin America: toward an Anglo-French Model. The World Bank Group, Washington, DC
GDF Suez (2012a) Document de référence 2011. Available in www.gdfsuez.com/group/
GDF Suez (2012b) Rapport développement durable 2011. Available in www.gdfsuez.com/group/
Guasch JL (2004) Granting and renegociating infrastructure concessions. Doing it right? World Bank Institute, Development Studies, Washington, DC
Haghe JP (1998) Les eaux courantes et l'Etat en France 1789–1920. Du contrôle institutionnel à la fétichisation marchande. Dissertation, EHESS
Hall D, Lobina E, Corral V (2011) Trends in water privatization. Available in http://www.psiru.org/sites/default/files/2011-03-W-Japan.doc
Lorrain D (1990) Le modèle français de services urbains. Economie et Humanisme 312
Lorrain D (1995a) Les services urbains en France 1982–1992. In: Lorrain D (ed) La privatisation des services urbains en Europe. La Découverte, Paris
Lorrain D (1995b) Gestions urbaine de l'eau. Economica, Paris
Lorrain D (2005) La firme locale-globale : Lyonnaise des Eaux 1980–2004. Sociologie du Travail
Lupton S, Bauby P (2008) Directives européennes sur la qualité de l'eau et montée de la délégation du service d'eau potable en France. Cosmopolitiques 17, Editions Apogée
Mason E (1979) The corporation in modern society. Harvard University Press, Cambridge, MA
Morin F (1996) L'oligopole des groupes multi-services français : dynamique, concurrence et coopération. In: International conference, services publics délégués et marchés de l'eau, Toulouse
OIEAU (International Office for Water) (2002) French country report, Aqualibrium Project
Orange M, Boisseau L (2007) L'histoire secrète du mariage entre GDF et Suez. La Tribune, September 18, 19
Pezon C (2000) Le service d'eau potable en France de 1850 à 1995. Presses du CEREM, Paris
Schneier-Madanes G, de Gouvello B (2003) Conflits de l'eau à Buenos Aires, les enjeux urbains, Eaux et réseaux, les défis de la mondialisation. IHEAL/La Documentation française, Paris
Sierra K (2006) L'accès à l'eau pour tous impose d'investir dans les infrastructures. Le Monde, March 21
Sirtaine S, Pinglo ME, Guasch JL et al (2005) How profitable are infrastructure concessions in Latin America? Empirical evidence and regulatory implications, vol 2, Trends and policy options. World Bank, PPIAF, Washington, DC
Suez (2006) Document de référence. Available in http://80.93.94.168/fr/finance/investisseurs/documents-sur-la-fusion/documents-sur-la-fusion/
Suez (2007) Document de reference. Available in http://www.info-financiere.fr/upload/MAN/2009/09/FCMAN112904_20090911.pdf
Suez (2011) Document de reference. Available in http://www.suez-environnement.fr/wp-content/uploads/2012/04/DDR-SEC-2011-version-anglaise-définitive-05042012.pdf
Suez ancre sa stratégie dans l'eau et l'énergie (2004) La Tribune, March 5
The World Bank (1994) Infrastructure for development: annual report, World Bank and Oxford University Press

Veolia Environnement (2006) Rapport annuel. Available in http://www.finance.veolia.com/docs/pdf/file0390.pdf

Veolia Environnement (2007) Document de référence. Available in http://www.finance.veolia.com/docs/DDR-2007-version-finale-31-03-08.pdf

Veolia Environnement (2012) Rapport financier annuel – document de référence. Available in http://www.finance.veolia.com/docs/VE-DDR-2011-FR-16-04-2012.pdf

Chapter 5
Technological Rent: The Key for Water Services Regulation

Pascal Chauchefoin and Annabelle Sauvent

5.1 Building a New Technological Paradigm

Questions concerning the definition of a regulatory approach capable of reconciling market mechanisms and general interest obligations are at the heart of a debate about the definition of public services (Demsetz 1968; Finger and Allouche 2002; Lorrain and Stoker 1995; Rachline 1996; Lorrain 2003). In France, in terms of local public services like water distribution and sanitation, such questions have a particular consonance due to both the large number of different contexts that need to be taken into account and a long tradition of partnerships between public institutions and private enterprises in the field. The most important of these questions focus on how to circumscribe the economic and financial power of private operators and on ways in which to counter the asymmetry of information between various actors (Balance and Taylor 2004; Breuil and Nakhla 2005; Chong et al. 2006).

The history of relations between local authorities and private water companies in France demonstrates the degree to which public and private interests were and continue to be intertwined in the emergence and development of water and sanitation services. The technological aspect always has played an essential role in the dynamic of the water sector and has contributed to introducing an advantage for private enterprises in public-private partnerships (PPPs) that has developed over time.[1] This point, rarely underlined in the literature, represents a fundamental problem in the regulation of the public-private relationship worldwide. The need to place a greater emphasis on conserving the resource has the effect of undermining the

[1] There are several definitions of the public-private partnership. The definition used here was elaborated by C. Boiteau (2007): the delegation of a public service, particularly as a concession, is considered a form of PPP.

P. Chauchefoin (✉) • A. Sauvent
Centre de Recherche sur l'Intégration Economique et Financiére – CRIEF-TEIR" (EA 2249), Université de Poities, 2, rue Jean Carbonnier, 86022 Poitiers Cedex, France
e-mail: pascal.chauchefoin@univ-poitiers.fr; annabelle.sauvent@univ-poitiers.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_5,

technological paradigm based on the treatment of water—"healing" polluted water—and enables us to glimpse new regulatory opportunities.

A general recognition emerged in the early 2000s of the need for a more integrated approach to managing the water cycle (from the spring to the treatment, including water supply), with a focus on preserving the resource before pollution occurs. Suppliers are beginning to fulfill this expectation. The trend not only concerns new scientific paradigms, but will also, of necessity, have organizational implications. This represents a historical chance for public authorities to establish a new kind of PPP that makes it possible to overcome problems associated with the technological rent deriving from treatment technologies. In this context, technological rent is the income procured by the competitive advantage of owning a unique technological resource.

5.2 Technological Rent and Regulatory Problems Concerning PPPs: A Historical Perspective

Since the mid-nineteenth century, private companies have been involved in supplying a service for which local authorities are responsible. Contracts were first delegated to private enterprises, largely because municipalities were both fragmented and small, so they could not meet their obligations on their own. Of course, another reason was that a private offer already existed and represented, in the eyes of public decision makers, a credible alternative to public management. Because private interests in water services were introduced very early in France, the question of the regulation of public-private relationships within the framework of the local water monopoly was posed there earlier than elsewhere. An analysis of relations between sovereignty-based and market approaches over the last 150 years makes it possible to understand why technology, like sewage treatment plants, is today a key variable in PPPs and why it poses fundamental regulation problems.

5.2.1 The Water Market and the Private Offer

While local public services in France are defined as those for which, unlike other public services, the municipalities are primarily responsible, it is clear that government initiatives have had a relatively strong influence on how they are organized. As in all sectors associated with public demand (Nelson 1993), the growth of water companies and their success in international markets can be explained by a particularly favorable environment created by national institutions (Petitet 1999; Pezon 2000).

5.2.1.1 The Structure-Providing Role of the State

From the 1930s to decentralization in the 1980s, the state—guarantor of the general interest—was opposed to the untrammeled expression of particular interests,

including local interests. Water services did not escape the process of tutelary homogenization deployed throughout France. Initially, this process was designed to meet the need for water distribution infrastructure, which went hand-in-hand with the high urban growth rates of the time. The proportion of the French population supplied with drinking water rose from 70 % in 1954 to more than 95 % in 1982. The sanitation market started to grow in the 1960s.

The expansion of network infrastructure was carried out within the framework of a state project to modernize the country's public services. The project, which was designed to support economic growth, encompassed state-of-the-art firms such as the large French water companies, the so-called majors: Générale des Eaux, Lyonnaise des Eaux, and, to a lesser degree, SAUR.[2] In water, this modernization of public services formed a series of trusteeship systems encompassing legal and administrative instruments. The project was orchestrated by leading civil servants and executed by major state organizations such as the engineers of the Ponts et Chaussées,[3] the technical administration, and what are called départements.[4] It included a series of measures favorable to delegation that accompanied the introduction of an obligation for municipalities to balance their water budgets, the elaboration by state services of a standard concession specifications sheet (1947), the appearance of affermage (1951)[5] and, lastly, the introduction of technical, administrative, and financial monitoring of the management of water services delegated by the state (Pezon 2000). Finally, in 1952, a century after the Compagnie Générale des Eaux[6] was set up, private operators already had supplied drinking water to half of the French population (Pezon 2000, p. 123). State intervention, more than anything else, has contributed to the success of affermage.[7]

[2] Compagnie Générale des Eaux became Veolia Environnement and Société Lyonnaise des Eaux became Suez Environnement. See Chap. 4 for more on the French majors.

[3] The École des Ponts et Chaussées is one of the world's oldest engineering institutes. It has been training the elite of French engineers for more than 200 years.

[4] A département is a territorial and administrative division of France between the région and the commune. There are 96 départements in metropolitan France and five overseas.

[5] An affermage contract is a written agreement between the public owner of a facility/property and an operator that stipulates the conditions under which the operator may possess the facility or property for a specified time and rent. With an affermage contract, the municipality guarantees the infrastructure investments, while the private operator covers the day-to-day operating expenses. In a concession contract with a municipality, the private operator is granted the exclusive right to operate, maintain, and invest in the public utility for a set period of time.

[6] Founded in 1853, Compagnie Générale des Eaux obtained its first public service concession to supply water to Lyon. On the initiative of Napoleon III and throughout the entire Second Empire, the creation of private companies to operate the urban water systems opened the way for modernization and enhanced the quality of life in towns and cities. Compagnie Générale des Eaux became Veolia Environnement in 2003.

[7] Four main mechanisms were to contribute: subsidies to municipalities acquiring infrastructure; the financial interest of the engineers of the Ponts et Chaussées; the introduction of a ceiling for water prices (between 1952 and 1970) within the framework of France's anti-inflation policy of guaranteeing local politicians the right to raise prices gradually when using private operators, according to a contractual price-indexing mechanism; and, from 1986, the implementation of tax breaks for affermage management.

Theoretically, this approach presupposes that different actors fulfill different roles, with local authorities responsible for constructing the necessary infrastructure while the private company (the delegatee) operates and maintains the facilities and collects fees. But C. Pezon demonstrates that the private operator gradually extends its field of action by acting as a financier, an investor, a project engineer, and a builder. This administrated demand benefitted pioneering French water companies that would later use their position as domestic leaders to conquer substantial markets abroad.[8]

The gradual process of decentralization in France introduced a degree of confusion in tutelary relations between the "center" and the "periphery" (Grémion 1976). Vis-à-vis the consumers, mayors of French towns and cities are those most directly responsible for ensuring that the quality of local public services is maintained. Urban mayors responsible for managing aging infrastructure are faced with both technico-economic problems and the financial issues of public management (Gaudin 2007). Furthermore, under European Union (EU) law, municipalities are obliged to do everything in their power to ensure the distribution of high-quality water and the improvement of wastewater treatment. Even if the municipalities attempt to develop their own expertise by improving technical equipment, there is little to suggest that the dominant model has been called into question, especially in that private actors have been able to adjust their offer to take local characteristics into account (Lorrain 2005) and that EU law does not intervene in choices concerning the management of local public services. In fact, once the guidelines have been set out, the development of the water market cannot help but benefit well-established operators who display technical competences and numerous commercial contacts. It was not until the 1980s, with the revelation of irregularities and a general feeling that the situation had become far too opaque, that relations between the public and private spheres were called into question by municipalities, professionals, and public opinion. The government intervened vigorously.[9] On the ground, the period was marked by an ever-increasing sophistication in terms of contracts, giving rise to more frequent inconsistent agreements combining standard aspects of both affermage and concession approaches (Cordier and Morel 2007).

The proportion of the French population supplied by the private sector rose from 17 % in 1936 to 50 % in 1975 to 80 % in the early 2000s (Guérin-Schneider and Lorrain 2003). Thus, the state at its different levels has played an essential role in the emergence of national oligopolies. With decentralization, the confrontation between supply and demand became more direct and the role of consumers more influential, but the post-war economic model did not disappear: the needs expressed by local authorities defined an infrastructure market in which private companies were able to provide an offer based on technology. Inversely, technical progress,

[8] Générale des Eaux, Lyonnaise des Eaux (known, at the time, as Société Lyonnaise des Eaux et de l'Eclairage), and, later, SAUR, set up, respectively, in 1853, 1880, and 1933.

[9] For instance, the 1993 Sapin Law on the Prevention of Corruption and Transparency in Economic Life and Public Procedures.

oriented by increasingly constrictive European laws and decrees, has provided opportunities to improve the service, which, in turn, have increased infrastructure requirements.

5.2.1.2 Exploiting Technological Rent

The most recent developments in the theory of the private operator, the evolutionary theory of the firm in particular, insist on the essential role of innovation in terms of performance and place cognitive capacities at the center of value creation. The firm is viewed as an ensemble of skills efficiently accumulated and combined over time (Dosi et al. 1988, 1990; Nelson and Winter 1982). The process of collective learning and research and development help boost competencies, which gradually become specific. The firm's core competencies constitute barriers to mobility, protect it from imitation, and guarantee adequate performance over the long term. Benefitting, as highlighted above, from a favorable economic and institutional environment that encompassed the development phase of major urban networks, regulatory requirements, the legal "safety" of contractual relations, fragmentation of the municipalities, and government incentives for PPPs, the three French majors found it easy to build and exploit their knowledge base and put an unbridgeable gap between themselves and their competitors. Gradually, these companies were able to adopt a multi-divisional style of organization that enabled them to operate in various specific segments, providing a complete turnkey installation offer.

The 1970s marked a turning point in the water sector. Based on their core competencies, the French companies diversified into complementary activities such as maintenance and the construction of piping and conduits, and took a more systematic interest in energy distribution, heating, waste, and other network-based urban services before going into other sectors newly open to competition, including communication, construction, and transport. In effect, they became multi-utility groups. In the 1990s, this strategy was imitated by other actors abroad who were able to enter the water market. But in the early 2000s, multi-utilities, faced with growing insolvency, were obliged to sell assets deemed to be less strategic. Some groups, like the European electricity companies that exited the water sector, refocused on their core business, while others, like the French groups, concentrated on municipal services.[10]

In terms of innovation strategy, the leading water operators organized themselves within an international network based on the principle of the cognitive division of work—a network in which research is segmented between subsidiaries according to the knowledge and learning capacities they require in order to maximize efficiency (Moati and Mouhoud 1994). This strategy is not uniquely focused on technology; indeed, it also aims to improve interactions between technology and the characteristics of the market. Such firms are thus capable of identifying and exploiting innovation

[10] See Chauchefoin and Sauvent (2008) for more details on the various movements influencing the sector-based structure.

opportunities and maintaining their capacity to appropriate knowledge (David and Foray 1995). Furthermore, knowledge accumulated by the firm increases its acquisition cost. Their leaders protect this technological rent, their historical accumulated knowledge. This is based on a so-called curative or treatment logic, largely influenced by the orientation of European regulations: the objective is to solve the problem posed upstream by applying a specific technical or technological approach to water treatment (Gray 2005; Twort et al. 2000). The growing severity of rules and laws, increasing demands on the part of consumers, changing needs, the degradation of the resource, and the development of ever-more accurate measuring techniques have contributed to the growth in the number of stages needed to produce drinking water and treat wastewater and to the sophistication of treatment technologies and procedures. In addition to this global offer from the major water companies, there are margins occupied by a large number of specialized actors associated with the various stages of the production of drinking water and sanitation that conform to the principle of the cognitive division of labor. If actors are sometimes viewed as competitors in specific segments, they also can be partners, providing that their skills complement those of the majors or that resources have to be shared for research purposes. At the local level, a demand is viewed as consonant with the general interest, and a private offer is seen as deriving from horizontally integrated international oligopolies possessing key skills. This technological aspect considerably complicates the regulatory framework.

5.2.2 PPPs and Regulation Problems

The regulation of competition is based on two major principles: increasing the efficiency of competition between operators and reducing asymmetry of information. But local regulation does not escape, any more than its national counterpart, the influence of the regulator (Hart 2003; Ménard and Saussier 2000, 2003; Yvrande-Billon 2008).

5.2.2.1 The Problem of Regulation

Theoretical reflection about regulation revolves around two major issues: access to the market and the execution of the contract. First, how can competition for the market be organized? Water distribution and sanitation forms a local monopoly; once attributed to a concessionaire, the local market is captive because it is impossible to duplicate the infrastructure network to make rival offers possible. There are only two ways of intensifying competition: ex ante, before a contract has been signed, and ex post, on the expiry of the contract, with the possibility of the contract holder renewing.

In the water sector, it is hard to create competition for the market because regularly putting companies up against one another is difficult. The required level

of investment to build infrastructure networks induces long-term depreciation; thus, water companies need long-term contracts to make their initial investment profitable.

For ex post competition, in theory (Baumol et al. 1982), the credible threat of the entry of a newcomer (or of the return of the contract holder) at the end of the contract should be enough to create competitive pressure throughout the duration of that contract. In reality, there are obstacles to this mechanism. First, the newcomer (or the local authority in the case in which the contract is renewed) must be correctly informed about the network's technical characteristics (size, degree of obsolescence, quality of past maintenance, performance). However, many of these variables cannot be accurately measured because most installations are underground. Equally, the assets involved should not have become too specific over the course of the contract (Baumol 1982). This means only the contract holder will have the resources needed to guarantee the continuity of the service in a new contract.

There also is the problem of how to ensure the contract will be executed efficiently. Two theories address this question. According to incomplete contract theory (Hart and Moore 1988), because a contractual document cannot take into account all factors that are or become relevant over the course of the contract, either that contract must be frequently renewed to ensure that the contract holder has to deal with competition as often as possible—which raises the problems outlined above—or the specifications must be classified so that only services that can be properly assessed are covered by the contract.

Transaction cost theory asserts that the major problem resides in the existence of specific assets (Saussier et al. 2004; Williamson 1975). Specificity depends on the degree to which assets are complementary: the productivity of the specific asset is higher when it is associated with a particular asset for which it has been designed than when it is linked to any other asset. If the asset is highly specialized, it will be difficult to redeploy (treatment systems meet particular quantitative and qualitative requirements and are thus not automatically transposable to other situations). Owners of complementary assets (local authorities) therefore run the risk of being highly dependent on their partners possessing key skills, a fact that would give the partners extra clout in the contractual relationship. Thus, the more highly specific the required assets are, the higher the risk of opportunistic behavior on the part of private enterprises is and the higher the transaction costs borne by the local authority will be. The specific character of the assets in the water distribution and sanitation sector covers a number of realities, which correspond to the theoretical categories developed by Riodan and Williamson (1985): investments are localized (water catchment operations, drinking water distribution networks, and the collection and treatment of wastewater are all, of necessity, located within a specific geographical area); they are dedicated to a particular method of production (pumping or purification stations specifically adapted to local needs and unable to satisfy, even temporarily, a demand from outside the local network); and the human resources mobilized are involved in a learning process, which implies a specific form of expertise.

5.2.2.2 Difficulties of Implementation

After more than 20 years of decentralization and repeated legislative interventions, lawmakers drew up a report[11] highlighting the persistence of an information asymmetry between the various stakeholders, a lack of communication and strategic planning, poor definition of objectives and monitoring of results, and an excess of technical culture. In an attempt to suggest solutions to these problems, a 2006 law[12] provided a more rigorous definition of the obligations of the delegatee, encouraged free choice in terms of management approaches, and gave detailed information concerning pricing rules. But the law did not solve the essential problem linked to the existence of specific assets in the sector. In effect, because water distribution and waste services are highly technical, assets within the industry are becoming more specific. Thus, when treatment procedures are complex, municipalities often have no choice but to call upon private operators because they themselves lack the requisite expertise.

Faced with the growing importance of environmental issues, municipalities have the chance to become more involved in emerging segments and create new kinds of organization encompassing the entire water cycle. This could provide new possibilities in terms of public-private partnerships.

5.3 A New Approach to PPPs: Integrating the Water Cycle

Naturally, a more integrated approach to managing the various stages of the water cycle implies the development of technological innovations, but it also presupposes organizational innovations, in which a closer relationship exists among private operators, local authorities, and consumers. This is an essential issue for authorities responsible for organizing water and sanitation services.

5.3.1 A Worrying Situation

Reports provided by the French Institute for the Environment (IFEN) describe in no uncertain terms the alarming state of the resource (IFEN 2005). According to the institute (2006), the level of diffuse pollution remains high across France,

[11] The Martinand Report (2001). Another report, the Miquel Report, issued in 2003, established a critical summary of various laws on water (1964–2004) by underlining "the very mediocre measures introduced to conserve the resource." Taking into account the lack of investment in certain areas, it will be necessary to work simultaneously on both conservation and treatment.

[12] The 2006 Water Law.

degradation has become chronic, and the presence of toxic micropollutants in the water has been noted for the first time. In parallel, the tendency to overexploit the resource has been growing from year to year. Now, the quality and quantity of water are interdependent: the development of water abstraction over the last 30 years has altered the way in which natural ecosystems function. The concentration of pollutants has increased, diminishing capacity for self-purification, and excessive pumping has led to saltwater intrusion into coastal aquifers (Miquel 2003).

The Water Framework Directive of 2000, which fixed the objective of attaining high-quality water by 2015, obliged France to react rapidly and effectively. Tasks included strengthening conservation parameters; implementing more efficient approaches to anticipating restrictions and ensuring they are respected in critical periods; improving communication and promoting awareness on the part of users; and supporting the introduction of instruments designed to manage the resource collectively, a focus of water agencies in their multi-annual intervention programs.

This evolution will inevitably have financial consequences for local authorities, especially given that major projects concerning the renewal of the drinking water network, filtering stations, and the improvement of treatment technologies are ongoing (IFEN 2006). From a strictly financial point of view, the annual cost of renewing pipes and conduits and maintaining the country's filtering stations is estimated at 3 billion euros between now and 2015, a figure that is set to increase yet further after that date, according to available forecasts (Berland and Juery 2003; Talpin 2002). An added cost is the investment required to extend networks to meet demand generated by urban development and cover additional charges for treating drinking water for more consumers. Taking into account the delicate financial situation in which the local authorities find themselves (Genguant 2008), these imperatives will probably be difficult to satisfy and will require funding and amortization procedures (Guérin-Schneider and Lorrain 2003). One way to resolve this worrying situation would be to move away from raw water treatment and focus on preserving the resource.

5.3.2 Toward a Logic of Co-Production

The current period is marked by a growing awareness of the need to develop technologies that respect the environment. Organizing authorities are strongly encouraged to make progress in this direction. New market opportunities are becoming available. Meanwhile, major companies in the water sector are now emphasizing their social and environmental responsibility.

5.3.2.1 New Initiatives in Favor of the Conservation of the Resource

Today, new products are being developed around green technologies and preventive measures, notably emanating from actors intervening in niche markets

and the conservation of natural resources. This emerging and potentially rich market is of interest to all private operators in the water sector and beyond. For example, operators in the construction industry already are developing technical systems designed to collect and use rainwater in individual housing estates. In terms of treatment technologies for drinking water and wastewater, research is increasingly focused on biological procedures that limit the formation of sub-products. As recent databases on newly lodged patents in the water sector attest (Chauchefoin and Sauvent 2008), quantitative problems with the resource have led some innovators to focus on reducing leaks in the networks and in the homes of individual consumers, implementing more economical procedures, and seeking alternative resources (desalination of seawater, recycling wastewater, collecting and using rainwater), etc. The way forward in terms of technological development is shrouded in uncertainty. These orientations could spur a paradigm shift and the introduction of new productive relations, because innovators are obliged to put the accumulated competencies and experiences of everyone in the market to good use.

5.3.2.2 Opportunities for a New Regulatory Approach?

In all sectors undergoing a technological mutation, investors are incapable of correctly anticipating the characteristics of the market. The principle of rational anticipation that prevails in inter-temporal economic calculus cannot be applied. Choices can only be made in a sequential fashion, principally by taking into account three conditions that need to be satisfied simultaneously: the specific resources of the firm must be used to maintain or strengthen its competitive position as market opportunities are identified and anticipated; those resources must make it possible to minimize irrecoverable costs, because infrastructure that cannot be reused in an identical way implies a financial loss if it is abandoned; and there must be complementary investment. The first two points are obvious, consisting as they do in simply verifying the existence of a correlation between beliefs or weak market signals and the resources of the firm. The question of complementary investment is less familiar but equally important. This requirement was highlighted by Richardson (1960), who demonstrated that the profit potential of any investment is conditioned by the fact that complementary investments are made by other entrepreneurs. Those investments can be combined with competencies required in the construction phase of new productive capacities. Later on, in the use phase, they help avoid bottlenecks or interruptions in the production process. In terms of inter-firm coordination, time is vital. In its most current expression, coordination can be envisaged as a process in which autonomous entities pursuing distinct objectives are placed in a functional relationship. The most elaborate definitions emphasize organizational approaches that guarantee collective learning processes based on cognitive cooperation between the actors involved and the attentive management of information flows.

This is the context of uncertainty in which water companies operate today. That is why new partnerships, such as those between SAUR and IFREMER,[13] are developing and why Veolia has become involved in the NARSI project.[14] But, above all, coordination opens new perspectives for local authorities on both the construction and use of new productive capacities which, to guarantee the success of innovative approaches, must be closely intertwined.

On the primary level, the organizing authorities play an influential role in selecting associated knowledge and expertise when private companies cannot deliver a standard offer for new segments of local demand. This could be achieved by, for example, setting up research consortia and training high-level public sector engineers in the new technologies. Local authorities would thus be involved in the co-production of new knowledge, a situation which did not pertain when the water treatment industry first emerged. Such an approach would shift power in the relationship to the local authorities.

In terms of the use of new capacities, the need for anticipatory management implies territorial planning, which takes into account the localization of the resource, a countryside policy, and the articulation of territorial scales. As a corollary, several relatively new approaches will have to be exploited, among them encouraging a systematic reduction in consumption and collecting rainwater; providing advice and incentives in the construction of new buildings; developing new storage techniques in urban developments; and differentiated network management. Consumers find themselves at the forefront of all of these concerns. Here again, original organizational approaches must be introduced to enable local authorities to play a genuine intermediary role vis-à-vis the market.

Acknowledgments The authors would like to acknowledge with much gratitude the financial support received from the water research program of Contrat de Projet Etat-Région and from the Fond Européen de Développement Régional (FEDER).

References

Balance T, Taylor A (2004) Competition & regulation in water: the future of the European Water Industry. Lavoisier, Paris

Baumol W (1982) Contestable markets: an uprising in the Theory of Industry Structure. Am Econ Rev 72(1):1–15

Baumol W, Panzar J, Willig R (1982) Contestable markets and the Theory of Industry Structure, Revised edition, 1988. Harcourt Brace Jovanovich, San Diego

Berland JM, Juery C (2003) Inventaire et scénario de renouvellement du patrimoine d'infrastructures des services publics d'eau et d'assainissement, Office international de l'eau, final report

[13] Institut français de recherche pour l'exploitation de la mer (French Research Institute for Exploitation of the Sea).

[14] Natural and Artificial Systems for Recharge and Infiltration.

Boiteau C (2007) Les conventions de délégation de service public. Transparence et service public local, Editions Le Moniteur, coll. Action Locale
Breuil L, Nakhla M (2005) Concilier efficacité et service public dans les concessions de service d'eau et d'assainissement dans un environnement institutionnel incertain. Revue d'Economie Industrielle 111:9–27
Chauchefoin P, Sauvent A (2008) Dynamique sectorielle dans l'eau et l'assainissement: une analyse à partir du processus d'innovation. Economies et Sociétés, Special Issue, No. 42(8):1441–1460.
Chong E, Huet F, Saussier S et al (2006) Public-private partnerships and prices: evidence from Water Distribution in France. Rev Ind Organ 29:149–169
Cordier M, Morel JB (2007) Distribution d'eau potable et délégation de service public. Contrats Publics, November, pp 60–64
David P, Foray D (1995) Dépendance du sentier et économie de l'innovation: un rapide tour d'horizon. Revue d'Economie Industrielle, Special Issue, pp 27–52
Demsetz H (1968) Why regulate utilities. J Law Econ 11:55–66
Dosi G, Freeman C, Nelson R et al (eds) (1988) Technical change and economic theory. Pinter, London
Dosi G, Teece D, Winter S (1990) Les frontières des entreprises: vers une théorie de la cohérence de la grande entreprise. Revue d'Economie Industrielle 51:238–254
Finger M, Allouche J (2002) Water privatisation, trans-national corporations and the re-regulation of the water. Spon Press, Industry
Gaudin JP (2007) Gouverner par contrat. Les presses de Sciences Po, Paris
Genguant A (2008) Investissement, fonctionnement et endettement des collectivités locales. Pouvoirs locaux 76(I):47–53
Gray NF (2005) Water technology: an introduction for environmental scientists and engineers. Elsevier, Oxford
Grémion P (1976) Le pouvoir périphérique, Bureaucrates et notables dans le système politique français. Seuil, Paris
Guérin-Schneider L, Lorrain D (2003) Note de recherche sur une question sensible. Les relations puissance publique-firmes dans le secteur de l'eau et de l'assainissement. Flux 52–53:35–54
Hart O (2003) Incomplete contracts and public ownership: remarks and an application to public-private partnerships. Econ J 113:69–76
Hart O, Moore J (1988) Incomplete contracts and renegotiation. Econonométrica 56(4):755–785
IFEN (2006) L'environnement en France, Les synthèses, édition 2006
Institut Français de l'Environnement (IFEN) (2005) Enquête "les collectivités locales et l'environnement" – volet Eau, La gestion de l'eau potable en France en 2001, Etudes et travaux, no 44
Lorrain D (2003) Eau: le temps d'un bilan. Flux 52(53):4–7
Lorrain D (2005) La firme locale-globale: Lyonnaise des Eaux (1980–2004). Sociologie du travail 47:340–361
Lorrain D, Stoker G (eds) (1995) La privatisation des services urbains en Europe. La Découverte, Paris
Martinand C (2001) La maîtrise des services urbains organisés en réseau, rapport pour le Conseil Economique et Social, section cadre de vie
Ménard C, Saussier S (2000) Contractual choice and performance: the case of water supply in France. Revue d'Economie Industrielle 92:385–404
Ménard C, Saussier S (2003) La délégation de service public, un mode organisationnel efficace ? Le cas de la distribution d'eau en France. Economie Publique 12:99–129
Miquel G (2003) La qualité de l'eau et de l'assainissement en France, French Senate report, no 215, Assemblée Nationale report, no 705
Moati P, Mouhoud E (1994) Information et organisation de la production: vers une division cognitive du travail. Economie appliquée 46(1):47–73
Nelson R (1993) National innovation systems: a comparative study. Oxford University Press, Oxford

Nelson R, Winter S (1982) An evolutionary theory of economic change. Harvard University Press, Cambridge, MA
Petitet S (1999) Du 'modèle français des services urbains' à l'analyse de leur production. Revue d'Economie Régionale et Urbaine 4:737–764
Pezon C (2000) Le service d'eau potable en France de 1850 à 1995, CEREM, CNAM
Rachline F (1996) Services publics, Economie de marché. Presses de Sciences Po, Paris
Richardson GB (1960) Information and Investment, new edition, 1990. Oxford University Press, Oxford
Riordan M, Williamson O (1985) Asset specificity and economic organization. Int J Ind Organ 3:365–378
Saussier S, Ménard C, Huet F et al (2004) Mode de gestion et efficacité de la distribution d'eau en France, Une analyse néo-institutionnelle, Report for the French Ministry of Ecology and Sustainable Development
Talpin JJ (2002) Eau potable: le renouvellement est beaucoup trop lent. La Gazette des communes, des départements et des régions, 29 July 2002, pp 44–47
Twort AC, Ratnayaka DD, Brandt MJ (2000) Water supply. Butterworth-Heinemann, Oxford
Williamson OE (1975) Market and hierarchies, analysis and antitrust implications: a study in the Economics of Internal Organizations. The Free Press, New York
Yvrande-Billon A (2008) Concurrence et délégation de services publics. Quelques enseignements de la théorie des coûts de transaction. Revue française d'économie XXII(3):97–131

Chapter 6
Liberalization of Water Services in Europe: The End of the French Water Exception?

Lætitia Guérin-Schneider, Lise Breuil, and Sylvie Lupton

6.1 Liberalization of the Water Sector and the French Example

Since 1951, European states have progressively engaged in a reconciliation process with the goal of adopting shared European Union (EU) legislation to develop a common market. The legislation rests on three main categories of legal acts: the treaty, which is equivalent to a constitution; the directives; and the regulations.[1]

The scope of the EU legislation has expanded considerably through the years. To regulate the common market, several categories of goods and services—either economic (energy, telecommunications, and railways) or non-economic (national education, basic social security programs, etc.)—have been defined with specific market regulations (Services of General Interest). Among them, Services of General Economic Interest (SGEI) designate services of an economic nature that are subject to public service obligations, including public networks such as water and sewerage

[1] A directive in the EU political system is a legal text that requires member states to achieve a particular result without imposing the means of achieving it. To be applied, a directive needs each member state to transpose it in its national legal system. A directive is distinguished from a regulation, which is self-executing, applies directly to member states, and needs no transposition.

L. Guérin-Schneider (✉)
Institut National de Recherche en Sciences et Technologies pour l'Environnement et l'Agriculture (IRSTEA), Joint Research Unit "Water Management, Stakeholders and Uses" (UMR G-EAU), 361 rue Jean-François Breton, 34196 Montpellier Cedex 5, France
e-mail: l.guerin-schneider@irstea.fr

L. Breuil
Agence Française de Développement, AgroParisTech-Engref, Joint Research Unit "Water Management, Stakeholders and Uses" (UMR G-EAU), Paris, France
e-mail: breuill@afd.fr

S. Lupton
NEGOCIA Research Center on Trade, Paris, France
e-mail: slupton@advancia-negocia.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_6,

utilities.[2] The European policy has long remained vague about this concept. The organization of Services of General Interest was considered a national competency, not subject to any European law. However, the liberalization policy of SGEI initially developed by the EU in the mid-1980s introduced competition within industries of national importance that previously had enjoyed monopolies (energy, telecommunications, railways, etc.). This process of liberalization had two objectives: to create a single market for SGEI and encourage higher levels of management efficiency, thus offering new opportunities to private companies.

Economic competition regulations were designed to guarantee equal access to the market for all operators and social and territorial cohesion through the notions of "public service obligations" and "universal service." Europe's approach to the regulation of SGEI is evolving (Bauby 2011; Henry et al. 2003).

The issue addressed here is whether this evolution of the EU framework could influence the organization of the water sector in countries, like France, that have maintained their own organization until now. The organization of the water service in France is freely determined by each municipality (notably by its mayor, who is elected).[3] It can be publicly organized or subject to public-private partnership. In the latter case, the franchise bidding procedure (delegation procedure) is not subject to EU public procurement legislation, which requires all criteria to be explicitly defined in advance. This context has favored the development of French water behemoths, whose scale has rarely been equaled by companies from other countries.[4]

The water sector generally is characterized by technical and economic factors that distinguish it from other SGEI (Table 6.1). In the name of these specificities and out of respect for subsidiarity, local public services such as water and sanitation utilities were long ignored by European competition legislation.

In terms of management models, though, other European legislation indirectly influences the water market and is far from neutral. The influence of successive directives, initially technical[5] (demands concerning water quality and wastewater) and more recently economic[6] (the principle of cost recovery), has been decisive in terms of the professionalization and development of enterprises in the sector.

Numerous national reforms were intended to enhance a more rational and industrial style of management within the sector. Attempts to introduce economies

[2] In reference to this institutional framework of Services of General Interest and also to the French legal concept of public service, we will use the phrase water and sewerage services rather than water and sewerage utilities.

[3] The mayor enjoys relative independence from the other administrative levels in France. The municipality (commune) manages public infrastructure and organizes service delivery. Because France has more than 36,000 municipalities, and most of them have fewer than 10,000 residents, the municipalities form larger groups (inter-communality), often called "syndicats," for joint water and wastewater management.

[4] See Chap. 4 for more information on the French "majors."

[5] See Appendix at the end of this chapter for all directives on water quality and sanitation.

[6] Water Framework Directive (2000/60/EC).

Table 6.1 Comparison of telecommunication, electricity, and water services

	Telecommunications	Electricity	Water
Basic features	Multi-pole networks, each consumer is a producer	Production → transport → distribution → final consumption	Resource → treatment → transport → consumption
	Increasing storage capacity	No storage	Water cycle
			Limited storage
Terms of reference	Globalization	Globalization	Watersheds
Organizing authority	National or regional	National or regional	Local
Community standards	Internal market	Internal market	Environment and public health
Production	Low cost of production of message	Very high level	High cost: extraction, treatment, compliance with standards
		High investment	High investments
Interconnection	Generalized global	Generalized continental	Limited
Transport	Multiple means (wired, wireless, satellite, cable, electrical circuits, etc.)	Natural monopoly of networks of transport and distribution	Natural monopoly of the supply chain and distribution
	Technological progress and lower unit costs	Third party access	High costs and relatively stable
	Maintenance costs	Increasing costs with distance (losses)	High maintenance costs
			Leakage
Payment of transport	Integrated in the contract	Integrated	Integrated
Distribution	Possible unbundling	Natural monopoly networks – third person access	Integrated
Marketing	By provider	By provider	By provider
Provider	In competition	In competition	Monopoly at the level of the organizing authority
Global payment of the service	By the issuer	By the consumer	By the consumer
Possible competition	Compulsory	Compulsory	Selection by organizing authority between "in house" and outsourcing
	In service	In service	For the service in case of outsourcing
Technological progress	Rapid	Fairly slow	Slow
Trends in unit costs	Rapid decline	Stability and increases due to production	Stability and rising because of standards
Providers	Global groups integrated + "small"	Global groups + "small"	Local companies + large multi-service groups
Industrial organization	European oligopoly	European oligopoly	Multiplicity of local companies + several large groups

Source: Bauby (2010)

of scale often were associated with opening up to private management. While the example of England, which regionalized its water and sanitation services in 1976 before privatizing them in 1989, is at once extreme and well known, less reference is made to the examples of Italy and Portugal. These countries introduced regional management structures, accorded private law status to public enterprises, and made it possible to organize concessions with private partners (Marques 2006; Argento and van Helden 2010).

Nevertheless, the possible extension of liberalization legislation to the water sector was only recently made explicit in a number of opinions published by the European Commission (EC).[7] The EC defended its position on liberalization not only in the internal EU debate but also in international negotiations, such as those on the General Agreement on Trade in Services (GATS) within the World Trade Organization (WTO). The EC suggested liberalizing a number of sectors, including environmental services.

While liberalization has, up until now, been encouraged by the EU, the policy has been criticized by those who consider liberalization to be little more than a dogma. A growing number of economists are highlighting the limits of liberalization as applied to public utilities (Lobina and Hall 2008). Nevertheless, whether or not the approach is appropriate, evolutions in European regulations have encouraged it. It is therefore legitimate to ask what the consequences would be of a yet broader approach to liberalization, for example if stricter competition rules were imposed in the field of environmental services.

Two questions arise in this context. First, if Europe decided to liberalize local water and sanitation utilities, would liberalization follow the same course as it has for national utilities? Furthermore, what would be the consequences of such a policy at the member-state level and on the international water market? In this regard, the French example is instructive. The liberalization encouraged by the EC presents an opportunity to increase international market share for private French companies, which already are active in the water sector. However, strict competition laws could call into question the dominant position of those same companies in France. Instead of requiring all criteria to be explicitly defined in advance, the French bidding procedure respects the principle of intuitu personae, in which the mayor of a municipality is able to negotiate directly with the bidders and can make his or her choice according to personal conviction.[8]

As the debate on liberalization and privatization deepens, especially around the liberalization of local public utilities, it is crucial to envision the consequences of a scenario in which local public water and sanitation services are liberalized.

[7] The European Commission (EC) is one of the main institutions of the European Union. It is an executive body composed of one commissioner per member state. Unlike members of the European Parliament, commissioners are not elected.

[8] Intuitu personae was introduced in France because the trust relationship was considered crucial to counterbalancing the incompleteness of the delegation contract.

6.2 Liberalization or Privatization: Two Notions Too Frequently Confused

In current usage, liberalization and privatization often are used to refer to the same concept. But while the relationship between them is understandable, purely and simply assimilating the two terms can lead to confusion.

Liberalization refers to a process involving the introduction of competition in sectors formerly characterized by exclusive rights or monopolies. With liberalization, state mechanisms of control, or even trusteeship, are replaced by market rules (in which case, the oft-used term is deregulation). Liberalization is applied to sectors in which, historically, one enterprise has enjoyed exclusive rights to develop and exploit infrastructure but natural monopoly conditions have disappeared. Examples include energy and communications. In these sectors, technological constraints placing limits on the possibility of duplicating networks were gradually overcome, and monopolies continued to exist due to political expediency before eventually being phased out.

Privatization refers to the status of the operator responsible for the activity. An activity is privatized when both the ownership of the infrastructure and the right to exploit it are accorded to organizations with a private legal status and access to private capital. The change in the legal status of France Télécom and the French government's sale of a percentage of its shares in the company is an example of gradual privatization.

There is no reason why liberalization and increased competition should exclude publicly funded organizations. Indeed, this was demonstrated in Scandinavia: the contracts of major public water operators have been renewed (for example, Malmo in Sweden) following a bidding process during which the historical public operator had to compete with private operators.

EU law does not require privatization of public organizations. The EC itself deplores the confusion between the terms "public service" and "public sector," as well as the confusion between "liberalization" and "privatization."[9] If the approach taken by member states regarding the liberalization of the energy and telecom sectors has been characterized by a process of gradual privatization, nothing obliges other sectors to follow the same path as energy, telecommunications, railways, and other national public utilities.

[9] In its Green and White Papers on Services of General Interest and Public-Private Partnerships (PPPs) (European Commission 2004a, b; 2003). The purpose of the Green Papers published by the commission is to stimulate debate and launch consultations on particular subjects at the European level. Consultations can generate a White Paper aimed at translating discussions prompted by Green Papers into concrete proposals on European policy.

6.3 Water in France: A Hybrid Model

The French water situation is intricate. On one hand, due to the extensive involvement of private companies, the water sector already can be considered de facto privatized and liberalized. But at the same time, water and sewerage are never entirely privatized because they fall under a municipal area of jurisdiction that owns the infrastructure and manages the services (Table 6.2).

In addition, water and sanitation are true natural monopolies. Duplicating networks is costly, and it is difficult to introduce competition due to transport costs and the need to ensure health safety. If competition exists, it can only be by way of a bidding system, or by comparison, using a system of pseudo-competition, as applied in England after privatization (Littlechild 1988).

The delegation procedure in France is not competitive in the strict sense of the word, and intuitu personae continues to apply in the bidding process.[10] Selection criteria are not made explicit ex ante; the mayor has discretionary power to adjust his or her selection criteria throughout the negotiation process.

The justification for intuitu personae derives from the fact that local authorities are unable to draw up complete contracts ex ante granting operators the right to run an essential service for a long period of time. Theoretically, the process of building trust and understanding with the operator limits long-term risks and transaction costs (Williamson 1985). Moreover, in the early days of urban water services, private companies were smaller, which meant less information asymmetry between the mayor and the operator.

The success of this model also can be explained by the compromise on financial and technical questions reached by operators and local authorities in the early 1990s. Entrenched over the course of time, the compromise was based on a win-win situation. Private operators partially financed the budgets of local authorities by means of entry fees, later phased out by law,[11] and provided substantial funds to political parties before legislation introduced in the 1990s made such practices illegal.[12] In return, local authorities provided operators with a safe and profitable market (Lorrain 1998), which formed the foundation for their international development. Synergies still exist today, in the technical rather than financial sphere, with companies providing solutions to new problems associated with sanitation and the environment.[13]

[10] Despite the obligation, introduced by the Sapin Law in 1993, to advertise for and fairly analyze bids. The Sapin Law was designed to prevent corruption and improve transparency in economic activities, public procurement, and public funding of political activities.

[11] The practice of levying entry fees, enabling local authorities to demand a certain sum from the private operator winning the bid, which is then allocated to other public services, was banned by the Barnier Law, No. 95–101 of February 2, 1995 (Article 76).

[12] Notably via the law of January 15, 1990, on the Limitation of Electoral Expenditure and the Clarification of the Funding of Political Activity.

[13] On the notion of technological rent, see Chap. 5.

Table 6.2 Management mode of water services in France

Procedure applicable to the award of the public contract		Direct public management ("régie")	Public procurement	Public service delegation ("délégation")	
Type of contracts		N/A	Management contract	Lease contract ("affermage")	Concession contract ("concession")
Approximate duration		N/A	3–5 years	10–12 years	25–30 years
Distribution of functions	Technical and commercial exploitation	Local authority	Private operator	Private operator	Private operator
	Maintenance and replacement of infrastructure	Local authority	Local authority	Private operator	Private operator
	Funding of upkeep of infrastructure	Local authority	Local authority	Local authority	Private operator
	Owner of the infrastructure	Local authority	Local authority	Local authority	Local authority
Payment of the operator		By users	By the local authority, fixed part with incentive remuneration	By users	By users

This table presents typical cases. In practice, there are a number of intermediate situations (for example, lease contracts—affermage—with a concession clause)

Table 6.3 Major findings of the Sapin Law Observatory (water and sewerage delegation)

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number of bidding processes observed	582	684	509	477	573	544	693	641	603
Number of bidding processes in the sample that can be used to calculate the price[a]	333	195	211	208	230	214	256	239	206
Percentage of incumbents renewed (renewal rate)	92 %	82 %	88 %	89 %	92 %	87 %	91 %	85 %	89 %
Average number of bids per procedure	N/A	2.4	2.1	2.2	2.3	2.3	2.2	2.4	2.6
Additional delegations won by independent operators (in number of contracts)	20	37	8	11	10	16	18	5	4
Evolution of average price[b]	−9 %	−10 %	−12 %	−8 %	−21 %	−10 %	N/A	N/A	N/A
Evolution of price in municipalities with fewer than 10,000 inhabitants	4 %	−4 %	−3 %	−3 %	−3 %	−12 %	−5 %	−1 %	−9.5 %
Evolution of price for municipalities with more than 10,000 inhabitants	−16.5 %	−14 %	−17 %	−12 %	−27 %	−9 %	−6 %	−1 %	−9 %

Source: AgroParisTech (2006)

[a]The renewal rate is based on a larger sample

[b]Average price of private operator: total income divided by total volume sales (the price is thus weighted by volume)

However, limits on competition for markets do not derive exclusively from intuitu personae. France is characterized by an oligopoly, and only one company submits a bid in a third of the delegation procedures.[14] Nine out of 10 delegation contracts are awarded to incumbent private operators, and although local companies, operating independently of major groups, win a few contracts every year, foreign groups have yet to make an appearance on the French market (Table 6.3). The incumbent operator is ideally placed to win the bid for a new contract. In these conditions, only a highly determined mayor receiving excellent advice could really envisage choosing a new operator.

Thus, the water sector in France is neither privatized nor liberalized. It is a hybrid system in which responsibilities are shared by public and private entities and in which competition for markets, while not excluded, is not strictly applied.

[14] As demonstrated by the Sapin Law Observatory (Brunet et al. 2003), which was set up by Agro-Paris-Tech-Engref with the support of the Ministry of Ecology.

6.4 Ongoing Evolutions in EU Policy on the Liberalization of the Water Sector

A range of technical and, above all, organizational approaches characterizes the management of water and sewerage services. Nevertheless, EU policy on quality standards in the water sector and, more generally, on the liberalization of network industries, has created a general framework that exerts an influence on the way water utilities are managed (EUROMARKET 2003).

The EU has published a number of directives on water quality and sewerage since the 1970s. The reason for this approach lies not in a desire to create an internal market, but rather in a concern to protect public health and the environment. The policy of harmonizing sanitation and environmental standards has led to substantial changes to the management of water and sanitation. European directives on water came in three waves of legislation that focused on water quality for human activities (1973–1988); pollution prevention (1988–1995); and the general principles governing the protection and management of water (1995 to the present)[15] (see Appendix at the end of this chapter).

The high water quality standards imposed prompted private operators to enter into contracts to deliver drinking water services in France and Italy and led to the complete privatization of the service in England and Wales. Considering just how many new parameters were introduced in the directives of 1975 and 1980, operators were given a relatively short deadline to conform (Lupton and Bauby 2010).[16]

Starting in the 1980s, considerable efforts were made to apply the standards outlined in the European directives. In France, substantial investment in drinking water treatment infrastructure had to be made quickly. Furthermore, the kind of expertise and savoir-faire required prompted cities such as Toulon, Toulouse, Lyon, Paris, Bordeaux, and many others to delegate the service to private sector operators. The 1991 directive on sewerage, meanwhile, also resulted in a higher level of involvement on the part of the private sector, except in countries such as Germany and the Netherlands, which already had high drinking water standards.

In France, European legislation eventually encouraged the abandonment of the use of several catchment areas that did not provide sufficient quality and safety guarantees. The new standards also encouraged the interconnection of production sites so that drinking water could still be supplied if water resources were accidentally polluted. To achieve economies of scale in terms of production (volume treated) and operations (monitoring of quality), existing inter-communal structures will have to be expanded, which could lead to increased involvement on the part of the private sector.

[15] The most important legislation between 1995 and the present was the Water Framework Directive (WFD) of 2000.

[16] The stringency and scope of these EC drinking water standards can seem quite surprising. According to Jordan (1999), this can be explained by the short-term horizons of politicians and the relative ignorance of member states about the actual implications of these directives. Directives were viewed as a "commitment of policy intention," not a "genuine legal obligation" (Macrory 1992, p. 350).

A doctrine of liberalization of SGEI gradually has emerged from the corpus of directives,[17] which, until recently, was only applicable to national network industries. These principles are:

- The phasing out of exclusive or special rights; in other words, the suppression of traditional monopolies.
- The dissociation of some segments—notably distribution/sales and production, for which competition becomes possible—from the transfer segment, which requires infrastructure like pipes and remains a natural monopoly.
- The introduction of non-discriminatory, fair competition rules in competing segments with, on occasion, an independent regulator.
- A recognition of the specific character of a universal service, the objective of which is to guarantee general and continuous access at a reasonable price and high quality. This implies universal service obligations to the service provider.

The French exception constituted by the role of intuitu personae in the attribution of delegation contracts has been, until now, in conformity with EU concession law. European law distinguishes public procurement contracts, governed by strict competition rules, from concessions, which are merely covered by general principles of transparency, equality of treatment, proportionality,[18] and mutual recognition. The criterion defining the concession is based on the notion of the economic risk taken by the operator, which relies on income generated from users (European Commission 2000).

For a long time, concessions were not taken into account in EU law. But in the absence of explicit rules, a form of derivative law emerged. Case law generated by the EU Court of Justice has eroded the notion of concessions by introducing a particularly broad conception of the field of public procurement contracts without, however, going so far as to confuse the two.[19]

Thus, the existence of legal risks associated with the absence of regulation has gradually convinced certain states that European legislation designed to better define the rules governing concessions is to be welcomed. The European Council[20] meeting held in Lisbon in March 2000 already had called for accelerating the process of liberalization in all markets in the EU. The question of extending competition requirements to local networks has been posed but not yet resolved, in that there is no majority on either side in the European Council or Parliament. The Treaty of Lisbon, which went into effect on December 1, 2009, reinforces the rights and powers

[17] See Appendix at the end of this chapter for the various liberalization directives relative to the telecommunication, railways, electricity, and postal services.

[18] The principle of proportionality requires that any new measures must be both necessary and appropriate in regard to the objective sought.

[19] Telaustria Judgment, ECJ, December 7, 2000, Case C-324/98.

[20] The European Council is an institution of the EU. It is charged with defining the general political directions and priorities of the EU. It has no formal legislative power and it comprises the heads of state or government of the member states, along with the president of the European Commission and the president of the European Council.

of all member states and local authorities and curbs the desire of some parties to liberalize local public services. In 2011 the French Senate expressed reservations about changes to rules governing concessions, and the EC proposed a draft legislative provision that same year on concessions, which would confirm the criterion of risk and reinforce publicity obligations. The award criteria would be defined ex ante and could not be changed during negotiations.

A final version of the directive on concessions was then adopted. However, this set off a debate among citizens and organizations in different countries and provoked a petition—the European Citizens' Initiative—demanding that water be removed from the scope of the Concessions Directive. Finally, in a statement in June 2013, the EU's European commissioner for internal market and services announced the exclusion of water from the directive. Attitudes in Europe about the way in which the water and sanitation sector should be managed are gradually changing, and it is possible that the practice of intuitu personae will be abandoned in the medium term.

6.5 What New Perspectives Would Emerge with the End of Intuitu Personae?

The new procedure of competitive dialogue suggested by the EC in 2004[21] for public-private partnerships includes a negotiation phase, but the main reform envisaged would be the introduction of competition based on weighted criteria defined in advance. This new procedure would be applicable to water concessions. This is the precise point where the principle of intuitu personae is really challenged, in that the mayor would have some restriction in his or her freedom of choice.

What would be the consequences if the practice of intuitu personae were abandoned in France? The definition of a priori selection criteria opens the door to new entrants because it reduces incumbent advantage. On the other hand, French companies are consolidating their positions, as witnessed by the renewal of the water delegation contract for the Paris suburbs: in the name of competition, water giant Suez Environnement attempted to convince the elected officials of the Syndicat des Eaux d'Ile de France (SEDIF)[22] to subdivide their delegation, or, in other words, to set up a number of independent subcontracts. This would have increased Suez's chances of beating out the contract holder, Veolia Environnement, and winning part of the contract. The option was rejected by the elected officials.

[21] The Green Paper on PPPs of April 30, 2004, followed by a summary of the consultation published in May 2005, and the communication of November 17, 2005.

[22] SEDIF is an inter-communality serving water for 142 municipalities around Paris for more than four million users. Paris is not a member of this inter-communality and has its own service, recently returned to public management (régie) after 150 years of private delegation. SEDIF, whose water contract was renewed in 2010, remains delegated to the private sector.

With the introduction of more competition, public operators also could bid for public service delegations. In the long term, that could lead to the emergence of public operators that would be increasingly independent from local authorities in terms of status and hierarchy. This scenario is all the more credible with the accelerated development of inter-communality[23] since 1999. Taking advantage of a larger inter-communal perimeter, or territory, many régies—direct public managers—have increased in size. Such direct public management operators are thus able to develop skills and expertise. In the southwest of France, one inter-communality implemented at the local scale[24] now offers a range of services to all the county's municipalities, much to the irritation of private operators.

On the other hand, the principle of short-term régie-style management could be called into question. Currently, the management approach to be applied—régie or delegation–is chosen by the local authority (see Table 6.2). Unlike delegation contracts, there is no predefined term with the régies. With liberalization, régies could be regularly compelled to face competition, unless they agreed not to offer services outside the territory for which they were originally responsible. This would be the application of the in-house principle, which is increasingly recognized by the EU Court of Justice.[25]

Finally, the reinforcement of public management in France would weaken the French private water companies. Their success in France has enhanced their international development since the mid-twentieth century, and they have grown large enough to export their technical skill. The domestic market provided them with cash flow to finance their international development.

At the European scale, in theory, more liberalization in the water sector should be considered favorable to the development of private companies by increasing their ability to conquer international markets beyond Europe. Internationally, new private operators could increase their market shares and challenge French companies like Suez and Veolia. In France, the consequences on the market would be differentiated by the type of areas. In urban zones and rural areas in which an inter-communal system is used to create economies of scale, the status of large régies and private enterprises could converge. Public and private operators would be distinguished only by the nature of their capital structure and, initially at least, their organizational scale (regional or international, respectively). Ex ante competition would be fierce in these areas. However, the question arises about how to monitor the operator ex post in what will inevitably be a monopoly lasting for the duration of the contract.

[23] See note 3 for more about French local organization and inter-communality.

[24] The Syndicat Départemental des Landes.

[25] The in-house principle was recognized in France by law No. 2010-559 of May 28, 2010. Municipalities are allowed to create local societies publicly owned but under private law. These so-called Sociétés Publiques Locales can operate water or sewerage utilities on the territory of the shareholder municipalities and no competition is required (Sapin Law does not apply to them). In 2011, only a few municipalities had chosen this management mode. That is why it is not detailed in Table 6.2.

In other rural areas without inter-communal organization and with low population densities and dispersed population centers, the competition would probably be limited because such contracts would be less profitable. Low population density increases per capita infrastructure costs and few industrial users, buying large quantities of water, limits per capita revenue. Private operators could abandon this segment of the market in what economists call the risk of creaming off the market. Services in such areas would be supplied by micro-régies with limited technical and human resources, incapable of guaranteeing a safe, high-quality service.

Currently, private operators already have displayed less interest in providing services to such areas. Table 6.3, above, illustrates the end of mutualization of cost between large and small contracts within delegation operators. Private operators abandoned their historical strategy of extending their market from large cities to small ones by pricing small cities only on marginal cost, rather than on full cost. As a consequence, from a strict cost recovery point of view, prices were under-estimated in small cities and over-estimated in others.

As a consequence, there is a risk of operators creaming off the best contracts and ignoring the worst: only the most profitable segments are of interest to competing operators. The legal obligation to provide a universal service should, in theory, limit these perverse effects. Nevertheless, in practice, in the case of local services in which costs are supposed to be covered without external aid (cost recovery principle), it is difficult to see how a two-speed public service can be avoided. These considerations demonstrate the wisdom of not only focusing on the implementation of competition rules, but also taking into account issues associated with social solidarity and the regulation of monopolies.

6.6 French Systems of Regulation Yet to Be Fully Developed

The liberalization of national network services is accompanied by a system of regulation based above all on encouraging fair competition between operators within the market and protecting universal service obligations (notably, via financial compensation mechanisms). In liberalized sectors, so-called independent national regulation authorities have been set up precisely with this objective in mind. In France, examples are provided by the Energy Regulation Committee and the Electronic Communications and Postal Authority.

The specificities of the water sector, notably the fact that competition within the market is virtually impossible, has led to the development of other kinds of regulation instruments focused on monitoring contracts and comparative evaluation. In spite of numerous initiatives taken in France since the 1990s (Guérin-Schneider and Nakhla 2003), benchmarking is still rarely practiced. Several attempts for comparative strong regulation have been rejected with the election of

right-wing governments.[26] However, a consensus formed around the need to define a shared core of performance indicators that could be applied to public services to control the result (continuity, quality, sustainability, etc.) rather than input (personnel, costs, etc.) (Cour des comptes 2003; Cousquer et al. 2005; Guérin-Schneider and Nakhla 2000; Institut de la Gestion Déléguée 2004; Martinand 2001).

Performance indicators were finally legitimized by law: the use of such benchmarks was imposed in an annual operator report,[27] and a clearly defined list of performance indicators is required in the annual report written by the mayor, describing water and sewerage services in terms of quality and price.[28] The Water Law of 2006 created the French National Agency for Water and Aquatic Environments (ONEMA) and mandated this new administrative body to collect at the national level the information included in these annual mayoral reports. It remains to be seen if this national performance indicator monitoring system will quickly attain its objectives or whether a stricter approach to regulation will prove necessary. First results are not entirely satisfying. In February 2011, utilities for which at least one performance indicator had been published in the monitoring system represented only 24 % and 19 % of the population served by drinking water and wastewater utilities, respectively (Canneva and Guérin-Schneider 2011).

6.7 Anticipating the Negative Impact of Liberalization

EU law has not yet challenged the specificity of concessions based on the principle of intuitu personae rather than competition. Nevertheless, the liberalization of public services is now deeply anchored in the culture of the EC. Thus, anticipating the impact of the eventual repeal of the principle of trust is important.

If the principle of strict competition were to be legislatively imposed on the water sector in Europe, the market share would probably be modified, challenging major companies. But if regulation remains limited to fair competition, the impact could also be social, as illustrated above by the French case study.

In France, the most likely outcome of the end of intuitu personae would be the emergence of new operators alongside French companies: probably foreign and new public enterprises (régies). The latter would reshape the status of régies,[29] notably by enabling them to operate outside of their original territories. This situation could undermine the dominant position of French companies in the country, in Europe, and around the world. The oligopoly in France could be attenuated.

[26] In 2002, a law established a regulatory body for water services with relatively strong prerogatives for monitoring and control and a remit to provide local authorities with information on pricing and performance.

[27] Decree No. 2004-136.

[28] So-called Rapport Prix Qualité du Service (Decree No. 2007-675 and its implementing decree).

[29] Or the development of the Public Local Societies recently introduced in French Law (No. 2010-559).

However, the introduction of competition and the end of mutualization of cost between large and small contracts within delegation operators, as mentioned above, may create a two-speed public service. Profitable areas would gain in competition, whereas the less profitable would be abandoned.

This demonstrates the importance of retaining mechanisms independent from the market. It is necessary to regulate service quality and maintain instruments of social solidarity, such as the universal service obligation and mutualization mechanisms, that have made the development of water services in France and Europe possible.

Finally, regulation will only be effective if it does not remain at a national or European level. Most of the countries in Europe and elsewhere are organized at a local level. The regulation tools, notably performance monitoring systems that have developed in many countries, shall be appropriated and used by local authorities to monitor and negotiate contracts with private operators or to steer public operators.

Acknowledgments The authors would like to thank Pierre Bauby for his help and expertise in this chapter.

Appendix: Directives in the Water Sector and Other SGEI

Main Water and Sanitation Directives

- Surface water directive (75/440/EEC[30]) and its daughter directive (79/869/EEC)
- Bathing water quality directive (76/160/EEC)
- Dangerous substances directive (76/464/EEC)
- Fish water directive (78/659/EEC)
- Shellfish water directive (79/923/EEC)
- Groundwater directive (80/68/EEC)
- Drinking water quality directive (80/778/EEC) and its revision (98/83/EC)
- Urban wastewater treatment directive (91/271/EEC)
- Nitrates directive (91/676/EEC)
- Water Framework Directive (2000/60/EC)

European Directives on the Liberalization of SGEI

Telecommunication

- Commission Directive 90/388/EC of June 28, 1990, on competition in the markets for telecommunications services, and its revision (Directive 99/64/EC)

[30] EEC: European Economic Community

- Directive 96/19/EC on full competition in telecommunication markets (amending Directive 90/388/EC)
- Commission Directive 2002/77/EC on competition in the markets for electronic communications networks and services (amending Directive 90/388/EC)

Railways

- Council Directive 91/440/EEC on the development of the European Community's railways
- Directive 2001/12/EC of the European Parliament and Council on the development of the European Union railways (amending Council Directive 91/440/EEC)

Electricity

- Directive 96/92/EC of the European Parliament and Council concerning common rules for the internal market in electricity
- Directive 2003/54/EC of the European Parliament and Council concerning common rules for the internal market in electricity (amending directive 96/92/EC)

Postal Services

- Directive 97/67/EC of the European Parliament and Council on common rules for the development of the internal market of Community postal services and the improvement of quality of service
- Commission directive 2002/77/EC on competition in the markets for electronic communications networks and services (amending directive 97/67/EC)
- Directive 2008/6/EC of the European Parliament and Council with regard to the full accomplishment of the internal market of Community postal services (amending Directive 97/67/EC)

References

AgroParisTech (2006) Observatoire de la Loi Sapin. Déroulement des procédures de délégation de services publics d'eau potable et d'assainissement de 1998 à 2006. Available in http://www.agroparistech.fr/IMG/pdf/LS_synt_06-GC_VersionFA.pdf, http://www.agroparistech.fr/-Sous-Rubrique-Laboratoire-GEA-.html

Argento D, Van Helden GJ (2010) Water sector reform in Italy and in the Netherlands: ambitious change with an uncertain outcome versus consensus-seeking moderate change. Int Rev Adm Sci 76(4):790–809

Bauby P (2010) Mapping of the Public Services in the European Union and 27 Member States, CEEP

Bauby P (2011) L'européanisation des services publics. Presses de SciencePo, Paris
Brunet E, Guérin-Schneider L, Bonnet F (2003) Impact of a new legislation on the water market and competition in France. Water Sci Technol Water Supply 3(1–2):389–394
Canneva G and Guérin-Schneider L (2011). National monitoring of water utility performance in France. Water Sci Technol Water Supply 11(6):745–753
Cour des comptes (2003) La gestion des services publics d'eau et d'assainissement. Rapport public particulier, Les éditions du JO, Cours des Comptes
Cousquer Y, Dumont J, François H et al (2005) Les indicateurs de performance appliqués aux services publics de l'eau et de l'assainissement. Constats et propositions
EC (European Commission) (2000) Commission interpretative communication on concessions under Community law (2000/C 121/02)
EC (European Commission) (2004a) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - White Paper on services of general interest COM/2004/0374 final Brussels
EC (European Commission) (2004b) Report on the public consultation on the Green Paper on services of general interest, Commission Staff
EUROMARKET (2003) Analysis of the European Union explicit and implicit policies and approaches in the larger water sector. Deliverable 1. Available in http://mir.epfl.ch/euromarket
Guérin-Schneider L, Nakhla M (2000) Le service public d'eau délégué: du contrôle local des moyens au suivi de la performance. Revue Politiques et Management Public 18(1):105–123
Guérin-Schneider L, Nakhla M (2003) Les indicateurs de performance: une évolution clef dans la gestion et la régulation des services d'eau et d'assainissement. Flux 52/53:55–68
Henry C, Matheu M, Jeunemaître A (2003) Réguler les services publics en réseaux : l'expérience européenne. La Documentation Française, Paris
Institut de la Gestion Déléguée (2004) Indicateurs de performance Eau potable et assainissement: 'pour une liste commune'. Edition IGD
Jordan A (1999) European Community water policy standards: locked in or watered down. J Common Mark Stud 37(1):13–37
Littlechild S (1988) Economic regulation of privatised water authorities and some further reflections. Oxf Rev Econ Policy 4(2):40–68
Lobina E, Hall D (2008) The illusions of competition in the water sector – a response to the OFWAT/Cave consultations on introducing competition in the water sector in England and Wales, PSIRU reports
Lorrain D (1998) Le régulateur, le service public, le marché et la firme. Flux 31–32:13–23
Lupton S, Bauby P (2010) Quelles évolutions pour le service public français face aux directives européennes? In: Schneier-Madanes G (ed) L'eau mondialisée: la gouvernance en question, collection "Recherches". La Découverte, Paris, pp 109–128
Macrory R (1992) The enforcement of community environmental law: some critical issues. Common Mark Law Rev 29:347–369
Marques RC (2006) A yardstick competition model for Portuguese water and sewerage services regulation. Util Policy 14(3):175–184
Martinand C (2001) La maîtrise des services publics urbains organisés en réseaux. Conseil Economique et Social, Les éditions des journaux officiels
Williamson OE (1985) The economic institutions of capitalism: firms, markets, relational contracting. Free Press, New York

Part II
Water Management Models and Globalization: Privatizations and Access to Water

Chapter 7
From the French Model to a "Globalized Model"

Sylvain Petitet

7.1 The Evolution of Water Management Models

The French approach to water management has attained the status of a model in terms of both the management of the resource itself and the water supply and wastewater services associated with it. Insofar as the resource is concerned, the European Union (EU) and certain international organizations insist on an integrated management approach based on river basins, river agencies, and the introduction of the polluter pays principle in the water sector.[1] Similarly, these international institutions have long presented the "French model" of managing water supply—in this context, the delegated management of those services—as applicable throughout the world.

Over the last 20 years, a large number of major cities such as Buenos Aires, Manila, Mexico City, Casablanca, Chengdu, Santiago, and Jakarta have turned to one of the two French giants in the water sector—Veolia Environnement (Générale des Eaux) and Suez Environnement (Lyonnaise des Eaux)—to provide drinking water and wastewater services.[2] By insisting on their impressive technical, financial, and organizational capacities, as well as the virtues of the French model, multinational urban water service providers have conquered important markets. In most cases the water giants also have significantly improved services provided to consumers, both quantitatively and qualitatively, by winning contracts and

[1] Since 1964, France has been divided into six hydrographical basins. Each basin has its own water agency, although the Rhône-Mediterranée and Corse Water Agency is responsible for two river basins. The agencies are in charge of collecting fees related to water conservation and water quality as well as distributing funds to support investments. See Chaps. 2 and 3 for more information.

[2] See Chap. 4.

S. Petitet (✉)
Egis France Group, Immeuble "Le Carat," 170 Avenue Thiers, Lyon Cedex 06 79455, France
e-mail: Sylvain.PETITET@egis.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_7,

replacing publicly owned companies. Nevertheless, their commercial approach to financial management, the substantial price hikes they have introduced, delays in the delivery of new infrastructure demanded in the contract, and oft-fraught relations with local regulatory authorities have sometimes tarnished the image of the companies and of the French model, which the water giants use to justify their approach.

From a semantic point of view, the term "French model," which was often used in the 1990s when the largest French private operators succeeded in obtaining important international contracts in the water sector, was gradually replaced during the 2000s by "public-private partnership" (PPP). PPPs are contractual agreements between a national, regional, or local public agency and one or more private companies for the delivery of a service or the construction of infrastructure. PPPs can be divided into different categories, which can involve more or less private participation: concessions, lease and management contracts, mixed-ownership companies, contract services, technical assistance contracts, and a large number of contracts involving the construction, financing, operation, and transfer of water facilities (World Bank 2011a; Marin 2009).[3]

While a PPP covers a varied spectrum of practices, it also denotes a more modest attitude on the part of the previously all-conquering private sector, which claimed to be able, unaided, to rise to the challenges involved in making qualitative and quantitative improvements to the services delivered to urban consumers. Indeed, rather than talking about the internationalization or globalization of the French model of urban services management, often presented as the magic solution to efficiency in the water sector, it would be more appropriate to analyze the emergence of a global approach to the management of such services, developed primarily in the water sector by leading French companies.

7.2 Exploring the French Model

The exported version of the French model promoted during the 1990s is based on the notion of municipal administrations working in tandem with private sector service providers. Comparisons with the French approach to water sector management are legitimate. Today, the private sector supplies almost 80 % of the people in France. Indeed, the importance of the role played by private sector providers is unparalleled in the rest of the world.

Due to the relative lack of power of French local authorities and to the state's favorable attitude toward the role of private companies in the sector,[4] private

[3] A PPP is different from privatization, the latter referring to the transfer of the ownership of a water utility's assets to the private sector.

[4] During the Third Republic (1870–1940)—when French administrative law was elaborating the notion of public service—the Conseil d'Etat (the French Administrative Supreme Court), faced

companies have essentially been responsible for the development of most urban services, including water, sanitation, electricity, gas, waste, and urban public transport (Bezançon 1998). Approaches to financing urban services and the fiscal provisions associated with infrastructure development carried out within the framework of delegated management have provided such companies with fertile ground for expansion. Indeed, they have been able to form powerful multi-service industrial groups operating in France and abroad.

Nevertheless, local public authorities are sometimes able to manage drinking water distribution in both urban and rural areas in a highly efficient manner (Pezon 2000), and semi-public companies provide an alternative approach to the provision of drinking water in urban areas, combining the advantages of private sector management and public oversight of the company by locally elected representatives. It should also be noted that in 1946 the French government adopted a radically different solution in the electricity sector, which has a number of similarities to the water distribution sector, including the concomitant use of dams and networks to provide services and the use of meters and bills to pay for it. This solution, which also became a model, was presented as the spearhead of a certain kind of public service "à la française." In effect, to control the economically important energy sector in France, the state decided to nationalize 1,450 French companies active in producing, transporting, and distributing gas and electricity. The new company, christened Électricité de France (EDF), was responsible for carrying out delegated contract missions for all French local authorities.[5]

Thus, rather than contenting ourselves with the notion of a single French model, it would be more fruitful to examine a number of different models to give some idea of the sheer wealth of approaches applied in France to the management of public services. This range of options continues to exist despite the attempts of the authors of international agreements and European directives to put an end to public monopolies and open up all sectors of the economy to competition.

In terms of the recourse to private sector companies, an equally varied range of possibilities exists: from government contracts to different forms of delegation, including concessions, factoring, outsourcing, and third party management. However, such a spectrum of possibilities does not make France unique. Indeed, the

with numerous local objections to the implementation of a form of municipal socialism, regularly referred to the non-mandatory character of public sector interventions: "Companies with a commercial character are, in general, part of the private sector and [. . .] municipal councils can only set up companies of this kind if, due to particular circumstances of time and place, such an approach serves the public interest" (Judgment of the Conseil d'Etat, "Casanova," March 29, 1901).

[5] Now separate from Gaz de France (GDF), EDF changed its legal status in 2004, becoming a public limited company. Although the company was floated on the stock exchange in November 2005, the state retains an 87.3 % share. The EPIC, a management approach based on a public administration model, has been widely applied in a number of areas considered to be either strategic or intimately linked to French government policy in the fields of national planning and development, transport (the national railway company, Société Nationale des Chemins de fer Français [SNCF]), and, especially, telecommunications.

legal traditions of many countries allow for similar solutions, a fact that explains the ease with which the large French private operators have been able to operate in a raft of countries with noticeably disparate legal systems. In the water sector, the originality of the French approach resides not so much in the development of innovative public-private contracts as in the use of PPPs by the authorities responsible for delivering services, the development of private groups, and the ways in which such services are regulated.

7.2.1 Regulating Public-Private Relations

To return to the parallel between water and electricity, the similarities in the legal frameworks governing the two sectors bear examination. In both sectors, responsibility for the delivery of the services is allocated to the municipalities, also known as communes, the lowest administrative division in France. And in both sectors, there is a tendency to try to ensure that these municipalities are no more than authorities with organizational powers. In the electricity sector, these authorities delegate the management of their services to a public company with a virtual monopoly. In the water sector they tend to delegate their services to a large private company in an oligopolistic position. Both cases raise the question of the extent to which the service provided by public or private operators can be effectively monitored and whether such efforts are merely a reflection of the legal duty, rather than a legal power, to do so.

Many commentators believe that the issue already has been resolved. This is due to the juridical nature of the service provider. For example, a substantial number of observers claim that EDF has developed a genuine public service culture, to the degree that one can now talk of a kind of self-regulation on the part of the public service provider. This notion of systematic self-regulation involving local authorities with organizational responsibilities and consumer-citizens capable of expressing their dissatisfaction to local elected representatives has a long history (Lorrain 1990). However, the theoretical perspective on the regulation of urban services that it promotes does not stand up to an analysis of the way in which the system actually functions (Petitet 1999b).

7.2.2 Competition: More Theoretical than Real

Although it has been used as a theoretical argument, competition—both between approaches to management and individual operators—is an illusion. Decisions to delegate a service can be taken at the time the service is being set up, or when it has already been implemented. Such decisions may be motivated by a fear, stoked by private infrastructure and management companies' insistence on the complexity of the systems they provide, of not being able to access the skills necessary to deal

with managing municipal personnel. Or they may derive from financial concerns (e.g., the prospect of making substantial investments in the context of the kind of financial hardship that characterized the municipalities in the 1980s, or of dealing with priorities in areas other than the water sector). Whatever the case, the decision to delegate a service is very difficult to reverse. The most familiar examples of a return to public management (Grenoble in 2000; Paris in 2009) both involved a strong political will to dispense with the services of the operator in place at the time.

Generally speaking, once a company has been contracted, this arrangement will remain in place for a considerable length of time. Competition between different companies is, more often than not, merely theoretical. The dearth of competition in the sector can be partially explained by the fact that, as contracts expire, the contract holder has an undeniable advantage, linked either to the quality of the relationship established with elected representatives—which ranges from a good working relationship to outright corruption—to the superiority of the service provider or to agreements between companies in an oligopolistic position.

7.2.3 A Relative Lack of Supervision

From a legal point of view, delegation cannot, in any sense, be considered as a transfer of responsibility for the delivery of a service from a public authority to a private company. The delegating public authority retains responsibility for defining both the quantitative (services, prices) and qualitative factors of the service and for monitoring the service provided by the delegated private company. Delegated private companies must supply a technical and financial report on an annual basis.

However, for a number of reasons, monitoring the way in which delegated companies operate is a tricky business. It is, for example, often difficult to verify and assess elements supplied by delegated companies, not only due to a lack of references with which to compare them, but also, frequently, to a lack of competence on the part of the municipalities and départements[6] that are in a position to provide delegating authorities with assistance. Furthermore, if contracts are poorly negotiated, they may contain unpleasant surprises in terms of price hikes and the difficulty of appending additional clauses. There thus exists not only an asymmetry of information but also of competency between the delegated private company and the delegating authority. In spite of the introduction of legislation and regulations, and despite the efforts of associations of elected representatives, local authorities, and government departments, French public authorities still struggle to deal on an equal footing with major private companies specializing in public urban services.

[6] A département is a territorial and administrative division of France and is managed by a prefect and a general council. It is larger than the communes (referred to in this book as municipalities).

7.2.4 A Chaotic Regulatory System and a State Forced to Intervene

It seems that local politicians have taken the relative lack of complaints from consumers as a vote of confidence in a system that is still based on the principle of intuitu personae.[7] But does this regulatory approach encourage the kind of management that really takes consumers' interests into account? Even though they were often short-lived, the emergence of water consumer associations after the introduction of the 1992 Water Law highlighted a certain tendency on the part of public sector managers and private sector executives to ignore the complaints of citizen-consumers (Petitet and Varaschin 1999). Their inaction caused frustration on the part of consumers, who reacted by collectively refusing to pay bills, signing petitions, staging demonstrations, filing lawsuits, and engaging in other forms of protest in an attempt to make public and private sector managers acknowledge the problem and alter the system accordingly.

Clearly, changes to the system and its regulatory framework are rarely initiated by public or private sector managers. Instead, they are the result of legislative, regulatory, and judicial moves on the part of the state, and the départements mobilized in reaction to popular dissatisfaction. Laws introduced in the mid-1990s, following a number of scandals and the emergence of consumer protest movements, are symptomatic of the crisis affecting the delegated contract system.[8]

The self-regulation of the system therefore functions as a coalition between local authorities and private providers operating against a background of badly organized supervision on the part of elected representatives. In this context, the state only provides legal, legislative, or regulatory oversight encouraging local actors to participate meaningfully, when sufficient pressure is exerted by determinedly proactive consumer movements. The result is, therefore, not so much a local system of self-regulation as a system of global regulation by the state triggered by crises that are resolved on an ad hoc basis.

7.2.5 Full Cost Pricing and the Commodification of Water

When the urban public services management system was applied outside France, attempts were made to introduce the system of full cost pricing. Consumers, or

[7] See Chap. 6 for more on intuitu personae.

[8] The Law of January 29, 1993, "relative to the prevention of corruption and the transparency of economic activity and public procedures," known as the Sapin Law, introduced a certain formalism and reinforced procedures concerning requests for proposals. The Law of February 2, 1995, "relative to reinforcing the protection of the environment" (the Barnier Law), limited the duration of delegated contracts and ended franchise fees. And the Law of February 8, 1995, "relative to government contracts and the delegation of public services," known as the Mazeaud Law, obliged delegated companies to produce an annual report of their accounts containing all transactions associated with the contract and an analysis of the quality of the service delivered.

rather customers of the public drinking water service, were required to meet all the costs associated with establishing and administering that service. The principle—based on the idea that water is a commodity like any other (giving rise to individually metered supply at real cost), rather than a public service concerned with social solidarity and rejecting all forms of economic discrimination—is presented as the sine qua non not only of careful and responsible water consumption but also of the economic viability of the service.[9] Here too, comparisons with approaches applied in France appear legitimate.[10] It should nevertheless be observed that, in France, full cost pricing remains an entirely relative concept and the notion—by no means universally accepted—of water as a "commodity like any other" (French Ministry of the Interior 1967, p. 27) seems to be more an ambition rather the actual result of a long and arduous social process, the end of which is not yet in sight (Goubert 1986).

The historical transformation of water as a service delivered collectively by means of public fountains to a service delivered to the home via a distribution network and charged individually on the basis of a metering system cannot be considered solely as a teleological journey toward ever-increasing levels of hygiene and convenience. It also describes the adoption, due to dominant social forces, of a new model of public service. In fact, it seems that, in France too, much work has had to be done to impose this model (Petitet 1999a). Furthermore, while the full cost pricing model has finally gained ascendancy in France, its hegemony remains relative. Indeed, it can be seen as the end product of a long process of financial disengagement on the part of the state, a process coeval with the development of drinking water distribution services. In effect, while in many large cities in France, the development of this kind of service distribution began before 1902 (Figuier 1873), the approach was given an added boost by funds allocated by the Ministries of Agriculture and the Interior. It has been estimated that, prior to World War II, an average of 40 % and a maximum of 60 % (Valiron 1990) of investments required for the delivery of such services to rural and urban municipalities were derived from those funds. However, while the state provided substantial funding for the construction of the new distribution infrastructure before World War II, it began to transfer the financial burden from taxpayers to local consumers after 1945.[11]

[9] See Chap. 8.

[10] Particularly in view of the Water Law of January 3, 1992, the introduction of the so-called M49 General Accounting Rule, and the generalization of a binomial tariff.

[11] In 1954, the National Fund for the Development of Water Conveyance Infrastructure (FNDAE) was established. The entity was 60 % funded by the Pari Mutuel Urbain (PMU) lottery, with a license fee paid by local consumers making up the shortfall. The Water Law of December 16, 1964, introduced the river basin agencies (renamed water agencies in 1992), which dedicated most of their resources, the majority of which derived from fees paid by consumers, to combating water pollution (see Table 2.1). Moreover, the General Accounting Rule (M49), initially introduced in the largest local authorities and then rolled out across the country, first drew attention to and then prohibited the transfer of taxpayer contributions towards local consumers. The state also provided financial support for the development of water distribution networks in the form of loans granted by its financial network designed to help the municipalities invest in the sector.

Thus, the spread, in just under 50 years, of network-based drinking water distribution throughout the country has only been possible through substantial contributions from taxpayers and, to varying degrees, consumers themselves. Furthermore, while the state has gradually stepped back from funding these networks, contributions from local taxpayers (at the département level) and consumers (at the water agency level) are vital in terms of generating the kind of investment required to improve the service. Even if it is increasingly presented as the economic expression of the principle of equality between users, full cost pricing in France is largely illusory.

In the 1980s and even more so in the 1990s, the major French private operators were able to insist on their expertise and talked up the advantages of the French model (Perrot and Chatelus 2000). The majority of the contracts awarded in the 1990s delegated the provision of a part or the totality of water services, on the basis that private operators are able to provide an efficient service through their investment capacity, expertise, and technological performance. Indeed, the French model, known today as the PPP model, was portrayed as the magic solution to improve water services by delegating the provision of a public service from public authorities to a private operator, while retaining the ownership of the infrastructure and the responsibility for the service.

Despite efforts to present the French experience as a successful model for water services management by international private operators and certain international organizations such as the World Bank and the International Monetary Fund (IMF), a considerable number of contracts have been terminated prematurely or not renewed, especially in developing countries.[12]

It should be noted that in developing countries (more than in France), full cost pricing is difficult to establish and concessionaires are not allowed to make necessary investments at an appropriate time or adopt tariffs that would allow access to water for all. Financing essential urban services remains an urgent question that the globalized model, using the French experience as a reference, has not been able to solve. The creation of new kinds of public-private partnerships is critical in the search for new financing and management solutions.

Up until the 1980s, the financial institutions linked to the Caisse des dépôts et consignations—a public group that provides financial support for different levels of French government—provided preferential rates to support the municipalities in this drive, initiated by the state, to develop new infrastructure. Lastly, it should be noted that the départements also contributed to the public sector's efforts to develop drinking water distribution networks not only via direct subsidies, but also through appropriations from the Ministry of Agriculture and, later, the FNDAE. Today, the départements still provide subsidies, a fact that makes it difficult to implement the principle of full cost pricing.

[12] See Chap. 8.

References

Bezançon X (1998) Les services publics en France, De la Révolution à la Première Guerre mondiale. Presses de l'ENPC, Paris

Blake N (1956) Water for the cities. A history of the urban water supply problem in the United States. Syracuse University Press, Syracuse

Botton S, Brailowsky A, Mayaux PL (2010) Le rejet de la greffe ou les impensés du transfert de modèle de PPP, les cas de Buenos Aires (Argentine) et de La Paz-El Alto (Bolivie). In: Blanc A, Botton S (eds) Services d'eau et secteur privé dans les pays en développement Perceptions croisées et dynamique des réflexions. Agence Française de Developpement, Paris

Bull B, McNeill D (2007) Development issues in global Governance. Public-private partnerships and market multilateralism. Routledge, London

De Gouvello B (2001) La réorganisation des services d'eau et d'assainissement en Argentine à l'heure néo-libérale. Flux 44–45

Figuier L (1873) Les merveilles de l'industrie ou description des principales industries modernes (3). Furne, Jouvet et Cie, Paris

Food & Water Watch (2010) United Water. Suez Environnement's poor record in the United States. Food & Water Watch, Washington, DC

French Ministry of the Interior (1967) L'eau et l'assainissement. Étude des problèmes municipaux (14)

Global Water Intelligence (2012a) About Us. Available in http://www.globalwaterintel.com/about/. Accessed 20 Apr 2012

Goubert J (1986) La conquête de l'eau – l'avènement de la santé à l'âge industriel. Robert Laffont, Paris

Leurig S (2010) The ripple effect: water risk in the municipal bond market. Research Report, Ceres/Boston

Lorrain D (1990) Le modèle français des services urbains. Économie et Humanisme 312:39–58

Marin P (2009) Public-private partnerships for urban water utilities: a review of experiences in developing countries. World Bank, PPIAF, Washington, DC

National Research Council (2002) Privatization of water services in the United States: an assessment of issues and experience. The National Academies Press, Washington, DC

Perrot J, Chatelus G (2000) Financement des infrastructures et des services collectifs; le recours au partenariat public-privé. Presses de l'ENPC, Paris

Petitet S (1999a) De l'eau du Rhône à l'eau de la Ville, la mise en place d'un service de distribution d'eau potable à Givors (1899–1935) 5:109–142

Petitet S (1999b) Du 'modèle français des services urbains' à l'analyse de leur production. Revue d'Economie Régionale et Urbaine 4:737–764

Petitet S, Varaschin D (1999) Intérêts publics et initiatives privées, initiatives publiques et intérêts privés, travaux et services publics en perspective. Onzièmes entretiens, Centre Jacques Cartier, ENTPE, Vaulx-en-Velin

Pezon C (2000) Le service d'eau potable en France de 1850 à 1995. Presses du DEREM/CNAM, Paris

Public Works Financing (2010) PWF's 14th annual water partnerships report. Public Works Financing

Schneier-Madanes G, de Gouvello B (eds) (2003) Eaux et réseaux, les défis de la mondialisation. IHEAL- La Documentation Française, Paris

Valiron F (1990) La politique de l'eau en France de 1945 à nos jours. Presses de l'ENPC, Paris

Water Partnership Council (2003) Establishing public-private partnerships for water and wastewater systems. A blueprint for success. Water Partnership Council, Washington, DC

World Bank (2011a) Private participation in infrastructure database. Available in http://water.worldbank.org/water/node/83755. Accessed 20 Apr 2012

World Bank (2011b) Water. Available in http://water.worldbank.org/water/. Accessed 17 July 2011

Chapter 8
Privatization: Lessons from Argentina

Bernard de Gouvello, Emilio J. Lentini, and Graciela Schneier-Madanes

8.1 The Broken Promise of Privatization

In 1993 Argentina became the world's flagship model for privatization, the touted grand solution for a troubled economy and poor service. That year, Aguas Argentinas S.A., an international consortium headed by the French water giant Lyonnaise des Eaux, won a 30-year contract to provide water and sanitation services to most of the Buenos Aires Metropolitan Region in what was the largest concession in the world. But the Argentinian government broke the Buenos Aires contract a mere 13 years later, marking the end of a period during which international consortia had played a major role in structuring the way water provision and sanitation services in Argentina were managed.

Why did this once-promising organizational approach fail? Analyses of the situation have polarized proponents and opponents of privatization as well as companies and the government, with each sector blaming the other. Stepping beyond the post-privatization literature and inside some of the explanations quickly

B. de Gouvello (✉)
Centre Scientifique et Technique du Bâtiment – CSTB, Laboratoire Eau, Environnement et Systèmes Urbains – LEESU, École Nationale des Ponts et Chaussées, Université Paris-Est and AgroParis Tech, CSTB/LEESU-ENPC, 6–8 avenue Blaise Pascal, Cité Descartes – Champs sur Marne, Marne La Vallee, Cedex 77455, France
e-mail: bernard.degouvello@leesu.enpc.fr

E.J. Lentini
Centro de Estudios Transdisciplinarios del Agua – CETA, Universidad de Buenos Aires, Argentina, Chorroarin 280 (1427), Ciudad Autónoma de Buenos Aires, Argentina
e-mail: ejlentini@yahoo.com.ar

G. Schneier-Madanes
CNRS International Research Network on Governance of Water in the Americas, Urban Water Research Network "rés-EAU-ville" (GDR 2524 CNRS), and the Joint International Unit on Water, Environment and Public Policy (UMI 3157, CNRS/University of Arizona), CNRS/CREDA 28 rue Saint Guillaume, Paris 75007, France
e-mail: graciela.schneier@univ-paris3.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_8,

accepted for the failure, however, reveals global and external as well as local and internal factors jointly played a significant role.

The privatization of public utility companies in Argentina was carried out as part of a state reform program introduced in 1989 and was encouraged by international agencies such as the International Monetary Fund. The government justified the policy on the grounds of the parlous state of public finances—hyperinflation was at its peak in Argentina at the time—and poor economic management.

In the case of public utilities like electricity, gas, telecommunications, and water and sanitation, privatization seemed to be an ideal way of turning a dire situation around and attracting the kind of investment required to redevelop networks. Regulatory and operational functions were separated. Responsibility for the former fell entirely to the state, while operational functions were delegated to other actors, particularly private companies able to supply or procure the required financing. In Argentina, privatization was framed by a bilateral treaty designed to protect foreign investments and by the acceptance of the jurisdiction of a World Bank arbitration body, the International Centre for Settlement of Investment Disputes (ICSID).

Historically speaking, the evolution of the water and sanitation sector in Argentina created a unique situation in which the federal government provided services, via a public agency, Obras Sanitarias de la Nación (OSN), to the metropolitan region of Buenos Aires: the city of Buenos Aires itself as well as a number of its surrounding municipalities. Provincial companies provided services in the provinces and urban centers. However, some services were provided by municipal bodies or consumer cooperatives. It was on the basis of this institutional configuration that the movement toward granting water and sanitation concessions to private companies was to develop.[1]

In 1991, Corrientes became the first province to award a contract to a private operator. The 30-year concession, which covered nearly 300,000 residents in the provincial capital and nine other cities, was granted to the international consortium Aguas Corrientes S.A.

The key moment came in 1993, when the services previously run by the OSN were transferred to the Aguas Argentinas S.A. consortium, making it the world's largest concession. The floodgates opened. In the following years, approximately 20 water concessions were awarded to private companies. These concessions covered the country's biggest cities,[2] the outermost suburbs of the Buenos Aires Metropolitan Region, and the capitals and other urban centers of the country's northern provinces. The late 1990s represented the apogee of the privatization approach; at that point, companies with a private status, including cooperatives,

[1] Argentina is a federal republic with a national government composed of 23 provinces and the city of Buenos Aires (the national capital). Each of these entities is an independent jurisdiction with its own legislative and executive powers.

[2] Rosario and Santa Fe (Aguas Provinciales de Santa Fe S.A.); Córdoba (Aguas Cordobesas S.A.); Mendoza (Obras Sanitarias de Mendoza S.A.); La Plata and Bahía Blanca (Azurix Buenos Aires S.A.); Tucumán (Aguas del Aconquija S.A.); Salta (Aguas de Salta); and La Rioja (Aguas de La Rioja).

Table 8.1 Major water and sanitation concession contracts

Consortium	Geographical region	International operator	Start date	End	Duration (years/ months)
Aguas Argentinas S.A.	City of Buenos Aires and 17 municipalities	Lyonnaise des Eaux – France	April 1993	March 2006	12/10
Aguas Cordobesas S.A.[a]	City of Córdoba	Lyonnaise des Eaux – France	May 1997	December 2006	9/7
Aguas del Aconquija S.A.	Province of Tucumán	Compagnie Générale des Eaux – France	July 1995	October 1998	3/3
Aguas Provinciales de Santa Fe S.A.	Province of Santa Fe	Lyonnaise des Eaux – France	December 1995	February 2006	10/2
Obras Sanitarias de Mendoza S.A.	Province of Mendoza	SAUR (France)	June 1998	September 2010	12/3
Azurix Buenos Aires S.A.	Province of Buenos Aires	Azurix (United States)	June 1999	March 2002	2/8

Source: Information gathered by the authors

[a]The concession awarded in Córdoba to Aguas Cordobesas S.A. included water distribution services but not sanitation

provided water services to 70 % of Argentina's inhabitants. For the first time in the country's history, water became a commodity.

As the process of privatization expanded and settled across the country, however, cracks began to appear in the model for a variety of reasons. The first concession crisis occurred in 1997, when the contract awarded to Aguas del Aconquija S.A., a consortium headed by the French-owned Compagnie Générale des Eaux,[3] in the province of Tucumán, was terminated. Another concessionaire, Azurix Buenos Aires S.A., terminated its contract 4 years later.

The country's two biggest concession contracts, which belonged to the Buenos Aires Metropolitan Region and the province of Santa Fe, respectively, were terminated in late 2005 and early 2006, respectively. The contract with Aguas de Buenos Aires S.A., previously responsible for supplying services to seven municipalities in the Buenos Aires region, also was terminated, followed by Aguas de Valle's concession in the province of Catamarca and contracts with Aguas de Salta, Obras Sanitarias de Mendoza, and Aguas de La Rioja in 2008. In 2010, following the departure of almost all of the major private operators (Table 8.1), private companies serviced fewer than 30 % of the nation's inhabitants.

Three major concession contracts—Tucumán, Buenos Aires, and the province of Buenos Aires, all of which involved private international consortia and were terminated prematurely—lend insight into the processes that led to the failure of private management approaches in the water and sanitation sector in Argentina.

[3] Became Veolia Environnement (see Chap. 4).

The three cases represent the diversity of the groups involved (Lyonnaise des Eaux,[4] Générale des Eaux, and Azurix) and the types of territories concerned (Buenos Aires Metropolitan Region, almost the entire province of Tucumán, and privatized cities in the province of Buenos Aires).

8.2 Aguas Argentinas and the Buenos Aires Metropolitan Region

After the international call for bids by the Argentinian government in 1993, the water and sanitation services of the Buenos Aires agglomeration were transferred to Aguas Argentinas S.A., a consortium led by Lyonnaise des Eaux. The call for proposals made it possible to choose the bidder offering the lowest price. Five consortia submitted bids, each led by a major European group[5] in association with a number of Argentinian enterprises. Aguas Argentinas won the 30-year contract.

The concession served nine million of the region's 12 million inhabitants, or 2.5 million customers. Initially, only 71 % of the customers had access to water and 57 % had access to sanitation services. The concessionaire took on what was referred to as a "free faucet" system, in which prices are based on cadastral data. The plans imposed on the operator involved extending networks, renovating obsolete infrastructure, and building wastewater treatment plants. This five-stage plan was set to be completed by 2023, when water and sanitation services were to be accessible to everyone living in the territory covered by the concession. To monitor the application of the contract, the state set up the Ente Tripartito de Obras y Servicios Sanitarios (ETOSS) consisting of representatives of the state, the province of Buenos Aires and, from 1996, the city of Buenos Aires (Lentini 2007, 2008; Schneier-Madanes 2001, 2005a; Schneier-Madanes and de Gouvello 2003; de Gouvello 2001a).[6]

But the concessionaire soon confronted a series of problems. In 1994 the company successfully negotiated a 13.5 % increase in the prices it levied. A second round of price negotiations took place between 1997 and 1999. This round focused on two main themes: a modification to the system used to fund access to services[7]

[4] Became Suez Environnement (see Chap. 4).

[5] The French companies Lyonnaise des Eaux and Compagnie Générale des Eaux, the last joining the first as a minority shareholder; the British-run Thames Water International and North West Water International; and the Spanish water company Canal de Isabel II.

[6] The area of regulation of the ETOSS and thus the area of the concession of Aguas Argentinas corresponded only to the city of Buenos Aires and 17 other municipalities of the province of Buenos Aires that make up part of the metropolitan area of Buenos Aires. In the rest of the territory of the province of Buenos Aires, services were provided by two private companies: Azurix and Aguas del Gran Buenos Aires. There were also other forms of delivery such as cooperatives and municipal providers in some cities.

[7] Initially financed exclusively by newly connected consumers, it was decided that access to services should henceforth be funded by all users.

and the report on progress on the wastewater treatment plant. In January 2001, the first 5-year review, which had been postponed for 2 years, set a new price increase of around 15 % over the next 3 years, but the economic crisis that hit in December of that year and the resulting end of parity with the U.S. dollar called into question the viability of the contract. An emergency law passed, stipulating that all concession contracts sanctioned by the federal government had to be renegotiated and that prices could not be changed. January 2002 marked the beginning of a drawn-out period of negotiation that ended in March 2006, when a newly-elected government terminated the contract, citing, among other reasons, "a problem concerning an excessively high level of nitrates, and issues concerning water pressure and investment in the extension of services" (Lentini 2004).

The Argentinian government created Agua y Saneamientos Argentinos (AySA) to run the services under a new regulatory framework and split the ETOSS into two bodies (ERAS: Ente Regulador de Agua y Saneamiento and APLA: Agencia de Planificación).[8] Meanwhile, Lyonnaise des Eaux-Suez[9] appealed to the ICSID to obtain compensation for losses of around $1 billion. To date, the court has recognized some of Argentina's responsibility and an independent expert has been called in order to establish the amount of compensation owed.

8.3 Aguas del Aconquija (Générale des Eaux) and the Province of Tucumán

In 1991 the province of Tucumán had a population of 1.1 million people, including 650,000 who lived in the San Miguel de Tucumán agglomeration. Seventy percent of them had access to drinking water and 29 % had sanitation services, most of which were provided by a provincial agency, the Dirección Provincial de Obras Sanitarias (DIPOS). Due to its age and a lack of adequate maintenance and investment, the infrastructure was in need of repair and water quality did not always meet standards set at the time.

In March 1993, in line with the approach applied in Buenos Aires, the provincial government introduced a law transferring the services to the private sector in the form of a 30-year concession. The objectives established by the contract for extending and improving the service were very ambitious, with the planned construction of a tertiary wastewater treatment plant in the capital city, and a new regulatory framework was established.

[8] The ERAS is responsible for monitoring the quality of the service provided and for certain economic aspects related to pricing and the presentation of accounting data according to specific criteria. The role of the APLA is to define what kind of investments should be made in the territory covered by AySA.

[9] As Lyonnaise des Eaux became known after its merger with Suez.

On the deadline for the presentation of bids, only the Aguas del Aconquija consortium, led by Générale des Eaux and Argentinian companies, submitted a proposal. The existence of a single bid should have led to the annulment of the call for bids, but in fact it transformed it into a negotiation between equal parties (de Gouvello 2001b). Aguas del Aconquija suggested a 94 % price increase. After a phase of negotiation, the increase was reduced to 67.8 %, but with the addition of VAT (value-added tax) and local taxes, users had to pay an extra 85–100 % (Ferro 2001). The contract was signed in May 1995 and responsibility for providing the services was transferred on August 1 of that year.

The substantial price hike was extremely unpopular with consumers, sparking a very divisive political debate. In December 1995, a newly-elected governor began to renegotiate the contract. A month later, water distributed to consumers took on a distinct brown color for several days, fueling popular discontent that was expressed through a hostile press. As a result, many customers refused to pay their bills and relations among the company, users, and the province became increasingly fraught.

The company withdrew from the contract in March 1997, simultaneously lodging an appeal with the ICSID. The province terminated the contract, and a national public body responsible for planning in the water sector established a state-run company in its place. After a series of contradictory decisions concerning the competence of the ICSID, Générale des Eaux filed a compensation claim and was awarded $105 million—31 % of the amount claimed.

8.4 Azurix and the Province of Buenos Aires

Water and sanitation services in the Province of Buenos Aires (as opposed to the metropolitan region or city itself) were transformed into a concession in 1999. The services had deteriorated inexorably due to neglect by the provincial government since 1990, and the idea of privatization eventually gained acceptance.

Like the other two concessions, this one was set to last 30 years. Services extended to 56 municipalities that covered an area the size of Italy and were divided into six zones. Bids had to cover all services in up to five zones, a stipulation introduced to avoid any possibility of creating a monopoly. The candidates could make as many bids as they wanted, with the province selecting the combination of bids providing the largest franchise fee.

Azurix Buenos Aires S.A., then a subsidiary of U.S.-based Enron, unexpectedly made a bid of almost $440 million for a concession covering five zones (including 49 municipalities and 2.3 million people, most of whom lived in the province's two largest cities). This sum was far higher than all the other bid combinations presented, and the group was awarded the concession. Thanks to this transaction, Azurix, which already had a share in another water concession in Argentina,[10]

[10] Obras Sanitarias de Mendoza.

strengthened its role in the Argentinian scene and positioned itself for future calls for tender. Because no bids had been made for the last zone, which included seven municipalities in a poor area far from the center of Buenos Aires, a new call for tender was issued. The Province of Buenos Aires awarded the concession to an international consortium led by Aguas de Bilbao for only $1.26 million.

The provincial government set up a regulatory body to oversee the two concessions, focusing on the renovation and extension of the networks and on pricing policy. Goals for extending the networks were expressed as improved coverage rates, targeting 95 % for both water and sanitation services in all zones by the end of the contract.

From the moment it took over the concession in June 1999, Azurix Buenos Aires S.A. faced major problems. The company raised prices, citing cadastral records as a justification. Although such an approach was contractually legitimate, public reaction was far from positive. In April 2000, the people of Bahía Blanca were deprived of water for several weeks due to pollution problems at the dam supplying the city. The province took the side of users, which only added to growing tensions with the operator.

In April 2001, before its bankruptcy, Enron decided to cut ties with Azurix. Azurix informed the provincial government of its decision to unilaterally terminate the contract, citing the government's disregard of contractual clauses, and lodged an appeal with the ICSID. The ICSID later estimated the state owed the company $165 million. After the definitive departure of Azurix in March 2002, the province established a new provincial public enterprise to provide services.

8.5 Why Did the Concessions Fail?

Most, but not all, of the concession contracts signed during the 1990s were terminated.[11] External and internal factors delve into the complex dynamics at work in each privatization to explain what led to the failure of the model (Jouravlev and Valenzuela 2007).

8.5.1 Global and External Factors

The macroeconomic context. The period was characterized by a macroeconomic shock of a much greater intensity than the recurrent crises the country was used to. The shock led to generalized contract renegotiations, most of which resulted in the termination of the contracts concerned (Solanes and Jourvalev 2005).

[11] The successful concessions generally involved national and/or local capital, but their contractual renegotiations all included reduction commitments of investment, tariff increases, or direct contributions from the state. In the case of Córdoba, the transfer of equity capital of the foreign private operator to the new Argentinean company played a major role.

Poverty. Aggravated by the macroeconomic situation, poverty was a central factor in the failure of the private operators. A large section of the population was unable to pay its bills, and in the absence of specific mechanisms set up by the public authorities to cover those users (e.g., through a lower social tariff or direct subsidies from national funds), it seems it would have been impossible to recover the costs of the services (Ordoqui 2007; ETOSS 2001).

Institutional quality and corruption. Achieving an acceptable level of efficiency required rational decisions, effective management, and the effective monitoring of spending and corruption. Argentina's deeply unimpressive Corruption Perception Index demonstrated these conditions had not been met (Transparency International 2004).

Instability and lack of political consensus. The decision to delegate services was not based on a consensus between the major political parties. With the alternation of parties in power, new governments challenged the validity of existing contracts.

Water service was not a governmental priority. In general, resources granted by national and provincial governments did not meet the needs of the water and sanitation sector, which took a back seat to solving economic problems and producing short-term results (compatible with electoral considerations) (Defensor del Pueblo 2003).

The absence of long-term credit at the local level. The amount of investment needed to provide high-quality, universally accessible services and wastewater treatment plants meant that a suitable long-term funding system was indispensable. But the Argentinian government was unable to develop a policy enabling or obliging companies to use the domestic stock exchange to fulfill their long-term financing needs (Lentini 2004).

The perception of the cost of providing services. During the long period in which the OSN ran services at a loss, the population got used to prices that did not reflect the real cost of providing public utilities (Schneier-Madanes 2005a). In this context, increasing prices were directly associated with privatization and rarely seen as a necessary tactic used to recover costs.

Growing environmental concerns. The privatization process ushered in several serious problems related to water quality and flooding, as the concessionaires introduced more water into the system without installing necessary infrastructure to handle the increased volume. These problems occurred, however, against a backdrop of years of uncontrolled urbanization, water pumping, and increased precipitation—all factors that fell outside the control of the companies.

The influence of the media. In certain cases, the media, relaying the unfounded comments of opportunistic politicians, sometimes contributed an ideological rejection to the very idea of the private sector (de Gouvello and Fournier 2002).

Public opinion. Polls conducted in the second half of the 1990s revealed the privatization of water and sanitation services generally was unpopular with the public. The polling results reflected a growing discontent prompted by substantial price increases, a feeling reinforced by the decline of the Argentinian economy that started in 1995 and growing levels of unemployment and poverty.

The results also stood in stark contrast to polls conducted before privatization in Argentina that showed widespread support for the model.

This analysis, which is critical to understanding the failure to run water service efficiently, reveals two international factors:

The reorientation of the strategies of international groups. International groups changed their composition (purchasing or selling subsidiaries) and carried out strategic reorganizations that led them to abandon certain sectors to concentrate on fresh objectives (notably, the energy sector and water concessions in the new member states of the European Union) (Ducci 2007).

Recourse to the ICSID. Although it encouraged parties involved to sign contracts, the possibility of taking recourse to the ICSID undermined those contracts; companies faced with an adverse change in circumstance could receive compensation if the court judged in their favor (ICSID 2000, 2005; Defensor del Pueblo 2003).

8.5.2 Internal and Local Factors

An initial group of internal and local factors concerns calls for bids.

Poor information gathering. Preliminary studies for the preparation of bids were based on a lack of information on the real state of networks and services and on urban and hydrological data.

Lack of experience and the speed of the bidding process. International institutions and the federal government had neither the experience nor the necessary objectivity to deal with calls for tender in this sector in terms of the duration, scope, and size of the territories covered by the concession. Furthermore, the speed at which bidding processes were conducted left little opportunity to pragmatically extend deadlines, and calls for bids for concessions in various parts of the country were launched in such a way as to preclude the possibility of building up valuable experience, as the same principles were applied everywhere.

No guarantee of a long-term commitment on the part of operators. In all circumstances, renegotiations rapidly followed the selection of a bid. In fact, bids were made to win markets and did not imply a veritable commitment on the part of the operator (Guash 2004). For example, Aguas Argentinas was quick to negotiate a price increase to meet investment obligations. Azurix attempted to recover its high franchise fee by placing users in higher price bands. In the case of Aguas del Aconquija, the call for tender procedure was not even respected.

A second group of factors concerns the way in which contracts were drawn up and regulated.

Overly ambitious investment objectives. The arrival of major international groups gave rise to the idea that it was possible to develop sophisticated services within a short span of time. But such a view was overly optimistic in terms of investment plans.

The myth of the self-funding services. Contracts were based on the principle of full cost recovery, or, in other words, the idea that the development of services can be based solely on funds raised through consumer billing. However, this approach has never worked, even in developed countries like France, where the generalization of services was made possible by massive intervention on the part of the government. In a country like Argentina, the principle is impossible to apply due to the amount of investment required and a shortfall in social pricing mechanisms.

The lack of efficiency and competences of regulation bodies. Regulatory bodies were unable to act efficiently for two reasons: they were set up late in the delegation process or in an improvised manner and their employees, often chosen first and foremost on grounds of their political affinity, lacked experience and/or competency. The regulators too often fell victim to an asymmetry of information. Sometimes they were even ignored altogether, with fundamental questions directly debated between operators and politicians (Chama et al. 1996).

Shortcomings in regulatory frameworks. Like the bodies responsible for ensuring that they were respected, the regulatory frameworks themselves suffered from serious drawbacks. These frameworks were incomplete (justifications for changes in pricing were not offered, methodologies and procedures for calculating water pressure were not outlined); weak (operators were able to appeal to administrative bodies concerning sanctions applied to them, a fact that neutralized expected effects); nonexistent (no mechanism was created to compensate for asymmetries of information); or unsuited to the context (the creation of sub-concessions capable of meeting development needs was rendered effectively impossible by the operators) (Lentini 2007; BID 1997; Castro 2002).

Naïve contracts. Contracts were characterized by a high level of naïveté in terms of clauses applicable in cases of major economic crises. The mechanism used to modify contracts in the case of macroeconomic crises was developed to protect operators; however, the financial effect of such crises on the paying public was not taken into account. In fact, since the mechanism implied a substantial price hike, it proved inapplicable from a political standpoint.

A final series of internal factors is directly linked to the companies providing services.

Technical deficiencies. Certain technical deficiencies on the part of the operators directly affected the quality of the services provided. Thus, problems with water quality in the province of Buenos Aires and Tucumán were caused by issues both known to and relatively well managed by preceding public sector organizations. The inability of the newly installed operators to anticipate these problems or to deal effectively with their consequences highlights their lack of knowledge about the services for which they were responsible. Negative reaction on the part of local society (users and politicians) to such shortcomings was exacerbated by the fact that the companies claimed to be specialists in the field.

Operators' high-debt strategy. Operators applied an excessively debt-laden strategy based on foreign currency. This was extremely risky in view of the characteristics of the Argentinian economy and the conditions created by the introduction of parity with the U.S. dollar in the mid-1990s. Debt levels led to a particularly critical situation after the financial crisis of late 2001. For example, Aguas Argentinas' financial debt (93 % of which was in foreign currency) was 2.4 times the equity of the company (Lentini 2008).

Operators' communication strategies. Especially in Tucumán, operators' communication strategies regarding problems such as water quality and rising prices were either defensive or inadequate. By veering too far from core business, Aguas Argentinas' numerous communication campaigns in Buenos Aires, focusing notably on the protection of the environment, left the company exposed.

8.6 Regulatory Bodies Continue but with Diminished Powers

The idea of setting up a specific body for regulatory purposes emerged in Argentina alongside the privatization of public utilities. When those services were returned to the public sector, there was a general belief that a regulatory framework was no longer as necessary as it once had been. This approach was aggravated by the fact that users often thought regulatory bodies had failed to fulfill their role. The debate on whether or not to keep these agencies was resolved by the fact that, from the conceptual point of view and in regard to international experience, regulation by an independent body was justified. In the case of Aguas Argentinas, regulation made it possible to develop social tariffs (lower bills for low-income users as defined by certain specific criteria), regulatory accounting (a plan and manual of accounts for the economic transactions of the lender with a specific breakdown designed to improve transparency and facilitate monitoring processes), and benchmarking (evaluation of performance by comparison indicators with comparable services).

Even though they outlived the international consortia, the regulatory bodies are faced with a lack of financial resources. They receive a percentage of prices levied, which, in most cases, has not been pegged to inflation since the crisis of 2001. In Buenos Aires, splitting the ETOSS into two bodies has created additional administrative costs, highlighting problems with funding.

Moreover, because consumer billing is not the main source of funding for the services provided (which are partially financed by the federal or provincial government), regulatory bodies have been deprived of one of their main areas of responsibility: defining/calculating prices. Assuming the role of financier, the government (either national or provincial, depending on the concession) becomes the operator's main point of reference to the detriment of regulatory bodies, which inevitably become marginalized.

8.7 Priorities and Pragmatic Solutions

During the decade of privatization, improvements to the management of services were made in the technical, administrative, financial, commercial, and strategic fields. The depth of the change was proportional to the length of time the consortia managed the concessions. Overall, this new management culture survived the withdrawal of various groups, and changes in operators did not significantly affect organizational structure, technical and administrative procedures, or changes in personnel.

Beyond these imported practices, the experience accrued made it possible for these international consortia and local managers to gradually develop a greater degree of realism with regard to practical problems and an approach to prioritizing objectives that was originally lacking. Certain objectives were revealed to be unrealistic within the framework of a viable approach to the service. Changes in approaches to funding have made it possible to extend services in a context in which, due to the low incomes of users, it would otherwise have been impossible (Botton and de Gouvello 2008). The cancelation of a number of overly ambitious investment programs can be interpreted as part of this ongoing reappraisal of priorities. Lastly, certain service standards were relaxed (water pressure, the level of effluent treatment), reflecting the need for a group of actors to learn how to manage and rationally plan services more in line with local realities and possibilities.[12] The implementation of the "Agua + Trabajo" (Water + Work) plan (AySA 2009; Suez Environnement 2005) in 2004, which became the primary means of extending the networks, reflected new international governance approaches to providing water to very low income groups. The plan, designed to guarantee water access to the roughly two million people not yet connected to a network by installing new infrastructure, was jointly put into action by city councils, resident cooperatives, unions, and operators.

8.8 The Reaffirmation of the Role of Local Actors

The period during which concessions were awarded to private consortia was marked by the gradual reaffirmation of local actors. Generally speaking, municipalities are playing a greater role in decisions concerning the management and extension of services; indeed, they are far more involved in such processes than they were when the system was run by the OSN (Schneier-Madanes 2005a, b). Thus, in the case of Buenos Aires, while municipalities in the suburbs were not

[12] It should be recognized that these adjustments also reflected a slightly opportunistic attitude on the part of operators in terms of increasing profitability.

directly represented in the ETOSS, the new regulatory agency (ERAS) includes a commission with three representatives for the suburban municipalities[13] and AySA itself has a mayor of a Buenos Aires suburb on its board of directors.

Social movements and consumer associations also are playing a more important role. The withdrawal of international consortia has not curtailed this trend. In Buenos Aires, for example, the participation of users in the process was strengthened, notably in terms of the ERAS, by the introduction of a law instituting a specific representative commission for consumers defending the rights of paying customers.

The practice of inviting international consortia to run water and sanitation concessions, which had been lauded as a model worthy of emulation before it foundered, is no longer popular in Argentina or on the international scene. Nevertheless, new actors emerged or strengthened their position among service providers (local public enterprises, cooperatives, etc.); more actors became involved in the management of services (permanently established regulatory bodies, the involvement of town halls and consumer associations); and certain approaches to management compatible with the local context emerged.

Thus the albeit curtailed period of privatization, with Argentina leading the charge, encouraged the development of a more effective approach to the provision of water and sanitation services, regardless of the management model: efficiency, patrimonial management, rights of access to water, operator oversight, and social monitoring of a public service (Coing 2006). Nevertheless, it would be an exaggeration to say that the period witnessed the emergence of a new, well-defined model.

During this time of private management, a general cost-based principle was applied to prices. This approach ran counter to the way in which prices traditionally and politically had been set. However, for a variety of reasons, in this new phase of management, the principle was gradually abandoned: specific subsidies for poorer households did not accompany price increases, prompting the public to question the legitimacy of the principle of cost recovery, and the government's general policy was to avoid raising prices, opting instead to cover deficits using subsidies from the public purse. This decision led to a high degree of dependency on national public funding, an economic model that was by no means guaranteed to survive in the long term. The weaknesses of the legal and institutional framework for regulatory and oversight bodies and problems of transparency threatened the possibility of providing support for services on a long-term basis.

But what really changed in Argentina was the conception of water: it has gradually become a major political issue with both social and environmental implications.

[13] A consultative commission is also planned for the APLA. The commission will be made up of a representative from each municipality, plus a representative of AySA.

References

Agua y Saneamientos Argentinos (AYSA) (2009) Plan Aguas más trabajo, Buenos Aires. Presidencia de la Nación Argentina

Botton S, de Gouvello B (2008) Water and sanitation in the Buenos Aires metropolitan region: fragmented markets, splintering effects. Geoforum 39:1859–1870

Banco Interamericano de Desarrollo (1997) Argentina: el proceso de transformación del sector de agua potable y saneamiento. Documento de discusión, Washington, 155 p

Castro E (ed) (2002) PRINWASS Programme "Barriers and Conditions for the Involvement of Private Capital and Enterprise in Water Supply and Sanitation in Latin America and Africa: Seeking Economic, Social, and Environnemental Sustainability", European Commission, Fifth Framework Programme 1998–2002

Chama R, Lentini E, Barabino R et al (1996) Argentina: El proceso de transformación del sector de agua potable y saneamiento, BID (Banco Interamericano de Desarrollo), Departamento Regional de Operaciones 2, 179 p

Coing H (2006) Revenir à la régie … ou inventer de nouvelles formes de gestion publique et collective ? L'expérience latino-américaine, La Pensée, no 348, octobre-décembre 2006, pp 49–56

de Gouvello B (2001a) Les services d'eau et d'assainissement en Argentine à l'heure néolibérale. La mondialisation des 'modèles' à l'épreuve du territoire, L'Harmattan, 240 p

de Gouvello B (2001b) La concession des services d'eau potable et d'assainissement de la province de Buenos Aires: le cas AZURIX. In: Lorrain D (ed) Retour d'expériences: 7 cas de gestion déléguée à l'étranger. Ministère de la Recherche, ACI Villes, Paris, 19 p

de Gouvello B, Fournier JM (2002) Résistances locales aux privatisations des services de l'eau. Les cas de Tucumán (Argentine) et Cochabamba (Bolivie). Autrepart, no 21, IRD, Paris, pp 69–82

Defensor del Pueblo de la Nación (2003) Régimen Nacional de Servicios Publicos, Proyecto de Ley y Anexos. Buenos Aires, 63 p

de Obras y Servicios Sanitarios (ETOSS) (2001) Programa de tarifa social. ETOSS, Buenos Aires

Ducci J (2007) Salida de operadores privados internacionales de agua en América Latina. BID (Banco Interamericano de Desarrollo), Washington, DC, 172 p

Ferro G (2001) Aguas del Aconquija: revisión a una experiencia fallida de privatización, Universitaria Argentina de la Empresa/Centro de Estudios Económicos de la Regulación, Serie de Textos de Discusión no 26, Buenos Aires, 53 p

Guasch JL (2004) Granting and renegociating infrastructure concessions. Doing it right? World Bank Institute, Development Studies, Washington, DC

ICSID (2000) Compañia Aguas del Aconquija, S.A. et Compagnie Générale des Eaux demandantes c/Republica Argentina, demandada. Laudo, Washington, DC, 43 p

ICSID (2005) Aguas Argentinas S.A., Suez, Sociedad General de Aguas de Barcelona S.A., Vivendi Universal S.A., claimants, The Repubklic of Argentina, respondent, Arbitration under the rules of the United Nations Commission on International Trade Law, Claimants Memorial, Washington, DC, 235 p

Jouravlev A and Valenzuela S (2007) Servicios urbanos de agua potable y alcantarillado en Chile: factores determinantes del desempeño, LC/L.2727-P, abril de 2007, Serie Recursos Naturales e Infraestructura no 123, CEPAL

Lentini E (2004) La regulación de los servicios de agua y saneamiento: el caso de la concesión de Buenos Aires. Revista de Gestión del Agua da América Latina (REGA), vol 1 – no 2 – Jul./Diz

Lentini E (2007) Conflictos de la empresa prestadora con las prácticas regulatorias de los servicios de agua y alcantarillado y su impacto en la pobreza. El caso de la Concesión del Área Metropolitana de Buenos Aires. In: Yañez Fuenzalida N and Orellana R (eds) Servicios de Agua Potable, Regulación y Pobreza. Proyecto Visión Social del Agua de los Andes, Agua Sustentable y International Development Research Centre

Lentini E (2008) Servicios de agua potable y saneamiento. Lecciones de experiencias relevantes, Mimeo, Buenos Aires (in press, CEPAL, Santiago de Chile), 94 p

Ordoqui Urcelay MB (2007) Servicios de agua potable y alcantarillado en la ciudad de Buenos Aires, Argentina: factores determinantes de la sustentabilidad y el desempeño, vol 126, Recursos Naturales e Infraestructura. CEPAL, Santiago de Chile, 76 p

Schneier-Madanes G (2001) La construction des catégories du service public dans un pays émergent: la concession de Buenos Aires. Flux, no 44–45, Dérégulation, état des lieux, sept., Paris, pp 46–63

Schneier-Madanes G (ed) (2005a) Gestion métropolitaine de l'eau : le cas de la région de Buenos Aires. Privatisation et défis pour la gestion et contrôle. Programme ECOS-*Sud* /SEcyt. France/Argentine. CREDAL/IHEAL, Ecole Nationale des travaux Publics de l'Etat, Université Toulouse I, FLACSO Facultad Latinoamericana de Ciencias Sociales et Universités de Buenos Aires et General Sarmiento (Argentine), Paris/Buenos Aires

Schneier-Madanes G (2005b) Conflicts and the rise of users' participation in the Buenos Aires water supply concession. In: Coutard O, Hanley R, Zimmerman R (eds) Sustaining urban networks. Routledge, London/New York, pp 151–171

Schneier-Madanes G, de Gouvello B (ed) (2003) Eaux et Réseaux: les défis de la mondialisation, Editions de l'IHEAL – La Documentation Française, collection "Travaux et Mémoires", Paris, 346 p

Solanes M, Jourvalev A (2005) Integrando economía, legislación y administración en la gestión del agua en América Latina y el Caribe. CEPAL, Serie Recursos Naturales e Infraestructura, Santiago de Chile, 73 p

Suez Environnement (2005) Agua mas trabajo. Buenos Aires. Available in www.suez-environnement.com

Transparency International (2004) Rapport mondial sur la corruption 2004. Karthala, Paris

Chapter 9
Urban Water in the Post-Network Era: Lebanon and the Former East Germany

Cécile Féré and Franck Scherrer

9.1 Water Services in Lebanon and the Former East Germany: A Twofold Contradiction

Over the past 30 years, while models for the spatial management of both water resources and urban water services have been undergoing rapid globalization, the major public and private players in the water sector appear to have been suffering from a certain kind of amnesia. First, they seem to have forgotten the historicity of the collective, and, more specifically, national establishment of instruments for governing urban services (Lorrain 1995). The canonical model of networked universal service was indeed built over several centuries, with national variations unique to each developed country and the specific historical context of industrial economic development. The model resolved the issue of social and territorial equality of access to an essential commodity through the adoption of a facilities subvention strategy subsidized by a combination of a natural monopoly and voluntarism. Second, once this all-networked system appeared in the major developed countries, the issue of access to services logically took precedence over that of the installation of network facilities, prompting changes in economic, social, environmental, and territorial regulatory methods to suit the new state of affairs. This amnesia had the effect of transforming what began as a mere adaptation of an acquired model into a globalized demand for good sustainable management in countries and cities, dismissing the practical details relating to transfers, learning,

C. Féré (✉)
Institut d'Urbanisme de Lyon, Agence d'Urbanisme pour le Développement de l'Agglomération Lyonnaise, 18 Rue du Lac, BP 3129, Lyon 69402, France
e-mail: cecile.fere@urbalyon.org

F. Scherrer
Institut d'Urbanisme, Université de Montréal, 2940 Chemin Côte-Ste-Catherine, Montréal, Québec H3C3J7, Canada
e-mail: franck.scherrer@umontreal.ca

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_9,

and integration between exported and in situ models (Coing 1996; de Gouvello 2001; Dorier-Aprill and Jaglin 2002).

This demand is now at the crossroads of a twofold contradiction. The first aspect of this, which has prevailed since the 1980s, opposes the cognitive and normative dimensions of the proposed development model. In spite of a vision still marked by the notion of a completed network, new norms have been established: the dissociation of infrastructure management from service management by proposing a more integrated approach towards commodity or resource access; recourse to delegated management for its administrative efficiency; complete cost recovery to give users a sense of responsibility in their behavior as consumers; etc. Yet, this dissociation between the technical paradigm and the management norm implicitly presupposes that access to networked urban services will never be socially and territorially universal.

The second contradiction, which has now taken precedence over the first, lies in the new short water channel technicist paradigm (rainwater harvesting, autonomous wastewater treatment, etc.) and the co-production of services by users. These solutions are deemed more flexible and eco-friendly than the old communal networks of developed countries and are now promoted as the answer to overcoming the incompleteness or unsuitability of the universal network. This promotion of a new "post-network" technicist paradigm is taking place without urban water experts questioning themselves on a reversal of values, in which the absence of a network connection—formerly a sign of social or territorial archaism—is now the ultimate symbol of sustainable urban water.

Examples of this can be found in two urban situations that are facing the contradictory demands of the sustainable management of networked urban services. The first concerns Lebanese towns, casualties in the history of the completion of the canonical model, and the second involves towns of the former East Germany, where the acquired network model is too taxing and burdensome. Although both examples represent borderline cases with respect to the usual situations encountered depending on a country's level of development, in the past networked urban services have indeed evolved starting around the margins (Lorrain 2002). The case of Lebanese towns notably illustrates the first of the contradictory demands. The widespread application of the universal networking model over several centuries was interrupted by civil war. Thanks to reconstruction efforts led by the Council for Development and Reconstruction (CDR) after 1990, the facilities provision strategy was initially resumed—even though the canonical model of network completion was no longer anything but an unrealistic ambition—before attempts by today's international standards of "good management" to overtake it.

In the case of the small and middle-sized towns of the new German Länder (the old countries of the German Democratic Republic), plagued by substantial economic and demographic decline since the late 1990s and especially the early 2000s, the second of the contradictory demands may potentially be rather harsh. While these towns sink deeper into a financial crisis in which rising fixed costs for networked infrastructures are met with falling water consumption, the prevailing

discourse of urban experts hails this situation as an opportunity to proceed directly to the "post-network" world of individual or semi-communal solutions for thrifty, cautious, and responsible management of the urban water cycle. In either case, the terms of the twofold contradiction have only just been outlined, and the scope of the results is more heuristic than demonstrative.

9.2 Reasons for the Success of the All-Networked Model

To measure the major public and private players' collective amnesia about the historical conditions that were conducive to the development of networked urban water services, one must return briefly to the universal model of networked urban services. Generally, the well-known terms of this model include the driving force of economies of scale and the shared belief in the capacity of new technologies to bring about social changes (Musso 2003)—reasons why the networked facilities strategy was long considered an integrative solution.

In one particular historical and geopolitical context, namely a world that was dominated by the European and American industrial powers of the nineteenth and twentieth centuries, the widespread establishment and development of urban water service networks benefited from circumstances that would hardly have been reproducible elsewhere or in another era. In the nineteenth century, drinking water and wastewater treatment networks were initially developed in the highly centralized and dense parts of the major capitals and then in the major cities of Europe and North America, ensuring a balance between a supply of highly capitalist facilities and a solvent social demand (Offner 1993; Lorrain 2002).

A strong constraint was imposed on the earliest network development through the amount of fixed capital immobilization and the length of the period of return on investment (Lorrain 1995). From this initial development, which was financed by either the public or private sector and gave rise to a social demand for mass access to water, widespread service became available thanks to the establishment of public monopolies. The economies of scale that were generated as the monopoly-owned networks developed—through standardization and interconnections—enabled a reduction in access and development costs, albeit in a more restrained manner in the water sector than in the transport or telecommunications sectors. The widespread installation of facilities in the outskirts of cities, however, took place over a very long period of time, often spanning several centuries (Scherrer 1997). In some countries, notably France, the seemingly endless installation of networked facilities in outskirt regions has become not just the means but the very aim of town planning policy; the single act of providing all areas of the country with pipes, railway lines, or motorways fulfills both fundamental requirements of the French concept of public service (Coing 1997), namely social cohesion and economic modernization.

This extraordinarily powerful town planning and development method more or less ceased to work at the end of the postwar economic boom, both in countries where the all-networked system was highly developed and in those that were only

partially equipped (Schneier-Madanes and Petitet 2005). The era of providing facilities for provision's sake is over: both economies of scale and the shared belief in progress—the two main driving forces behind the all-networked model—are no longer relevant today. Instead, costs that are neither compressible nor transferable to future generations are what count. Today's regulatory strategy, be it environmental (as characterized by rising standards in areas such as pollution) or economic and social, presumes a certain number of financial choices that reflect strong tensions in the triangle of requirements of sustainable development (Barraque 1998).

9.2.1 First Possible Option: Delegating Trade-Off Decision Making

As the costs of managing networks grew overwhelming, the public monopoly mold, which is no longer interesting or profitable from a political point of view, effectively became obsolete at the turn of the 1980s. One political solution that is more or less a necessity is ultimately to get rid of the problem and delegate the management of service access to the private sector. This solution offers two advantages: that of benefiting from an aura of management efficiency and the possibility of delegating—symbolically at least—the painful responsibility of having to choose between economic, social, and environmental regulation. However, this is not just a simple matter of changing management modes and the public-private relationship. Layer by layer, the integrated system of the all-networked model is unbundled in terms of its basic functions and strategies to externalize transaction and self-regulation costs; various profit contribution levels are carefully tiered from that of minimum or essential service, whereby cost-effectiveness is achieved through an equalization fund while regulators part from operators and take charge of the latter.

Among all the critical interpretations that this process has generated in the scientific literature, one particular idea stands out: networked urban services are henceforth caught in a global societal and economic rationale in which the social and territorial forces of dissension are stronger than those of cohesion. Today, we are forced to manage these networks with scarce funds and make a certain number of choices that are not necessarily popular. This theory is similar to one proposed by Stephen Graham and Simon Marvin (Graham and Marvin 2001), who upheld the notion of the end of networked public services as an integrated, integrative, and universal-standard model of access to urban society. They posited that this model is no longer valid today because of the effect of liberalization strategies on the management of such services and the emergence of new alternative technologies. New regulatory models instead tend to favor the spatial and social differentiation of services, which is reinforced by the interaction between supply and demand. Such differentiation makes it possible to implement "by-pass" strategies, reflecting the ability of "premium network spaces" (Graham and Marvin 2001), or rich and

powerful users, to obtain high-end service and quality by exiting the universal network, leaving the latter to the working and middle classes. Thus, the unbundling of networks now entails a type of urban fragmentation known as splintering urbanism.

As most urban spaces of developed countries have been well equipped in the last 10 or 20 years and are even locally saturated in terms of infrastructure, the solution to new issues can no longer depend on the ad libitum reinforcement of the morphological system. The solution instead lies in two options that differ in terms of network doctrine. The first of these requires an alternative means of managing the existing stock of infrastructure and relates to the previous development. The second option presents itself as a technological challenge: that of substituting the all-networked system with a new technical paradigm, provisionally referred to here as the all-flexible model.

9.2.2 Second Option: The New Technical Paradigm, the All-Flexible Model

The all-flexible option is much less theorized than the previous one, as it lies more at the heart of the black box of urban engineering, which is rarely explored in the social sciences. The first element of this change in technological paradigm is based on a disconnection, which is already well under way, between a technical-economic optimum and economies of scale. The growth of flows enabled by the interconnection and industrialization of service no longer allows us to obtain the same marginal gains ever since the primary facilities provision market came to an end with the distribution of networked urban services among diffusely occupied areas. In view of the necessity for regulation in an uncertain market, the flexibility offered by short supply and demand channels appears to be the ideal solution, with the possibility of substituting the long cycle of economies of scale with the short cycle of subsidiarity (Prost and Le Gaufre 1997). The civic requirement of subsidiarity—that is, to provide services as close as possible to reasonably sized areas—replaces the historical combination of the all-networked model with another combination, namely that of a close familiar territory (eco-neighborhoods, or even small sectors or houses) and participative democracy around a new utopian concept of collective action: sustainable development.

The second fundamental element of the all-flexible model is to systematically encourage users to participate in the process of producing services, especially through changes in their behavior. All of today's flourishing short channels—waste sorting, in situ rainwater harvesting, private wastewater treatment, self-sharing, self-production of energy, etc.—can only work on the principle known as co-production of public services. As it happens, in Europe at least, the rise in popularity of co-production was concomitant with the growing need for sustainable development. This relationship has hitherto allowed us to dismiss any debate about

this new technical-economic paradigm that is the "all-flexible" model, which is eco-friendly and agrees with the values of the dominant social classes. In northern Europe, the development of short channels and service co-production within this new all-flexible paradigm has found ideological cement within the technical and advocacy sphere of urban expertise. It has done so by reaching into the old well of ecological ideas to draw out the reference to the autarkic development of micro-communities, a vision that tends to be disseminated in a lighter version that is more compatible with liberalism in all the public and private circuits promoting sustainable towns or habitations.

Is socio-technical autarky becoming the new teleological outlook of urban action by replacing the collectivist figure of the completed network? Such a hypothesis is probably premature. We could begin by considering the possibility of a transition period of varying length towards a new technical paradigm of urban water services, where a dichotomy continues to exist between the persistence of the cognitive all-networked model and the practical organizational methods of urban services that are becoming increasingly different from the latter (Coutard and Le Bris 2008). The example of Lebanon, whose situation lies between those of the former industrialized nations and emerging nations, will serve to illustrate this hypothesis. In another case, that of the shrinking towns of the former East Germany, the autarkic paradigm presents itself first and foremost as the technical rationalization of an unprecedented situation in urban collective action and urban development planning.

9.3 The Urban Water Network in Lebanon: The Hidden Outlook of Incompleteness

Lebanon is often considered unique because of the civil war (1975–1991) that greatly damaged its urban services. The case illustrates the impossibility of saving the henceforth mythical universal network model in a difficult socioeconomic context where public authorities are unable to provide the country with facilities, notably because of its debt levels. Negotiations involving the sector, ranging from the delegation to the development of service co-production, are at the very heart of water reforms.[1]

Heavy investments were made during the reconstruction period to repair and upgrade the country's infrastructure, especially energy, roads, and telecommunications. Yet, Lebanon still remains marked by a proliferation of technical and territorial

[1] Research carried out under the supervision of Franck Scherrer for the Rhône-Alpes Region (MIRA program) on networked urban services in Lebanese towns. Research on the electricity sector and the state of urban services in the Koura district and Tripoli was carried out by Eric Verdeil and Cécile Féré between 2005 and 2007.

accessibilities to urban services involving the de facto co-production of services by users. On one hand, the networked urban services in Lebanese towns were heavily disrupted by the conflict, both in terms of infrastructure and regulatory structures as well as demand, usage, and perceptions, notably because of population movements that gave rise to a geographical reconfiguration and confessional[2] homogenization (Verdeil 2008). The management authorities of urban services, overwhelmed by the extent of the damage and the rate of urban growth, failed to adapt their networks to the new demand. Dysfunctions in urban services then led users to develop alternative solutions, ranging from individual strategies (stocking water in tanks, private boring) to collective and commercial strategies that progressively appeared (selling water from tankers). The result was the development of an informal water and electricity sector. Major fraud that included loosening of gauges, illegal wells, and unpaid bills also developed due to government bankruptcy. Illegal practices have been estimated at 50 % at the national level.

On the other hand, the sums invested to upgrade the infrastructure of networked water and electricity services—to which a quarter of total investments were allocated—were unevenly distributed across the country, thereby reinforcing socio-territorial inequalities, especially between Beirut and the rest of the country, or urban and rural areas. As a result, service levels in the drinking water sector have varied according to location. The geography of these deficiencies can be measured at all levels: national, regional, local, or even intra-urban. In North Lebanon, the amount of water available per inhabitant in 2002 varied from one district to the next, ranging between 35 and 292 liters per inhabitant per day; in the Koura district located in northern Lebanon, only 65 % of the territory is covered by the water network, with the majority of urban sprawls being unconnected. Users also face technical problems: under-equipped networks, intermittent distribution, resource variability that depends on the season, poor water quality, etc. A very attractive private water market thus has been developed around the production and distribution of running water. As such, half the inhabitants of North Lebanon rely on two running water supply sources, and a quarter relies on three such sources (IPSOS-ICEA 2004).

The extreme variations in the conditions of access and service levels offered by the management authorities has led to the development of various means of accessing running water, ranging from public services to alternative paid or free practices, and illegal practices inherited from customs that were prevalent during the conflict (Féré 2006). Precarious self-reliant solutions that were initially implemented to cope with network dysfunctions eventually turned into strategies in finance (by adjusting consumption to incite competition between public services and the private sector), empowerment (by leaving the network and establishing private and autonomous urban services), and network bypassing, all of which are

[2] Lebanon is a confessional and parliamentary democracy, which represents the 18 religious groups in government.

strategies acquired from clientelist and confessional[3] practices. These bypass practices illustrate the introduction of different service levels among users: one corresponding to the demand for a customized offer or unbundling diversification (Jaglin 2005), and the other to precarious adaptations in response to faltering public services. Reforms of the 2000s attempted to shore up these services to save the universal model.

The country's extremely high level of debt, a significant portion of which is attributed to urban services, has indeed accounted for the adoption of structural reforms in urban services management since the 1990s. Water reforms that were approved in 2000 were mainly inspired by the World Bank and the Agence Française de Développement (AFD), but their implementation has been slow and difficult. The challenge of the reforms is to improve the technical and economic performance of the production and distribution of services, ideally with the aim of completing the all-networked system. The introduction of a decentralized water administration that began in the 1950s was disrupted by the civil war. After the conflict, there were 21 water authorities and many local committees. During the reconstruction period, this administrative management of water was denounced in reports written by the ministries in charge of water management and by international players involved in the reform project and the promotion of an integrated model, presented as a miracle solution to the difficulties faced by the sector. Institutional reorganization was established in 2000 by Water Act No. 221, which was the subject of many amendments. It proposed to regionalize water management by merging the 21 water authorities into four establishments (Ghiotti and Barakat 2006), each with strengthened competences and the responsibility over the entire water chain, from the planning and management of regional projects (previously the ministry's responsibility) to wastewater management (previously a municipal responsibility), thereby going against the institutional decentralization movement. In addition to integrated management, the water establishments were asked to integrate the principle of full cost recovery. However, the merger between authorities only took place in 2005; since then the new establishments have faced mounting financial, organizational, and political difficulties inherited from the former authorities and the previous political organization (Féré 2006).

Finally, the bypass or do-it-yourself systems that already exist render the discourse on giving users a greater sense of responsibility more or less invalid, as users are already called upon to rely heavily on themselves as a result of dysfunctions in urban services, as illustrated by double water and electricity bills. In view of this management dead end and despite the Lebanese municipalities' expectations of the collective model, the short water channel is becoming a solution, one that is notably promoted by the North Lebanon Water Authority. The authority is overwhelmed by its new responsibility in the area of wastewater management and is supported by the Rhône-Alpes[4] actors of decentralized cooperation in a situation of competition

[3] Based on clan or confessional patronage, due to war heritages.

[4] A region in southeastern France.

between management models. During a 2006 consultation with the resource-lacking municipalities of North Lebanon, the Urban Community of Lyon and the Rhône-Alpes[5] promoted the implementation of private wastewater treatment systems, even though such service co-production has long been a daily affair for these administrators.

The case of Lebanon demonstrates the complexity of a situation in which networked urban services have remained incomplete and where the desire to save this system is impeded by the economic situation of the country and its users. This gap between the desire to save an ideal model with a full cost recovery approach and the fact that users already are engaged in a de facto service co-production illustrates the dead-end in which the collective model of networked urban services finds itself today. The gap also contributes to the difficult implementation of water reforms. In such a context, the promotion of a short water channel might be a ready-made solution that could bring us closer to a new autarkic paradigm of urban collective action.

9.4 Urban Water Services in Shrinking Towns: Crisis of the All-Network Model or Crisis in Urban Action?

The study of a borderline urban development situation in Europe, that of the shrinking towns of the new German Länder, heirs of the German Democratic Republic (GDR), provides a window onto the changing situation of highly constrained networked urban services that could help us better understand the true nature of this change in the universal model.[6] Many developed countries are faced with this phenomenon of urban decline that, while not a new occurrence in the history of towns, nonetheless forces us to reconsider the classical concepts of urban development founded on a rationale of growth, especially in the universal model of networked urban services.

The case of the shrinking towns of the new German Länder combines a drastic decrease in the consumption of urban water services and the rise of a new way of thinking and acting, namely the co-production of services. Since 1989 and especially after 2000, the German reunification, profound deindustrialization, and the continuous migration of the young working population toward the western region of Germany have caused the former GDR regions and towns to shrink. This decrease is characterized by various geographical and migratory phenomena, and among all the typological analyses conducted in Germany to measure and characterize urban

[5] French local actors, and especially the Urban Community of Lyon and the Rhône-Alpes Region, has been invested in North Lebanon, while the U.S. Agency for International Development (USAID) has been invested in South Lebanon to experiment with and promote water reform.

[6] Research carried out for the Plan Urbain Construction Aménagement, under the scientific supervision of Marcus Zepf and Franck Scherrer (Zepf et al. 2008).

shrinkage, two classes that are particularly affected stand out: the middle-sized East German towns that are experiencing a double decline, demographically and economically (about −10 % in the population and −20 % in jobs between 1995 and 2002), and various-sized towns that combine these same critical factors with a high level of aging (33 % over 65) (Pohlan and Wixforth 2005). While this phenomenon is particularly pronounced in East Germany, it also affects some old industrial areas of West Germany such as the Ruhr.

To properly understand the way in which urban decline affects the all-networked model, one must conduct a two-step analysis of the socio-spatial, and, in particular, political development of East German towns since reunification. First, up until 2000, great efforts were made to install and upgrade urban infrastructure to meet new standards. This arose partly from peri-urbanization, which was a new and intense phenomenon taking place around large East German towns that automatically led to an extension of water distribution and wastewater treatment networks. It was also the result of a town planning policy based on the doctrine of bringing facilities and access to urban services in the new Länder back up to former standards. From the 1990s onwards, almost 50 billion euros were invested in the water networks of former East German towns. In Leipzig, the length of water pipes increased from 2,053 km in 1990 to 2,939 km in 2002, nearly a 50 % spike. Meanwhile, population numbers fell drastically. Second, this belated improvement of the universal model, worthy of the postwar economic boom, also has contributed to the price scissors between supply and demand. The first diagnosis made in German public debate has identified a technical problem: over-provision in networks, which, depending on the type of pipes, their lifespan, and the rate of population loss, is estimated by some experts at 10–70 %. This over-provision is directly associated with sanitary problems in pipes distributing potable water as well as those carrying wastewater, thereby requiring additional treatments that come at a cost.

Even so, the financial crisis is essentially linked to indirect costs. The underutilization of recently extended and modernized networks entails an increase in the fixed cost-revenue ratio because in a context of demographic and economic decline, revenues have indeed been plummeting. The increase in fixed costs, which may represent up to 80 % of global costs today, leads to an increase in the expenses that must be borne by users. Those users are becoming less and less solvent, as most solvent households have moved elsewhere.

In view of the need to invest in the urban water sector—globally managed by an extremely diverse mosaic of businesses with municipal public status—and owing to town budget deficits, the participation of private businesses in the water sector has become an unavoidable subject in urban management. Major representation of private businesses in the water sector is still rare, but its progression is undeniable, as is that of a new private sector-inspired management mode that integrates the criteria of efficiency and full cost recovery with the operating style of public water distribution and wastewater treatment firms. The spatial method of developing and delegating services in new Länder towns may well create new disparities on top of those resulting from shrinkage (Bernt and Naumann 2006).

Urban decline has moved higher up on the agenda of German public policy as one of the top priority issues both in terms of town planning and the urban social crisis, mutatis mutandis, like the crisis in the French suburbs. In 2001, the federal government created an important public action program called the Stadtumbau Ost (Urban Redevelopment East), with the aim of improving the economic and residential attractiveness of the new Länder, creating and maintaining jobs, and strengthening ties between inhabitants and their towns. The core constituent of this program involved communal housing neighborhoods. Towns with high vacancy rates may benefit from subsidies for demolishing buildings or even entire neighborhoods or town areas. However, up to now, this program has only contributed financial resources for the destruction of empty buildings and none for funding the consequences of such destruction on the other functional elements of shrinking cities, especially networked urban services. And yet, such large-scale destruction creates additional problems for networks, including aggravating the problem of over-provision, abandoning or destroying parts of networks, etc.

9.5 An All-Flexible Paradigm: The Debate

All of these seemingly objective descriptions of the impact of urban decline on the disorganization of networked urban services are proof of the development of a new way of thinking and acting in the field of urban expertise. All of the current rhetoric on this problem, the extent of which was unexpected, points to the necessity of overcoming it by abandoning the faded splendor of the outdated all-networked model. According to the vox technica, shrinking towns are a new challenge: most players perceive such shrinkage as a problem because it calls into question the fundamental model on which our economic system is based. This challenge can be met by overcoming such an interpretation. All of the experts' reports have one point in common, namely that demographic changes must be perceived as an opportunity to introduce innovative strategies and rethink the water supply and drainage system. The keyword is flexibility: "In the end, the situation gives us greater flexibility for a new start" (Simon 2006). The new dream in engineering and urban planning alike is to implement reversible systems capable of adapting to social and demographic changes.

Thus, management solutions must be exceeded on a day-to-day basis (by reducing costs or re-adapting networks according to socio-spatial changes) to develop more local, semi-decentralized, or decentralized alternatives for replacing networks—in other words, solutions that are essentially autarkic in nature, such as systematic harvesting of rainwater or in situ natural wastewater treatment. The proposals made by M. Koziol, A. Veit, and J. Walther in a 2006 report summed up the compatibility between the new technological paradigm and its associated societal dream: "Up until now, the centralized system as we have always known it did not present any limitations, as it was suited to high densities and strong consumption, which is no longer really the case in East Germany today; the

system's transformation towards alternative forms lies at the heart of the modernization of the water sector and is better adapted to a more sustainable management of water." All of the literature repeats the same mantra: autarkic systems are the solution to the lack of flexibility in networks in view of unprecedented and unpredictable socio-spatial changes. The development of anti-network autarkic technical solutions has long been at the heart of ecological urban expertise (Hahn 1991) and its sociology must now be examined. Presumably, its novelty lies in the fact that this new all-flexible paradigm seems to have found an ecological niche: Will shrinking towns be the laboratory of the post-network era?

The incompleteness of the universal network model, such as that of the Lebanese situation, does not correspond to a fundamental mismatch between the conditions necessary for developing the model and a country's level of urban development. Although accidental in origin, the establishment of a situation of perpetual incompleteness reflects the difference between the cognitive dimension of the Lebanese reconstruction (catching up on lost time, with the mythical objective of network completion) and the reality of a technical and territorial diversity of access to urban water services.

Promoting decentralized and alternative solutions to the communal urban network, however, is probably not the most suitable answer to problems in managing the urban water infrastructure of shrinking towns on the brink of bankruptcy. Yet, German urban expertise holds—almost unanimously—a seemingly consensual view that such a crisis represents an opportunity; the crisis is so deep that it can only force us to come up with new ideas, new organizations, and technical, organizational, and social innovations. In this context, the new post-network solutions contrast with those of the old model, term for term: the decentralized solution versus network savings, the short channel versus interconnections in large technical systems, the help-yourself approach and service co-production versus the collectivist nature of networks. Currently, this new technicist paradigm is more ideological than truly adapted to the fundamental challenges of urban action confronted with such unprecedented territorial situations. In either case, it has yet to be demonstrated that urban water can truly do without the tried-and-tested all-networked model, but the latter's cognitive and normative limitations are becoming increasingly apparent.

References

Barraque B (1998) Les services publics d'eau et d'assainissement face au développement durable. Annales des Ponts et Chaussées 87:24–32

Bernt M, Naumann M (2006) Wenn der Hahn zu bleibt. Wasserversorgung in schrumpfendenStädten. In: Franck S, Gandy M (eds) Hydropolis. Wasser und die Stadt der Moderne. Campus Verlag, Frankfurt am Main/New York, pp 210–228

Coing H (1996) Mimétisme ou métissage? Annales des Ponts et Chaussées 80:58–63

Coing H (1997) La notion de service public. In: Gariépy M, Marié M (eds) Ces réseaux qui nous gouvernent ? L'Harmattan, Paris, pp 233–245

Coutard O, Le Bris C (2008) Les réseaux rattrapés par l'environnement? Développement durable et transformations de l'organisation des services urbains. Flux 74:6–8

de Gouvello B (2001) Les services d'eau et d'assainissement en Argentine à l'heure néolibérale. La mondialisation des "modèles" à l'épreuve du territoire. L'Harmattan, Paris

Dorier-Aprill E, Jaglin S (2002) Gestions urbaines en mutation: du modèle aux arrangements locaux. Autrepart no 21, IRD-Ed de l'Aube, pp 5–15

Féré C (2006) L'accès aux services urbains en réseau dans les villes libanaises: cas d'étude autour de Amioun et Chekka (Liban-Nord). Dissertation for Master's degree Aménagement et urbanisme, Université Lumière Lyon 2, IUL, UMR 5600

Ghiotti S, Barakat L (2006) Quand territorialisation rime avec fragmentation. Les enjeux territoriaux autour de la réforme de la politique de l'eau au Liban. In: Brun A, Lasserre F (eds) Politiques de l'eau. Grands principes et réalités locales. PUQ, Québec, pp 189–222

Graham S, Marvin S (2001) Splintering urbanism: networked infrastructures, technological mobilities and the urban condition. Routledge, London/New York

Hahn E (1991) L'aménagement urbain écologique. Les Annales de le Recherche Urbaine 52:7–20

ICEA, CORAIL, IPSOS (2004) Projet d'appui à la réforme institutionnelle du secteur de l'eau au Liban, rapport no 2: Analyse des résultats des enquêtes socio-économiques, République Libanaise, Ministère de l'Eau et de l'Energie - Ambassade de France au Liban, Service de coopération et d'action culturelle

Jaglin S (2005) Services d'eau en Afrique subsaharienne; la fragmentation urbaine en question. CNRS Editions, Paris

Koziol M, Veit A, Walther J (2006) Transformation der zentralen System unter besondern-Bedingungen der Schrumfung, Stehen wir vor einem Systemwechsel in der Wasserverund-Abwasserentsorgung? Sektorale Randbedingungen und Optionen im stadttechnischen Transformationsprozess, net WORKS paper, no 22, Berlin, pp 92–118

Lorrain D (1995) Gestions urbaines de l'eau. Economica, Paris

Lorrain D (2002) Gig@city, (l'essor des réseaux techniques dans la vie quotidienne). Flux 47:7–19

Musso P (2003) Critique des réseaux. PUF, Paris

Offner JM (1993) Le développement des réseaux techniques: un modèle générique. Flux 13–14:11–18

Pohlan J, Wixforth J (2005) Schrumpfung, Stagnation und Wachstum — Auswirkungen auf städtische Finanzlagen in Deutschland. In: Gestring N (ed) Schwerpunkt: Schrumpfende Städte. VS für Sozialwiss, Wiesbaden, pp 19–47

Prost T, Le Gaufre P (1997) Le génie urbain entre subsidiarité et économie d'échelle. In: Gariépy M, Marié M (eds) Ces réseaux qui nous gouvernent. L'Harmattan, Paris, pp 305–324

Scherrer F (1997) Temps décalés, longue durée. Le prisme des infrastructures. In: Obadia A (coord) Entreprendre la ville: nouvelles temporalités, nouveaux services. Editions de l'Aube, Paris

Schneier-Madanes G, Petitet S (2005) Le 'modèle du réseau' face aux enjeux du développement durable. Economie et humanisme 372:19–24

Simon HW (2006) Flexibler Neuanfang. Stadtumbau birgt neue Chancen für die technische Infrastruktur. EntsorgaMagazin 25(6):16–18, Deutscher Fachverlag, Frankfurt am Main

Verdeil E (2008) Géopolitiques de l'électricité au Machrek. Maghreb Machrek 95:87–106

Zepf M, Scherrer F, Verdeil E et al (2008) Les services urbains en réseau à l'épreuve des villes rétrécissantes: l'évolution des réseaux d'eau et d'assainissement à Berlin-Brandebourg, Rapport PUCA, Lyon, IUG, CNRS, ENS-LSH

Part III
Governance, Conflict, and Participation: Sharing the Resource

Chapter 10
France's Water Policy: The Interest and Limits of River Contracts

Alexandre Brun

10.1 River Contracts and Water Management in France

France tested so-called clean river operations in the early 1970s to more effectively combat industrial, agricultural, and domestic pollution. The goal was to restore surface water quality, mainly by constructing wastewater treatment stations and sewerage networks. In the 1980s, France introduced the river contract, adding flood control and public awareness to pollution control. The decentralization and Europeanization of water policies have encouraged the development of river contracts, but their development is no guarantee of their effectiveness from an environmental standpoint. The state's objective is to respond to European Union (EU) water obligations.

A river contract is an agreement between the state and volunteering local authorities.[1] It includes 5- to 7-year study and works programs, and can be renewed. Through these programs, towns, industrial companies, and farmers can pool their resources and set common objectives at the watershed scale (river, lake).

[1] The decentralization law (1982) created the principle by which local authorities were independent in terms of managing their territory. Local authorities in France are administrative structures, distinct from the state administration, that take care of the interest of residents living in a given territory. The following three levels of government are considered to be local authorities: communes (similar to cities, also referred to in this book as municipalities), départements (departments), and régions (regions). The commune is the lowest administrative division. It is headed by a mayor elected for a 6-year term. The région is the largest local administrative division.

A. Brun (✉)
Université Paul-Valéry (Montpellier 3), Montpellier, France

Acteurs, Ressources et Territoires dans le Développement Art-Dev, UMR 5281, CNRS/Université, Montpellier 3, Montpellier, France

Centre de Recherche en Aménagement et Développement – CRAD, Université de Laval, Québec, Canada
e-mail: alexandre.brun@univ-montp3.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_10,

The results, however, have fallen short of the state's initial objectives because river contracts have focused too much on curative actions, and not on preventive ones.

The state manages rivers, canals, and lakes used by commercial and pleasure boats, but such public water bodies, including the River Seine in Paris or the Rhône in Lyon, represent only a small part of the French river system. Only 20,000 km of waterways are publicly owned, compared with more than 200,000 km that are privately owned. Private water bodies—rivers and lakes that are not navigable—are managed by the landowners who live beside them.

Landowners are obliged to manage rivers flowing through their property and manage their hydraulic structures, such as floodways, dams, and weirs. The aim is to remove obstacles to water flow to prevent flooding. However, riverside landowners—farmers and owners of secondary homes—are less and less inclined to carry out this work, forcing the state to find ways of involving them more effectively.

The other important player in riverside water management is the municipality, which is the lowest administrative division of France. Since 1885, municipalities have been responsible for the organization of drinking water supply and sewerage services. In addition, municipalities often have been obliged to work together in the framework of local authorities to carry out maintenance that should have been done by riverside landowners, in particular in the countryside, where fewer farmers operate than in the past.[2] Aware of the difficulties encountered by municipalities and confronted with increasingly serious pollution problems, the government passed the first Water Act in 1964. The goal was to optimize water management to preserve the quality of water resources and reduce conflicts between upstream and downstream users.

10.2 Advances and Limitations of the 1964 Water Act

The 1964 Water Act created six water authorities: Seine-Normandy, Loire-Brittany, Adour-Garonne, Rhine-Meuse, Rhône-Mediterranean-Corsica, and Artois-Picardy.[3] These water authorities[4] are responsible for charging fees related to the water

[2] According to the French Ministry of Agriculture, the total number of farms was 1.6 million in 1970 and fewer than 600,000 in 2003. The average surface area of the farms is now 70 ha (700,000 m^2) (Source: http://agriculture.gouv.fr/evolution-des-exploitationsconsulted on June 29, 2011).

[3] The area covered by each one of the six authorities does not correspond exactly to watersheds. For example, the Loire-Brittany authority takes care of the Loire watershed as well as coastal rivers in Brittany. See Chap. 2.

[4] Water authorities are state public administrative bodies under the French Ministry of Ecology and Ministry of Finance. They are managed by a board of directors that includes representatives from local authorities, various types of users, the state, and the water authority. The president of the board of directors and the manager of the authority are appointed by the government. *Cf.* Law no. 64-1245 of December 16, 1964, concerning the status and distribution of water and pollution control measures.

consumption and pollution by towns, farmers, and industrial players based on the polluter-consumer-pays principle. Three-quarters of the money obtained from these fees is redistributed in the form of investment, subsidies, or loans in the context of multiannual programs, in which each authority's priorities are defined. The actions of the water authorities represent a major financial lever today,[5] but their environmental impact remains limited (Cour des Comptes 2010).

When the act passed, experts hailed it as a major legislative breakthrough in Europe. The lawmakers emphasized "natural territories" (i.e., basins of the major French rivers) at the expense of the many small administrative areas such as the municipalities (Brun and Lasserre 2006; Ghiotti 2007).

Yet the emergence of river basins as "new territories" in water management did not prompt the state to relieve the municipalities of any of the obligations they had borne since the nineteenth century, including sewerage and drinking water supply. On the other hand, the municipalities were obliged to coordinate their respective local water policies and comply with state regulations in order to benefit from public aid for constructing or modernizing sewage treatment plants and building drinking water treatment plants, distribution networks, and other projects.

French legislation concerning the protection of the environment expanded considerably following the creation of the Ministry of the Environment in 1971. The emergence of the environment on the public scene and the environmental disasters widely publicized by the media explain why the French parliament passed several major pieces of environmental legislation. Some of them concern water and more generally "aquatic environments," (i.e., water as a resource for users but also as a "biological reserve" or "landscape"), according to the Water Framework Directive, or WFD.[6]

The EU also adopted a series of directives and regulations concerning the water sector beginning in the mid-1970s. EU member states had to transpose these into their national laws (quality of bathing water, quality of drinking water, etc.). Unfortunately, the diversification and stiffening of laws and regulations concerning water did not help modify bad practice on the part of users or intensify the involvement of landowners.

To supplement the legislative and regulatory aspects of water policy, the government created a contractual instrument referred to as "clean river operations" during the 1970s. These operations were supposed to be sufficient to meet the water quality targets set by the 1964 act. Dozens of local authorities seized the opportunity these operations presented to implement works that were, at the time, considered as priorities, in particular the fight against urban and industrial pollution.

[5] More than 10 billion euros between 2007 and 2012.

[6] The Water Framework Directive (2000/60) was designed to improve regulation and management of Europe's water resources. See Chap. 3.

10.3 The Origin of River Contracts

Clean river operations were designed to restore neglected rivers and encourage riverside landowners, users, and local authorities to begin managing them again by involving them in a common project. These operations were managed by the different ministries concerned with helping local initiatives. Certain operations sparked the interest of local players when they were launched, but outputs were difficult to quantify (Brun 2010).

In 1981, the government presented the river contracts as the logical follow-on to the clean river operations.[7] Five factors explain why river contracts were introduced:

1. In partnership with the water authorities for which it was responsible, the Ministry of the Environment implemented river contracts to part with public policies that did not sufficiently take into account the specific geographical characteristics of local territories and the economic difficulties facing users. The ministry therefore adopted a more local-based, more participatory, and less restrictive approach than laws and regulations imposed on territories and local stakeholders.
2. It was a way of getting local agencies of the Ministry of Agriculture and the Ministry of Public Works to carry out development programs that would cause less damage to aquatic ecosystems than they had in the past.
3. The state held that these contracts could help compensate for insufficient resources devoted to controlling water users and monitoring aquatic ecosystems.
4. The government wished to encourage mayors in rural areas to ensure farming practices would have less of a negative impact on aquatic environments.
5. The state brought together issues that the lawmakers had separated. Thus, in the framework of a river contract, the issues of water quality and flood risks were combined in an overall approach, while water legislation was still divided into two distinct areas: the restoration of water quality and laws concerning flood risks.

10.4 Objectives and Principles of River Contracts in 1981

At the outset, river contracts had two goals. The first was to rehabilitate the principle of regular watercourse maintenance to make up for the lack of involvement of riverside landowners. The second was to achieve the quality targets fixed by the regulations for certain rivers at the end of the 1960s. The river contract was based on four broad principles: voluntary participation, implementation at the scale of small river basins, solidarity among stakeholders, and simplicity.

The first principle held that a river contract was not obligatory and therefore differed in its very essence from laws and regulations. It was an approach based on the voluntary involvement of local players (Billet 2008). The second principle involved originally devising river contracts at the scale of small river basins.

[7] Circulars of February 5, 1981, and November 12, 1985, relating to the creation of river contracts.

The decision to exclude major river basins, such as the Loire, stemmed from the fact that the state wished to concentrate its resources on territories deemed a priority by the public authorities, where it would be easier to measure environmental improvements on completion of the river contracts.[8] The third principle involved a river basin approach, which would compel local players to renew water governance methods. Local players therefore had to deal with a territory, that of the river basin, that was unfamiliar to them. In preparing action programs at this scale, the municipalities and users realized they were interdependent from one another in terms of water. Solidarity between stakeholders was the condition imposed by the state before it would agree to a project for a river contract.

The fourth principle pertained to mayors and water users, who needed to be able to understand why and how they could become involved in a river contract. For this reason the procedure is a simple one: local stakeholders have to prepare a draft of the contract and submit it to the National Approval Committee (CNA),[9] which is made up of experts based in Paris. The draft contains a brief assessment of the river basin and is followed by proposed measures for each of the issues identified in the assessment, together with a governance method. The river contract is then described in detail—specifying the budget, stakeholders, employer (municipality or group of municipalities that will hire the technical and administrative staff), and river committee—before the CNA finally accepts it. The river committee consists of institutions, associations, mayors, and other local stakeholders and oversees the implementation of the contract through to completion.[10] River contracts got off to a rocky start, as only a few were signed between 1981 and 1985, but they experienced considerable success among local players, particularly mayors, in the 1990s and early 2000s.

10.5 The Political Success of River Contracts in the 1990s and 2000s

The political success of river contracts in the 1990s and 2000s can be explained by the opportunism of local elected representatives. Mayors realized that river contracts had a twofold advantage. First, they were a way of getting the state to

[8] The changes made to river contracts by the Ministry of the Environment in the early 1990s and then in 2004 had several consequences. In particular, relatively large river basins were given approval by the National Approval Committee and the procedure was extended to include bays, estuaries, and lakes. They were henceforth referred to as "environmental contracts" (Cf. Ministerial circular of October 24, 1994, relating to the 10-year plan to restore and maintain rivers and defining the purpose, content, and procedure for drawing up river contracts.

[9] Comité National d'Agrément.

[10] The ministerial circular of January 30, 2004, which transferred the approval procedure to basin committees, removed the solemn and exceptional character of the first river contracts; only a few of them were adopted and the minister of the environment sometimes came to sign the documents in person.

finance part of the studies and works, which they would otherwise have to pay for themselves. Second, they offered a way of managing water more appropriately than in the past, in particular between municipalities situated upstream and downstream in a given river basin.[11]

In spite of their differences, municipalities were among the local players with the most to gain from working together at the scale of a small river basin to present a credible project to the state authorities. They realized that they were required to carry out increasingly costly work to bring their sewage treatment and drinking water production plants up to standard to comply with EU public health regulations. Mayors, who were often in conflict with one another over the issue of water management, seized the opportunity offered by river contracts to have some of the necessary works financed by the state or intermediate administrative bodies, such as those at the regional level.

The principle of water management based on river basins also gradually won over municipalities that had been opposed to any reform of local water management. If a municipality upstream did not effectively control pollution, the financial efforts made by all the other municipalities further downstream to eliminate pollution would be to no avail. The same thing goes for the quantitative management of water: if municipalities upstream help themselves to too much water, those further downstream may experience periodic shortages. Consequently, many municipalities adopted the principle of basin-wide management to more efficiently manage water.

From the middle of the 1970s to the middle of the 2000s, the reform of public administration in France and the increasing Europeanization of public policies encouraged the development of river contracts. In 1982, decentralization—the transfer of some of the state's duties and prerogatives to local authorities—gave mayors greater responsibility in the area of regional development and the environment. In the area of water, river contracts were at the time the only instrument that enabled local players—and in particular municipalities—to pool their financial resources.[12] River contracts were also one of the ways of planning and coordinating action at the scale of small river basins.

In addition, Europe has produced more stringent and wide-ranging directives concerning water over the past 30 years. The Water Framework Directive, which was adopted in 2000 as a result of this process, requires EU member states to bring

[11] Latour and Le Bourhis showed the extent to which the implementation of a local water policy depends on the determination of local elected representatives (1995).

[12] Municipalities work together at two levels in the context of a river contract. First, they become jointly liable financially, insofar as each contributes to a structure in which they are grouped. The contributions from the municipalities vary according to tax revenue, number of inhabitants, length of river concerned, etc. These contributions are used to pay staff (engineers and technicians) responsible for designing, monitoring, and evaluating the river contract. Second, they are technical partners in the sense that they draw up a program that does not penalize any of them.

together managers and users in the context of local governance. In this way, mayors have become the artisans of local water policies. Municipalities now act together in commissioning studies of hydraulic, landscape, and fish-related issues prior to implementing development works. Mayors chair river committees, the bodies responsible for making decisions connected with river contracts (definition of actions, voting of annual budgets, etc.).

Conversely, the state's role has decreased considerably over the same period. To simplify, the government now draws up laws and regulations[13] and monitors their implementation at the local level via the French National Agency for Water and Aquatic Environments (ONEMA).[14] Local civil servants (engineers and technicians) no longer take charge of project management (Ghiotti 2007). Expertise from the public sector has become minimal in comparison with that of private firms. The six water authorities nevertheless remain under state supervision. They have become the municipalities' main and almost only financial partners.

10.6 A Highly Disputed Environmental Track Record

About 200 river contracts at various stages of completion have been identified in France. Most of them were launched between 1990 and 2000. As far as the Ministry of the Environment is concerned, this is a very satisfactory record. Certain authors consider the river contract to be an instrument that serves to implement the objectives of the EU imposed by the 2000 WFD (Drobenko 2004). Indeed, several European countries have experimented with river contracts, if only in the context of cross-border contracts (France-Belgium, France-Spain, etc.). In North America, Québec drew inspiration from them in finalizing its National Water Policy in 2000 (Choquette 2008). But the success of river contracts among mayors in France and their sheer number conceals certain strategic mistakes.

First, the decision to encourage investment in urban and industrial sewerage is contested by independent experts (Cour des Comptes 2002, 2010). In other words, river contracts addressed the problem of water pollution in a curative rather than preventive manner. As a consequence, nearly 2 billion euros have been spent in the context of river contracts.[15] But this expenditure has served mainly to provide

[13] Laws on the environment voted by the French parliament often correspond to European directives transposed into French law.

[14] The ONEMA (l'Office National de l'Eau et des Milieux Aquatiques) is the national public establishment created by the Water Act of 2006. The ONEMA is charged with "conducting and supporting at national level actions aimed at encouraging comprehensive, sustainable and balanced management of water resources, aquatic ecosystems, fisheries and fish stocks."

[15] The financial contribution of private-sector players (leisure sector, hydroelectric producers, and farming) is very limited. In fact, they help finance water policy via "pollution" and "consumption" charges and through the local and national taxes they are required to pay (which contribute respectively to the budgets of local authorities—including municipalities—and the state).

municipalities with sewage treatment plants. River contracts in which public aid was dependent upon introducing less polluting practices or saving water were rare (Brun 2010).

The situation is exactly the same for flood control. Municipalities have preferred to build and maintain dykes and dams to prevent flooding rather than buy farmland able to act as a natural reservoir in the event of a flood. Investment in sewerage and flood prevention has consumed 70–80 % of the funds allocated to river contracts. Certain goals related to the environment, the landscape, and the encouragement of users to adopt more environment-friendly practices have been considered of secondary importance by local players (Brun and Marette 2003; Allain 2004).

The overall result from the environmental point of view is disappointing. The physicochemical and bacteriological quality of surface water has indeed improved considerably. However, certain types of pollution have not been eliminated either because they require long-term treatment that is incompatible with the lifetime of a river contract or because no particular action was taken in this respect in the first river contracts (e.g., pollution by nitrates used in farming). An analysis of water data for 1990–2010 shows the environmental gains in river basins where river contracts were implemented were not significantly higher than those in basins where they were not.

Of course, river contracts have helped reduce conflicts over water use between different users thanks to local governance at the river basin scale. But the competition waged between municipalities to attract jobs and industry to their area is still strong. Mayors also refuse to modify their development strategies, even when the result is more housing construction around drinking water wellfields or property exposed to a greater risk of flooding. In this respect, river contracts are a failure. Urban planning and water management are still dissociated. Furthermore, riverside landowners have not come on board, apart from those who have been able to benefit from public aid to carry out work. In addition, a certain number of local stakeholders themselves and official commissions like the National Approval Committee are not convinced this new local water governance is the answer to improved water management.[16]

Finally, the multiplication of river contracts has led to the hiring of staff to prepare, monitor, and evaluate the resultant action programs.[17] But these contracts are only designed for the short term—10 years at most—so these engineers and technicians are not guaranteed any employment in the future. Should these jobs be made permanent? If so, who is to pay, the state or the municipalities?

River contracts do not replace laws and regulations; rather, they complement them. These contracts are referred to as “gentlemen’s agreements” because they

[16] In this instance, the river committee.

[17] One of the weaknesses of river contracts concerns evaluation at the half-way stage and end of the program. Those responsible for the contract are also in charge of evaluating it. The effect of this is to gloss over the problems that they, in particular those in political positions, have faced.

have no consequences from a statutory point of view, and therefore do not entail any risk of legal proceedings for stakeholders.

The quality of water and aquatic environments in France and in the majority of European states remains mediocre. The lack of involvement of landowners hampers local water management based on river basins, and mayors have other political priorities than providing a preventive, collective, and long-term response to water issues. Contractual instruments and local water participation are still a long way off.

Acknowledgments The author wishes to thank Dr. Graciela Schneier-Madanes for the interest shown by the Groupe De Recherche (GDR) in local water policies and the "Cahiers de Droit" team from Laval University for their constructive criticism during the summary on river contracts made for the "Cahiers de Droit." Thanks lastly to Christine Simoens from Sogreah Consultants (Artelia); David Bailey, SETS; Frédéric Lasserre, professor in Quebec; Jean-Paul Haghe, lecturer in Rouen; and Guy Pustelnik, EPTB delegate-general, for their assistance in the field.

References

Allain S (2004) Contrats de rivière et agriculture: quel pouvoir incitatif et quelle efficacité environnementale. Revue européenne de droit de l'environnement 4:401–413, Limoges

Billet P (2008) Les approches volontaires et les principes du droit de l'environnement. In: Hervé-Fournereau H (ed) Les approches volontaires et le droit de l'environnement. PUR, Rennes, pp 97–109

Brun A (2010) Les contrats de rivière en France: enjeux, acteurs et territoires. Les Cahiers de Droit 51(3/4):679–704

Brun A, Lasserre F (2006) Politiques de l'eau: grands principes et réalités locales. PUQ, Quebec

Brun A, Marette S (2003) Le bilan d'un contrat de rivière: le cas de la Reyssouze. Économie Rurale 275:30–50

Choquette C (2008) Le contrat de bassin: un outil de gestion à géometrie variable. In: Choquette C, Letourneau A (eds) Vers une gouvernance de l'eau au Québec. MultiMondes, Québec, pp 281–298

Cour des Comptes (2010) Synthèse du Rapport public annuel de la Cour des comptes, Paris, p 48

Cour des Comptes (2002) Rapport public particulier sur la préservation de la ressource en eau face aux pollutions d'origine agricole: le cas de la Bretagne

Drobenko B (2004) Les contrats de rivière et le droit communautaire de l'eau. Revue européenne de droit de l'environnement 4:383–400, Limoges

Ghiotti S (2007) Les territoires de l'eau. Gestion et développement en France. CNRS Editions, Paris

Latour B, Le Bourhis JP (1995) Donnez-moi de la bonne politique et je vous donnerai de la bonne eau. . .Rapport sur la mise en place des Commissions Locales de l'Eau. Centre de sociologie et de l'innovation de l'Ecole des Mines de Paris, Paris

Chapter 11
Traditional Water Management in the Mediterranean: Authorized Union Associations in Languedoc-Roussillon

Anne Rivière-Honegger

11.1 Water at the Regional Level: Languedoc-Roussillon

The Mediterranean region, where "water is at the heart of interactions between society and nature, between development and the environment" (Benoit and Margat 2008), is a testing ground for globalized water and issues of governance. The sheer age of the water management systems in the region, dating to the Middle Ages, invites a comparison between traditional structures and management and new approaches, and between the respective capacities of the two.

One of the specific characteristics of the Mediterranean region is the substantial quantity of water used for agricultural purposes: 63 % in the Mediterranean basin as a whole (United Nations Environment Program (UNEP) estimate, Blue Plan 2004). What can now be observed is a rapid evolution in the use of land, in which water plays a decisive role. This evolution is characterized by the increased number of functions assigned to water, the multiplication and diversification of the actors involved, and a breakdown in the borders between territories. The situation has led to conflicts over use and values and to a series of crises that call for the development of new models based on sharing and reallocating water. In terms of the future of water, the political dimension is important (Marié et al. 1999).

In this perspective, the French Mediterranean region of Languedoc-Roussillon can serve as a local-level testing ground for water management promoted by the European Water Framework Directive (WFD).[1] The WFD calls for decisions to be taken "at a level as close as possible to the place in which water is used or its quality degraded." This implies that stakeholders—from local authorities and consumers to farmers and government agencies—have to participate in decisions at the watershed level

[1] For more information on the WFD see Chaps. 2 and 3.

A. Rivière-Honegger (✉)
CNRS, "Environnement-Ville-Société" (UMR 5600, CNRS/Université de Lyon),
18 rue Chevreul, Lyon Cedex 07 69362, France
e-mail: honegger@club-internet.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_11, © Springer Science+Business Media Dordrecht 2014

(Moss 2008). Among these stakeholders, the landowner associations, called authorized union associations (assocations syndicales autorisées, or ASAs), are dynamic. They were formally established in southern France during the nineteenth century to manage water distribution in agriculture but have since evolved. Today, these associations have opened the door to a range of stakeholders and bring to the table broader philosophies about water and sustainability: they enhance traditional knowledge, built heritage, and traditional forms of association, and they have shown that they know how to gradually adapt to a changing context (growing urbanization, tourism, etc.).

The historic Languedoc-Roussillon is a region in southern France that sits at the crossroads of traditional agriculture and explosive tourism. In terms of agriculture, the main climatic restraint is precipitation, with crops requiring irrigation either as their primary source of water or as a supplement to natural rainfall. The region's steep slopes, lack of vegetation, and shallow soil surface layers accelerate runoff, leading to substantial shortfalls in flow rates. As a result, river systems have strong and irregular flows characterized by severe flooding in the summer. Across the region, streams are ephemeral and only the river Rhône provides a reliable resource.

Over the course of the centuries, the challenge of dealing with this relative lack of water prompted the development of a number of remarkable hydraulic systems designed to transport water first within a single catchment area—irrigation canal systems—and later to several catchment areas. These gravity-based canals, located both on the region's great plains and in its mountainous backcountry, initially served the needs of small farms and mixed farming operations but were later used to transport water to different areas of the region.[2]

Agriculture continues to play an important role in the regional economy, accounting for 6 % of commercial employment in 44,000 farmsteads (Pôle Prospective 2007). But agricultural land is subject to strong pressures and its future is dependent on a number of uncertain factors, including the globalization of markets, the transformation of structures of production, and the evolution of the European Common Agricultural Policy. Between the last two agricultural censuses (1988–2000), total agricultural land area decreased by 1 % per year, accounting for no more than 36 % of the region's land area compared with the national average of 51 %. Only 15 % of agricultural land is irrigated, with substantial portions of land being converted for urban development (Jarrige and Thinon 2006). This decline has accelerated the process of peri-urbanization, notably by encouraging the conversion of vineyards into urban development land. The economy therefore increasingly depends on residential development projects and services generated by demographic growth. Conflicts over water uses are growing. Agriculture still requires 300 million cubic meters (mcm) per year (Aqua 2020, 2006), in spite of the improved efficiency of irrigation systems and a substantial decrease in the area of irrigated land over the last 30 years (Association des irrigants des régions

[2] This is true of the case in which water was taken from the Montagne Noire by means of a diversion canal, enabling Pierre-Paul Riquet, chief tax farmer of the Languedoc and the Roussillon and designer of the Royal Languedoc Canal in the late nineteenth century, to transfer water to the Naurouze Threshold. This divided the catchment areas of the Aude and the Garonne, and, later, the Philippe Lamour Canal in the Languedoc (Carrière 1980).

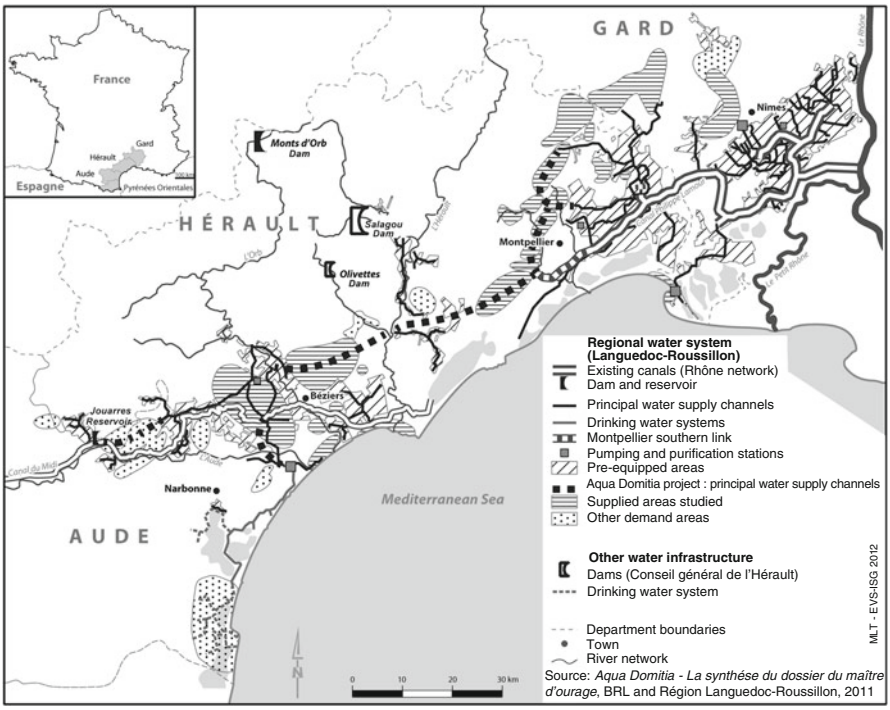

Fig. 11.1 Aqua Domitia project: network extensions to secure water resources using water from the Rhône (Source: Author)

méditerranéennes françaises 2009). In addition, the region is home to the strongest population growth in France. These demographic shifts are occurring within a changing institutional and legislative environment,[3] which undoubtedly will increase constraints concerning the access to and distribution of water.

To address the issue of water scarcity, the flagship project Aqua Domitia[4] will supply drinking and untreated water to the region.[5] This coastal artery is part of Aqua 2020, a long-term regional plan for sustainable water management. A charter on the sustainable management of water resources was signed by representatives of the region's local authorities (départements) in 2007. This emblematic project has become a significant component of France's water resources debate (Fig. 11.1).

[3] For example, the Law No. 2006-1772 on Water and Aquatic Environments (LEMA) of December 30, 2006, *JORF*, December 31, 2006.

[4] This project is intended to extend the Philippe Lamour Canal towards Narbonne and Beziers to the Spanish border using water from the Rhône and the Orb. The contract has been awarded by the government to the Compagnie Nationale d'Aménagement du Bas-Rhône Languedoc (CNABRL). The plan originated amid a major crisis—the 2005 drought—and the cession by the state to the region of the canals, pipelines, dams, and water treatment stations managed by CNABRL within the framework of the second phase of decentralization (Berthier 2008).

[5] Untreated water is used for watering gardens and for swimming pools.

11.2 Authorized Union Associations (ASAs): An "Ancestral" History of Water Management

Water networks[6] structure agriculture and the rural milieu and play a preponderant role in the management of water resources (Aubriot and Jolly 2002). The Languedoc-Roussillon region is characterized by its dense water infrastructure, which generally is run on a collective basis: only 30 % of farmsteads manage their own irrigation systems, compared with the average in France of 60 % (General Agriculture Census 2000). Infrastructure is essentially made up of installations set up in 1956 by the Compagnie Nationale d'Aménagement du Bas-Rhône-Languedoc (CNABRL) during the 1950s, which provided the institutional and operational framework for the transfer of water resources at the regional level (Pritchard 2011) (Figs. 11.2 and 11.3).

The CNABRL is authorized to take water from the Rhône for 75 years, with 6 mcm taken from the river every year. In the 1990s, the state concession totaled almost 100,000 ha, while individual concessions at the local level accounted for 54,400 ha. Since the late 1960s, the irrigated surface area has accounted for about 30 % of the region's irrigated surface area, or nearly 30,000 ha (Carrière 1999).

Fig. 11.2 The Bas Rhône Company, an important player in Languedoc (Source: Author, May 2004)

[6] Infrastructure.

Fig. 11.3 The Bas-Rhône Canal, which is important for agricultural development (Source: Author, May 2004)

Today, the CNABRL affirms its role as a major actor in the production of untreated water for use in the urban and tourism sectors.

In terms of traditional irrigation systems, associations form a fundamental unit of water management for agricultural uses and are specific to France (Haghe 1998). ASAs are public organizations made up of private landowners and are the responsibility of the prefect, who represents the national government at the local level.[7] ASAs own their infrastructure and hold collective water rights. They were set up to maintain irrigation and sanitation infrastructure—some of which has existed since the Middle Ages—as well as improve and extend irrigated territories and share maintenance costs equitably. In Languedoc-Roussillon, the origins of most ASAs stem from crisis situations, such as the phylloxera outbreak in the late nineteenth century and exceptional flooding in 1958.

Conditions of water access are defined by internal regulations. The ASAs are organized and administered by a general assembly made up of the owners, who pay a fee, and the union, which is composed of elected officials and a director. Historically speaking, external authorities always have been involved in a regulatory capacity. The associations vary widely in size from a few to several thousand members and rely to a large degree on input from voluntary workers.

Languedoc-Roussillon is home to more than 700 such associations, each made up of about 10,000 members. An estimated 36,000 ha of irrigable land, accounting

[7] Each region in France is under the government of a prefect named by the government.

Fig. 11.4 A flooding gate (martellière), a management tool in plot farming, ASA of the Gignac Canal (Hérault) (Source: Author, 2008)

for 22 % of the region's irrigable surface area, is managed by slightly more than 300 ASAs using gravity-based canal systems. Most water is drawn from surface flows or from groundwater pumping stations. It would appear that the associations were set up primarily to service the agricultural sector: 80 % of them focus on irrigation and 10 % concentrate on the sanitation and drainage of agricultural land (Fig. 11.4). The second major sector of the associations' activity is river management, including flood, riverbank, and riverbed protection, and sea defenses (Puech and Rivière-Honegger 2001; Rivière-Honegger 2004). The gravity-based irrigation systems managed by the ASAs play a major role in the water cycle (aquifer recharge and low water replenishment) and provide new services to the community (water supply, fire fighting, environmental preservation, etc.) beyond their historically agricultural activities (Montginoul 2006). This multi-functionality allows associations to be partners in integrated water management at the watershed level.

The 1992 Water Law encouraged a decentralized approach to management with the participation of stakeholders, politicians, government agencies, consumers, and local inhabitants. Even if the associations have experienced an arduous transition over the last 15 years, they have demonstrated a genuine capacity to adapt to a changing institutional context, which, on occasion, has called into question their very existence (Garin and Loubier 2002). In a study of 20 innovative associations, Rivière-Honegger and Puech (2007) presented the variety of organizational institutional solutions that have enabled the associations to continue to function and the associations' capacity to adapt and evolve. They also raised a question about the interaction between individual and collective interests and, beyond that,

the maintenance of a collective system for managing facilities used by farming communities since the infrastructure was first built.

Regulations governing the associations were recently updated[8]: the process of changing legal status was made easier and procedures for modifying union parameters were simplified, in that they are now dependent on the decision of a general assembly rather than on the results of a public inquiry. The homogenization of ASA statutes recently was established, allowing the associations to participate more in the new water management landscape.

11.3 From a Traditional Sector-Based Approach to a Transversal Conception of Water Management

The meaning of governance has many different shades in the scientific literature (Bertrand and Moquay 2004). The term seems to denote any public decision-making system or system for implementing public policies involving private actors. The implementation of this principle implies the participation of new actors and, therefore, a system of power-sharing designed to create consensus or consent in a context of conflict, the introduction of active internal communication, and more intense interactions between private actors and public policies. The study of local decision-making processes is thus associated with forms of collective action based on negotiation, compromise, and alliances between various networks. Proximity encourages the definition of objectives and an awareness of a shared identity on the part of the actors involved. The issue at play is to reinvest at a larger scale the knowledge and expertise acquired at the level of a specific irrigated area and, for the irrigation associations, to interact more effectively with political entities and technical agencies.

In the water sector, the notion of good governance is associated with integrated management, participation, and decentralization. This implies a reorganization of competences in which regional institutions are assigned new duties. Irrigation communities, seen as "being defined and delimited by water rights" (Ruf et al. 2008), are associated with these entities in a de facto manner. Because the competences are still vague, cooperation, although difficult, becomes essential.

Integrated management approaches are underpinned by two key concepts: conservation, in the sense of the prudent and measured management of natural resources with a view to guaranteeing their continued use in the future and, more recently, sustainable development. The 1992 Water Law thus affirmed the patrimonial character of water as a resource and highlighted the value of managing it in a balanced and sustainable fashion. The objective is to create the conditions

[8] Order of July 1, 2004, on Landowner Union Associations amended by Law No. 2006-1772 of December 30, 2006 – LEMA, *JORF*, December 31, 2006, followed by Decree No. 2006 of May 3, 2006, applying the order.

necessary for local bodies to reappropriate the power to manage resources, species, and spaces by encouraging and creating spatial continuity. Conservation is thus cast within a wider approach to planning that places an emphasis on regional development and the involvement of local communities. Four fundamental principles can be identified (Kalaora and Charles 2000):

- Management and responsibility, which corresponds to the moral obligation of each individual, organization, and institution to act in such as way as to maintain the natural patrimony and ensure that it is conserved for future generations;
- Cooperation, where solidarity outweighs individualism and competition and which calls into question approaches to hierarchy in terms of the governance of companies;
- Instability, which makes of "integrated management [. . .] a continuous, interactive, adaptable, and participative process" and presupposes that participants accept a certain degree of flexibility;
- Citizenship, which involves giving local people and stakeholders a say in complex decisions concerning the development of a given territory. There is no typical approach, nor is there any model for an integrated management process. Instead, a range of questions focusing on implementation has explicitly emerged in a number of contexts (Bonnet et al. 2005) with a view to defining a suitable strategy.

These participative approaches mark a decisive turn. In France, integrated water management is implemented at the catchment area level. A comparison of the principles of integrated water management and the approach taken by ASAs reveal a number of similarities. However, farmers sometimes find it difficult to work with this new kind of decision-making process, based as it is on the participation of the greatest number, and often have problems accepting new territorial divisions. They will have to forego their usual approach to decision making, based on co-management by professional unions and government agencies at the local level as well as on direct democracy rather than representation. The geographical unit on which the new management approach is based—the catchment area—no longer corresponds to an agricultural management territory. This raises the question of the juxtaposition of individual administrative territories. Heirs to a "long self-centered history" (Bodiguel 2007), farmers tend to be unenthusiastic about having to reconcile their actions with those of others. Although they are on the defensive due to the critical position in which they find themselves, farmers are nevertheless still present. Their presence confirms the relevance of preexisting irrigation parameters and current practices (particularly gravity-based irrigation), ensures that their water rights are respected, and defends their internal decision-making autonomy. However, they are not insensitive to the content of exchanges, particularly those relevant to environmental risks.[9]

[9] Author's interviews, Mid-Hérault Valley, 2007–2009.

An analysis of the way in which landowner associations function reveals two things: that water governance operates in a traditional way in terms of alternating between local and global approaches, and that management rules are essentially constructed at the local level in discussions about interests and in the process of adapting to techniques for governing water distribution. The rigor of the water tower mitigated by the flexibility of rules is a gauge of adaptation (Ghiotti and Rivière-Honegger 2009). The common awareness of a good shared by a number of users in a defined water territory eventually emerges as a major factor in ensuring that actors continue to play a role in water management. It is this balance that should be maintained (Rivière-Honegger 2008).

11.4 The Potential of Integrating Traditional Structures into Management

Incorporating ancient hydraulic systems and stakeholders into the new integrated water management proposed by the WFD at the watershed level is a work in progress. Actors involved will require a considerable amount of time to acclimatize to the new approach, as "local governance is a process, not a decree" (Bertrand and Moquay 2004). ASAs provide an interesting case study in terms of new approaches to water management at the local level. Recent research shows that all the actors involved recognize the practice of irrigation is based on a form of complex collective organization and that, in this regard, ASAs possess a high degree of expertise (Ruf et al. 2008; Rivière-Honegger and Puech 2007). As water is both a factor of social and territorial cohesion and a source of conflict, different stakeholders confront each other in the water arena. This implies following a mosaic of heterogeneous situations over various scales of time and space (Arrus 2002). In implementing a long-term approach to managing water resources, it is essential to understand stakeholders like ASAs. At this level of the irrigation community, members of the associations share a common culture and values in terms of water management, including the perception of water as a rare resource. Thus, the task of seeking compromise in times of crisis is facilitated by an inherent capacity for innovation (Bravard and Rivière-Honegger 2006, 2007).

References

Arrus R (2002) Mutations et réversibilité dans les modes d'usage de l'eau. Bassin occidental de la Méditerranée. Montagnes méditerranéennes 14:9–18

Association des irrigants des régions méditerranéennes françaises, Chambre d'agriculture Languedoc Roussillon, Chambre d'agriculture Provence Alpes Côte d'Azur, Région Languedoc Roussillon, Région Provence Alpes Côte d'Azur, Agence de l'eau RM&C (2009) Le poids économique, social et environnemental de l'irrigation dans les régions méditerranéennes françaises, report, 300 p

Aubriot O, Jolly G (eds) (2002) Histoires d'une eau partagée. Provence, Alpes, Pyrénées, Université de Provence, Aix-en Provence, 248 p
Benoit G, Margat J (2008) L'eau des Méditerranéens. Situation et perspectives. L'Harmattan, Prospective appliquée collection, Paris, 288 p
Berthier I (2008) Languedoc-Roussillon. Une démarche pour sécuriser la resource. Diagonal 177:41–44
Bertrand N, Moquay P (2004) La gouvernance locale, un retour à la proximité. Economie rurale 77
Bodiguel M (ed) (2007) Gouvernance et partage de l'eau. Le bassin versant de Grand-Lieu. Presses Universitaires de Rennes, Rennes, 204 p
Bonnet B et al (2005) Gestion intégrée des zones humides méditerranéennes. Conservation des zones humides méditerranéennes, Medwet, no 13, Tour du Valat, Arles, 160 p
Bravard JP, Rivière-Honegger A (eds) (2006) La pénurie d'eau: donnée naturelle ou question sociale? (1 and 2). Géocarrefour 80(4):257–358
Bravard JP, Rivière-Honegger A (eds) (2007) La pénurie d'eau: donnée naturelle ou question sociale ? (1 and 2). Géocarrefour 81(1):96 p
Carrière P (ed) (1980) Eaux et aménagements en Languedoc-Roussillon. Société Languedocienne de Géographie Tome 14(2–3):120–355
Carrière I (1999) Evaluation économique du programme d'aménagement hydro-agricole du Bas-Rhône-Languedoc. Doctoral dissertation in Economics, Université Montpellier 1, 363 p
Garin P, Loubier S (2002) Durabilité et fragilité des Associations Syndicales Autorisées (ASA) d'irrigation en France. Report for the Académie de l'Agriculture 88(3):61–71
Ghiotti S, Rivière-Honegger A (2009) Eaux sous 'pressions' et développement des territoires périurbains en Méditerranée occidentale (Languedoc−Roussillon). La vigne, le *sphaeromide raymondi* et les piscines. Norois 211(2):37−52
Haghe JP (1998) Les eaux courantes et l'Etat en France (1789–1919), du contrôle institutionnel à la fétichisation marchande. Doctoral dissertation, Ecole des Hautes Etudes en Sciences Sociales, Paris, 649 p
Jarrige F, Thinon P (2006) La prise en compte de l'agriculture dans les nouveaux projets de territoires urbains. Exemple d'une recherche en partenariat avec la communauté d'agglomération de Montpellier. Revue d'Economie Régionale et Urbaine 3:393–404
Kalaora B, Charles L (2000) Intervention sociologique et développement durable, le cas de la gestion intégrée des zones côtières. Nature sciences sociétés 8(2):31–38, Elsevier
Marié M, Larcena D, Derioz P (eds) (1999) Cultures, Usages et Stratégies de l'eau en Méditerranée Occidentale, tensions, conflits et régulations. L'Harmattan, Paris, 543 p
Ministry of Agriculture (2000) General agriculture census, Comparative Chart Metropolitan France, CD-Rom
Montginoul M (2006) Les eaux alternatives à l'eau du réseau d'eau potable pour les ménages : un état des lieux. Ingénieries 45:49–59
Moss B (2008) The water framework directive: total environment or political compromise. Sci Total Environ 400:32–41, Elsevier
Pôle prospective (2007) Futurs possibles, impacts sur les territoires, Cahier 2 - Devenir de l'agriculture, Prospective des territoires en Languedoc-Roussillon, Université Paul Valéry, Montpellier 3, Direction Régionale de l'Equipement Languedoc-Roussillon, 72 p
Pritchard SB (2011) Confluence, the nature of technology and the remaking of the Rhône. Harvard University Press, Cambridge, MA, 371 p
Puech D, Rivière-Honegger A (2001) Etat des lieux des Associations Syndicales Autorisées en Languedoc-Roussillon, Région Languedoc-Roussillon, DIREN Languedoc-Roussillon, 5 tomes, including a report, 120 p
Rivière-Honegger A (2004) La gestion de l'eau par les associations de propriétaires fonciers. Méthodologie pour un inventaire regional. In: Ruf T, Rivière-Honegger A (eds) La gestion sociale de l'eau, concepts, méthodes et applications. Magazine Territorires en Mutation, Université de Montpellier, Montpellier, no 12, p 63–80

Rivière-Honegger A (2008) Regards sur les paysages de l'eau. Evolution des usages de l'eau, dynamiques du territoire et mutations paysagères en Méditerranée occidentale. Dissertation (Habilitation à diriger des recherches), vol 1, synthesis report, 310 p, vol 2A and 2B, collection of publications (selection of 20 articles), ENS-LSH, Lyon

Rivière-Honegger A, Puech D (2007) L'analyse de quelques études de cas, témoins de l'évolution des Associations Syndicales Autorisées en Languedoc-Roussillon, Languedoc-Roussillon Region report, 67 p

Ruf T, Riaux J, ISIIMM (Innovations sociales et institutionnelles dans la gestion de l'irrigation en Méditerranée) (2008) Synthèse générale, 113 p

Chapter 12
Dam Projects and Protest: The Exception of Alqueva (Portugal)

Fabienne Wateau

12.1 Dams and Protest

Dams and protest. Very often these two words accompany one another. Technological prowess and political will make the headlines, but above all, when a dam affects housing, the displacement of the population is fiercely denounced. Anti-dam sentiment is widespread and often vehement. Recently, the projects that have attracted the most attention are those of the Three Gorges in China, Narmada in India, Belo Monte in Brazil, and the Tigrus and Euphrates in Turkey. Pamphlets, condemnations, and requiems flow from the pens of essayists, intellectuals, local scholars, and spokespeople and former inhabitants of drowned villages. Arundhati Roy in India is one of the most emblematic figures (Roy 1999), like Patrick McCully in the United States (McCully 1996).

In France the post-war Tignes Dam is a prime example of the misunderstandings between decision makers and inhabitants and of demands that turn into resentment and bitterness. The dam was part of a program to "modernize France and democratize the consumption of electricity" (Varaschin 2001). Authorities ensured that the flooded, former pastoral village was reborn as an upmarket ski resort, yet Tignes ritually maintains the tragic history of the drowning of the village and the dispersion of its population. In 2000, on the occasion of the emptying of the reservoir, which happens every 10 years, villagers marched in a procession organized on the remains of the village, smoothed over by water and mud. At the foot of the bell tower, now lying on its side, priests carried out baptisms and a confident grandfather declared to his 8-month-old grandson: "You have been baptized here on the earth of Tignes, my

F. Wateau (✉)
CNRS, "Laboratoire d'Ethnologie et Sociologie Comparative – LESC" (UMR 7186, CNRS/Université Paris Ouest Nanterre La Défense – Paris X), Maison René-Ginouvès, 21 Allée de l'Université, Nanterre cedex 92023, France
e-mail: fabienne.wateau@mae.u-paris10.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_12, © Springer Science+Business Media Dordrecht 2014

grandson, and in 20 years, when the EDF[1] concession expires, you will take back our drowned past for us."[2] Hope and sorrow are still handed down through the generations, and with indignation.

These situations are not exceptional. *Big Dams and Inhabitants* (Blanc and Bonin 2008), which examined "the relevance of these huge facilities in the light of the new issues of sustainable development," described other instances of resistance combined with resilience: "Whenever these reservoirs are emptied, it gives rise to veritable pilgrimages by former inhabitants of the valleys, their children, and the engineers and workers involved in building the dams" (Faure 2008, p. 103). Fighting the construction of the dam at Saint-Jean du Gard in the Cévennes in southern France, the tough green/localist resistance and the power games in the protest movement mobilized all strata of the population (Clavairolle 2008).

But these large dams also have their champions (Lacoste 2001; Ayeb 2001), who emphasize the cleanliness of hydraulic energy compared with nuclear power, now that we have entered the age of sustainability. On a worldwide scale, however, the number and intensity of conflicts provoked by big dams are increasing as is the number of projects awaiting construction (Bethemont 2008, p. 32). As a result, methods have been proposed to better evaluate and forestall the risks linked to population displacements (Cernea 2008).

The case of the Alqueva Dam in southeast Portugal lies in a particularly interesting theoretical interval: it simultaneously is an heir to the civilizing traditions of state development through access to water, a forerunner of the application of measures of public consultation and participation of the mid-1990s, and one of the most modern constructions for the storage and management of water in the early twenty-first century.

12.1.1 Protest on the Iberian Peninsula

Spain is no exception to the pronounced trend of protest. It is home to the third largest number of dams in the world, and resistance to dams and diversions there is well organized. Studies on the Ebro basin highlight the many localist, regional, and heritage-related reasons (Clarimont 1999). Associations like the Platform for the Defence of the Ebro, the Coordination of People Affected by Large Dams and Diversions (COAGRET), or the Foundation for a New Water Culture remain alert to any new constructions. The most recent protest movements have concerned the dams of Yesa, Itoiz, Biscarrués-Mallos de Riglos, and Sanliestra. At Riaño, in 1987, the submersion of seven villages provoked strong resistance. In vain, villagers and ecologists climbed onto the roofs of houses to stop the construction from advancing (Canal Sanchez-Pagin 1988).

[1] Électricité de France S.A., the French national electricity company.

[2] Personal communication, Tignes 2000.

The protest movement in Portugal is equally strong. Like the Tignes in France, the Vilarinho das Furnas Dam was pushed through in 1974 in the name of modernization. It required the dismantling of a community and has left deep scars and bitterness at a national level. The displaced inhabitants left with the doors, windows, beams, and tiles of their houses, planning to rebuild elsewhere. Every year, a religious procession is held around the reservoir.

Today, the national social and socioeconomic context has changed and so have the modes of protest. On Portugal's Minho River, the building of the Sela Dam was the subject of organized local resistance for more than 12 years, beginning in 1996. The mayor was deeply involved and was prepared to support the dam if sufficient compensation was forthcoming for the valley. But when no agreement was reached, opposition mounted. The government has shelved but not abandoned the project (Wateau 1999, 2002). In 1997 archaeologists on the Côa River succeeded in preventing the submersion of prehistoric rock art by mobilizing the international scientific community (Gonçalves 2001). And Sabor, envisaged as an alternative to the Côa Dam, continues to attract the attention of ecologists. In 2006, a committee evaluating the environmental impact gave a verdict of "nim": neither yes (sim) nor no (não).

12.1.2 The Necessary Ingredients for Protest

A comparative study of the different stages in these protests, systematically gathering and classifying all the news articles about them, by theme and by dam, brings to light an interesting fact: there is a standard method of fighting dam projects. Françoise Clavairolle, in a rigorous analysis of the arguments used by opponents of the Saint-Jean du Gard Dam, identified four categories: ecological, socioeconomic, technical, and symbolic. These categories very often are discovered and put forth over the course of the fight, strengthening the substance of the opposition.

More precisely, the ecosystem is always altered, changing the water temperature and endangering or destroying migrations, fish habitats, or rare and fragile fauna and flora. In one place it is beavers, gray herons, orchids, and cyclamens (Clavairolle 2008), while in another it is lampreys, salmon, shad, or a noble variety of grapevine (Wateau 1999). The opposition also regularly evokes the fear of mosquitoes or of the mist that will affect the climate and damage crops important to the local economy.

The socioeconomic arguments essentially concern local crop production. In the Cévennes in France, for example, it was feared the dam would destroy the fragile new economic and social structure that has grown up around local products. Those against the construction of a dam also tend to question its projected profitability: Will the benefits really outweigh the costs? And if so, for whom? For the urban centers at the expense of the margins? Arguments against the technical efficacy of the project often concern the location of the site, maintaining, for instance, that the

bedrock is not solid enough to support the infrastructure or, even worse, that the pressure of a huge mass of water over the fault line could trigger a catastrophic earthquake.

Finally, localist, symbolic, or heritage-related arguments lend further support to the protest, based on the history of a valley, its architectural heritage, or the territorial role it plays. Thus, in the Gard in France, it is the identity of the Cévenols, the famous resistant Protestants, that is directly attacked. In the Ebro valley in Spain, it is the water culture of Aragon. In Minho, it is the medieval fisheries, and in Cantabria, Spain, it is a dozen churches, as well as buildings with coats of arms and mozarabic stones.

All of the necessary ingredients for protest appeared to be present in Alqueva in southeast Portugal (Fig. 12.1). Now the largest reservoir in Europe, it boasts a surface area of 250 square kilometers (km^2) and a volume of 4,115 cubic hectometers (hm^3) of water. There were sound ecological arguments, with bats, black cranes, freshwater turtles, and narcissi imperatively requiring protection. There were a number of cave paintings and important megalithic ruins. There were also serious risks of provoking an earthquake, because the reservoir exerts pressure on the fault line responsible for destroying Lisbon in 1755. The opposition voiced grave suspicions about the economic interest of this huge undertaking, with its constantly changing objectives and irrigated products that would have to be sold on saturated markets. Mist and water loss presented certain risks. Beneath all of the arguments flowed a complicated social context, in which the land could no longer support rural workers. So why did no substantial opposition to this project emerge? Or at least, why were the objections insufficient to prevent the construction of this dam?

12.2 Alqueva and Its History

Straddling the Guadiana, a cross-border river that originates in Spain, Alqueva was envisaged in the 1920s and completed in 2002. Francisco Franco and Antonio de Oliveira Salazar, dictators of Spain and Portugal, respectively, signed the agreement to build the dam in 1968 and work started in the 1970s, although it was subsequently interrupted several times. The completion of the project essentially was assured in 1997, when the European Union agreed, with some reluctance, to meet two-thirds of the total cost (Fig. 12.2).

Originally, the dam was to be used to irrigate the vast Alentejo plain, worked intensively during the years of the Salazar dictatorship for the dry farming of cereals. The arid lands of Alentejo, which still belong to large landowners despite successive waves of land reform introduced in the 1970s and 1980s, are essentially destined for mixed farming. Estates, generally covering more than 1,000 ha, are dedicated to cereals, stock-breeding, pasture, private hunting and, depending on the location, cork oaks, olive trees, vineyards, or irrigated melons. The owners of these estates, or latifundia, are not farmers themselves; they are more likely to be

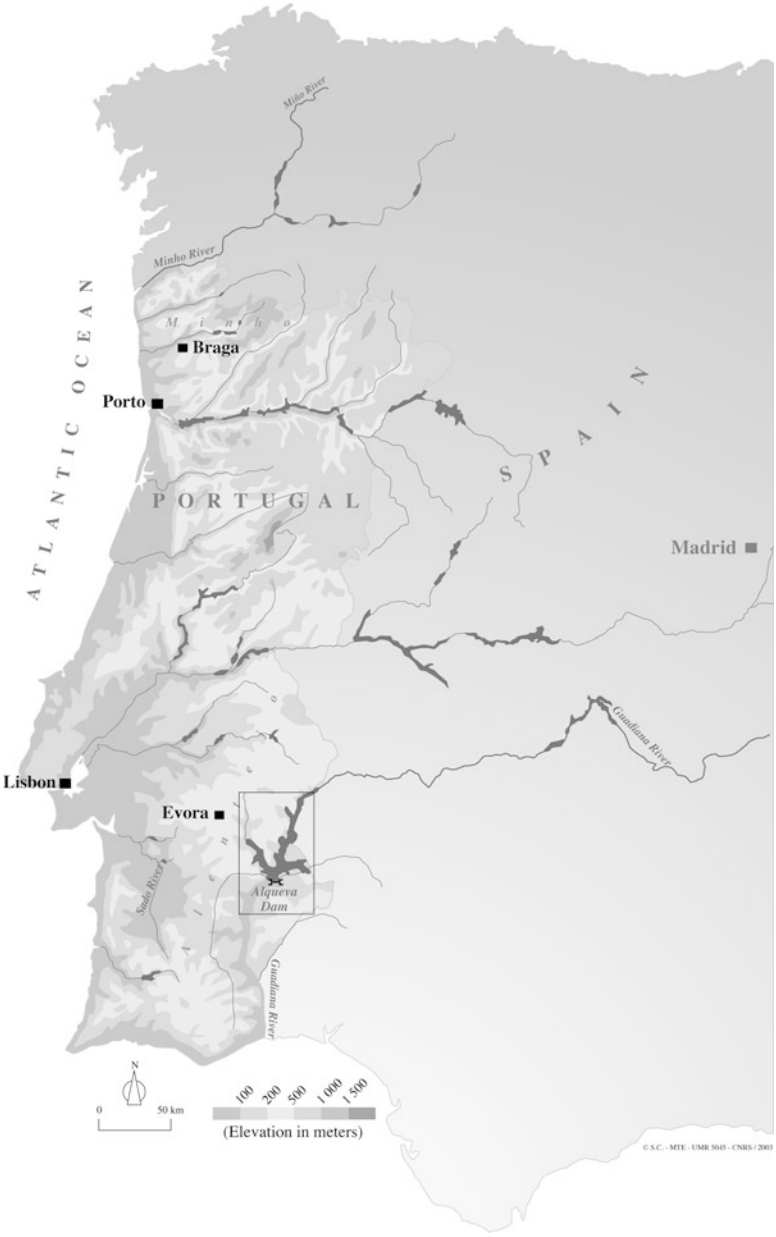

Fig. 12.1 Map of Portugal and the Alqueva Dam

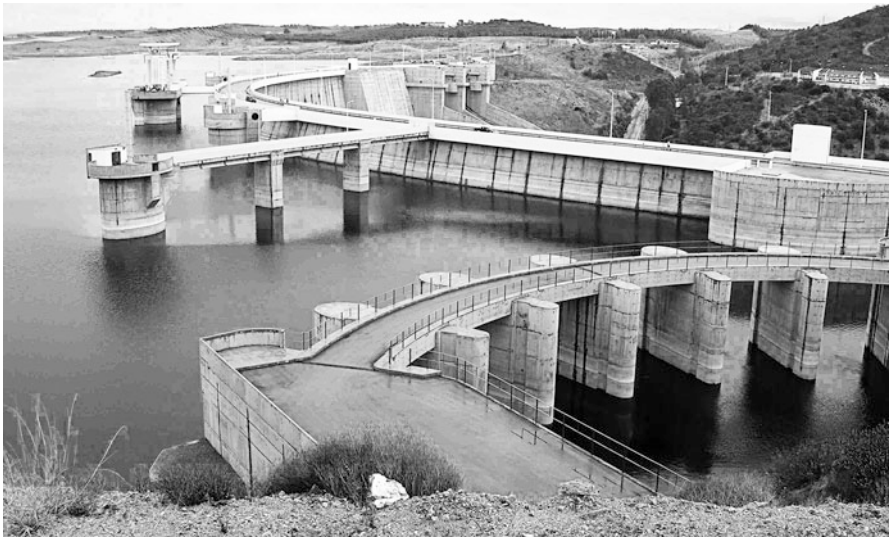

Fig. 12.2 The Alqueva Dam (Source: Author)

doctors, lawyers, engineers, or academics who, having inherited these estates, often rent them out wholly or partially. Irrigating the Alentejo plain was intended to intensify production and, at the same time, allow more people to work and live off these lands.

The myth of water as both a civilizing force and the means by which everyone can reap the benefits of an irrigated plot of land was promulgated by those in support of the dam (Drain 1996). Sometimes compared to the Minho, one of the greenest regions of Portugal and farmed by small landholders, the Alentejo plain irrigated by Alqueva was touted as the second paradise of Portugal. The various proposed purposes of the dam—supplying water to the city of Sines (a project since abandoned), electric generation, drainage, and the distribution of water to houses—remained very subordinate to the irrigation of the Alentejo plain. Today, 124,000 ha of irrigated land are still planned, but farming almost certainly will not be the primary purpose of Alqueva in 20 years. Some promoters are studying the optimization of the tourist potential of the reservoir, because tourism could offer better prospects of economic profitability.

12.2.1 The Black Book of Alqueva

Three books published in the 1980s expressed different reactions to the projected building of the dam. The first denounced the megalomania of the undertaking and proposed alternatives. The two others were firmly in favor of the infrastructure,

advancing all possible arguments for its construction. But none of them, not even the *Black Book of Alqueva*, totally condemned the project.

In the *Black Book of Alqueva* (1981),[3] published by the Monarchist People's Party, specialists from different disciplines expressed their doubts about the suitability of the dam, point by point: the project was based on miscalculations of the water flows in the Guadiana River; it was an agreement whereby Spain had few obligations in the event of a water shortage; it represented a failure to explore alternatives; the hydroelectric production did not justify the size of the infrastructure; the site (Sines) had no need of Alqueva; and it was located in a highly dangerous seismic zone. But the most criticized aspects were the exaggerated size and cost of the dam and the policy of supply. In this respect, the project was denounced as "an invitation to centralism, concentrationism, monoculture, industrial irrigation, a process that only increases the use of chemical fertilizers, the consumption of fossil fuels and imported machinery" (p. 52). Even if, as the authors declared, "we are not against the project to irrigate the Alentejo, ... we consider that the best solution lies in the construction of small and medium-size dams covering a wider area" (p. 37).

Some 25 years later, now that the Alqueva has been built, it is easier to appreciate the extent to which these fears were well founded: there is a trend towards intensive monoculture in the olive plantations of the Ferreira do Alentejo region, with drip irrigation and fertilizers; land ownership is becoming more concentrated, often passing into the hands of the Spanish; and the production of electricity is only the fifth largest in the country. In addition, the seismic risks were taken very seriously, and millions of tons of concrete were poured onto the fault. On the other hand, Spain has signed an agreement concerning the minimum flow of the river, and the question of quantity appears to be settled. The question of water quality, however, remains. This problem had not been envisaged at the time, and yet hardly 5 years after the dam was filled, the water of Alqueva already was largely contaminated.

The second book was a response to the first. Published in 1982, *Alqueva the Great Dam* is a collection of articles by the left-wing journalist Antunes da Silva criticizing the right-wing government in power, notably for "fearing that Alqueva will give an abundance of water and light to lands inhabited by people who did not vote for it[4] and, for that reason, it punishes them relentlessly (p. 11). [...] the water will irrigate new lands [...], satisfy the thirst of inland towns and villages, come to the rescue of existing or future industries, and that is how Alentejo could become an Eldorado [...]" (p. 18).

The myth of water is very present in those lines. And yet today, contrary to the hopes expressed, ordinary people have derived little benefit from this new water. Only the richest landowners have been able to make the investments needed to irrigate their land. At the moment, it is essentially Spanish entrepreneurs who are

[3] *Barragem de Alqueva, Livro Negro*.

[4] The region was a stronghold of the Communist Party.

buying up and modernizing estates of more than 900 ha. The water also is reserved for luxury tourism, with five-star hotels and golf courses sprouting up around the dam.

The third book, *Pursuing Alqueva for the Development of Alentejo and of the Country*,[5] published in 1985, brought together all the defenders of the Alentejo region (mayors, unions, technicians, and scientists) in favor of the dam and against the government in power: "[. . .] once again, the Alqueva project is absolutely necessary to the development of Alentejo and of the country. [. . .] The present position of blockage is unacceptable, condemning a whole region to desertification, despite the potential that exists there—in the form of water—which [. . .] should constitute the vector central to its social and economic development, instead of which it continues to flow, with no benefit, into the sea." Once again, the salvation of Alentejo by water is the driving concept.

12.2.2 Ecologists, Intellectuals, and Politicians

In the 1990s, Portuguese and Spanish ecologists fought the Alqueva project. But their aim was never to prevent its construction, simply to limit its impact on the environment. In particular, resistance crystallized around the 139 m-mark above sea level, a maximum level for the reservoir that would have reduced the number of trees lost to the project. But the maximum level of 152 m above sea level that had initially been planned was maintained, despite 2 years of firm and regular protest. More than one million trees were cut down to prepare the way for the 25,000 ha of water. Certain olive trees, hundreds of years old and the focus of wide media attention, were carefully dug up and ceremoniously replanted in different parts of the country. The bats were moved to new caves. The right to call for the protection of the cave paintings, most of which were on the Spanish side of the lake, fell to the municipality of Cheles, which took no action.

Portuguese intellectuals raised no opposition to the Alqueva Dam. Was the project already too old, too polemical, or too political? Or did they prefer to believe, rather ingenuously, that it could only benefit the country? The answer is unclear. What is certain is that no academics, writers, or artists of note were involved in the opposition. No local scholar or protest association ever clearly condemned the project. And yet radical positions already had been adopted in Portugal, for example in Vilarinho das Furnas, where Portuguese writer Miguel Torga strongly contested the decision in the media. But in Alqueva, nobody appeared to believe the costs outweighed the benefits.

Associated with a promise that had to be kept, an impressive and majestic construction that showcased national technological skills, and the prestige and pride of a nation, Alqueva was used by all the successive governments, both left

[5] *Prosseguir Alqueva para Desenvolver o Alentejo e o País.*

and right. Today, it is the largest reservoir in Europe, and it will almost certainly remain so ad vitam aeternam, because it no longer corresponds to any relevant reality on an environmental level. Alqueva was obsolete before it was built.

12.3 Alqueva and Policies of Public Participation

Beyond the historical, social, and economic dimensions of the project, the construction of the dam took place at the very moment when policies of public participation[6] were reactivated at the Rio Forum of 1992, whose directives were to be applied to every big construction project. The Alqueva project had both financial means (European funding was no longer restricted) and intellectual means (all the traumatic histories of dams had been analyzed). Particular attention was paid to Luz, the only village of slightly more than 400 inhabitants that was flooded by the Alqueva reservoir.

The process of resettling the population of Luz was experimental in Europe and today can be qualified as satisfactory, technically speaking. It entailed replicating the village and, during the difficult stages of moving—including relocating the cemetery—pairing villagers with a team of psychologists (Wateau 2008). The company building the dam, the Company of Development of the Alqueva Infrastructures (EDIA), set up a permanent team of four experts in the village, including a sociologist, agricultural engineer, historian, and architect. The systematic reproduction of the houses began in 1996. The new village, about 2 miles from the old site, was completed in 1999, and the villagers started to acclimate to the idea of moving. Up until 2002, the year the cemetery and then the village population was relocated, the team of experts interacted with the inhabitants every day, listening to them and reassuring them. The team remained in place and in contact with the population for 5 years after the move, during the period corresponding to the guarantee on the replacement of private houses and public buildings (Fig. 12.3).

In terms of participation, it appears that lessons had been drawn and directives were applied. Permanent consultation with the villagers was established. People were able to express their discontent and come to agreements, or even modify infrastructure that had already been built and paid for, including church benches, house chimneys, and marble window frames. In newspapers, one could read that "all the hypotheses that had not been advanced at Vilarinho das Furnas were proposed to the inhabitants of Luz. They chose to have a new village, decided on its location [. . .] the houses were built with care [. . .], collective facilities are of good quality [. . .]. And even when the inhabitants of Luz complained, one can only hear [in their complaints] the voice of Vilarinho das Furnas which echoes that of

[6] As defined by Sophie Allain (2001).

Fig. 12.3 The new village of Luz (Source: Author)

Luz. The work accomplished at Alqueva does not extinguish the crime of Vilarinho. Alentejo exhibits the injury of its brothers in the north."[7]

The situation appeared to be perfectly under control, and yet, in the village of Luz, nobody wanted to leave their old houses. The absence of organized resistance did not mean the presence of collective consent. Opposition from the villagers was expressed in a diffuse manner throughout the process, with some moments of more obvious exasperation that called into question the constructive effects of public participation: in a petition in 2000, the inhabitants denounced broken promises, lies, and bad faith. Construction of the new village, which had been assembled and dismantled several times due to a lack of overall supervision, increased the total cost of the work and discredited those in charge of the project. The new houses, meant to be identical to those they were replacing, hardly resembled the originals, and the layout of the village as a whole, much more extensive and open than the old one, altered its social character. Despite all of that, the villagers moved without too much fuss, finding the modern comforts provided by the new construction easy to adopt.

The desire to believe, the need to have faith in this huge project, was probably the most effective element in its favor. At a local scale, the villagers complained, but in the end they all received what they had demanded. To borrow an allegory from the Portuguese poet Fernando Pessoa (1989), they hoped that their "untranquility" would procure a better future for their grandchildren. At the regional scale, the hopes for development in this arid, deserted zone were such that the construction was quickly adopted. People are still prepared to wait for the investment to bear fruit, for entrepreneurs to get organized and transform Alentejo into an attractive region providing job opportunities. At the national scale, the promise has been kept and the dam is seen as a strategic reserve of water for the

[7] in *Publico*, May 30, 2004, "O vale das ilusões."

country. And even if water quality is becoming problematic, notably for the luxury tourist developments that were imagined, optimizing Alqueva, creating a demand around the supply, is seen as a solution.

12.4 Exploitation and/or Delay?

It is invalid to speak of a delay among the villagers in contesting the project, as some academics theorists have suggested. That reveals an ignorance of the factors that can motivate and mobilize a population. It also reduces to hastily-sketched principles a local situation that is more complex than might at first appear to developers and intellectuals with no direct experience of local daily life. In the village, it was not delay that people feared, but the accusation of exploiting their situation. For months and months, rubberneckers came to visit the village that was going to be drowned. With unparalleled patience, the villagers answered their sometimes sordid questions and sated their curiosity and appetite for the sensational. One Carnival Sunday in 2001, more than 150 cars pulled into the village in 90 minutes. Packed into the narrow streets of the old village, some of the cars managed to offload souvenir hunters. But in Luz, no cap or t-shirt, not even a pot of jam, was sold to the visitors. For the right-wing village mayor under a left-wing government, it was very important that Luz should not be seen as exploiting the situation. The inhabitants of the village, he told the media, are the sacrificed people of Alentejo, not opportunists to be reproached for taking advantage of a social and political history not of their choosing. After all, everyone in the village was against the dam. Or at least, nobody wanted their house to be affected. The visitors, piqued at not finding anything in the way of a souvenir, pillaged the low walls of shale surrounding the fields at the edge of the village. Brandishing a small stone, they could affirm that they had visited the village of Luz before it was submerged beneath the waters.

A comparable ethical position was adopted in relation to protest. A group of Germans came to the village one day intent on helping the inhabitants of Luz organize their protest, explaining they had more experience in dealing with mistreatment by governments. The mayor declined their offer. Thanking them for their concern for Luz, he explained this was the villagers' story, and the visitors' help was not needed. In the face of a moral value, resistance and protest were relegated to a principle rooted in the history of a region in relation to its nation.

12.5 Alqueva: An Example for the Future?

So what conclusions can we draw about Alqueva? What role did public participation play? What benefits can this experience provide for the future? First, can we speak of a new departure in the rationale of imposing large infrastructures on a

population? Probably not. Alqueva was built for the good of the country, not so much for irrigation or electricity but to create a strategic water reserve for both domestic and international reasons. Let us recall, however, that Alqueva was decided in the 1950s and 1960s, which tends to diminish the effects of the process as a whole. Was there a new departure in the approach to the project? Yes, without a doubt, because past experience was taken into account. The building of the Alqueva Dam was a direct and symmetrical echo of the drama of Vilarinho das Furnas. And it was in the light of the previous experience, considered a national catastrophe, that the building of the new dam was approached with caution and thoughtfulness.

In terms of compensation, the experimental dimension of Alqueva, with the choice of the identical rebuilding of a village, respecting the social morphology of the old village, was probably the result both of heightened civic awareness and of Portugal's entry into the European Community in 1986. Lastly, was there a new departure in terms of effects? Yes, because between 1953 (Tignes) and 2002 (Alqueva) an irreversible recognition emerged of the existence of the populations, the heritage, and even the landscape destined to be submerged. This constitutes "a development in our conception of social cohesion, principles of collective management, and responsibility in choice and decision-making processes" (Guichard 2003).

And yet, the joint venture responsible for the project does not appear to have invented anything. It did no more than repeat the desiderata expressed by the inhabitants in 1977 and 1978, when the first meetings were held with the villagers. According to the study conducted at the time by the anthropologist Isabel Carvalho, the villagers desired, in order of importance: the transfer of the cemetery before the inhabitants were moved; the building of a new village and church in which the patron saints could be reinstated; proximity to the original site; a new village with all amenities (drains, electricity, schools, pharmacy, doctor); a town hall; a community center; and a house with a garden for everybody (Carvalho 1981).

Put that way, it appeared easier to avoid a challenge. These sacrificed people of Alentejo, so lacking in protest, some might say, nevertheless succeeded in obtaining everything they asked for and then some, in the form of a cable network, a museum, a huge bull ring, and a gymnasium. But the return to oblivion and the lack of economic and tourist activities in the interior of the country are now taking their toll. At the end of September 2008, more than 40 people (10.5 % of the population) had left the village because of lack of employment or lack of houses to build on land that had, nevertheless, been set aside for that purpose. The village is losing its vitality and sociability, the school almost closed, people are having trouble readapting, and apathy is steadily gaining ground.

The great dam of Alqueva has not yet gained international renown. And yet it represents the most modern construction of its kind in Europe, with a carefully monitored reservoir, benefiting from all the latest technology and expertise. Tourism developers are late in coming forward, or perhaps they still fear the construction of factories in Spain and the potential for pollution to spill into the reservoir. In the context of sustainable and globalized water, Alqueva is not conclusive or satisfactory enough as an example to become an effective model of how to build dams in

the future. Alqueva nevertheless represents a new and important step forward in the construction of dams, one in which populations are taken into more thoughtful consideration and carefully rehoused. Despite the limitations mentioned, this essential dimension must clearly be appreciated and developed.

References

Allain S (2001) Planification participative de bassin et gouvernement de l'eau. Géocarrefour 76(3):199–209
Ayeb H (2001) L'Égypte et le barrage d'Assouan. Que serait l'Égypte sans ce très grand barrage? Hérodote 103:137–151
Barragem de Alqueva, Livro negro (1981) Ed. Amanhã, Lisboa
Bethemont J (2008) Les grands barrages, entre contestation et développement? In: Blanc N, Bonin S (eds) Grands barrages et habitants. Eds MSH & Quae, Paris/Versailles, pp 23–39
Blanc N, Bonin S (eds) (2008) Grands barrages et habitants. Les effets sociaux du développement. Eds Maison des sciences de l'homme & Quae, Paris/Versailles
Canal Sanchez-Pagin JM (1988) Riaño: cinco villas. Rafagas históricas. Ed Lancio, Léon
Carvalho I (1981) A população da Aldeia da Luz e a barragem de Alqueva. In: Barragem de Alqueva, livro negro. Ed Amanhã, Lisboa, pp 77–88
Cernea M (2008) Penser les risques sociaux du développement. In: Blanc N, Bonin S (eds) Grands barrages et habitants. Eds MSH & Quae, Paris/Versailles, pp 57–75
Clarimont S (1999) Les conflits pour l'eau en Europe méditerranéenne: le cas du bassin de l'Ebre (Espagne), unpublished doctoral thesis, Montpellier
Clavairolle F (2008) Habiter les lieux: le rôle de la mémoire. In: Blanc N, Bonin S (eds) Grands barrages et habitants. Eds MSH & Quae, Paris/Versailles, pp 125–140
Drain M (ed) (1996) Les conflits pour l'eau en Europe méditerranéenne. Espace Rural 36
Faure A (2008) Écouter les voix de la vallée: les riverains de la Dordogne. In: Blanc N, Bonin S (eds) Grands barrages et habitants. Eds MSH & Quae, Paris/Versailles, pp 101–124
Gonçalves ME (2001) O Caso de Foz Côa: um laboratório de análise sociopolítica. Edições 70, Lisboa
Guichard F (2003) Réflexions autour de deux conflits pour l'eau au Portugal : Alqueva et Côa. In: Drain M (ed) Politiques de l'eau en milieu méditerranéen. Le cas de la péninsule ibérique, vol 82. Casa de Velázquez, Madrid, pp 236–249
Lacoste Y (2001) Géopolitique de l'eau. Hérodote 102:3–18
McCully P (1996) Silenced rivers. The ecology and politics of large dams. Zed Books, London/New Jersey
Pessoa F (Bernardo Soares) (1989) O Livro do dessasosego. Editora Brasiliense, São Paulo
Prosseguir Alqueva para desenvolver o Alentejo e o País (1985) Ed. Caminho, Lisboa
Roy A (1999) Le coût de la vie. Gallimard, Paris
Silva A (1982) Alqueva, a grande barragem. Livros Horizonte, Lisboa
Varaschin D (2001) Tignes, la naissance d'un géant. Artois Presses universités, Arras
Wateau F (1999) Barrages, Identités et Frontières. Des barrages sur rivières frontalières (Sela et Alqueva)? In: Pujadas J, Martín E, Pais de Brito J (eds) Globalización, Fronteras culturales y políticas y Ciudadanía. Santiago de Compostela, pp 229–244
Wateau F (2002) Du Portugal à l'Europe. Effets d'échelle, de Melgaço à Alqueva. Lusotopie IX (2):165–176
Wateau F (2008) Reproduire un village à l'identique: Alqueva. In: Blanc N, Bonin S (eds) Grands barrages et habitants. Eds MSH & Quae, Paris/Versailles, pp 77–99

Chapter 13
Interbasin Water Transfers in Spain: Interregional Conflicts and Governance Responses

Nuria Hernández-Mora, Leandro del Moral Ituarte, Francesc La-Roca, Abel La Calle, and Guido Schmidt

13.1 Changing Course in Spanish Water Policy

Water politics, water culture, and water engineering all have played a central role in shaping the Spanish landscape and society. The contemporary water geography and ecology of the country are the products of centuries of socioecological interaction. Neither the history of the country nor its present geographical layout can be understood without taking into account the radical transformations of the water landscapes.

Covering 504,030 square kilometers (km^2), Spain is roughly the size of California and home to 46 million inhabitants. The country experiences significant climatic and rainfall variability, with annual average precipitation ranging from 2,000 millimeters per year (mm/yr) in some of the more humid northern regions to 300 mm/yr in central regions and the drier Mediterranean southeast. Intensive development of water resources has allowed for the irrigation of more than 3.6 million ha (less than one-third of the total agricultural surface that produces

N. Hernández-Mora (✉) • L. del Moral Ituarte
Departamento de Geografía Humana, Universidad de Sevilla, C/Doña María de Padilla s/n, Sevilla 41004, Spain
e-mail: nhernandezmora@us.es; lmoral@us.es

F. La-Roca
Department d'Economia Aplicada, Universitat de València, Campus dels Tarongers, Oriental 2E06, València 46022, Spain
e-mail: froca@uv.es

A. La Calle • G. Schmidt
Fundación Nueva Cultura del Agua, C/Pedro Cerbuna 12, Zaragoza 50009, Spain
e-mail: alacalle@ual.es; gschmidt.privado@gmail.com

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_13,

more than 55 % of agricultural output), the development of a significant hydroelectric capacity that supplies nearly 10 % of all national electric needs, and an effective domestic water distribution network. Significant public and private investments in water supply infrastructure in Spain throughout the past 100 years have resulted in more than 1,200 major dams, more than 20 major desalinization plants, and several interbasin water transfers of varying capacity and regional significance.

Historically, there has been wide-ranging agreement among the main water decision makers and stakeholders on projects and plans based on technical and political criteria (del Moral 2010). Nonetheless, several factors have thrown this old system into crisis: increasing interregional conflicts and water allocation demands; the appearance of new water users who challenge the long-term privileges of large historic water holders; exponential growth in illegal water use; increasing ecological deterioration despite new European Union (EU) and international sustainability policy objectives; and a lack of understanding of water scarcity as a risk to be managed, not as a geophysical imbalance or a structural hydrological deficit.

Today, the political impasse that has delayed the publication and approval of new river basin management plans (RBMPs) in Spain and the fact that new infrastructure proposals meet with strongly organized social and often political opposition is proof that the system that had worked well in a closed water policy community is no longer operative. An important lesson that can be drawn from the Spanish case is that the long-term effects of a supply-oriented water policy approach are not free of contradictions. Beyond a certain level of water resources development, augmenting existing resources through increased river regulation or water transfers simply postpones shortages and conflicts without resolving the underlying problems.

Overestimating resources or demanding an artificially high volume of water to meet short-term management goals and appease pressure groups results in social or environmental crisis over the longer term. In Spain, this practice has resulted in the over-allocation of existing resources and a transfer into the future of politically difficult decisions to limit demand and use. New plans must deal with the absence of new supply augmentation alternatives, challenges to implement instream flow requirements, and inevitable trade-off decisions. Despite significant public and private investments in water supply infrastructure, no technical, territorial, political, or social agreement exists on how to allocate water in Spain.

13.2 Institutional Setting for Water Resources Management and Allocation in Spain

Spain's enormous investment in hydraulic infrastructure is rooted in more than a century of water legislation and planning efforts. The first comprehensive Water Act, approved in 1879, declared all surface waters as part of the public trust and

allowed for the privative use of that water through administrative permits. The early twentieth century was marked by the development of national hydraulic plans designed to promote the country's economic and social transformation. These plans called for publicly funded hydraulic public works and suggested, for the first time, the need to devise large interbasin water transfers as a means to allocate water between regions. The ideas promoting economic progress through irrigation and the development of institutions powerful enough to implement them have an irregular trajectory throughout the periods that marked the country's tumultuous twentieth century: monarchy (until 1931), the Second Spanish Republic (1931–1936), the Spanish Civil War (1936–1939), and Francisco Franco's dictatorship (1939–1975). With the establishment of democratic rule in 1978 and a new constitutional framework, Spain was divided into 17 autonomous regions. Today, these regions have broad powers in a wide range of issues, including health, education, social policy, natural resources management, environmental policy, and land use planning.

The political division of the country into these regions brought to the water negotiating table and the political arena strong regional interests that had been largely silent until that time. In this context, a new Water Act was approved in 1985 to adapt water legislation to the new social and political reality. The new law built on an existing water planning and management structure that divided Spain into river basin districts encompassing a single river basin or several smaller basins. The 1978 Constitution and the 1985 Water Act established that when a river basin crosses more than one autonomous region (interregional river basin), it is managed by a river basin authority (RBA) that is organically ascribed to the national Ministry of Agriculture, Food and the Environment. When a river basin flows entirely within the territory of an autonomous region, it can be managed by that region's government through either an autonomous water agency or by a department within the regional government. Figure 13.1 shows the current boundaries of the 25 existing basin management districts. This administrative division has resulted in the transfer of management responsibilities to regional governments in the case of interregional basins, a process that is still ongoing.

In terms of water planning, the 1985 Water Act incorporated some key features:

- It required RBAs to develop river basin management plans (RBMPs) as the central instrument for water allocation and management within the river basin district. It also required the Ministry of the Environment to develop a National Hydrological Plan (NHP) to coordinate and balance the needs of individual river basin plans and design and approve any potential interbasin water transfers.
- It established the increase in available resources through the construction of new hydraulic infrastructure (dams, canals, and water transfers) as the primary goal of water planning.
- It maintained the water use permitting system established by the 1879 Water Act, whereby individual water users, municipalities, or irrigator associations request and are granted water permits. The permits give them a right to use a certain volume of water for a specific purpose and in a specific location for a maximum renewable period of 75 years.

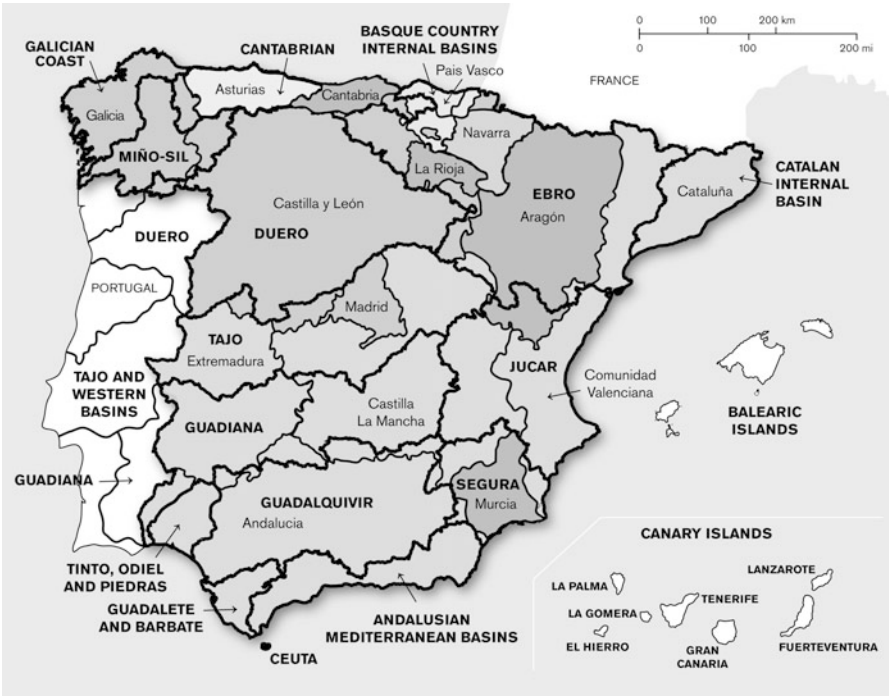

Fig. 13.1 River basin districts and autonomous regions in Spain (Source: MMA 2000)

- It modified the order of priority allocation to reflect Spain's changing socioeconomic priorities (Table 13.1). Individual RBMPs can alter this order as long as domestic water supply is maintained as the priority use.
- Groundwater resources, which had been privately owned until 1985, were incorporated into the public trust, thus bringing them under the planning and management responsibilities of RBAs and into the general calculation of allocable water resources. Any post-1985 groundwater uses in excess of 7,000 cubic meters per year (m^3/yr) require a permit.
- It consolidated a long-standing tradition of user participation in water resources management. Representatives of irrigator associations, hydroelectric companies, municipal uses, and autonomous regions are represented in RBA boards and commissions in proportion to the amount of the region's territory and population included in the river basin (in the case of autonomous regions) and to the amount of water used (in the case of consumptive users) (Varela and Hernández-Mora 2009).

The 1985 Water Act has been revised at different times in response to changing needs and priorities. The first major reform came in 1999 after the particularly severe 1992–1995 drought. In terms of water allocation, the 1999 Water Act[1]:

[1] Law 46/1999.

Table 13.1 Order of priority allocations in Spain's water legislation

1879 Water Act	1985 Water Act
1. Domestic water supply	1. Domestic water supply
2. Railroads	2. Irrigation and agriculture
3. Agriculture	3. Hydropower generation
4. Navigation canals	4. Other industrial uses
5. Water mills, crossing boats, and floating bridges	5. Aquaculture
6. Aquaculture	6. Recreational uses
	7. Navigation
	8. Other uses

Source: Authors' own elaboration

- Introduced government-supervised, market-based mechanisms as a means of either temporarily or permanently reallocating water among users and sectors. The law allowed two possible mechanisms:
  - Water permit exchange centers set up and managed by an RBA. They use public funds to buy water rights from permitted users permanently or for a specified time period (Requena 2011; Ferrer and Martín 2011).
  - Water permit seasonal sales, which allow for the voluntary sale of water use rights on a seasonal basis among users in the same river basin districts (Corominas 2008).
- Introduced environmental flows as a prior restriction to other uses, determining that minimum flows had to be calculated for different river segments. While this innovation is significant, the requirement was vague and few RBMPs actually incorporated true minimum instream flows into their planning documents.

In 2000 the EU approved the Water Framework Directive (WFD). A movement called Nueva Cultura del Agua, or New Water Culture, which was closely related to the defense of the WFD proposals, emerged in Spain, advocating for a change in water policy from large, environmentally destructive projects to more demand-side solutions and public participation. In 2003 the WFD was transposed into Spanish Law.[2] The transposition tried to balance the existing goals and practices of Spanish water policy with the new aims of the WFD, thus failing to produce real change.

[2] Law 62/2003.

13.3 History and Development of Water Allocation Decisions in Spain

Water allocation and management responsibilities constitute a multi-level, multi-agency process that operates within different institutional frameworks at different spatial and temporal scales. Table 13.2 summarizes the different spatial scales in which water allocation decisions are made and the legal and administrative instruments that enable those decisions.

Table 13.2 Characterization of water allocation decisions in Spain on a spatial scale

Spatial scale	Characterization	Legal/administrative instrument	Dominant allocation criteria
International	Spain shares four major river basins with Portugal (Tajo, Duero, Guadiana, and Miño)	Albufeira Convention	Guarantee hydroelectric production, supply, minimum environmental flows, and flood protection
Country	Allocation of water resources among river basin districts within the Spanish part of the Iberian Peninsula + islands	National Hydrologic Plan (approved by national law): System of National Hydrologic Equilibrium (*Sistema de Equilibrio Hidrológico Nacional*) for inter-basin transfers greater than 5 mcm	"National hydrological balance" National economic and territorial strategies
River basin district	Allocation of water resources between smaller natural river basins within the same river basin district	Basin Management Plan (approved by national or autonomous law)	Regional economic development Sectoral development
Exploitation system	Territories within a river basin district supplied by a common distribution network (natural, as in a common aquifer, or artificial, as in an irrigation system)	Basin Hydrologic Plan Water balance	Sectoral/territorial (sub-basin)
Demand unit	Cluster of users grouped by activity/use (irrigation, urban supply, hydroelectric users)	Basin Hydrologic Plan Existing uses and future demand expectations	
User	Holder of water use rights (a city, a hydroelectric company, a landowner or a water user association)	Water use permit	Existing rights

Source: Authors' own elaboration

Before the 1985 Water Act was approved, allocation of water resources had been a mostly top-down process, in which the construction of large hydraulic infrastructures was executed in response to economic development schemes designed at the national level by a powerful central government. Water management and planning, and thus allocation decisions, were dominated by a strong and largely closed water policy community made up of irrigators, hydropower companies, and developers. Often times, decisions during this period resulted in significant imbalances in water allocation and availability between regions within the same river basin and among regions in different river basins. For instance, hydraulic infrastructure was often built to supply water in other regions, regardless of local or regional needs or preferences, to further national economic development goals. Over time these inequalities have surfaced through political conflicts when autonomous regions have become more politically powerful or through the illegal use of alternative water resources, primarily groundwater.

River basin management plans allow for the allocation of water to different management systems—areas in which the basins are subdivided for management purposes—and user groups within each system based on existing uses and projected future demand. Within the parameters established in the RBMPs, RBA user-participatory boards decide annual allocation quotas[3] to individual users or groups of users depending on annual precipitation and existing reservoir and groundwater levels.

The 1985 Water Act established that any allocation of water between different river basins had to be included in the NHP. In 1993, the Socialist government presented a draft NHP without waiting for the elaboration and approval of the individual basin management plans. The draft, largely inspired by the early twentieth century ideal of spurring economic development, proposed moving large volumes of water (up to 3,350 million cubic meters (mcm) per year) from northern humid regions to more arid southeastern regions through a series of publicly funded large interbasin water transfers, namely from the Duero, Tagus, and Ebro rivers (Fig. 13.2). The 1993 plan was the subject of a strong 3-year national controversy. In addition, Portugal strongly objected, arguing that uses and environmental values in the Portuguese Tagus and Duero rivers would be negatively affected. Following its victory in the 1996 elections, the conservative Popular Party carried out a campaign promise to open national debate on water policy and planning and withdrew the draft plan.

Intense water planning and policy activity by the 1996–2000 legislature ensued. Some of the primary milestones of this period included:

- The approval of the RBMPs in 1998;
- The publication of a White Paper on Water (MMA 2000), the first comprehensive and critical analysis of the situation of water resources in Spain subject to public debate and review;

[3] Cubic meter (m^3) per hectare and type of crop or per number of inhabitants, in the case of urban water supply.

Fig. 13.2 National water grid as proposed in the 1993 draft National Hydrologic Plan (Source: MMA 2000)

- The negotiation and signing of the Albufeira Convention in 1998, which governs Spanish-Portuguese relations for the management of transboundary rivers;
- The modification of the 1985 Water Act in 1999;
- The negotiation of a new NHP, approved in 2001 during the 2000–2004 legislature.

The approval of the 1998 RBMPs was a technical process largely closed to public input and debate. While autonomous regions were represented in the RBA participatory boards, allocation decisions generally adhered to pre-1985 processes and regional interests were inadequately represented. However, some regional interests emerged, resulting in the allocation of specific volumes to different regions within a basin.

In 2000 the government proposed a new NHP that was less ambitious than the 1993 version but continued to emphasize the construction of new reservoirs and water transfers. The project's strategic objective was attaining a general water balance in Spain by distributing water resources between the so-called surplus basins and basins with so-called structural deficits. The main feature of this project was the transfer of some 1,000 mcm of water annually from the mouth of the Ebro River to Valencia, Murcia, and Almeria in the east and southeast, and to Barcelona in the north. The project again was shelved in the face of strong social and political opposition from the Ebro basin, including mass demonstrations in Madrid,

Barcelona, and Brussels; the reluctance of the European Commission to provide funds for the project due to concerns about the environmental impacts on the Ebro delta; and the Socialist victory in the Spanish national election of 2004.

After 2004, Spanish water policy appeared to relegate large hydraulic works in rivers and focused instead on the promotion of desalination as the new supply alternative. The AGUA Program,[4] approved by the Socialist government in 2005, envisaged the construction of some 20 desalination plants along the Mediterranean coast to provide the water that otherwise would have come through the Ebro transfer. The new emphasis coincided with the beginning of the new hydrologic planning cycle under WFD guidelines, which started in earnest in 2004. In accordance with WFD requirements, new RBMPs had to be approved by December 2009 for a 6-year planning cycle (La-Roca and Ferrer 2010). However, interregional conflicts and political confrontations have significantly delayed the process.

Unresolved conflicts between different autonomous regions regarding water allocation decisions are hindering the current river basin planning process. This is the case, for instance, of the Tajo and Segura RBMPs, two basins connected by the country's largest interbasin water transfer. As of late 2013 the plans were deadlocked over conflicts regarding the viability of the Tajo-Segura water transfer in the context of current ecological requirements in the Tajo basin, and legal challenges from the Castilla-La Mancha autonomous region to an infrastructure that was approved in pre-democratic Spain.

The political interplay between the different autonomous regional governments and the central government in terms of water planning and management has been further complicated by the parallel process of updating several Statutes of Autonomy, the basic laws that define the institutional make up and responsibilities of each autonomous region. The most recent wave of reforms occurred during the 2004–2008 legislature and have included new references to water in the form of reserves or priority rights over water flows of rivers that cross more than one autonomous region. This break in the status quo between regions has further fueled interregional conflicts over water and has resulted in several appeals of the reformed statutes to the Constitutional Court.

13.4 Interbasin Water Transfers

The need to balance the uneven natural distribution of water resources availability in Spain through interbasin water transfers has been a central part of Spanish water management since the first hydraulic works plans of the early twentieth century. Furthermore, the historical socioeconomic significance of irrigated

[4] AGUA: Actuaciones para la Gestión y la Utilización del Agua, or Actions for Water Management and Utilization.

agriculture along the Mediterranean coast, particularly in the Valencia and Murcia autonomous regions, justified the need to augment water resources in a region where water scarcity was seen as the only impediment to the development of a thriving agricultural and tourism-based economy.

Two primary criteria have been used to allocate resources among river basins:

- The so-called hydrologic deficit, also called structural deficit, of the recipient basin. The deficit is determined within the RBMP when available resources are insufficient to meet existing and expected future demands. However, demands are considered inelastic variables, economically, socially, and politically unquestionable and independent of planning and management decisions. The unit costs (per m^3) of the water transfers are usually undervalued when compared to other alternatives such as desalination or regenerated water. Also, demand management alternatives are typically not rigorously considered.
- The so-called excess resources in the donor basin. By law, there are excess water resources when existing natural or renewable resources exceed present and future economic and social demands in the donor basin. Since 1992, and particularly since 1999, environmental flows have been considered as reserves in potential donor basins through the estimation of minimum instream flows. If present and future demands (and minimum flows) are guaranteed in the basin, the leftover water is considered excess that can be transferred. However, existing resources have systematically been overestimated and environmental flow requirements underestimated.

As Fig. 13.3 shows, a number of interbasin water transfers are operational in Spain. Tajo-Guadiana is under construction and several others were proposed at one time but never built, though they continue to be part of the regional political discourse (Ródano-Ebro, Segre-Llobregat, Ebro water transfer, Tarragona-Barcelona).

13.4.1 Tajo-Segura Interbasin Water Transfer

The Tajo-Segura (ATS[5]) is the most significant water transfer in operation today. While it was conceived in the earlier part of the twentieth century, construction began in 1971 and the transfer became fully operational in 1980. The ATS allows for a maximum transfer of 600 mcm/yr over 1,000 km from the Entrepeñas and Buendía dams in the Tajo River headwaters to the Júcar, Segura, and Mediterranean river basin districts in the southeast for urban water supply and irrigation (Fig. 13.3). According to the 1971 enabling legislation, only excess water from the Tajo River Basin can be transferred. However, the law failed to determine

[5] Acueducto Tajo-Segura.

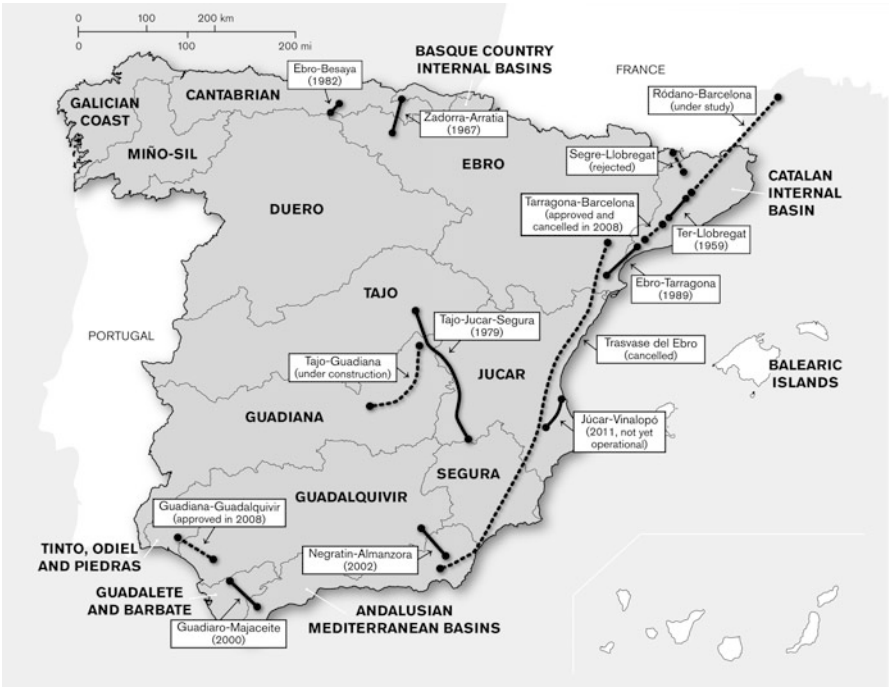

Fig. 13.3 Existing and proposed interbasin water transfers in Spain (Source: Authors)

how that excess was to be calculated. Typically, the Segura RBA representatives and end users, mainly irrigators, ask for maximum volumes to be transferred. These volumes are usually granted, except when the Tajo is suffering extraordinary drought conditions.

Different pieces of legislation and judicial decisions have aimed to establish a concrete operational rule for the water transfer. In 1980, a new law determined the water use fees (per m^3) to be paid by end users. It also created the Commission for the Exploitation of the Tajo-Segura Transfer, which meets quarterly to determine transfer volumes. Over the years, the government of Castilla-La Mancha has questioned the availability of excess resources, arguing that the commission has allowed for the transfer of too much water, making it difficult for the donor region to meet its own existing water needs. These repeated legal challenges to the transfer decisions of the commission have resulted in a judicial determination of excess (and therefore transferrable) water resources. Excess is broadly defined as the difference between the water in the Entrepeñas and Buendía dams plus the minimum expected runoff, minus the volume of water needed to cover all consumptive uses in the Tagus River Basin, including minimum flows required at a specified measuring point in the Tajo River downstream from the transfer canal.

The 1998 Tagus RBMP established a clear exploitation rule for the transfer system that tried to deal with mounting regional conflicts between Castilla-La Mancha and Murcia and the ongoing legal battle. The rule established:

- No transfers are allowed when storage in the Entrepeñas and Buendía dams falls below 240 mcm/yr.
- Under drought circumstances, when the water stored in the Entrepeñas and Buendía dams falls below certain monthly volumes, the water transfer decisions have to be approved by the national Council of Ministers.

Since the 1999 Water Act reform, irrigators in the Tajo River Basin have been allowed to sell water rights to irrigators in the Segura River Basin using the transfer infrastructure under drought circumstances and when enabling legislation is approved. This was the case during the 2005–2008 drought. The volumes sold are included in overall calculations of total volumes transferred.

In spite of the rules, conflict has continued to escalate between donor and recipient regions, and the courts have continued to intervene. Several reasons help explain this situation. First, original calculations of natural renewable and excess resources in the Tajo River were inflated. In addition, since the 1980s, available resources in the upper Tajo basin, where the transfer originates, have decreased by an estimated 47.5 % (Estevan et al. 2007). Meanwhile, political and public pressure from the recipient regions has forced the commission to allow maximum transfer volumes to the environmental detriment of the Tajo River. Furthermore, the transfer commission operates in a completely opaque fashion, with no public or stakeholder input or transparency in its negotiations, which are confidential.

In the summer of 2006, the middle stretches of the Tajo River dried up while significant volumes of water were being transferred through the ATS. This resulted in a strong social outcry in the Tajo basin that demanded, for the first time in an organized fashion, the cancellation of the ATS. Shortly thereafter, the government of Castilla La Mancha included a closing date of 2015 for the ATS in its Draft Statute of Autonomy but removed this provision after the central government rejected the proposal.

A new draft RBMP for the Tajo River proposes an increase in minimum instream flows for the river, an increase in the amount of Tajo water allocated to both Madrid and Castilla-La Mancha, and changes to the operational rules for the ATS. Under these new guidelines, the viability of the ATS is, at the very least, questionable. Political opposition from Murcia and Valencia to this draft delayed its publication and submission to public review. The central government has actively sought to broker an agreement between donor and recipient regions in order to avoid sanctions from the EU for delaying the implementation of the WFD.

13.4.2 The Ebro-Tarragona (Catalan Internal Basins) Water Transfer

The Ebro-Tarragona water transfer was approved in 1981[6] and allows for the transfer of up to 121.6 mcm/yr from the lower Ebro River to the Francolí River Basin—both in the autonomous region of Catalonia, but in different river basin districts—through a pipeline that stretches 80 km. The water is used for industrial and urban municipal supply in the Campo de Tarragona region. The transfer was justified by the high water stress index in the Francolí River Basin, which supplied a thriving chemical industrial complex, and the availability of potential volumes of water that could be obtained through increases in irrigation efficiency in the lower Ebro basin.

As part of the 1981 transfer agreement, industrial users in Tarragona would financially compensate farmers for the lost water rights. Farmers actually suffered no real loss, as the transferred volumes resulted from agricultural modernization plans that were publicly funded, and the transfer has endured with no social or political conflict. The transfer became operational in 1989 and has never reached the maximum volume allowed. While it originally supplied water to 21 municipalities and 21 industries, those numbers had jumped to 70 municipalities and 30 industries by 2007. In 2008 industrial users proposed to the Catalan RBA the alternative of using regenerated water from surrounding sewage treatment plants to reduce water use costs. Those plans are under consideration.

13.4.3 The Negratín-Almanzora Transfer

Located in the Andalusian autonomous region, the Negratín-Almanzora transfer was approved in 1998 to strengthen supply guarantees for irrigation and municipal water supply in the province of Almería. It transfers a maximum of 50 mcm/yr from the Negratín Dam in the Guadalquivir headwaters to the Cuevas de Almanzora Dam, 120 km away in the Mediterranean Andalusian Internal Basin. An exceptional feature of the project is that its funding legislation[7] explicitly recognizes that the Guadalquivir River Basin has no excess water and that the water transfer will aggravate the basin's water deficit. It therefore establishes strict conditions under which transfers can take place:

- Transfers will only be allowed when reserves in the Negratin Dam exceed 210 mcm.
- Transfers will only be allowed when overall reserves in all of the dams in the Guadalquivir River Basin's general regulation system exceed 30 % of total capacity (around 5,000 mcm).

[6] Law 18/1981.

[7] Law 55/1999.

- A maximum of 50 mcm can be transferred annually.
- Final users must pay the cost of new infrastructure in the Guadalquivir basin necessary to compensate for the additional deficit caused by the water transfer.

The Negratín-Almanzora water transfer is managed by a Technical Management Commission, which determines the transferrable amounts on an annual basis. It is made up of representatives of the Andalusian Water Agency, the Guadalquivir RBA, and users of both the donor and recipient basins.

The transfer provides resources for highly productive irrigation and for urban and tourist development on the eastern coast of Almería. The inputs from the Guadalquivir River Basin help reduce the pressure on the conflictive ATS that also supplies the region. On the other hand, the Negratín-Almanzora transfer connects two river basins within the same autonomous region, whose government supports the idea of more efficient water distribution for economic and employment reasons. These two factors help explain the project's relatively low level of conflict and the support it receives from both the central and regional governments.

Social protest has come in the form of the Federation of Irrigator Communities (FERAGUA), the main irrigators' organization in the Guadalquivir basin, which opposed the water transfer (FERAGUA 2000). The group's aim was to accelerate the construction of new dams to increase the regulation capacity in the Guadalquivir River Basin. In fact, Guadalquivir irrigators belonging to FERAGUA have taken advantage of the transfer facilities to sell water to users in Almería.[8] Other farmer organizations in the Guadalquivir River Basin, such as the Union of Small Farmers and the Irrigation Association of Andalusia, explicitly supported the transfer. Their close links to the ruling Socialist party in Andalusia and the fact that they have members in both basins help explain their support. Environmental organizations opposed the transfer but were unable to organize significant social protest.

13.4.4 The Ebro Water Transfer and the 2001 NHP

Perhaps the most significant public debate over interbasin water transfers is the debate over the proposed Ebro River Basin transfer, which was the central element of the 2001 NHP. The NHP proposed a large-scale water transfer from the Ebro River through two canals that would transfer a total of 1,050 mcm/yr over 900 km: 190 mcm to Barcelona in Catalonia and 860 mcm to the Mediterranean southeast (Valencia, Murcia, and Almería provinces) (Fig. 13.4). The estimated cost of the project was 4 billion euros during a 10- to 15-year construction period. The water transferred would be used for irrigation (650 mcm) and urban water supply (400 mcm). While the transfer was the central proposal of the NHP, it also foresaw

[8] At 0.18 euros/m^3.

Fig. 13.4 The Ebro transfer proposed in the 2001 National Water Plan (Source: MMA 2001)

the building of more than 100 large hydraulic infrastructures in different river basins with an additional budget of 2 billion euros.

The NHP was approved by the Spanish parliament in June 2001 after a long and intense controversy over economic, ecological, social, cultural, and political issues. Different ideas about the physical and political structure of the country, interregional cohesion, efficiency and equity issues, and land use and spatial development models were involved. The role the extensive continental irrigated agricultural sector played in the Spanish economy and rural areas, as well as the traditional and new intensive coastal irrigated agriculture; the effects of the EU's Common Agrarian Policy; the evolution of the labor market; and new immigration trends were also discussed. The pattern of residential and tourism development in coastal areas emerged as either a justification for or criticism of the project. Water economics and the water pricing system, the role of public subsidies on water development and management, and the environmental costs of the traditional water policies were subject to public debate in Spain, just as they had been throughout Europe with the drafting of the WFD.

In November 2003, a new left-wing coalition government was elected to govern Catalonia's autonomous region. Many of the social conflicts surrounding the NHP proposal focused on the impacts on the lower Ebro and the river's delta, located in Catalonia. As a result, the new autonomous government refused water from the

Ebro River transfer for Barcelona's water supply, thus breaking historical political alliances in support of hydraulic development policies. In response to the Spanish government's request for EU financial support for the project, the EU released its unofficial technical position in spring 2004, casting serious doubts on the supply guarantee, water quality, and environmental and economic aspects of the proposal: "DG ENV has strong reservations concerning the net environmental benefit and hence the eligibility of the financing request. We have numerous concerns in relation to the cost benefit assessment carried out by the Spanish authorities and we are doubtful as to the financial viability of the proposed transfer. We continue to have reservations concerning the environmental impact of the proposed transfer and its coherence with EU environmental legislation and policies."[9] The EU position also stated the "project's financial sustainability is very unclear [. . .] even assuming that the national capital will have no financial returns, it is very difficult to understand (considering also the result of economic analysis) how such a use of public money may be consistent with the objective of economic development."[10]

In March 2004 the Socialist party surprisingly won national elections and halted the transfer construction that was underway. Through legislative action, the government modified the NHP law by eliminating the Ebro transfer from the plan while maintaining the other proposed infrastructure. In its place, the government proposed a series of alternatives to increase water availability in the receiving basins, including constructing desalination plants and instituting efficiency measures and environmental restoration programs. These measures were incorporated into the AGUA Program.

13.5 Challenges to interregional Water Allocation: Where Are We Today?

Decisions about the distribution of water resources between different regions within the same river basin district typically have not followed explicitly defined allocation criteria. However, in the new WFD planning cycle, explicit regional deal making has become more common. In general, the distribution of water between regions belonging to different river basin districts, where allocation criteria are more explicit, usually responds to regional or national development goals. A clear difference in hydrological stress levels between donor and recipient river basins is necessary. However, once this surplus/deficit formula has been taken into account, the strong potential for economic development in the recipient regions and associated influential pressure groups (irrigators, developers, utilities, etc.)

[9] Note of February 20, 2004, from Directorate General for the Environment to Directorate General for Regional Policy of the European Commission.

[10] Internal note of March 3, 2004, from Unit A3 to Unit D.01 of Directorate General for Regional Policy of the European Commission.

determine the final decision. Environmental, social and, more recently, economic considerations have been secondary and not rigorously analyzed. In fact, the focus on sectoral plans and strategies over ecological considerations was preserved in the transposition of the WFD to Spanish law in 2003.

The goal of transferring water from the northern humid regions to the southeastern Mediterranean coast reflected a national strategy to reinforce the productive capacity of regions where a better climate permitted higher yields and more profitable crops. The Tagus-Segura transfer and the 2001 Ebro water transfer proposal are the most recent manifestations of proposals and plans that date back to the first half of the twentieth century. More recently, an additional goal is to sustain and promote urban development and the tourism and recreational industry, the primary economic sector in Spain today, which is largely concentrated on the Mediterranean coast. As a result, in addition to impacts on the aquatic ecosystems and uncertain economic viability of these projects, such water transfers promote an unbalanced regional development model: the concentration of population and economic development in degraded coastal areas and demographic decline in central rural areas from where water is transferred.

Water transfers have promoted the growth of the intended economic activities in the recipient basins—irrigation and later tourism in the Segura basin or industrial development in Tarragona, for instance. However, problems have arisen. A primary one is the erosion of objectives phenomenon, whereby initial estimates of growth in water uses are quickly exceeded, exacerbating the situation of hydrological stress or deficit that the transfer was meant to alleviate. In addition, when interbasin transfers occur between different autonomous regions, a sense of historical and territorial injustice often emerges in the donor basins, resulting in growing interregional conflict that is less apparent when transfers occur within the same region.

The RBMP is the legal instrument in which the sharing agreements are registered. Nevertheless, only the NHP can provide coherence for the whole process. An iterative adjustment process takes place involving the initial interbasin transfer requests, the basin planning process, and the national aggregation and balancing of individual basin proposals. RBMPs build on existing water rights and strive to increase availability for new users (new rights). Because large areas in Spain have a semiarid climate and users pay low prices for water, demand is always growing and planning objectives have traditionally focused on new storage and transport infrastructure to increase water availability. The basin plans allocate water to current rights holders and create reserves for future demand. Future demand in a basin can be established in different regions, presenting opportunities for interregional sharing problems to arise. The allocation agreements therefore build on three levels.

The first level is determined by existing water rights, which enjoy great stability despite the theoretical possibility of revising them. Water rights can be seen as the product of previous agreements. The courts resolve potential disagreements at this level.

Secondly, RBMPs constitute the framework for new water rights allocation among users and regions in a basin. Allocation decisions have a significant

technical component. Natural or renewable resources are estimated on the basis of existing hydrological information, using models and extrapolating. Water shares are expressed as annual volumes of available resources and are assigned to exploitation subsystems within the basin. They are then allocated to different user or demand units within the exploitation system—for instance, an irrigator community—either because of a preexisting right or through the creation of a new one by administrative permit.

Detailed norms are set for the allocation of water among users. Some are established by law. Others, which determine the final share of water in its details, such as the monthly flow, are agreed upon by users in the context of the RBA participatory boards under the supervision of the water administration. For drought periods and in compliance with the 2001 NHP, special drought management plans have been prepared in each river basin to guarantee priority uses.

Finally, sharing water between basins is the function of the NHP. Its approval is a competence of the Spanish parliament, and therefore the possibility of an agreement is purely political. Furthermore, given the existence of increasingly powerful autonomous regions and that river basin planning district boundaries do not coincide with regional delimitations, allocation decisions have a double dimension, often determined by political or regional interests. This political complexity has resulted in the failed attempts in 1993 and 2001 at a general interbasin sharing agreement and continues to fuel social conflict.

13.6 Future Challenges for Spanish Water Management

From a legal standpoint, the basin planning process and the NHP is meant to reflect the overall consensus on water allocation between basins, between regions, and between users. The Spanish government historically has sought to minimize conflict among users by making more resources available at the expense of the environment. However, with the establishment of democracy in Spain, and particularly since the 1990s, the construction of many of the new hydraulic infrastructure projects has resulted in intense social conflict. The delay in the approval of the RBMPs and the strong conflicts over water allocation decisions reflect the breakup of the traditional hydraulic policy community and the need to build a new consensus. Increasing openness and transparency, and the incorporation of new stakeholders in the implementation of today's RBMPs and the next planning cycle may help move the process forward.

Large and expensive hydraulic infrastructure projects strongly condition water management, establishing institutional and political inertia to justify their construction in response to strong pressure from benefitting social groups. These factors greatly reduce the possibility of introducing efficiency criteria or economic or environmental rationality in management decisions, even if ultimately only the needs of a minority are met.

New situations of stress, scarcity, and conflict arise in new territorial and socioeconomic contexts of demographic growth; urban, infrastructure, and technological expansion; agricultural development through the expansion and intensification of irrigation; and industrial and tourism growth. While the global territorial (socioecological) system is transformed, its physical and natural (ecological) basis is weakened, thus reducing the adaptability of the system as a whole and increasing its vulnerability. In this context, the primary challenge is to define viable limits to growth, thus avoiding the erosion of the objective phenomenon.

The Spanish case, with a strong tradition of river basin-based water planning and management, highlights the conflicts inherent to interregional transfer decisions. This is particularly true when these transfers move water from one river basin to another, and even more so when the water transfers affect regions with different political and administrative structures. Conflict is directly related to a collective sense of inequity in the allocation decisions and, increasingly, with the defense of environmental and patrimonial values in the donor basins. When authoritative allocation decisions lead to regional imbalances, conflict invariably arises. The lack of effective control of existing water demands can seriously hinder management and alter allocation decisions through the illegal actions of individual users.

A central piece in the development of Spanish water policy has been the early constitution of a solid policy community, integrated by irrigators, hydroelectric power companies, and concrete and building firms. These interested parties have hindered the adaptation of water policy to evolving social demands. It is thus important to design institutional arrangements that combine long- and short-term decision making without compromising the ability to adapt and change. Public participation should be a key element in such an institutional design. However, the Spanish case shows that the demand for increased social participation is difficult to meet. It requires changes in mentalities and power structures and the necessary convergence of national interests with management perspectives that take into account and defend regional territorial interests.

References

Corominas Masip J (2008) Modernización o reconversión del regadío? Dimensiones socioeconómicas, ambientales y territoriales, VI Congreso Ibérico sobre Gestión y Planificación del Agua, Vitoria-Gasteiz, December 2008. Available in http://www.fnca.eu/congresoiberico/documentos/p0302.pdf

del Moral Ituarte L (2010) The hydraulic paradigm and the production of a new geography in Spain: origins and historical evolution between the sixteenth and twentieth centuries. In: Tvedt T, Coopey R (eds) A history of water. Series II, volume 2 Rivers and society from early civilizations to modern times. I.B. Tauris, Londres, pp 440–462

Estevan A, La Calle A, Naredo JM (2007) Las series hidrológicas en la instrucción de Planificación Hidrológica. Available in http://www.unizar.es/fnca/docu/docu172.pdf

FERAGUA (2007, 2003, 2000) FERAGUA Informa, issues 2, 13, 14 and 28. Available in http://www.feragua.com/downloads/Feragua-Informa_t9876.html

Ferrer G, Martín M (2011) Los instrumentos de mercado y la recuperación del estado cuantitativo de las masas de agua subterráneas. Experiencias comparadas en las cuencas del Júcar y del Guadiana, VII Congreso Ibérico sobre Gestión y Planificación del Agua "Ríos Ibéricos +10. Mirando al futuro tras 10 años de DMA" 16/19 Feb 2011, Talavera de la Reina. Available in http://www.fnca.eu/wp-content/uploads/2011/08/11-Ferrer.pdf

La-Roca F, Ferrer G (2010) The water framework directive observatory: an assessment of the WFD implementation process in Spain, Ambientalia, Special issue on the water framework directive, pp 1–26. Available in http://www.ugr.es/~ambientalia/articulos/art_categorias/wfd/PUBLIC%20PARTICIPATION/SPI_8_LaRoca_Ferrer%282010%29_Ambientalia_en.pdf

MMA (2000) Libro Blanco del Agua en España (White Paper on Water in Spain). Secretaría de Estado de Aguas y Costas. Dirección General de Obras Hidráulicas y Calidad de las Aguas. Ministerio de Medio Ambiente. Madrid, 637 p. Available in www.mma.es/portal/secciones/fondo_docu_descargas/libro_blanco/

MMA (2001) Plan Hidrológico Nacional (National Water Plan). Secretaría de Estado de Aguas y Costas. Dirección General de Obras Hidráulicas y Calidad de las Aguas. Ministerio de Medio Ambiente

Requena R (2011) Plan Especial del Alto Guadiana. VII Congreso Ibérico sobre Gestión y Planificación del Agua "Ríos Ibéricos +10. Mirando al futuro tras 10 años de DMA" 16/19 Feb 2011, Talavera de la Reina. Available in http://www.fnca.eu/wp-content/uploads/2011/08/18-Requena.pdf

Varela C, Hernández-Mora N (2009) Institutions and institutional reform in the Spanish water sector: a historical perspective? In Garrido A, Llamas MR (eds) Water policy in Spain. CRC Press/Balkema, Leiden

Part IV
Governance, Conflict, and Participation: Mechanisms of Power

Chapter 14
Politics and Governance in the Water Sector: The Case of Mumbai

Marie-Hélène Zérah

14.1 The Narrow Institutional Perspective to Water Reforms

Governance and politics are at the core of the debates on water supply in developing cities. Under the pretext of streamlining management, the reforms initiated in the late 1980s attempted to separate the issues of governance and politics. They form part of a more general trend of depoliticizing developmental challenges and public policies (Ferguson 1990). Those promoting reforms have not completely dismissed their political dimensions, but have turned their attention to two principal aspects. On one hand, the analysis of the political economy of reforms has highlighted the importance (and lack) of political voluntarism (Shirley 2002). On the other hand, the lack of accountability of elected representatives has been strongly criticized and corruption and patronage networks are perceived as serious hurdles to the improvement of water supply networks (World Bank 2004). Yet, the provision of urban services remains an instrument for the perpetuation of "political machines" (Ayee and Crook 2003) over the long term. The neo-institutional approach, which holds that providing incentives for collective action, decentralization, and a greater place for market mechanisms would neutralize the discretionary power of elected representatives, is insufficient. It is necessary, therefore, to refocus the discussion on the role of political actors and the manner in which they carry out their actions at various scales, from the city to the locality. Since they are unavoidable protagonists in the definition and implementation of policies for urban services, this is an important concern for research.

The city of Mumbai, in which strong political competition, a powerful administration, and an organized civil society coexist, provides an ideal case study.

M.-H. Zérah (✉)
Centre de Sciences Humaines and Institute of Research for Development – IRD,
Centre de Sciences Humaines, 2 Aurangzeb Road, New Delhi 110 011, India
e-mail: marie-helene.zerah@ird.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_14,

This situation highlights the acute mismatch between the push for performance and real practices. The study of these practices reveals the complex relationships between various actors, including elected representatives and the people, or elected representatives and engineers, and more largely, the existing coalitions for or against reforms. Moreover, Mumbai is an exemplary case of the trajectory of reforms undertaken in India, where the term "good governance" has generated a discourse on public modernization, which is supported by the alliance of donors and high-level bureaucrats. However, the content of these reforms has not seriously embraced the issue of urban diversity and underprivileged localities. Above all, the persistence of conflicts over urban services as a means of inclusion in the city forms part of a decentralization process with ambiguous consequences.

14.2 The Modernization Mantra for Water Supply

Beginning in the late 1980s, the failure of the public sector to finance and universalize services for the majority of the countries of the South led a push for reform, which included the introduction of private operators. International organizations promoted privatization[1] as the best instrument for supply to poor localities, presenting it then as a response to the "thirst for efficiency" (Shirley 2002; Komives 1999). As the public sector remains the central actor in the institutional scenario, the analysis of the Indian case follows a specific trajectory. The change in the discourse on the modernization of the public sector exemplifies a technocratic and depoliticized vision of governance, which can spread in the absence of private operators.

14.2.1 The Failure of Reforms to Promote the Private Sector

Indian expert groups and the Ministry of Urban Development first voiced the need to reform the water sector in the early 1990s. The calls for reforms were prompted by the public sector's inability to provide water for all and resembled the international doctrine. Conferences held with international organizations boasted the concession model and the success of international experiments. Several privatization projects were discussed under the leadership of these organizations or initiated bilaterally between governments and private companies. All these first-generation projects failed, and multinational water companies—except Veolia—closed their representative offices. Despite a push for reforms, private investment was nearly absent, reflecting the trials and tribulations faced by infrastructural

[1] Privatization is understood here, in the wide sense of the term, as including all forms of delegation to the private sector.

projects seeking private international funding in the water sector and, in general, those in South Asia (Harriss et al. 2003).

Although political voluntarism is often no more than a façade in analyses of public action (Lascoumes and Le Galès 2007, p. 16), the dominant explanation advanced for such failures was the lack of political courage and strategic vision. However, other factors explain these failures, such as gaps in the regulatory framework, the lack of economic viability of contracts, the challenge of spiraling prices (Zérah 2001), or the capacity of certain groups of engineers to resist (Connors 2007). Further, regional governments, which are the key decision makers for urban infrastructure policies, were the privileged interlocutors for all negotiations. Barely consulted, local elected representatives opposed reforms locally—sometimes successfully—as did the civil society. A front opposing the privatization of water was formed. It consisted of national and local non-governmental organizations, community associations, and activists from the academic and intellectual milieus. These protests were increasingly crowned with success. In Delhi, a coalition led by an NGO allied with residents' welfare associations and blocked a project to introduce private operators that was financed by the World Bank. The coalition highlighted the flaws in the contract awarding procedure and provided solid counter-expertise (Bhaduri and Kejriwal 2005).

Consequently, the alliance of technocratic and economic bodies (senior officials, international organizations and consultants, economic elites) upholding the good governance discourse refocused its plea on the importance of modernizing the public sector. This was partly due to the awareness that, in Indian cities,[2] the main actor in the water sector was and will remain the public sector. As a result, the World Bank recommended the development of tools to increase transparency, benchmarking, and accountability and suggested that the role of international operators be revamped, with them being seen as an instrument for improving services. This approach was shared by the central government of India and led to a series of second generation projects focused on transferring expertise, conducting audits, and implementing pilot projects for providing round-the-clock services. The passage to a 24-hour supply became the new reform mantra, as no Indian city provided continuous water supply to its users. The idea was to show that such a water supply was more economical for public utilities and that it was attainable through a series of measures on both the supply and demand sides. Uninterrupted supply would also help reduce distribution inequalities (Water and Sanitation Programme 2003).

14.2.2 The Reform Project in Mumbai

The Greater Mumbai Municipal Corporation decided to implement policies in tune with the newly revised norm. In Mumbai, the municipality is in charge of the

[2] India's urban population is estimated to be 31.1 % of the nation's total population (377 million city dwellers), according to the 2011 Census. In 2011, 53 cities had crossed the one million inhabitants mark, but thousands of small- and medium-sized towns suffer from a serious lack of infrastructure.

overall water supply network and has greater decision-making powers than in other cities.[3] Supply is intermittent, the network old and deteriorating, leaks substantial, and distribution inequalities considerable. However, water supply is financially profitable, essentially because of the industrial consumption, which accounts for 80 % of the income for 20 % of overall consumption. This situation enables higher investments than in other cities. In legalized slums and working-class housing,[4] Mumbai has a policy of shared connections for user groups. Each user group, which pays for water at subsidized rates, officially comprises an average of five to six households. But this policy only applies to inhabitants who can prove they arrived at their place of residence before the cut-off year of 1995. Those who arrived after 1995 have not been regularized.[5]

To improve the service and promote an integrated approach to reform, the municipality devised a water mission in the mid-2000s. The core proposals were suggested by a consultancy firm, financed by the World Bank's PPIAF program.[6] The aim, on the scale of a ward of around one million people, was to conduct an accurate audit of the water network, making technical and institutional recommendations for progressing to a continuous water supply. From the very beginning, the project was viewed as a Trojan horse for privatization. It was openly opposed by community-based organizations, residents' welfare associations, and RTI[7] activists, who indirectly received support from certain municipal engineers (Bawa 2009). The institutional option of privatization, which the municipal council did not support, was abandoned. Other measures prompted by this mission still stand, such as revamping the tariff system, installing water meters for all, and introducing prepaid water meters for inhabitants who came to the city after 1995.[8]

This was the first time that a city had considered such a solution in India. The reasons cited for introducing it established an explicit link between the provision of

[3] In this text, Mumbai refers to the municipality of Mumbai, which had an estimated population of 12.5 million inhabitants in 2011. It forms part of an urban agglomeration of 18.4 million inhabitants consisting of several municipalities that are beyond the scope of this chapter. The 2001 Census estimated the slum population at 54.1 %. According to Risbud (2003), 49 % of the slum population uses collective networks, 5 % uses individual ones, and the rest have to resort to various sources for access to water. As for sanitation, 8 % of households do not use toilets.

[4] These are called chawls in Mumbai.

[5] This cut-off date is important, as it offers the right to rehabilitation programs when housing is demolished due to infrastructure projects. For certain projects, the date was extended to 2000.

[6] The Public-Private Infrastructure Advisory Facility (PPIAF) promotes public-private partnerships and depends mainly on the World Bank.

[7] The 2005 Law on Right to Information (the RTI Act) allows all citizens to request access to files of governmental administrations and institutions (with a few exceptions). Officials have to provide the information requested within 30 days of the application or face sanctions.

[8] The idea of prepaid water meters was inspired by the South African model. The meters are operated with cards bearing magnetic strips, and, like phone cards, can be recharged. One pays a certain amount of money, which allows access to a corresponding volume of water. Once the recharge amount is used up, the hand-pump no longer yields water and one's account has to be recharged.

an uninterrupted water supply for all inhabitants and the introduction of this technical mechanism in slums. This logical linkage is far from insignificant; it argues that the technical integration of these localities would help optimize the network. In other words, the idea is that the connection and billing of inhabitants deprived of water supply would lead to world-class water supply.[9] The inhabitants deprived of municipal supply access water through other, more expensive sources controlled and managed by mafia-like groups, resulting in a financial loss for the municipality. A prepaid service for slums would have the automatic effect of wiping out these other modalities of accessing water. A further discursive argument affirmed that these meters would help reduce supply inequalities, although they are embedded in power inequalities that worked in favor of the British and local notables during the colonial period and the middle and upper classes during the post-colonial period (Gandy 2008; Zérah 2008). The construction of a discourse on scarcity to conceal inequalities and power relations between social groups—which Swyngedouw (1997) described in the case of Guayaquil, Ecuador—is also at work here.

The water mission as a whole essentially stemmed from decisions taken by one of the deputy municipal commissioners, a member of the upper echelons of the public service bureaucracy.[10] These high-level officials are trained to head state and local administrations and are appointed to various managerial positions for a fixed period of time. They work in a public system riddled with hierarchical relations and a post-colonial bureaucracy that reigns over those they govern. They also form the social elite and have been maintaining strong professional relations with international organizations since the late 1980s.

For two decades, these commissioners have helped drive urban reforms, strengthening an elitist vision of the city they share with the upper-middle classes and experts. This vision often contradicts the idea of disinterested public action and of upholding the general interest. Further, when reforms are noticeable, these officials gain visibility in the media, which helps them build an image of leadership and eventually leads to their recruitment by private firms or international organizations.

Local elected representatives, on the other hand, are not full-fledged members of this pro-reform coalition, as they do not formulate policies. In fact, the municipal institutional architecture distributes power unevenly between the administration, headed by the municipal commissioner, and the elected municipal members, who have limited decision-making powers (Pinto 2000). A 1992 law on decentralization introduced changes but did not transform the relationship between administrators and elected representatives (Ruet and Tawa Lama-Rewal 2009). Thus, it is an elitist, technocratic vision that is promoted that takes little note of the local reality.

[9] This is clearly stated in the municipal commissioner's letter dated December 12, 2007, to the executive committee of the municipality.

[10] The posts of municipal commissioner and deputy municipal commissioner are assigned to officials from the Indian Administrative Service, the highest administrative service of the Central Government of India.

14.3 Technical Arrangements in Poor Localities: Constantly Reconstituted Diversity

Everywhere in developing cities, taking urban diversity into consideration is a central issue that has led to new mechanisms for participatory or community supply at the locality level. Some authors posit that this can lead to risks of aggravating urban segregation (Graham and Marvin 2001) or of the possibility of communities turning in on themselves (Jaglin 2005), while others underscore the twofold potential for improving services and more participatory governance (Mitlin 2004). However, it is important to consider the complexity of infra-local governance and what it implies when it has to be coordinated with top-down centralized public policies.

14.3.1 The Morphing of User Groups

For Indian cities, the significant socio-spatial inequalities in accessing services are often represented in a binary fashion, with residential localities on one hand and slums on the other. This vision is distorted; it neither reflects the reality of the distribution of urban poverty (Baud and De Wit 2009) nor adequately emphasizes the nature of slums. The type of material used, the legal status of the settlement (whether authorized or not) and the land on which the settlement is located (whether government land or private land) all contribute to a large diversity of existing slums. Even though access officially is characterized by filled and empty spaces—areas with and without supply—the modalities of supply are far more varied (Zérah 2008). In a binary perception, the 1995 cut-off year serves as a demarcation line between the localities that receive water supply through a user group connection because they are authorized, and the others because they are unauthorized.

However, the user groups conceal the multifariousness of access modalities. Ostensibly a simple system, the mechanism of shared connections was transformed and reshaped by the people themselves. Steinweg's research (2006), restricted to one locality of the city, found between three and 20 households per connection—not five households, which was the official norm. This results in considerable individual price differences per cubic meter. In fact, under cover of the group, an internal system of discrimination penalizes the tenants who pay a disproportionate part of the bill, sometimes even the entire bill. The usual description of water in slums controlled by mafia or private groups that determine water supply access is inadequate. It simplifies reality. This is what De Bercegol and Desfeux (2007) demonstrated when they identified 15 "networks" in the enclosed locality of Ram Nagar in east Mumbai.

To resolve the water problems of this slum, which was built on a hill in the late 1980s, the municipality supplied water to the user groups from the main water pipe. In reality, over the years, more sophisticated systems (storage, electric pumping, and mini-networks with individual connections) or networks of up to

800 households were grafted onto the user group model. These networks were built, financed, and managed by actors who had varying relations with politics. De Bercegol and Desfeux studied these variations in detail.

Their first level of analysis of such practices concerned actors who invest in construction. De Bercegol and Desfeux distinguished five configurations. The first case involves networks formed at the initiative of a non-governmental organization; the NGO liaised with the municipality, mobilized users to contribute financially and bore the lion's share of the investment, and managed to set up three small networks. The second case is that of a network financed directly by one of the area's elected representatives, with her discretionary funds.[11] While some networks can be clearly associated with a political party, that is not always the case. The inhabitants sometimes bargain, seizing any opportunity emerging due to the intense political competition in the area. A third type is the network financed privately by a local entrepreneur, who invested directly in a service, managing the infrastructure alone, with hopes of maximizing the profits. De Bercegol and Desfeux noted a variant in the fourth type, in which the owner combined private interests with community service. The fifth configuration consists of a community mini-network, formed and financed at the initiative of a group of inhabitants.

As far as the analysis of the economic and management aspects of these networks is concerned, these arrangements produced considerable price differences. Management models varied according to the type of ownership. Local entrepreneurs, who privately managed their networks, imposed exorbitant prices on newcomers. In other cases, network subscribers delegated the management and decision-making responsibilities to a local leader. In situations involving a more cooperative configuration, a more democratic management system existed.

Such empirical research creates an inventory of generic descriptions that could be attributed to slums: a local entrepreneur, the very figure of an exploiter, probably protected by elected representatives and the administration; community networks managed democratically and praised in some strands of the related literature; collective arrangements appropriated by a local leader affiliated with a political party who serves as a mediator during elections; or networks directly controlled by elected representatives—shades of classic clientelism as decried by international organizations (Devaranjan and Shah 2004). Thus, within a small settlement, given the intense political competition, modes of access are numerous. Such arrangements can be placed in a spectrum ranging from genuine community-based management (with more or less democratic decision making) to complete commodification.

The case of the Ram Nagar slum reveals that the municipality apparently takes no notice of the diversity at work, constituted over the long term but in constant flux. For the municipality, these hybrid networks do not exist, although they may have been authorized by fuzzy institutional procedures. In reality, it is difficult to

[11] Local elected representatives or parliamentarians have an annual discretionary budget for their constituency.

match access to water supply with legality and non-access with illegality. Political and social pressures are too strong to leave localities without any form of supply. The implicit recognition of local arrangements by the municipality suggests that some engineers know how to apprehend the reality in the poorer districts. There is some margin for action to improve services, but it is not taken up by the public administration.

14.3.2 The Implementation of a New Technical Device

In the quest for a technical and managerial solution to include all users with no access, the municipality came up with the idea of introducing prepaid meters. However, it looked at meters as a single solution for all settlements without taking into account the diversity described above. After having assessed the number of potential connections to prepaid meters, the municipality invited a tender. This is a classic and procedural logic of awarding public contracts, but no thought was given to the potential social impacts of the mechanism even though Mumbai had some experience with social engineering through participatory programs for improving sanitation in slums. These experiments met with varying degrees of success (Zérah 2008, 2009). No feedback was collected to learn the reasons for success or failure, however, even though such feedback could have proved useful for further actions, including implementing the meter system. Several explanations can be found for this. First, the water department is extremely centralized and is essentially concerned with the network's technical dimensions alone. The chief engineer finds it pointless to select pilot zones, since "we know the people who need it."[12] Further, engineers rarely entertain a positive image of participatory programs, especially as the municipality's organizational structure attaches no importance to innovative experiments. Finally, the social workers involved in participatory programs receive little support, are often denigrated within their own departments, and do not have the means to capitalize on their experience. Yet, social engineering to improve water supply is a process of "trial and error" (Botton 2007; Connors 2007) that relies on familiarization with underprivileged localities. Connors showed that attempts to improve supply in selected slums of Bangalore failed when the water board chose to route it through user committees formed via a multilateral program, rather than relying on informal governance networks.

The creation of long-term incentives for field engineers also plays a role in the success of participatory programs. Botton (2007) demonstrated similar results in experiences in low-income communities in Buenos Aires. She emphasized the importance of the social training of engineers, capitalization on experience, and keeping track of successes to formulate a more systematic supply policy in deprived localities. In Mumbai, while the need for reform is highlighted, there is

[12] Author's interview conducted on April 2, 2008.

an insufficient focus on improving and introducing new skills in technical departments. In the face of urban diversity, reliance solely on a technical device is not a solution.

As a result, local leaders or elected representatives serve as mediators—a point that underscores two modes of governance. One is constituted by formal processes and procedures, based on rights, and intended for the inhabitants of residential localities. The other relies on informal compromises and clientelist practices, often routed through local elected representatives, ultimately ensuring access to water supply for a part of the population. In this "porous" and unclear environment (Benjamin 2005), rights are negotiated and local elected representatives play a key role in obtaining a minimum of rights. Relying on an efficient political leader to liaise and negotiate with the bureaucracy is an important tactic for the poorer sections of the population. Consequently, serious reflection is required on the role of political competition and the methods of action adopted by the different parties—an area that Indian urban studies have neglected (Tawa Lama-Rewal and Zérah 2011).

14.4 The Place of Politics and Citizen Inclusion

Urban governance studies have focused mainly on the place of civil society and private actors as well as on the role of decentralization (Ruet and Tawa Lama-Rewal 2009). The multi-scalar relationships between elected representatives, bureaucrats, and technicians have been largely ignored, despite the decentralization process. While decentralization has not led to any deep-seated transformations in the relationships between elected representatives and the administration, it has produced certain effects that need to be understood. For historical reasons, local democracy in Mumbai is more effective than in other cities and, since the late nineteenth century, the municipal council has been functioning practically uninterrupted.

The municipal council's composition reflects Mumbai's highly fragmented political sphere. The city is dominated by a coalition formed by the Shiv Sena, a regional and xenophobic Hindu party that champions the rights of the "sons of the soil,"[13] and the Bharatiya Janata Party (BJP), the Hindu nationalist party from the Hindu Right. In the opposition, a second bloc is composed of two secular parties: the Indian National Congress (INC) and the Nationalist Congress Party (NCP).[14] However, the latter coalition governs the state, which generates stiff competition

[13] The term "sons of the soil" is a commonly used expression to refer to the local inhabitants and distinguishes them from migrants, who are considered outsiders. In Mumbai, the rhetoric of "sons of the soil" has been one of the identity markers of the Shiv Sena, despite the long history of migration in Mumbai.

[14] The NCP is a regional party that formed in 1999 after breaking away from the Indian National Congress.

between the two blocs. Two other minority parties are present in the public arena: the Samajwadi Party, which has an electoral base in a number of Muslim-dominated localities, and the Maharashtra Navnirman Sena (MNS), which ideologically resembles the Shiv Sena.

Local elected representatives can wield power at two levels of government. At the city level, the Standing Committee, composed of a representative number of elected officials, approves the budgets and oversees all reforms proposed by the municipal commissioner. In a majority of cases, the position taken by the administration prevails and the Standing Committee affixes its seal to the proposals, but it can oppose the bureaucracy. At the constituency level, as shown above, political leaders are instrumental in providing services (or not). The debates generated by the proposal to reform water services, especially the prepaid meter exercise, demonstrate that an issue concerning urban services that is directly related to the status of the poor in the city remains first and foremost a political issue. In such a case, local elected representatives are not only intermediaries, but they also defend the ideological position of their party locally.

The administrative machinery paid special attention to presenting the prepaid meter mechanism to the elected representatives. The administration's letter to the Executive Committee runs as follows: "It is therefore necessary to set up a mechanism for giving these people formal access to drinking water as long as they are residing in their unauthorized dwellings, without giving them any right regarding the regularization of their structures" (Standing Committee Letter, 2).

This statement circumvents the idea that providing water automatically translates into a right to the city. The municipality presented the experiment of prepaid meters with a discourse on streamlined management to clear a political minefield. However, it opened a Pandora's box in terms of rights. NGOs and activists protested against the mechanism in the name of the right to water.[15] Their opposition was based on their knowledge about the implementation of such meters in Johannesburg and the court case that ensued.[16] It was perceived as a discriminatory instrument penalizing poor families and destroying social networks.

Ironically, the argument of it being a discriminatory instrument was also brought into play by the elected representatives, who opposed the mechanism for other reasons, some of which were far from laudable. The rejection of prepaid meters forms part of the ideological debate on the right to the city, which reflects the fissures between the parties. The Hindu nationalist parties—particularly the Shiv

[15] In India, the right to water is not recognized as such, but it follows naturally from the right to life and the right to food (Cullet 2007).

[16] In Phiri, a locality in the larger and better-known Soweto neighborhood in Johannesburg, prepaid water meters were installed as part of larger water reforms. The mechanism was highly contested by inhabitants and civil society organizations as being contradictory to the constitutionally upheld right to water in South Africa. It led to a court case that resulted in the disconnections of the prepaid meters.

Sena and the MNS—strongly opposed this measure. One MNS leader, whose words reflect the violent positions and actions of his party vis-à-vis north Indians, who constitute the large share of new migrants, said:

> The allotment criteria are not clear: who are these prepaid meters for? The votebank? What? And what about those who are still in the process of settling down here? There should be a limit to Mumbai... all the Municipal Corporation thinks about is money... they [bureaucrats] have come up with one policy for all and that is what we are opposing.[17]

The MNS and the Shiv Sena regarded this new means of supply as benefiting the recent migrants, who were taking away the jobs of the "sons of the soil" and imposing a non-native culture on Maharashtra, the state that includes Mumbai. In contrast, the Congress and the NCP representatives were in favor of the measure, partly because they saw it as a source of revenue for the municipality. Another reason was their opposition to the Shiv Sena. The NCP leader was the most virulent of all: "I have spoken of the following matter in my budget speech before the Executive Committee: when it comes to buying apartments, you don't ask for proofs... why do you want proofs from these poor people. Isn't this discrimination?"[18]

Nonetheless, this leader also explained that it would be possible to insert conditions to ensure that the program beneficiaries would not later seek benefits under rehabilitation programs. This ambiguity underscores the rising stigma of the poor in Mumbai. A parallel can be drawn with the demolition drives targeting Delhi's slums to make way for beautification projects (Dupont 2008). Indeed, this tendency to define a conditional form of citizenship is at work in all of India's major cities (Zérah et al. 2011b).

Interesting conclusions may be drawn from the discussion on the prepaid water meters. First, the technical inclusion of users in urban services cannot be dissociated from a parallel discussion on citizenship and social inclusion. Thinking of supplying water to people whose rights are not recognized is somewhat schizophrenic, but this contradiction is mostly not discussed when implemented in localized areas. In this specific case, since the project concerned the city as a whole and the level of polarization in Mumbai is high, it threw open the issue of the status of poor people or migrants. In such a case, it is impossible for the bureaucracy to ignore local elected representatives. As the chair of the Executive Committee put it, "If we are against, they [the bureaucrats] won't be able to implement it because it will become too politicized."[19] Thus, even if the power of local elected representatives is limited, they cannot be completely excluded from the decision-making process, as was possible in the past. This suggests that the law on decentralization has gradually changed the rules of the game and has led to a shift in the elected representative-bureaucrat relationship. Second, the political choice made by elected

[17] Author's interview conducted on April 7, 2008.

[18] Author's interview conducted on April 8, 2008.

[19] Author's interview conducted on April 7, 2008.

representatives is, above all, an outcome of their negative perception of immigrants from northern Indian states and of their fear that they could transform the city's demographic composition and its identity. This, in turn, raises other important questions about the application of decentralization in Indian cities and the dangers of polarization that it may bring about.

14.5 Bringing Local Knowledge into the Reform Process

The reform projects in the water sector in India remain guided by a technical vision of modernization. Like numerous cities in the south, the pivotal principle for such reforms is that of building a consensus within the state apparatus, comprised of high-level officials and governments that reflect the interests of the elite (Corbridge and Harriss 2000; Grindlee 2001).

In this model of governance, there is no provision for experimentation or the introduction of social parameters. To include such a provision would require restructuring skills at the municipal level. The ongoing deliberations in Mumbai on the introduction of prepaid meters clearly illustrate this. While the implementation of such a mechanism appears ill-suited to the local situation and was rejected by an active civil society and a section of the municipal council, the administration saw prepaid meters as an overall solution in a classic top-down approach. The solution failed. It was also based on the idea that users are consumers—an idea rejected by large sections of the civil and political society. Yet, the multifaceted nature of service provision models in poor localities pleads for a less ambitious approach that takes the informal modalities of urban governance at the local level into account, along with the hybridization of modes of access. This more modest approach should go hand in hand with a debate on politics and rights. Local elected representatives should be seen as partners in formulating local solutions, despite their contribution to the increasing stigmatization of the poor and newcomers as a dominant political issue in the city. Their local knowledge and their role as intermediaries cannot be bypassed if reforms to improve services are to be taken seriously.

However, today's consensual discourse boasting the merits of decentralization should also take into account the possible gray areas to which it gives birth, as seen in Mumbai's case, where polarization and political competition can contribute to anti-migrant rhetoric and violence against migrants and the poor. Decentralization is indeed a very ambivalent challenge with potentially contradictory outcomes, but an unavoidable one if the rights of urban citizens to a decent quality of life are to be enhanced (Zérah et al. 2011a).

Acknowledgments The author would like to thank H. Coing, V. Dupont, L. Kennedy, and S. Tawa Lama-Rewal for their comments and acknowledge the research by R. de Bercegol and A. Desfeux for their master's thesis, to which this chapter refers.

References

Ayee J, Crook R (2003) 'Toilet wars': urban sanitation services and the politics of public-private partnerships in Ghana. IDS working paper, Institute of Development Studies, Brighton

Baud ISA, De Wit J (2009) New forms of urban governance in India: shifts, models, networks and contestations. Sage, Delhi

Bawa Z (2009) K-East WDIP Case Study. Paper presented at the seminar 'The voice of city dwellers in urban governance. Participation, mobilisation, and local democracy – comparing Indian/South African debates', University of Mumbai, 12–14 Jan 2009, p 22

Benjamin S (2005) Touts, pirates and ghosts. In: Sarai reader 2005: bare acts. Delhi, pp 242–254

Bhaduri A, Kejriwal A (2005) Urban water supply. Reforming the reformers. Econ Polit Wkly XL (52):5543–5545

Botton S (2007) La multinationale et le bidonville: Privatisations et pauvreté à Buenos Aires. Karthala, Paris

Connors G (2007) Watering the slums: how a utility and its street-level bureaucrats connected the poor in Bangalore. Ph. D. Massachusetts Institute of Technology

Corbridge S, Harriss J (2000) Reinventing India: liberalization, Hindu nationalism and popular democracy. Polity Press, Cambridge

Cullet P (2007) Water law in India: overview of existing framework and proposed reforms. International Environment and Law Research Centre, Working paper no 1, Geneva, p 16

De Bercegol R, Desfeux A (2007) La gestion du service d'eau par réseaux de groupes d'usagers. Etude de l'accès à l'eau dans un bidonville mal desservi par la municipalité de Mumbai, Master 2, Institut d'Etudes Politiques de Rennes

Devaranjan S, Shah S (2004) Making services work for India's poor. Econ Polit Wkly 28(XIL):907–919

Dupont V (2008) The dream of Delhi as a global city. In: Paper presented at the 38th World Congress of the International Institute of Sociology, Budapest, 26–30 June 2008. Session on new urban explorations I: global perspectives, 29 June 2008, p 23

Ferguson J (1990) The anti-politics machine: "development," depoliticization, and bureaucratic power in Lesotho. Cambridge University Press, Cambridge/New York

Gandy M (2008) Landscapes of disaster: water, modernity and urban fragmentation in Mumbai. Environ Plann A 40(1):108–130

Graham S, Marvin S (2001) Splintering urbanism networked infrastructures, technological mobilities and the urban condition. Routledge, London

Grindlee MS (2001) In quest of the political: the political economy of development policy making. In: Meier E, Stiglitz J (eds) Frontiers of economic development, the future in perspective. Oxford University Press, Oxford, pp 345–380

Harriss C, Hodges J, Schur M et al (2003) Infrastructure projects: a review of canceled projects. In: Public policy for the private sector, note no 252. World Bank, Washington, DC, p 6

Jaglin S (2005) Services d'eau en Afrique Subsaharienne. La fragmentation urbaine en question. CNRS Editions, Paris

Komives K (1999) Designing pro-poor water and sewer concessions. Early lessons from Bolivia. In: Policy research working paper no 2243. The World Bank, Washington, DC

Lascoumes P, Le Galès P (2007) Sociologie de l'action publique. Armand Colin, Paris

Mitlin D (2004) Reshaping local democracy. Environ Urban 16:3–8

Pinto M (2000) Metropolitan city governance in India. Sage, Delhi

Risbud N (2003) Part IV: summary of city case studies: Mumbai. In: UN-HABITAT (ed) Global report on human settlements. The challenge of slums. UN-Habitat, London

Ruet J, Tawa Lama-Rewal S (eds) (2009) Governing India's metropolises: case studies of four cities. Routledge, Delhi

Shirley MM (2002) Thirsting for efficiency: the economics and politics of urban water system reform. Pergamon Press, New York

Steinweg T (2006) Different perceptions of accountability and performance in Mumbai's water sector. Dissertation, University of Amsterdam, p 112

Swyngedouw W (1997) Power, nature, and the city. The conquest of water and the political ecology of urbanization in Guayaquil, Ecuador: 1880–1990. Environ Plann A 29:311–332

Tawa Lama-Rewal S, Zérah MH (2011) Urban democracy: a South Asian perspective. South Asia Multidiscip Acad J. Available in http://samaj.revues.org/3188

Water and Sanitation Program (2003) 24-hour water supply: is this goal achievable? Drawing lessons from rapid distribution system diagnostic assessments in Indian cities. WSP-South Asia, Delhi

World Bank (2004) World development report 2004: making services work for the poor. University Press, Oxford

Zérah MH (2001) The cancellation of the Pune water supply and sewerage project: water and sanitation program, South Asia. The World Bank, New Delhi

Zérah MH (2008) Splintering urbanism in Mumbai: contrasting trends in a multilayered society. Geoforum 39:1922–1932

Zérah MH (2009) Reforming solid waste management in Mumbai and Hyderabad: policy convergence, distinctive processes. In: Ruet J, Tawa Lama-Rewal S (eds) Governing India's metropolises: four case studies. Routledge, Delhi

Zérah MH, Dupont V, Tawa Lama-Rewal S (eds) (2011a) Urban policies and the right to the city in India: rights, responsibilities and citizenship. UNESCO and Centre de Sciences Humaines, Delhi, p 180

Zérah MH, Dupont V, Tawa Lama-Rewal S (eds) (2011b) Right to the city and urban citizenship in the Indian context. In: Zérah MH, Dupont V, Tawa Lama-Rewal S (eds) Urban policies and the right to the city in India: rights, responsibilities and citizenship. UNESCO and Centre de Sciences Humaines, Delhi, pp 1–11

Chapter 15
Inequalities and Conflict: Water in Latin American Cities

Jean-Marc Fournier

15.1 Water and Conflict in Latin America

In 2001, the United Nations announced eight Millennium Development Goals, one of which was to reduce by half the number of people without access to drinking water and a sanitation system by 2015. In this regard, considerable progress has been made in Latin American cities. In spite of substantial demographic growth, rates of access to salubrious water sources rose from 95 % to 97 % between 1990 and 2008, while rates of access to improved sanitation infrastructure increased from 81 % to 86 % (WHO and UNICEF 2010). Although these figures are high in comparison with other regions around the world, there are marked differences between individual countries and cities. Generally speaking, it is estimated that approximately 100 million people still do not have access to drinking water (Inter-American Development Bank 2010). Furthermore, merely because a distribution system exists does not mean the service it provides is either continuous or of a constantly high quality. A large number of distribution systems are in a poor state of repair and the overall quality and upkeep of the service can best be described as mediocre (Jordán and Martínez 2010). Moreover, due to the difficulties involved in providing a service to people living in isolated, hard-to-reach areas on the outskirts of cities, progress has slowed over the last few years (Inter-American Development Bank 2010). In reality, universal access to water is an eminently complex, long-term problem whose facets must be understood if success is ultimately to be achieved (United Nations 2009).

The situation is characterized by a number of paradoxes. For example, within individual cities, and often within individual neighborhoods, some people have access to seemingly limitless quantities of drinking water as well as private swimming pools, while others are subject to drastic rationing. Furthermore, while

J.-M. Fournier (✉)
Espaces et Sociétés – ESO (UMR 6590, CNRS), Université de Caen, ESO-CNRS, Maison de la Recherche en Sciences Humaines (MRSH) Campus 1, Caen cedex 14032, France
e-mail: jean-marc.fournier@unicaen.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_15,

the public water management sector generally loses money, private enterprises specializing in the field, be they local or international, often make large profits. In the 1990s, the privatization of water services was presented as a universal solution to the age-old problem of ensuring access to water for all.

But privatization generated conflicts and encouraged the formation of social movements in a number of countries in Latin America, triggering a series of veritable water wars. Water conflicts are noticeable in all Latin American cities. Local conflicts occur in thousands of cities on a day-to-day basis, whereas national conflicts are most clearly expressed during pre-election political campaigns. In the international media, the conflicts opposing foreign water companies and national governments mainly took place in Argentina and Bolivia. Such debates, polemics, and conflicts about water reveal the presence of social forces in interaction with power systems. Moreover, such conflicts represent a necessary stage in the construction—marked by errors, failures, and successes—of more socially equitable water projects shared by the whole community. There is no miraculous general model capable of resolving the question of universal access to water, a question which, in effect, is characterized by transformations occurring over dozens of years and encompasses social inequalities and the conditions of their production and reproduction. More precisely, it is a question that highlights the fact that water management not only depends on the technical, financial, and political choices of managers, but also, and more fundamentally, on global social choices made by a variety of actors linked to each other by power relations. Relations between social classes thus have a direct impact on water management. The spatial fragmentation of Latin American cities, a product of their colonial past, can be seen as both the reflection and the cause of inequalities in access to water.

15.2 The Evolution of Academic Approaches to Water

In the 1960s and 1970s, although not yet a field of research in its own right, the issue of water distribution in Latin American cities began to appear in studies about housing and social movements. Later, many authors focused on public services (Coing 1995; Jaramillo 1995; Cuervo 1996) and analyses of technical networks (Dupuy 1987). Initially, with the exception of certain specific cases, the question of social conflicts received little attention. Some authors concentrated on historical and cultural evolutions, the water crisis, and political and social issues, but, again, they tended to take a monographic approach. Studies mainly focused on large cities, particularly on capitals such as Mexico City, São Paulo, and Buenos Aires. In the 1990s, an increasing number of international comparative analyses were published, focusing on the "exportation of the French model" and on globalization (Schneier-Madanes and de Gouvello 2003). The context of structural adjustments imposed by the major financial institutions and the emergence of environmental questions encouraged scholars to consider water from both an economic and ecological perspective.

A new field of research gradually developed, influenced by the increasing number of public services that were undergoing privatization and by the success of publications on networks. Many researchers, their viewpoints largely defined by the disciplines in which they worked and the institutions that employed them, focused on governance, decentralization, transformations in funding mechanisms, and the respective roles of the public and private sectors. A number of scholars associated with the World Bank (Idelovitch and Ringskog 1995), many of them economists, believed in the possibility of developing a universal model of urban water management and posited that international comparisons had to be made to understand general processes (Riviera 1996). Their approach was underpinned by a conviction that water management should be rational. They took the view that water was a commodity and that, as in any business selling commodities, the books should be balanced. Consequently, they argued that massive subsidies no longer should be handed out and that water no longer should be supplied for free or at unfeasibly low prices.

Furthermore, the input of international experts and professionals working in the private sector was considered indispensable in terms of increasing efficiency. The global context was characterized by the emergence of international water coalitions working to reconcile environmental concerns with development in an approach that some commentators have described as "green neoliberalism" (Goldman 2007). Those networks, whose membership is made up of experts, donors, and decision makers, have organized major international conferences.

The privatization of water services in Latin America has given rise to heated scholarly debate, much of it fueled by political and ideological presuppositions. A substantially negative reaction has emerged on the part of public opinion, politicians, academics, and association-based activists (Petrella 2009; Barkin 2005; Balanyá et al. 2005; Bell 2009) denouncing the failure of privatizations and listing its causes: excessive prices, corruption, abuse of power by private groups, a failure to take into account the needs of poorer members of society, mass layoffs, etc. On the other hand, a number of researchers close to the World Bank (Spiller and Savedoff 1999; Chong and López-de-Silanes 2005; Chong 2008) have highlighted the predominantly positive aspects of these changes: increased financial profitability, a boost in productivity, and improvement in the quality of services. Yet other authors, associated with the International Monetary Fund (IMF), have drawn attention to social inequalities and insisted on the notion that, far from being strictly financial in nature, the problem is largely one of political will (Camdessus 2003). The question of whether the process of privatization has positive effects in terms of access to water for all, and, more generally, on the living conditions and well-being of the poorest sections of society has not been resolved. Quantitative indicators can be used to argue that improvements in the quality of the service have led to increased levels of health (Galiani et al. 2008). But a more qualitative, sociological approach clearly reveals that privatization is not in itself an essential factor of change; indeed, a "pro-poor" approach can be applied to develop technical solutions and provide adequate public governance (Castro 2007; Laurie 2007). Thus, broadly speaking, a comparison can be made between a water management

model designed by economists and engineers on one hand and, on the other, societies in which practices and representations are based on other logics that can be neither acknowledged nor incorporated into the model because they are too complex and unpredictable.

Beyond this scholarly controversy, the fundamental question is not whether water should be managed by the public or private sectors, but whether a social consensus will emerge about making access to water a genuine social priority (Budds and McGranahan 2003). In terms of water management, the private sector serves a very small minority in Latin America (United Nations 2009) and clashes between scientific and ideological positions regarding the issue are relatively frequent. Conflicts associated with water gave rise to an abundant literature in the first decade of the new millennium. In Bolivia, the Cochabamba Water War in 2000 became the global symbol of resistance to privatization. This conflict began when the national government signed a contract with international companies to improve water access. As a consequence, the cost of water increased and the people of Cochabamba refused to pay, arguing they didn't want foreigners to financially profit on something as vital as water. After several months of violent street protests, the government had to cancel the contract.

The case prompted innumerable scholarly, journalistic, and activist books, articles, and reports. But 8 years after the contract with the private companies was terminated, public water management had not produced substantial improvements in the service (Shultz 2009).[1] It should be added that analyses of disputes about water have revealed a lack of universally accessible, objective information (de Gouvello and Fournier 2002). Such analyses also demonstrate the need for at least some degree of social monitoring and the impossibility of effective reform without consulting and receiving approval from local people (Sánchez Gomez and Terhorst 2005).

Legal reform is another field that has generated a substantial amount of research. Indeed, a good deal of legislation on water has been passed in a number of countries. Much of this new legislation serves to clarify and redefine the responsibilities of various actors and geographical management scales. For example, the recently amended Uruguayan Constitution now states that the right of access to water is a fundamental human right. In Venezuela, it is now illegal to delegate water services to private companies. At the international level, there is no legally recognized right of access to water, but the public health threat posed by urban water shortages is discussed with ever greater frequency in international forums and water is increasingly considered a heritage shared by humanity.[2] More recent research has underlined the efficacy of public-public partnerships (PUPs) rather than the more well-known public-private partnerships (PPPs). The idea is to establish joint ventures involving public bodies with a view to sharing expertise

[1] Another somewhat similar case illustrating the failure of privatization, which has been the object of a good deal of research, is the one of Buenos Aires (see Chaps. 8 and 16).

[2] See Chap. 2.

about solidarity and mutual aid rather than economic profit (Hall et al. 2009). Efforts are thus made to demonstrate that water services based on the notion of social progress can be run rationally and efficiently without necessarily having recourse to the private sector. Furthermore, an increasing number of authors are focusing on the multiple facets of the water question (technical, legal, economic, social, cultural, etc.) to elaborate a systemic, integral vision that takes into account the issue of social equity.

15.3 The Inherent Difficulty of Reapportioning Power

For social geographers, water is both a spatial and social object: a resource whose unequal distribution in space and between social classes—the subject of permanent arbitrages—reflects both the causes and consequences of social inequality (Fournier 2001). The particularity of this approach is that it considers geographical space to be first and foremost a social construct reflecting power relations within society. In this regard, priority is accorded to identifying actors and their power to transform or perpetuate geographical spaces, giving material expression to the state of social relations. Moreover, the issue of water in Latin American cities also has been interpreted from a Marxian point of view, which insists on relationships of domination (Jaramillo 1995; Petrella 2009; Swyngedouw 2004) as well as from the perspective of what is increasingly referred to as the "New Water Culture" (Arrojo Agudo et al. 2005). At the same time, the theme of gender and the role of women in elaborating innovative long-term solutions to water management has gradually become more central (Bennett et al. 2005); indeed, women are often the first to feel the effects of a lack of water, as they are responsible for running the household.

Attempts to reform water management by applying various forms of privatization—concession or total privatization—have been characterized by partial failure.[3] Many reasons exist for this, and they will not be listed here. But an essential explanation is the failure to take into account the human factor and the possibility of transforming the societies under consideration. The relevance of social geography is, precisely, to be found in the contribution made by empirical field studies in contact with the real world. Information derived from such studies makes it possible to put the claims inherent in economic and technical models constructed from on high into perspective and provides a necessary bottom-up view of society. Furthermore, the highly strategic question of water pricing is complex and difficult for members of the public to grasp. Many people in working class communities in Latin America are convinced that water falls from the sky, flowing through the system by simple gravity, and comes out of the tap naturally. Typically, the considerable efforts required for distributing water, the techniques, skills, and expertise applied, and, above all, the ever-increasing costs associated with treating

[3] See Chap. 6.

Fig. 15.1 Water tanks on the roof of buildings in Argentina, a sign of a lack of a water network. Names of candidates for elections are written on the walls (Source: Author)

wastewater, are not taken into account. A refusal to pay high prices for water can thus be seen, at least to some degree, as the rejection of a process that is not understood (de Gouvello and Fournier 2002).

15.3.1 Water as a Political Tool

Beyond this lack of understanding among engineers, economists, and managers and between local people and consumers, water in Latin American countries carries very strong social overtones (Schneier-Madanes 2005). In working class communities on the outskirts of major cities, politicians and electoral candidates are wont to say: "Vote for me and I will give you water" (Fig. 15.1).

Delegating water services to a private company radically alters the rules of political clientelism. Theoretically, in the delegation model, an independent regulatory body would hold regular meetings to avert conflict and maintain consensus. But in real life, while politicians are not entirely sidelined, decisions about technical and financial matters can partially escape them, an observation that also holds true for many other countries around the world. In fact, it seems that it is by no means easy to alter approaches to water management rapidly because such a process would involve redefining the roles and degree of power wielded by the various actors capable, or otherwise, of changing society as a whole. From this point of view, reform would presuppose a reduction in the power of certain actors. Generally speaking, it is difficult to deprive someone of power, especially of great power they have enjoyed for a long period of time.

Logically enough, in electoral campaigns, water continues to be used as a major political tool employed either to win elections or gain ground on the government. Examples abound. One is the Bolivian presidential election of 1997 between Hugo Banzer and Gonzalo Sánchez de Lozada. Banzer proposed an extensive project designed to definitively solve the water problem without, however, having the guaranteed and credible financial resources to do so. Sánchez de Lozada, who lost the election, supported a less ambitious, financially more realistic project that was electorally less convincing.

More recently, in Argentina, former President Nestor Kirchner also used the question of water to strictly political ends. His "Agua más trabajo" (Water + Work) plan was a participative management operation involving the Argentine government and Aguas Argentinas, a private company run by the French group Suez Environnement (Botton 2007). The plan consisted of setting up cooperatives to extend water networks in socially deprived neighborhoods. Partnerships were set up between local residents, who carried out the building work; the municipality, which directed it; and the Argentine state, which coordinated and financed the project. More than a sustainable solution, this program enabled the Argentine government to appeal to voters. Similarly, in Venezuela, President Hugo Chavez has promoted a Bolivarian revolution in the water sector, notably by setting up local technical councils directly controlled by the central government, thus short-circuiting traditional intermediary bodies (Fournier 2010).

The links between power, politics, and water management are strong and cannot be radically modified in the short term. The extreme positions expressed in Bolivia's water conflicts suggest that political and ideological issues sometimes override pragmatic concerns and, in certain cases, common sense approaches. In reality, the question is so socially sensitive because it implies major daily constraints for members of the poorer sections of society who are distrustful of solutions imposed from above.

15.3.2 "Water Is Not a Commodity"

Alter-globalization movements, activists opposed to the globalization model, and associations promoting a new culture of water have interpreted the termination of contracts as a victory in their more wide-ranging struggle against neoliberalism (Balanyá et al. 2005). The creation of international networks linking such associations has undeniably given them more power and made them more visible. According to these actors, who insist that "water is not a commodity," the social aspect of the question of access to water has not been sufficiently highlighted or discussed (Petrella 2009). Furthermore, they have encouraged the development of an international approach to water in which the resource is seen as a common heritage in the sense outlined on a number of occasions by the Porto Alegre Forum since 2002.[4]

[4] The World Social Forum (Porto Alegre Forum) has championed the idea of water as a human right. Water can be considered part of the global commons, shared with all of the world's people and life forms, and as a collective asset and heritage belonging to all of mankind.

This approach has done much to spread awareness of the need to better understand and share the points of view of local society. These activist networks have elaborated a number of legitimate critiques of the risks involved in privatization and the damage occasionally caused by it. Nevertheless, their critiques sometimes have been polemical, negative, or relentlessly systematic and, as such, bereft of any constructive content. Today in Bolivia and Argentina, some people claim to have won the water battle and defeated the neo-colonialism of the major European and North American capitalist groups (Olivera and Lewis 2004). The attitude can be seen as positive in that it bears witness to the fact that the water question has been appropriated by local people. But maintaining a status quo by means of a traditional management system is not in itself a solution (Sánchez Gomez and Terhorst 2005). In spite of intense conflicts, considerable financial losses, and interminable polemics, the process followed for the last 15 years or so can, in spite of everything, be viewed positively in terms of the consolidation of local democracy and the emergence of genuine counterpowers capable of questioning global models. Lastly, technical performances, expertise, experiences in the field of management, and, in general, the positive aspects of private enterprises have sometimes been underestimated. More generally, it can be argued that the lack of serious public debate and the scarcity of shared objective information make it impossible to develop more socially just water management approaches adapted to local specificities.

Certainly, there are exceptions to this rule and success stories do exist. In Bogotá, for example, a relatively original system of mixed subsidies makes it possible to charge more for water in rich neighborhoods to subsidize the service in poorer ones. Although characterized by a number of contradictions, the system has enjoyed a degree of success. Elsewhere, the gradual introduction of partial privatization in Mexico City has produced encouraging results (Marañon Pimentel 2004). Nevertheless, major challenges lie ahead in terms of democratizing access to water and rationalizing its use (De Alba 2005; Tortajada 2006; Barkin 2007), while health problems associated with water persist (Marañon Pimentel 2009). In Rio de Janeiro, while a number of adequate one-off initiatives have been taken, no global vision has yet emerged (Britto 2003; Vargas 2005).

The case of Santiago de Chile, where the water service has been universal since 1995, notably thanks to a sustained policy in favor of social housing (Pflieger 2008), provides a counterexample. The approach is consonant with a global choice on the part of Chilean society, initially imposed by General Pinochet's dictatorial regime, which, in the 1970s, set up a publicly owned limited company tasked with managing water services while remaining financially autonomous. After the return of democracy, the new government decided to continue the policy (Figueroa 2005). In 1999, the government privatized the water supply companies. The privatization years thus demonstrate that while there is no global panacea applicable in all countries, concrete solutions have been applied on a more local basis. To get some idea of how approaches could be developed to make water management more efficient, thereby contributing to a reduction of social inequalities in Latin America, the history of water should also be examined.

15.3.3 Water as a Means of Integration and Exclusion: The Colonial Heritage

The cities founded by the colonial regimes in Latin America are characterized by their geometrical layouts. Codified in the Law of the Indies of 1573, urbanization followed a colonial model on the grand scale, applied to the entire continent. Depending on their place of birth, social role, and skin color, individuals had a status defining their place within the colonial hierarchy. Colonial cities were designed for two purposes: to integrate members of the indigenous population to control them more effectively and to exclude them to affirm the superiority of the Spanish colonists. Water distribution was central to the implementation of such discriminatory practices. For example, in Puebla, Mexico, the uses to which water was put were dictated by the social position of the user; water considered to be of the highest quality was reserved for the use of Spanish colonists, while water thought to be of a lower quality was consumed by the Indian population (Fournier 2003).

During this period, the founding of cities, the process of Christianization, the pacification of the Indians, and water management were all part of the same logic of control. In most cases, local water sources initially were channeled by small canals built and controlled by monks. Locals took their water from these canals or from fountains in the convents in the center of the city. Access to water systematically involved the Catholic Church: water was a gift from God. Later, the system was improved thanks to the construction, on higher ground, of drinking water reservoirs that supplied public fountains. The reservoirs were closely guarded to ensure that water was not stolen through illegally constructed pipelines or other means. A large number of Indians saw to the upkeep of the fountains and, above all, transported water to people's homes in wooden barrels or jars. Indigenous people lived on the outskirts of the cities, where fountains were nonexistent. Until major improvements were made in the late nineteenth and early twentieth centuries, only convents, churches, hospitals, prisons, and a few other public buildings provided systematic access to water in many cities. The integration and exclusion of colonized populations were dependent on an entirely discriminatory system of water distribution.

Latin America as a whole is characterized by similar situations in which water, historically the object of conflicts and negotiations, permanently conditions the evolution of society. In Guayaquil, Ecuador, investments and urban water distribution policies are constantly monitored by a middle class that makes sure its own interests come before any ambitions to develop universal access (Swyngedouw 2004). In Peru, water was a vital factor in pre-colonial and colonial times, and this remains true in the post-colonial era (Trawick 2003). In reality, power is always, at one time or another, dependent on how water is controlled. Power in society and power over water are intrinsically interdependent. All Latin American countries achieved independence long ago and many of them are still marked by the influence of revolutionary movements that sought to achieve greater social justice.

However, the colonial heritage has not been entirely effaced. Water carriers, or aguadores, are still to be found, in one form or another, in many countries, occupying a relatively lowly position in society. Water continues to be sold and stolen and causes disputes in local neighborhoods and even on individual streets.

In Latin American cities today, water provides a reflection of inequality and segregation. Systems of access to water vary from one neighborhood to another, depending on the social classes that inhabit them. In poorer neighborhoods, where living conditions are precarious, women wait at home for water to be distributed in trucks. Sometimes dependent on the goodwill of the drivers, they are forced to get up very early in the morning to wash clothes and crockery. Indeed, in many neighborhoods, especially those located on the outskirts of major cities, the problem of water primarily affects women who have to struggle to obtain it. For those fortunate enough to enjoy a higher standard of living, the resource is never an issue. Having unlimited access to water, a swimming pool, money, and land while possessing extensive social networks and social influence means occupying a privileged or dominant social position. On the other hand, lacking a water tap, not owning a home, and being unable to find work in the formal labor market are both the signs and the symptoms of social exclusion and a marginal position in society.

Generally speaking, better-off members of society, mindful of health issues, continually monitor the quality of the water they consume, introducing new controls and sanitary measures. The poorest sectors of society have neither the resources nor the knowledge to apply such an approach, while the middle class—a category that is difficult to define—displays a broad range of intermediary practices. The absence of a social pact, in which water is universally accessible, militates against a socially and geographically equitable distribution of the resource.

15.4 Socio-Spatial Fragmentation and Power Relations

In the cities of Latin America, inequalities in terms of access to water often are explained by the existence of quantitative, technical, economic, political, and geopolitical problems. Although such explanations are valid, power relations between social groups are also of fundamental importance. More than the problem of quantity, the question of the equitable distribution of water between all members of society is at issue. This socio-spatial division is a de facto obstacle to the elaboration of a more egalitarian system.

Moreover, countries that currently have a system of universal access, for example in Europe, have benefitted from specific historical conditions: in the late nineteenth century, the introduction of universal water services was linked more closely to considerations of hygiene aimed at protecting the bourgeoisie and the dominant sectors of society than to satisfying concerns associated with social equity. At the time, it was technically impossible to do otherwise. Furthermore, today, in those same countries, substantial numbers of less well-off people are

unable to pay their water bills and are forced to rely on social services to do so in their stead.

For about 20 years, attempts to impose top-down reforms on water management have, while causing a number of problems, improved the overall situation, at least to some degree. All actors now admit that water is not a commodity or commercial service like any other because it is essential to human survival. However, if water has no price, it certainly has a cost. Inevitably, consumers will have to pay for the service—even if it is only a modest sum—if the erroneous idea of unlimited water supplies is to be dispensed with. Moreover, it would seem that the water question must be depoliticized in that it is too often used as a tool in electoral campaigns and an instrument in the field of political clientelism. Social issues associated with water demand bottom-up solutions: social compromises, a dialogue between social classes, modifications of relations between social actors, and the diffusion of objective information shared by as many people as possible, or, in other words, a democratization of the issues linked to water.

References

Arrojo Agudo P et al (2005) Lo público y lo privado en la gestión del agua, experiencias y reflexiones para el siglo XXI. Ediciones del oriente y del mediterráneo, Madrid

Balanyá B et al (eds) (2005) Reclaiming public water, achievements, struggles and visions from around the world. Transnational Institute, Corporate Europe Observatory, Amsterdam

Barkin (2005) Ciudades. Review No. 73. Universidad Autónoma de Puebla, Puebla, Mexico, pp 21–30

Barkin D (2007) La gestión del desastre urbano. Ciudades 73:21–30, Universidad Autónoma de Puebla

Bell B (ed) (2009) Changing the flow, water movements in Latin America. Transnational Institute, Corporate Europe Observatory, Amsterdam

Bennett V, Davila-Poblete S, Nieves Rico M (2005) Opposing currents, the politics of water and gender in Latin America. University of Pittsburgh Press, Pittsburgh

Botton S (2007) La Multinationale et le bidonville, privatisations et pauvreté à Buenos Aires. Karthala, Paris

Britto AL (2003) Rio de Janeiro: mutations de l'action publique et émergence du secteur privé (Brésil). In: Schneier-Madanes G, de Gouvello B (eds) Eaux et réseaux, les défis de la mondialisation. Travaux et Mémoires de l'IHEAL, La Documentation Française, Paris, pp 289–310

Budds J, McGranahan G (2003) Are the debates on water privatization missing the point? Experiences from Africa, Asia and Latin America. Environ Urban 15(2):87–113

Camdessus M (2003) Financer l'eau pour tous, rapport du panel mondial sur le financement des infrastructures de l'eau, Conseil mondial de l'eau. Available in www.worldwatercouncil.org

Castro JE (2007) Poverty and citizenship: sociological perspectives on water services and public-private participation. Geoforum 38:756–771

Chong A (ed) (2008) Privatization for the public Good? Welfare effects of private intervention in Latin America. Inter-American Development Bank, David Rockefeller Center for Latin American Studies/Harvard University, Washington, DC/Cambridge, MA

Chong A, López-de-Silanes F (eds) (2005) Privatization in Latin America, myths and reality. The World Bank/Stanford University Press, Washington, DC/Palo Alto

Coing H (1995) La transnationalisation en Amérique latine. In: Lorrain D, Stoker G (eds) La Privatisation des services urbains en Europe. La Découverte, Paris, pp 143–161

Cuervo LM (ed) (1996) Economía política de los servicios públicos. Centro de Investigación y Educación Popular, Bogotá
De Alba C (2005) Hidropolítica en la crisis decisional: coyuntura o síntomas de colapso? Ciudades 66:27–32, Universidad Autónoma de Puebla
De Gouvello B, Fournier JM (2002) Résistances locales aux 'privatisations' des services de l'eau: les cas de Tucuman (Argentine) et Cochabamba (Bolivie). Autrepart 21:69–82, Éditions de l'Aube, IRD
Dupuy G (1987) La crise des réseaux d'infrastructure: le cas de Buenos Aires, ENPC. Université de Paris-XII, Paris
Figueroa O (2005) Infraestructuras, servicios públicos y expansión urbana en Santiago. In: De Mattos C et al (eds) Santiago en la globalización : una nueva ciudad? SUR Corporación de Estudios Sociales y Educación, Universidad Católica de Chile, Santiago de Chile, pp 243–272
Fournier JM (2001) L'eau dans les villes d'Amérique latine, inégalités sociales et concurrences des usages. L'Harmattan, Paris
Fournier JM (2003) Service de l'eau, inégalités sociales et héritage colonial à Puebla (Mexique). In: Schneier-Madanes G, De Gouvello B (eds) Eaux et réseaux, les défis de la mondialisation, op. cit., Institut des Hautes Etudes de l'Amérique latine, Paris, pp 131–141
Fournier J-M (2010) L'autre Venezuela de Hugo Chavez, boom pétrolier et révolution bolivarienne à Maracaibo. Karthala, Paris
Galiani S, Gónzalez-Rosada M, Schargrodsky E (2008) Water expansion in Shantytowns: health and savings. In: Chong A (ed) Privatization for the public Good? Welfare effects of private intervention in Latin America. Inter American Development Bank, David Rockefeller Center for Latin American Studies/Harvard University, Washington, DC/Cambridge, MA pp 25–41
Goldman M (2007) How 'water for all!' policy became hegemonic: the power of the World Bank and its transnational policy networks. Geoforum 38:786–800
Hall D et al (2009) Public-public partnerships (PUPs) in water, Public Services International Research Unit, University of Greenwich. Available in http://www.psiru.org/
Idelovitch E, Ringskog K (1995) Private sector participation in water supply and sanitation in Latin America. Inter-American Development Bank, Washington, DC
Inter-American Development Bank (2010) Drinking water, sanitation, and the Millennium Development Goals in Latin America and the Caribbean. Inter-American Development Bank, Washington, DC
Jaramillo S (1995) Ciento veinte años de servicios públicos en Colombia. Centro de Investigación y Educación Popular, Bogotá
Jordán R, Martínez R (2010) Pobreza y precaridad urbana en América latin y el Caribe, Situación actual y financiamiento de políticas y programas, CEPAL, Naciones Unidas, Cooperación Andina de Fomento, Santiago de Chile
Laurie N (2007) How to dialogue for pro-poor water. Geoforum 38:753–755
Marañon Pimentel B (2004) Participación del sector privado en la gestión del agua potable en el Distrito Federal. In: Tortajada C, Guerrero V, Sandoval R (eds) Hacia una gestión integral del agua en México: retos y alternativas. Cámara de Diputados, Centro del Tercer Mundo para el Manejo del Agua, México, pp 289–366
Marañon Pimentel B (2009) Economic costs of water-related health problems. Int J Water Resour Dev 25(1):65–80
Olivera O, Lewis T (2004) Cochabamba, water war in Bolivia. South End Press, Cambridge, MA
Petrella R (2009) Pour un pacte social de l'eau, le manifeste de l'eau pour le XX^{e} siècle. Éditions Fides, Montréal
Pflieger G (2008) Historia de la universalización del acesso al agua y alcantarillado en Santiago de Chile (1970–1995). Revista Eure 34(103):131–152
Riviera D (1996) Private sector participation in the water supply and wastewater sector, lessons from six developing countries. The World Bank, Washington, DC
Sánchez Gomez L, Terhorst P (2005) Cochabamba, Bolivia: public-collective partnership after the water war. In: Balanyá B et al (eds) Reclaiming public water, achiements, struggles and visions

from around the world. Transnational Institute, Corporate Europe Observatory, Amsterdam, pp 121–130
Schneier-Madanes G (2005) Gouvernance de l'eau: l'émergence des usagers, le cas de la concession de l'eau de Buenos Aires. Sciences de la Société 64:54–67
Schneier-Madanes G, de Gouvello B (eds) (2003) Eaux et réseaux, les défis de la mondialisation. Travaux et Mémoires de l'IHEAL, La Documentation Française, Paris
Shultz J (2009) Water in Cochabamba, after the water revolt: a legend with mixed results. In: Shultz J, Crane Draper M (eds) Dignity and defiance: stories from Bolivia's challenge to globalization. University of California Press, Berkeley/Los Angeles pp 63–81
Spiller P, Savedoff W (1999) Spilled water: institutional commitment in the provision of water services. Inter-American Development Bank, Washington, DC
Swyngedouw E (2004) Social power and the urbanization of water, flows of power. Oxford University Press, Oxford Geographical and Environmental Studies, New York
Tortajada C (2006) Water management in the Mexico City metropolitan area. Int J Water Resour Dev 22:353–376
Trawick P (2003) The struggle for water in Peru, Comedy and tragedy in the Andean commons. Stanford University Press, Stanford
United Nations (2009) Water in a changing world, the United Nations world water development report 3. Unesco, Paris
Vargas MC (2005) O negócio da água: riscos e oportunidades das concessões de saneamento à iniciativa privada: estudos de caso no sudeste brasileiro. Annablume, Saõ Paulo
WHO, UNICEF (2010) Progress on Sanitation and Drinking Water, 2010 Update. Joint Monitoring Programme for Water Supply and Sanitation, Geneva, World Health Organization, New York, United Nation Children's Fund

Chapter 16
From Private to Public: Challenges in La Paz and El Alto, Bolivia

Franck Poupeau

16.1 The Return of the Water Service to Public Management

Attempts to return private water distribution services to the public sector have been wrought with difficulties, especially in Latin America (Bakker 2000; Guérin-Schneider Lorrain 2003). The water distribution service of the metropolis formed by the cities of La Paz and El Alto in Bolivia has been no exception (Crespo 2002). Bolivia is internationally known for its Water Wars, which led to the departure of several multinational companies that held water and sanitation concessions in the country. The expulsion of Bechtel from Cochabamba in 2000, for example, sparked a new cycle of social protests that liberalization policies—and their repressive instruments—had succeeded in keeping under control since the 1980s, when the workers' movement was defeated. The idea that natural resources should be reclaimed by the public sector was advocated, notably, by the cocaleros (coca workers) unions led by Evo Morales. The future head of the Bolivian government first came to national prominence during the presidential elections of 2002. He then went on to play a central role in the protests in El Alto against exportation of hydrocarbons to Chile in what is best known as the Gas War. In the wake of this episode, his Movimiento al Socialismo (MAS) party became the country's leading political force. This momentum eventually translated into a 53.7 % share of the first-round vote in the presidential elections. The new head of state pledged to help indigenous people, who had been the victims of colonial and post-colonial rule, and return to the public management of water services in the cities of La Paz and El Alto, which together form Bolivia's largest concession.

F. Poupeau (✉)
Sociologist, CNRS Assistant Professor, and Director, iGlobes Joint International Unit, UMI 3157, CNRS/University of Arizona, 1133 E James E. Rogers Way, JW Harshbarger Building, Tucson, AZ 85721, USA
e-mail: franck.poupeau@gmail.com

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_16,

In January 2007 Morales issued a decree that transformed the consortium, Aguas del Illimani, which had held the concession since 1997, into a public and social enterprise (Botton 2007b; Defournier 2007; Jacobs 2007; Sprong 2007; Mayaux 2008). Like the nationalized oil company YPFB,[1] the water distribution service became one of the flagships of the government's political transformation agenda. The service's new organizational model was designed to represent a decisive break with the private sector approach by supplying water for all. But by early 2010, the Ministry of Water and a public and social enterprise known as Empresa Pública y Social de Agua y Saneamiento (EPSAS)[2] had no more changed pricing policy than they had succeeded in introducing urban policy and social aid programs capable of combating and defeating the kind of unlicensed building, unauthorized development, and land speculation so characteristic of areas bereft of infrastructure.

The chances that the municipal company EPSAS will significantly reduce inequalities in access to water services seem to be minimal, especially since declarations concerning the social vocation of the company that replaced Aguas del Illimani are being made against a confusing legal background. The contract signed when the service was privatized is still operational, even several years after remunicipalization, and the status has not changed. Attempts to develop projects on the outskirts of the expanding areas of the cities of La Paz and El Alto also have been hampered by a lack of public funding, which does not cover the shortfall caused by the relative insolvency of local residents and the costs associated with extending the network in geographically hard-to-access areas. Due to a lack of resources, the new company is pursuing a policy of community participation and private sub-contracting initiated in the 1990s to ensure that a service was provided to poorer neighborhoods (Poupeau 2008a). This continuity with the urban governance model implemented over the course of the preceding decade is exemplified by transfers of technology (accounting, IT, planimetrics, etc.), and the enduring use of forms of new public management inherited from organizational approaches applied in the private sector (Lorrain 2003). It is therefore legitimate to examine the extent to which change has been affected by the return of the water service to public sector management. Is the fact that the municipality now runs the service likely to generate new approaches to decision making and participation in the cities concerned and, if so, to what degree? And how can this be linked to contemporary transformations in local urban geography? The La Paz-El Alto case study reveals that integrating indigenous populations into public policies is characterized by logics of conflict rather than a genuine attempt to accommodate their "right to water," even though that right is promulgated by the Bolivian government.

[1] Yacimientos Petrolíferos Fiscales Bolivianos is the state-owned oil company of Bolivia since its renationalization in May 2006.

[2] Public and Social Company of Water and Sanitation.

Studies on the Return to Public Management of Water

While the subject of the privatization of water distribution services has generated a healthy literature over the course of the last few years, approaches to ensuring a return to public management have received relatively little attention (Bakker 2010). For example, while the Water War in Cochabamba in 2000 focused attention on the failures of attempts to liberalize the sector (Nickson and Vargas 2002; Sprong 2007), the difficulties encountered by the municipal company since then, notably from the point of view of social participation and the quality of a service that, 10 years on, seems to be incapable of meeting the expectations of local people, have received relatively little attention (Driessen 2010). On a larger economic and demographic scale, the case of the Buenos Aires concession raised questions about the social efficiency of the private model in poor, under-equipped (carenciados) neighborhoods in major cities, and the strategic problems faced by companies regarding the mandate they must fulfill in their concession (Botton 2007a). From a broader perspective, Latin America represents an ideal locus for studying the challenges faced by water distribution services (Jouravlev 2000; Schneier-Madanes and de Gouvello 2003; Schneier-Madanes 2010): the urban explosion that occurred in the continent before it did in other parts of the developing countries rendered more visible the effects of a lack of regional planning and basic infrastructure (Troin 2000), while also providing an opportunity to test the capacity of the French water model imported in the 1980s to adapt to the needs of the poorest urban areas (Finger and Allouche 2002; Bonin 2005). The return to a public service model in cities like Buenos Aires and Tucumán in the late 1990s called into question the efficiency of the model without, however, providing clear solutions to infrastructure problems associated with unequal access to water in the metropolises of the "South."[3]

16.2 The La Paz-El Alto Metropolis: Water Resources and the Water Distribution Service

At the end of the first decade of the third millennium, the neighboring cities of La Paz and El Alto formed a metropolis of approximately two million inhabitants. For several decades, urban growth in La Paz, the seat of Bolivian government, was slowed by its geography and geology. The city sits in a valley at the foot of the Royal Cordillera at an elevation of between 3,200 m and 3,900 m, and new residential buildings are built in the least stable areas, at the foot of cliffs and sedimentary rocks eroded year after year by the rain. The growth of the city of El Alto, meanwhile, is not limited by any natural obstacles. Situated on the high

[3] See Chap. 8.

plateau overlooking La Paz, it has experienced exponential demographic growth, with its population increasing from 11,000 inhabitants in 1950 to around one million in 2010 (INE 2009).

The two cities use different water supply systems from the half-dozen dams located upstream, which have a total storage capacity of 52.7 million cubic meters (mcm). Their spatial distribution is defined by the physical constraints of the basins and valleys traversing the city, and the inequalities in infrastructure between the two areas lie in their differing economic potential. Due to their respective histories, the two cities present distinct but equally marked forms of socio-spatial segregation. Unsurprisingly, the best equipped neighborhoods are at once the oldest and the wealthiest. Meanwhile, the middle classes—middle managers, employees, and members of the intellectual professions—tend to live in the neighborhoods surrounding the historic center. The central area of the city encompasses the business district and the government administrations; it is surrounded by the laderas, neighborhoods set on the mountain slopes extending as far as the high plateau, with their brick or adobe residential buildings. El Alto, on the other hand, has a different but no less rigid layout. It is articulated around La Ceja, the main road junction with La Paz. The city's inner ring is made up of the oldest and most compact neighborhoods and includes administrative buildings and small artisanal and commercial enterprises. A third ring, less densely urbanized and more extensive, is the product of the endogenous growth of the two cities and of the trend for families to purchase property in less expensive areas on which they can build their own houses. The farther neighborhoods are from the first ring of development, the worse their access to urban services.

Founded in the sixteenth century, La Paz developed around a colonial center, which evolved into a business district and was gradually surrounded by residential and industrial neighborhoods. Over the course of the twentieth century, due to a lack of space, the economic activities formerly carried out in La Paz (transport, arts and crafts, retail, and manufacturing) moved to El Alto, which has, since being founded in the 1940s, always had an economic function as a purveyor of additional labor and available space (Poupeau 2009a). All that is left in the center of La Paz are government administration buildings, tertiary services, and the city's wealthiest inhabitants. Less well-off people, such as lower paid public sector workers and the under-employed, have been inexorably pushed outwards, first to the laderas surrounding the valley and then to the high plateau overlooking the city, where they have been joined by a wave of rural migrants looking for work (Poupeau 2009b).

When the service was privatized in 1997, 95 % of La Paz's water was supplied by the drinking water network and 80 % by the sanitary network (around 140,000 connections). Meanwhile, El Alto's urban services suffered numerous shortcomings, with 65 % of its supply derived from the drinking water network and 25 % from the sanitary network (100,000 connections) (Botton 2007b; Laurie and Crespo 2007). According to the national census of 2001, 15 % of El Alto's 165,000 households had no electricity, 37 % were classified as insalubrious, and 65 % had no access to drinking water (53.7 % had indirect access via standpipes,

while 11.3 % had no supply).[4] Above all, there were pronounced spatial inequalities, with the oldest and most central neighborhoods being the best equipped, in stark contrast to more recently developed districts on the edge of the city. In a context in which liberal policies were applied in most sectors of the national economy (Kohl 2004), it is understandable that privatizing the municipal water service was viewed as a viable solution to the problem of supplying working class neighborhoods.

16.3 The Aguas del Illimani Contract: Modalities and Limitations

The contract signed with Aguas del Illumani[5] in July 1997 was for a 30-year concession, with objectives to be redefined every 5 years (Komives 2001; Braïlowsky 2007; Defournier 2007). The contract was part of a wave of market capitalizations of natural resources and urban services. A regulatory authority, Superintendencia de Agua y Servicios Básicos (SISAB),[6] was set up for each privatized sector. Indeed, the contract was signed with SISAB and not with the municipalities concerned.

The objective of the contract was to guarantee that all households in the concession would be supplied with water: 100 % in terms of drinking water in La Paz and El Alto—71,752 connections to the drinking water network in the first 5 years—and 95 % sanitation coverage in La Paz and 90 % in El Alto.[7] To achieve these objectives, the contract defined two areas in the concession territory: one in which the service provision objectives of the contract were to be carried out, and an unsupplied area, in which the operator had no contractual obligations. In effect, the operator was only obligated to equip areas that fulfilled a certain number of criteria based on the population density of the neighborhood and connection costs to the main network.

[4] The difference between the 1997 and 2001 data derives primarily from the way in which household connections were counted. In many households built between the 1960s and the 1990s, a connection did not depend on having a tap inside the house, but having one in the courtyard (Poupeau 2010).

[5] Aguas del Illimani was set up as a limited company with an initial capital of $11 million, divided as follows: Suez Environnement (formerly Lyonnaise des Eaux) 55 %; Bolivian shareholders (BISCA and CONNAL) 27 %; Argentinian shareholders (Inversora de Servicios SA) 9 %; International Finance Corporation (IFC, a World Bank institution responsible for operations in the sector) 8 %; and employees 1 %.

[6] Regulatory Authority of Water and Basic Services.

[7] Based on a price cap mechanism, the contract included, in addition to an initial "social tranche" at a very high rate (less than 30 m^3), a much lower rate of $0.22 per m^2 (compared with an average cost of $0.52), which did not cover the costs of the service. Consequently, in an initial period, 78 % of water used accounted for only 48 % of the operator's revenue.

The contract rapidly became the object of some controversy. In the early 2000s, a study on the impact of the contract and its mandate to expand the network into the poorest areas of the metropolis demonstrated that it would not be enough to extend the network to supply the poorest neighborhoods (as the traditional natural monopoly model suggested it would) (Komives 2001). Three years into the concession, the company still had not managed to meet demand in those areas. But what was at issue was not the company's commitment, but the nature of the contract. Indeed, the Aguas del Illimani contract was characterized by its focus on extending the geographical area supplied and on providing new connections. The contract also included very precise quality standards, both in terms of inputs (equipment, technology), and outputs (connection techniques, pricing). The government at the time had contractually obliged the company to maintain the quality of its installations to guarantee an equitable service for all.

The problem was, therefore, that, due to contractual issues, Aguas del Illimani lacked the flexibility required to equip the poorest households. Lower price barriers for those households and financial incentives should have been introduced to encourage the operator to invest in poorer areas. On the other hand, households without resources could only benefit from the service if the operator presented an offer that was diversified enough to meet variations in demand from different kinds of households. It is, therefore, not surprising that the concessionaire failed to equip poorer areas, such as the periurban neighborhoods on the outskirts of El Alto, especially when they were not located in the area that, according to the contract, had to be supplied. Due to the uniformity of the offer, the poorest households were discouraged from requesting the company to connect them. It is likely that problems concerning the connection of poorer areas were familiar to a company as large and experienced as the French-based Suez Environnement, Aguas del Illimani's largest shareholder (Braïlowsky 2007).[8] Indeed, in tandem with the contract, a certain number of measures characteristic of what is generally referred to as a "pro-poor" approach were introduced. Beyond the limitations of the contract, the shortcomings of these measures can be used to explain the failure of Aguas del Illimani in La Paz and El Alto.

16.4 The Failure of the "Pro-Poor" Approach

In setting up the Aguas del Illimani consortium, Suez Environnement's objective was to develop a model for supplying poorer neighborhoods that could be used to extend its overseas markets. One of the consortium's first managers in Bolivia declared that "the objective was to demonstrate that Lyonnaise des Eaux [which later became Suez Environnement] was capable of succeeding in difficult areas" (Poupeau 2008b). As soon as the contract was signed, SISAB authorized Aguas del

[8] See Chap. 4 for more information on Suez Environnement (formerly Lyonnaise des Eaux).

Illimani to take out 5-year loans to deal with predictions of prohibitive costs in areas that were equipped. This measure made it possible to reduce installation costs from $155 to $105 in exchange for labor supplied by the households concerned. In 1998, only 20 % of households supplied for the first time that year chose to pay in full. For the first 5 years of the contract, evaluations seemed to be fairly positive (Barja and Urquiola 2001; Foster and Irusta 2003; Jacobs 2007; Braïlowsky 2007).

The contract also included provisions for the least favored areas to be equipped with a "condominial" system, which involved linking local networks to the main network by means of a collective branch pipe supplying an entire grid of residences. The technical model consisted of equipping secondary streets with pipes of a smaller diameter, linked under the roadway to the pipes of the main streets, a system designed to reduce costs by 30 % compared to standard installations. Users had to install and maintain the pipes. This technical system therefore involved the participation of the inhabitants of poor neighborhoods as a means of reducing installation costs.[9] But, to the degree that these connections were installed with financial support from the World Bank via the condominial system and the participation of residents in installation works, a 2006 audit[10] did not consider that they were among the connections outlined in the contract because they did not result from investment made by the company itself. The audit estimated that 35 % of the 71,752 connections outlined in the original contract were not installed. This gave SISAB grounds for terminating the contract: "Aguas del Illimani diversified its investment risks by introducing a mechanism which involved having local residents carry out installation work" (SISAB 2006, p. 14).

The relative lack of investment on the part of Aguas del Illimani in terms of regular connections and its growing recourse to the participation of the poorer inhabitants is likely linked to the political situation, which was marked by increasing social tensions. Investments in the water sector began to slow in 2000 with the Cochabamba Water War.[11] The contract of the private operator, Bechtel, was terminated in the wake of massive popular action on the part of users (Sprong 2007). In 2004, committees from El Alto united under the banner of the Federación de Juntas Vecinales (FEJUVE)[12] to demand the departure of Aguas del Illimani. Previously characterized by a certain conservatism and a clearly clientelistic approach to the defense of the interests of local residents (Sandoval and Sostres 1989), the FEJUVE became a political organization at the forefront of the struggle against neoliberal policies. Demands for Aguas del Illimani to be nationalized were

[9] The introduction of the condominial system made it possible to install an extra 6,325 new drinking water connections in the first 5 year period and an extra 6,482 in the second, in addition to the 52,764 and 25,452 new connections made in the two periods, respectively. According to these figures, community participation in installation work thus accounted for 12 % of new connections in the first 5-year period and 25 % in the second. In 2005, SISAB underlined that this type of connection accounted for up to 56.3 % of new installations.

[10] Carried out by Pozos and Asociados at the request of SISAB.

[11] See Chap. 15 for more on the Water War.

[12] Federation of Neighborhood Organizations.

indissociably linked to the "October Agenda," which brought the coalition of social movements to power under the leadership of Morales' MAS party in 2005 (Do Alto and Stefanoni 2008).

16.5 Returning the Water Distribution Service to Public Sector Management

In January 2007, Morales' government concluded negotiations over the termination of the company's contract in Bolivia. Aguas del Illimani was replaced by a public and social water distribution company. In November 2006, Morales stated: "As the government, we can expel the company, it's within our powers, but then we couldn't obtain the money needed to have more water in El Alto. Everyone would demonstrate against us. Once the company is gone, what we want to guarantee is a water supply."[13] In fact, the negotiation process had been initiated in January 2005 by the interim government of Carlos Mesa, which had promulgated, under pressure from El Alto-based social organizations, a series of supreme decrees designed to encourage Aguas del Illimani to leave. Reticent at the outset, in March 2006, the company seemed to accept that the process was ineluctable, even if it never accepted the conclusions of the 2006 audit.[14] While the social organizations of El Alto lobbied for the company simply to be expelled, Morales' government decided to "meet the demands of the population as rapidly as possible" by carrying negotiations through to their conclusion and avoiding interminable legal actions involving international regulatory bodies. This would safeguard investment from international cooperation entities, which had made negotiation a sine qua non of their continued support. EPSAS[15] was to recuperate the shares of the French consortium via a trust held by the National Fund for Regional Development (FNDR), which was tasked with setting up the Ministry of Water as the new owner within 6 months.[16]

[13] *El Diario*, November 19, 2006.

[14] The audit recognized only $24 million of the $45 million of assets declared by the company. Taking into account the $13.5 million to be repaid to international bodies, the company, according to the audit, was still owed $11 million. Finally, following assessments carried out by the sector's regulatory authority, $5.5 million was allocated not as compensation but as capital for the next 9 years of management. The funds were released by the Ministry of the Economy, which issued bonds covering the sum required for Aguas de Illimani's withdrawal.

[15] Supreme Decree 28985, which set up EPSAS, was marked by a ceremony held on January 4, 2007, at the Palace of the Government. Abel Mamani, the minister of water at the time, presented documents demonstrating that the company had been nationalized.

[16] The Ministry of the Economy also issued $9.5 million worth of credits in favor of the FNDR with a view to reimbursing the debts contracted by Aguas del Illimani to the Inter-American Development Bank (IADB), the Caja Andina de Fomento, and the International Finance Corporation.

The difficulties encountered by Aguas del Illimani in terms of fulfilling its obligations were emphasized by the Bolivian government with a view to justifying the termination of the contract and highlighting the social vocation of the new company, which was to extend the network to neighborhoods ignored by the private operator, provide more affordable prices to poorer households, and respect the environment by developing wastewater treatment systems in particularly contaminated areas. SISAB fined Aguas del Illimani $450,000 when the concession ended. The goal of the new company, EPSAS, was to develop the concept of water for all, notably by focusing on community participation in the metropolis' various neighborhoods. According to the Ministry of Water, "citizens must collaborate so that the company can meet the demands of consumers."[17]

The contradictory situation in which the Ministry of Water and the government found themselves upon taking power, caught as they were between political promises and financial constraints, likely accounts for the hesitation and confusion over the transition to EPSAS. However, the ministry raised questions about how the new company would operate. In effect, as soon as it was set up, EPSAS was obliged to find $35 million in investments to develop the network in the 5 years to come. While the company's social vocation enabled it to directly reinvest consumption and connection bills, the only substantial funding available was international cooperation.[18] From this point of view, no real break with the preceding liberal model seems to have occurred, which depended on external funding to make up for shortfalls in the least solvent areas.

16.6 Water Policy in the New Political Constitution of the Plurinational State of Bolivia

Is there, then, a paradox inherent in the approach taken by a government anxious to promote the "decolonization of the state" to maintain a community participation system, a keystone of the pro-poor policy, in an effort to reduce installation costs in economically insolvent areas (Poupeau 2008a)? In effect, this approach is dependent on funding from international cooperation agencies, which are able to impose their own priorities, schedules, and watchwords on national decision makers (Rodríguez-Carmona 2009). In a market context, a public or private company operating in these conditions runs the risk of reinforcing the dual nature of the distribution system: alongside the network long ago installed in the wealthiest neighborhoods, poorer people in periurban areas have access to a system adapted to their means—a "poor" network for poor people, according to the expression

[17] *El Diario*, January 5, 2007.

[18] Venezuela provided a $5.5 million subsidy. The European Union promised another $4 million and countries including Japan, Norway, and Switzerland provided a multitude of smaller subsidies for localized projects.

coined by sociologist Carlos Crespo (2002). However, there is nothing to suggest that the same approach, applied in a context different from pro-poor policies, would produce the same effects. Attention should thus be focused once more on the policy implemented at both the local and national levels to analyze how community participation measures are maintained.

In 2007, the Ministry of Water unveiled two distinct stages in the process of setting up the public and social enterprise.[19] First, the new public company had to demonstrate its efficiency by making the best use of available resources. Second, the Bolivian parliament's recognition of a universal right to water presented the possibility for the public enterprise to turn to the Bolivian government to fund heavy investments. Insofar as the first stage was concerned, it seems that the organizational and legal approaches inherent in the public and social mode of water distribution did not undergo any real modifications. Faced with a choice between a model of universal access to water that was difficult to fund without external subsidies and the provision of inferior installations for poorer households, the company was obliged to develop an alternative urban services approach. But, even working together, a commission responsible for overseeing the establishment of the new public enterprise (in which the Ministry of Water has been represented since 2007), the municipal authorities of La Paz and El Alto, and the neighborhood committees of the two cities (but not EPSAS, whose role is limited to supplying the necessary information), have not produced any tangible results. Indeed, the municipal company is organized in the same way and has the same contractual constraints as the enterprise that it replaced.

However, there are some notable exceptions: the priority traditionally accorded to rural areas was somewhat undermined with the implementation in 2009 of a plan for poorer outlying urban districts. Furthermore, to get around the price norms stipulated by the contract, a social measure was introduced in the form of a tariff for households consuming small volumes of water (less than 15 m^3). In 2009, this price structure covered 59,946 connections in La Paz and 145,859 in El Alto. Official results indicate that 28,000 new drinking water connections and 22,500 new connections to the sanitation system were installed between 2007 and 2009. The 5-year program (2007–2012) envisioned the installation of 44,000 and 33,000 new connections, respectively.[20] According to these figures, therefore, the La Paz and El Alto concession had 285,000 individual connections managed by 428 employees, corresponding to a rate of 1.5 employees per 1,000 connections—well above international efficiency norms recognized in the sector (two per 1,000).

In regard to the second stage unveiled by the Ministry of Water, a new constitution proposed by the Morales government was finally passed in 2008 with 62 % of the vote. In terms of natural resources, the constitution acknowledges a right to water for all and outlaws any form of privatization. On April 22, 2009, as part of this process of legal transformation, Morales suggested to the Assembly General

[19] Interview carried out on January 17, 2007.

[20] Source: Bolivian Ministry of Water, December 2009.

of the United Nations that a World Earth Day should be introduced to encourage people to live "in harmony with nature." This initiative was accompanied by a ceremony held in Bolivia on June 5, presided over by the then-new water minister, who paid homage to Pachamama (Mother Earth) as a source of inspiration for the government's new public policies.

However, while declarations of constitution and cosmological principles doubtless have their place, the reality of the situation is far more complex, notably in regard to the recourse to the private sector for funding and carrying out works designed to expand the network.

Maintaining Private Investment in the Municipal Enterprise

In February 2009, the Ministry of Water allocated 174.8 million bolivianos ($23 million) over a 20-year period to guarantee water supply to La Paz and El Alto and the neighboring municipalities and to anticipate the effects of climate change. In January 2009, only 80 % of water storage capacity for the metropolis was assured. Work on the construction of an additional dam in the Alto Hampaturi region began with support from the National Fund for Productive and Social Investment. Other projects were also launched in various areas of the metropolis: digging a dozen wells, constructing a water treatment station (52 million bolivianos), and increasing the capacity of another station (9.4 million bolivianos) from 150 to 650 liters per second. The National General Treasury contributes 60 % of the funding for last project, with the municipal government of El Alto adding the remaining 40 %. The ministry also lists other network extension projects, which demonstrate the difficulty for a public firm to extend the service without the support of private funds. In one district, private firms are constructing a sanitation network for 14.6 million bolivianos and enlarging the drinking water network for 8.5 million bolivianos. In another district, companies are extending the sanitation network for an investment of 20.2 million bolivianos and extending the drinking water network for 8.5 million bolivianos.

The fact that some projects are still delegated to the private sector may seem surprising. In fact, it roots are to be found in the statutes of EPSAS which, as a limited company, does not have the right to receive funding from external sources. Funding must therefore be sought from the Ministry of Water, the national government, or city governments. In return, EPSAS is obliged to make a contribution equal to 10 % of the donation. This signals the emergence of an original model, which implies a return to a three-pole partnership (Clarke Annez 2010) that includes the private sector, the municipal public sector, and government instead of a return to an entirely public approach. This original private-public partnership approach makes it possible for the new company to compensate for its inability to undertake major works using its own capital, as was demonstrated by an accident in La Paz in 2008.

16.7 Conflicts in Gestation: Community Rights Versus the Right to Water

On January 25, 2008, a landslide caused by seasonally heavy rain washed away the structure supporting the pipes in the Pampahasi system, which supplies the southern and eastern areas of La Paz. The accident had immediate and long-lasting repercussions. The entire area was without water for 3 weeks, underlining the fact that the company was unable to repair the service quickly and highlighting the shortcomings in its urban risk prevention system. Hospitals and companies had to use water tankers to provide a skeleton service, while school holidays had to be extended.

It comes as no real surprise that, forced to confront day-to-day management and solvency problems, the recently renationalized company did not have time to focus on natural risks. But this "institutional vulnerability" (Hardy 2009a) meant that it was impossible to find technical alternatives. Reusing old pipes proved to be a precarious practice, water trucks were costly and not up to the job, and repair work dragged on, lasting 5 months. In effect, repairs cost $450,000—money that EPSAS did not have. The company was thus obliged to go cap in hand to the municipality and the national government, eventually obtaining a loan. In a context of political instability in which the regional opposition was making headway in La Paz, the political issue at stake was the efficiency of municipal management. The mayor urgently set up a municipal call for tender for the job of repairing the damaged pipes, with the contract awarded to TAURO S.A. Supported by a certain number of La Paz-based firms, he also requested that EPSAS change its legal status to that of a mixed enterprise to deal with the numerous maintenance and prevention projects that the Pampahasi accident had rendered necessary. However, the vice minister of basic services rejected the proposal, citing its incompatibility with the status of water outlined in Bolivia's new constitution, which was awaiting approval at the time.

But the enterprise's institutional vulnerability was not confined to the financial sphere. It also involved wider problems concerning the regulation of natural resources. In effect, pipes were cut in the community of Hampaturi, adversely affecting harvests in neighboring agricultural land. The community authorities demanded compensation for the incident as well as payment for allowing the pipes to traverse their land. Since the introduction of the Participation Reform in Bolivia in 1994, the communities that form native community lands (tierras comunitarias de origen) have, in effect, been able to claim collective ownership of the legal area of the community. In 2008, even if the new constitution had not yet been signed, this tendency was not only reinforced but legitimized by the constitutional projects of the Morales government. To exert pressure on the company, peasant communities prevented workers from accessing damaged pipes and beginning repair work. Due to its lack of legal status, EPSAS was unable to negotiate on its own with the peasant communities and consequently had to rely on the mediation of the municipal and national governments, with the help of the

army, to achieve a "pre-accord between the public authorities (Ministry of Water, Ministry of Rural Development, and Ministry of the Interior) and the representatives of the inhabitants" (Hardy 2009b). This pre-accord envisioned, among other things, the construction of defensive levees to protect residences and agricultural land from regular flooding.

Above all, the Pampahasi accident highlighted the problems posed by the coexistence of the customary law of local communities and the need to provide urban services. The solution provided by the nation's new constitution is to promote the right to water, designed to guarantee universal access to drinking water (either free or at a reasonable price).[21] This right implies an obligation to produce results rather than provide means. As such, it says nothing about approaches to managing the service (public, private, public-private partnership) or the nature of share ownership. But as the example of the rupture of the Pampahasi system demonstrates, incorporating the right to water in the new constitution does not guarantee that cities will be supplied: whether in terms of urgent repairs or the construction of additional dams destined to compensate for scarcity due to increased glacial melting (Ramirez and Olmos 2007), the rights of rural communities upstream to use the resource for their own ends outweigh concerns over supply to the cities. This situation is all the more explosive in that, for the time being at least, there are no opportunities for negotiation between the parties involved. On the other hand, the territorial approach to the recognition of customs and traditions could be combined with the recognition of water as a common good, thus making it possible to introduce public arbitrage between urban users and upstream communities, which, while their rights have finally been recognized, are still in a position to hinder the system. In the current state of affairs, they constitute no more than a private social agent among others, and their place in the ensemble of institutions responsible for regulating the global use of resources has yet to be found. In a context in which water resources destined to supply the La Paz-El Alto metropolis are running out, it is likely that an increasing number of conflicts of this kind, involving upstream community areas with rivers, pipes, and dams, will occur in the future.

It is possible that this type of environmental conflict can only be solved locally, in that the regulation of natural resources is carried out on a number of levels (Doern and Johnson 2006): the local level of regional management; the municipal level guaranteeing urban services; the national level, involving the implementation of public policies concerning the distribution of the resource; and even the international level, with the implementation of environmental laws and decrees and management models for the service (Meublat 2001). Above all, these conflicts call for a deep reappraisal of the principles of urban governance in the La Paz-El

[21] According to Karen Bakker, the concept of the right to water has limits associated with human rights: "Private companies' adoption of a discourse focusing on human rights indicates its limitations as an anti-privatization strategy. Human rights are individualistic, anthropocentric, centred on the State, and compatible with the private water distribution service; [human rights] thus represents a very limited strategy for those who reject the privatization of water" (Bakker 2007, p. 447).

Alto metropolis. A balance must be struck between recognizing the rights of communities and guaranteeing a public water distribution service. But beyond the accident of January 2008, the case of this concession demonstrates that the return to a municipal management approach does not mean a return to square one, to a state that pertained before the privatization of the system. New features include the emergence of communities upstream—communities whose existence was previously denied—and the intervention of the state, which has assumed a new regulatory role beyond the framework of the market to encompass an integral approach to the resource in the areas concerned, ensuring the continued participation of the private sector in the maintenance and expansion of the system. These elements bear witness to a transformation in approaches to regulating natural resources and the urban services that distribute them. And these elements must, by means of an analysis of the conditions in which a municipal service can be implemented, be articulated within the framework of a new management model.

References

Bakker K (2000) Privatizing water, producing scarcity. Econ Geogr 76(1):4–27

Bakker K (2007) The 'commons' versus the 'commodity': alter-globalization, anti-privatization and the human right to water in the global south. Antipode 39(3):430–455

Bakker K (2010) Privatizing Water. Governance failure and the world's water crisis. Cornell University Press, New York

Barja G, Urquiola M (2001) Capitalization, regulation and the poor. Access to basic services in Bolivia. United Nations University, World Institute for Development Economic Research, discussion paper no 2001/34

Bonin H (2005) Le modèle français du capitalisme de l'eau dans la compétition européenne et mondiale depuis les années 1990. Sciences de la société 64:55–74

Botton S (2007a) La multinationale et le bidonville, Privatisation et pauvreté à Buenos Aires. Karthala, Paris

Botton S (2007b) Capitalisation d'expérience: Aguas del Illiamani. Regards croisés sur la concession de La Paz/El Alto (1997–2007), Roneotype, Latts/Aisa Report

Braïlowsky A (2007) Buenos Aires, Argentine (1993–2006) et La Paz, Bolivie (1997–2007). L'impossibilité de travailler dans une logique d'intérêts partagés: une approche transversale des contrats de La Paz et de Buenos Aires. Suez Environnement

Clarke Annez P (2010) Urban infrastructure finance from private operators: what have we learned from recent experience. In: Peterson GE, Clarke Annez P (eds) Financing cities: fiscal responsibility and urban infrastructure in Brazil, China, India, Poland and South Africa. World Bank, Washington,DC, Ch.11

Crespo C (2002) La concesión de La Paz a los cinco anos. Elementos para una evaluación. Available in http://www.aguabolivia.org/CEPLAG%20paper.htm

Defournier V (2007) The concession contract of Aguas del Illimani in La Paz/El Alto, Bolivia. Inputs for Private Sector Participation in Urban Water Systems in Less Developed Countries. London School of Economics and Political Scienc, MSc Development Management

Do Alto H, Stefanoni P (2008) "Nous serons des millions". Evo Morales et la gauche au pouvoir en Bolivie. Raisons d'agir, Paris

Doern B, Johnson R (eds) (2006) Rules, rules, rules, rules. Multi-level regulatory governance. University of Toronto Press, Toronto

Driessen T (2010) Transparencia, un desafío para la empresa pública SEMAPA. Centro de Estudios Aplicados a los Derechos Económicos, Sociales y Culturales, Cochabamba
Finger M, Allouche J (2002) Water privatisation: trans-national corporations and the re-regulation of the water industry. Spon Press, London/New York
Foster V, Irusta O (2003) Does infrastructure reform work for the poor? A case study on the cities of La Paz and El Alto, Bolivia. World Bank Policy Research working paper 3177
Guérin-Schneider L, Lorrain D (2003) Note de recherche sur une question sensible. Les relations puissance publique-firmes dans le secteur de l'eau et de l'assainissement. Flux 52(53):35–54
Hardy S (2009a) La vulnérabilité de l'approvisionnement en eau dans l'agglomération pacénienne: le cas du sous-système El Alto. Cyber Eur J Geogr (online), Dossiers, Vulnérabilités urbaines au sud, Document 457:545–560
Hardy S (2009b) Ruptura del aprovisionamiento de agua potable. Sistema Hampaturi-Pampahasi, La Paz, enero-febrero 2008. Bulletin de l'Institut français d'études andines 28(3):545–560
INE (Instituto Nacional de Estadística) (2009) Información estadística. Available in http://www.ine.gov.bo/indice/indice.aspx?d1=0301&d2=6
Jacobs J (2007) Best practice in serving the poor in global water privatizations. Dissertation, Cranfield University, School of Applied Science (Supervisor: Dr. Richard Franceys)
Jouravlev A (2000) Water utility regulation: issues and options for Latin America and the Caribbean. Cepal, Santiago
Kohl B (2004) Privatization Bolivian style: a cautionary tale. Int J Urban Reg Res 28(4):893–908
Komives K (2001) Designing pro-poor water and sewer concessions: early lessons from Bolivia. Water Policy 3:61–79
Laurie N, Crespo C (2007) Deconstructing the best case scenario: lessons from water politics in La Paz-El Alto, Boliva. Geoforum 38:841–854
Lorrain D (2003) Les quatre compétitions dans un monopole naturel. Qu'est-il en train d'arriver au secteur de l'eau ?. Flux 2/3(52/53):69–86
Mayaux PL (2008) Retour sur le retrait de Suez de La Paz-El Alto. Flux 4(74):83–91
Meublat G (2001) La rénovation des politiques de l'eau dans les pays du Sud. Revue Tiers Monde 43(166):249–258
Nickson A, Vargas C (2002) The limitations of water regulation: the failure of the Cochabamba concession in Bolivia. Bull Lat Am Res 21(1):99–120
Poupeau F (2008a) Les ambivalences de la participation communautaire. Le cas du service de distribution des eaux à El Alto, Bolivie. Autrepart 47:245–254
Poupeau F (2008b) Carnets boliviens (1999–2007).Un goût de poussière. Aux lieux d'être, Paris
Poupeau F (2009a) El Alto, una ficción política. Bulletin de l'Institut français d'études andines 39 (2):542–565
Poupeau F (2009b) Les frontières de la métropolisation. Inégalités socio-spatiales d'accès à l'eau et indicateurs de pauvreté à La Paz, Bolivie. Transcontinentales 7:81–104
Poupeau F (2010) De la migración rural à la movilidad intra-urbana. Una perspectiva sociológica sobre las desigualdades de acceso al agua en El Alto (Bolivia). In: Poupeau F, Gonzalez Andricain C (eds) Modelos de gestión del agua en los Andes. IFEA/PIEB, Lima
Ramirez E, Olmos C (2007) Deshielo de la Cuenca del Tuni Condoriri y su Impacto sobre los Recursos Hídricos de las Ciudades de La Paz y El Alto. IHH/UMSA/IRD/ULB/IAI (Project funded by the Embassy of Holland in Bolivia – PNCC)
Rodríguez-Carmona A (2009) El proyectorado. Bolivia tras 20 años de ayuda externa. Plural Editores, La Paz
Sandoval G, Sostres F (1989) La ciudad prometida. Pobladores y organizaciones sociales en El Alto. Editorial Sistema/ILDIS, La Paz
Schneier-Madanes G (ed) (2010) L'eau mondialisée. La gouvernance en questionn. La Découverte, Paris
Schneier-Madanes G, de Gouvello B (eds) (2003) Eaux et réseaux. Les défis de la mondialisation. IHEAL/La Documentation Française, Paris

Sisab (Superintendencia de agua y servicios básicos) (2006) Informe final. Metas de expansion. Pozo & Asociados/SISAB, La Paz

Sprong S (2007) The politics of third world water privatization: neoliberal reform and popular resistance in Cochabamba and El Alto, Bolivia. Doctorate dissertation, York University, Graduate Program in Political Science, Toronto

Troin JF (2000) Les métropoles des “Sud”. Ellipses, Paris

Chapter 17
Water Governance Tools: The Role of Science and Decision Support Systems in Participatory Management

Aleix Serrat-Capdevila, Juan B. Valdés, Hoshin V. Gupta, and Graciela Schneier-Madanes

17.1 Understanding Water Management

The need for holistic approaches and cross-disciplinary teams that address complex interactions at the water basin scale and evaluate alternative futures has become increasingly more evident over the past two decades. Integrated water resources management (IWRM) has emerged as the new paradigm for decision making in relation to water. This approach adopts the basin scale as the natural unit within which to consider water issues in their broader context and through the more focused lenses of economic efficiency, social equity, and environmental sustainability. This progression towards a holistic view of water resources research and decision making is reflected in new initiatives and programs, making stakeholder participation a basic requirement. In most countries, water policy reform has revealed the difficulties of shifting from a sectorial and centralized approach to one that is more spatial, transverse, and connected with water resources. In this process,

A. Serrat-Capdevila (✉)
International Center for Integrated Water Resources Management (ICIWaRM-UNESCO), 7701 Telegraph Road, Alexandria, VA 22315, USA

Department of Hydrology and Water Resources, University of Arizona, 1133 E James E. Rogers Way, JW Harshbarger Building, Room 122, Tucson, AZ 85721, USA
e-mail: aleix@email.arizona.edu

J.B. Valdés • H.V. Gupta
Department of Hydrology and Water Resources, University of Arizona, 1133 E James E. Rogers Way, JW Harshbarger Building, Room 122, Tucson, AZ 85721, USA
e-mail: jvaldes@email.arizona.edu; hoshin.gupta@hwr.arizona.edu

G. Schneier-Madanes
CNRS International Research Network on Governance of Water in the Americas, Urban Water Research Network "rés-EAU-ville" (GDR 2524 CNRS), and the Joint International Unit on Water, Environment and Public Policy (UMI 3157, CNRS/University of Arizona), CNRS/CREDA 28 rue Saint Guillaume, Paris 75007, France
e-mail: graciela.schneier@univ-paris3.fr

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_17,

stakeholder involvement and participation in water resources processes is a key element that is gradually being incorporated into policy and institutions.

Integrating scientific and technological knowledge in the new models of participatory governance is an important challenge in addressing existing management issues and improving understanding and cooperation among social actors. Science and technical tools such as decision support systems (DSSs) have evolved from their insular roles in engineering back rooms to take center stage in the resolution of complex participatory water management and planning challenges.

Water, human activities, and the environment in which we live are inextricably interwoven. The availability and beneficial use of water depend on the timing and manner of its arrival (rainfall intensity, rain or snow, duration, frequency); the physical setting of the region (climate and weather, topography, geology); the engineering structures in place; the environmental constraints (existing ecosystems); legal frameworks; institutional policies; and the social, economic, political, and cultural context. A detailed understanding of how the system works and behaves is critical to making good decisions. However, understanding the implications of these decisions is equally important: What consequences are likely to ripple through the interwoven system, and what parties will be affected as a result of a particular set of actions? Grasping the coupled human and physical system is essential.

In general, scientists, academicians, and some practitioners are convinced that numerical models are indeed a good tool to support decision making, but the reality is that the adoption of modeling tools—decision support systems—by policy and decision makers is not standard practice. However, managers, policymakers, and elected representatives are unlikely to use a model or tool they are unfamiliar with, regardless of how good it may be. Furthermore, they generally will not use such models if they don't understand how the models have been developed or how they will help them make informed decisions. In addition, stakeholders will not sufficiently trust decisions based on information provided by a model if they perceive the model as non-transparent, if they are unconvinced the model addresses their views and concerns, or if their input has not been requested or integrated into the development of the models.

So, how can we merge the science, data, and models with decision making at different levels of operations, policy, and governance, in a sustainable way over the long term? For all integrative science to be perceived as credible, relevant, and transparent—and thus acceptable to inform and guide decision making in the public eye—one factor is essential: stakeholder participation through science-fed collaborative planning processes. Two case studies of local participatory planning approaches and collaborative modeling efforts in the United States—the Rio Grande in New Mexico and the San Pedro River in Arizona—as well as the shared vision planning methodology, provide examples of science-based participatory approaches to water resources governance and help illustrate the evolution of decision support tools and methods for water resources management. By acknowledging uncertainty and efficiently connecting institutions in charge of observation and monitoring (government agencies), research and analysis (research centers and academia), and planning and decision making (elected constituencies with stakeholder participation), management can become adaptive and resilient to variability and change.

17.2 Water Resources and Decision Support Systems in the U.S.

Traditionally, decision support systems in water resources management have been characterized by limited decision-making scope. These decision support systems have typically been based on black-box optimization models, understandable only by technical experts, and developed for very specific purposes such as reservoir and infrastructure operations or engineering designs. In general, such DSSs drew from a broad set of tools aimed at informing and supporting decision making, including tools to help understand costs and benefits of construction alternatives, operating rules for reservoirs and other infrastructure, actions to perform given a set of different coexisting constraints, and simulations to understand consequences of different operating policies or management alternatives.

In the United States, there has been a move to consider these aspects since the nineteenth century, but the focus has been mostly on economic impact. For example, the 1936 Flood Control Act required only a positive cost-benefit analysis for a plan to be deemed feasible, and subsequent documents consolidated the concept of "contribution to national income" as the preeminent water resources planning objective (Loucks et al. 1981). Consequently, economic objectives—measured through cost-benefit analysis—have dominated water resources planning in the U.S. and worldwide during much of the past century.

During the Harvard Water Program (1955–1960), academicians and senior federal and state agency staff worked together on research and training for water resource systems design and planning. They developed tools and methods which, given a planning objective, would determine what set of structural measures, operating procedures, and water allocations ("level of development for different water uses") would best achieve the objective (Maass et al. 1962).

In an attempt to address some of the difficulties of assigning economic values to the broad range of possible water resources planning objectives, the U.S. federal government adopted the *Principles and Standards* of the Water Resources Council in 1973 (revised in 1979) by making environmental quality as important as economic development in terms of a planning objective. Gradually, cost-benefit analysis went from being the primary objective to a constraint to ensure the economic soundness of a plan, among and equal to other considerations (Loucks et al. 1981). However, even when planners and decision makers acknowledged the need to account for other factors beyond cost-benefit and other quantitative analyses, the planning process was almost always engineered through the lens of computer modeling. Models were therefore developed mostly in support of the tasks to be performed by planners, managers, and decision makers and were independent from the challenges of being a decision maker operating within the constraints of their constituencies and their part in the decision-making process.

Not surprisingly, these prescriptive models were developed by engineers and technicians, who were often viewed as the only source of trusted information, and with little or no stakeholder input (Cardwell et al. 2009). These traditional

approaches, with their optimization algorithms and objective functions, were unable to successfully incorporate into their computations the variety of important factors that are important to decision makers. These engineering-focused methods made it difficult to properly assign numbers to societal preferences and environmental values. Further, they were unable to reflect the possibility of solutions involving negotiated trade-off in a transparent way. There was no mechanism for representing the values of intangible assets, essential but invaluable variables, or the long-term impacts on the resources of the commons (air quality, riparian impacts, land-cover and landscape values, etc.).

17.3 The Need for Integrative Science and Models

The need to handle information from diverse physical and social datasets and to develop holistic and integrative decision support systems has given rise to a new type of modeling tool in water resources planning: system dynamics modeling. Initially developed at the Massachusetts Institute of Technology in the late 1960s (Forrester 1968) for economic and business applications, system dynamics platforms facilitate flexible representations of the relevant behaviors from each component of the system as well as the incorporation of feedback loops, allowing better understanding of the interactions among components of the system.[1]

If a functional holistic and integrative model is to be developed to support decision making, it is likely that this model will draw from findings and information from models specific to each system component. Models of different resolutions will allow representation of different aspects of the problem and can be geared to answer different research questions and inform different sets of decisions (Liu et al. 2008).[2] While information regarding natural processes, impacts, and feedbacks in the natural system can be upscaled from fine resolution to higher-level models, the behaviors and policies from the socioeconomic and institutional models can be used to drive lower resolution models and assess impacts on the natural system.

Ultimately, planners and decision makers are likely to use the modeling tools that simulate the overall behavior of the basin with a simplified but still accurate representation of all of its components to answer their specific management questions. Because it draws from the findings of more complex models, a DSS model will be more computationally efficient, allowing numerous model runs in a short time. Roach and Tidwell (2009) and Kang and Lansey (2011) are excellent

[1] The book *Limits to Growth* is a good example of this, as it was based on a system dynamics simulation of the Earth's population growth and resource use (Meadows et al. 1972).

[2] This approach has been formulated and described in detail by Wagener et al. (2005) and Liu et al. (2008) based on the experience of the University of Arizona-based National Science Foundation Science and Technology Center SAHRA (Sustainability of semi-Arid Hydrology and Riparian Areas) in conducting integrated multidisciplinary research addressing water management challenges in the U.S. Southwest.

examples. The possibility of comparing simulations of different management options and decision alternatives through a user interface in a short time span makes system dynamics a user-friendly tool for decision makers and the public. System dynamics DSSs are currently being used for medium- and long-term planning and management at the basin scale (Tidwell et al. 2004; Yalcin Sumer and Lansey 2004; Kang and Lansey 2011).

One of the essential steps sometimes underestimated in the collaborative (i.e., participatory) development of a model is the description and agreement on a common conceptual model of the system (Gupta et al. 2012). A conceptual model of a system is the understanding of how that system works in reality and how the different components of the system interact with each other. Individuals, scientists, and academicians in particular may often think they understand the overall system enough to develop a software model themselves. However, their views and understanding of the system, like those of any stakeholder or individual involved in the process, are likely to be incomplete and conditioned by their background and limited individual experience. In a collaborative and participatory process, with representation from all relevant stakeholders, all of these partial conceptual models will be used to develop a common conceptual model—a shared understanding—of how the system functions. Through these interactions, individual stakeholders will go through a social learning process by improving their own understanding of this socioecological system. As the collective conceptual model becomes the basis on which decisions will be made, sustainability learning is the process by which actors gain shared understanding of which decisions are likely to be sustainable and which ones are not (Pahl-Wostl et al. 2007).

For the collaborative planning process to succeed, it is important that everyone's partial views and understanding of the system contribute to the overall conceptual model of the system. There are currently no formalized approaches to ensure this is done properly as an initial stage. Physical scientists and modelers often have overlooked or failed to acknowledge that an effective facilitation of such a stakeholder process can be challenging and falls within the domain of the human sciences practitioner. For example, the Participatory Rapid Assessment (PRA) is a method from applied anthropology that helps structure stakeholder participation for shaping a collective, agreed-upon conceptual model. It provides an environment in which facilitators can pose questions or raise issues and allow stakeholders to discuss them, expressing themselves in ways in which they feel more comfortable (Chambers 1994).

If the decision-making process is to be truly coupled with physical and human considerations, it has to include the impacts on populations—both economic activities and shifts in vulnerabilities. A collectively agreed-upon conceptual model of the physical and human system of the basin will help stakeholders and decision makers identify the main issues and challenges at the basin scale and for each stakeholder. The process of developing a common conceptual model may reveal some cause-effect relationships, as well as highlight those that are not well understood, pinpointing where the uncertainties and the unknowns are in the system. These steps are essential to formulating critical questions that need an answer to move decision-making processes forward. What do we know now and what do we need to know to make informed

decisions? Once the key questions have been formulated, then considerations about the type of modeling tools and decision support systems can be pursued.

If stakeholders and decision makers are involved in the process of developing a collective conceptual model of how the system works and identifying the main issues and unknowns that need to be answered to make planning or management decisions, they will likely support and invest themselves in a planning process involving the development of computer models and decision support tools. In addition, models developed in a participatory way provide a commonly agreed upon representation of a system and its problems (Lynam et al. 2002; Le Page et al. 2010). They become an image of the common understanding that, although imperfect, can be changed and improved with time. The participatory analysis during model development, and its contribution to decision making, brings with it the social learning that can alter and inform perceptions of local problems and their cause-effect relationships. The previous approaches to integrate science, models, and human understanding of the same reality have been strongly influenced by the lessons learned during the authors' involvement in specific participatory processes to face water resources challenges in basins of the U.S. Southwest.

17.4 Integrated Water Resources Management: The Upper San Pedro Partnership and the Middle Rio Grande Water Assembly

The Upper San Pedro Partnership (USPP) in Arizona and the Middle Rio Grande Water Assembly (MRGWA) in New Mexico are two examples of scientist and stakeholder collaborations in which a system dynamics integrative platform was developed to support planning and decision making. In both cases, a DSS model was collaboratively developed to help evaluate different combinations of water conservation measures and management alternatives, helping weigh their implementation costs and environmental benefits in terms of water saved.

The participatory planning processes in the San Pedro River Basin and the Rio Grande are the result of different institutional drivers at different moments—a basin initiative to meet a federal mandate in the San Pedro and a statewide planning initiative in New Mexico. They are two examples of the new trends in the IWRM approach that imply a shared responsibility between government levels (central, regional, and local) and the civil society in a river basin. Local actors have to be legitimate representatives of the local society, encourage public participation, and be accountable for their acts.[3] Capacity building and social learning are the main goals of these initiatives and help guarantee the sustainability of the projects. Stakeholders in both cases include a variety of organizations that range from federal and state agencies to environmental groups, municipalities, and grassroots

[3] The 4th World Water Forum 2006 in Mexico "Local Action for a Global Challenge."

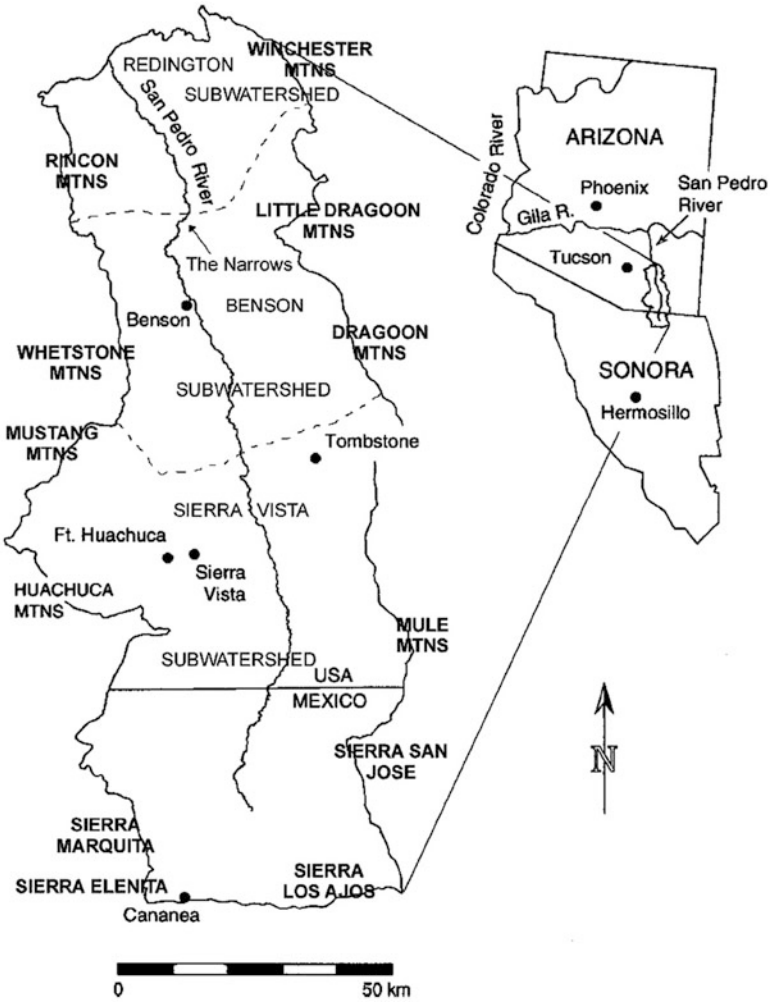

Fig. 17.1 The San Pedro River Basin

organizations. The sector, regional scope, interests, and policy levels of each may be different, but they all have a strong stake in how the region's water may be used and allocated. Both basins face severe water management challenges (scarcity, environmental damage) and need to find solutions to balance existing human and environmental demands with existing water supply.

17.4.1 The Upper San Pedro Partnership

The San Pedro River starts near the mining town of Cananea in Mexico and crosses into the U.S. 40 km later, joining the Gila River 200 km further north (Fig. 17.1).

The Upper San Pedro Basin covers 4,727 km^2 and is home to 114,000 residents. The area was originally agricultural but has transitioned towards the services sector, catering to the U.S. Army's Fort Huachuca as the main economic engine of the basin, as well as tourism and retirees. It hosts a unique riparian corridor, with perennial unregulated flows in a desert, semi-arid environment that is now protected by the San Pedro Riparian Natural Conservation Area (SPRNCA) on the U.S. side of the basin. The river is connected to the aquifer, which is recharged by rainfall runoff from the surrounding mountains during the summer monsoons and the winter rains. Annual average rainfall is 16 in. This connection allows the aquifer to feed the river during the long dry season, and the river flows year round, supporting a lush riparian forest and a highly biodiverse ecosystem.

Originally an agricultural basin, sustainability problems arose when rural electrification, the use of pumps for irrigation, and a growing population combined to draw down groundwater levels and threaten the conservation area. In November 2003 the U.S. Congress passed a mandate summoning the agencies and stakeholders in the basin to find a sustainable solution by 2011. An added incentive to act was the envisioned departure of the military post if the water sustainability problems weren't solved.

The Upper San Pedro Partnership was created by its own member agencies to solve the water management challenges in the basin and close the gap between human demand, natural availability, and environmental needs. The USPP is composed of stakeholder representatives from 20 state and federal U.S. agencies (see box below) and has no representatives from the Mexican side of the basin, although transboundary communication occurs. The partnership has three main committees: the Partnership Advisory Committee (PAC), the Executive Committee (EC), and the Technical Committee (TC). The PAC is the decision-making body representing all entities, the EC represents the member entities that finance projects and operations, and the TC coordinates technical and scientific advice and oversight.

Upper San Pedro Partnership Stakeholders

Arizona Association of Conservation Districts, Arizona Department of Environmental Quality, Arizona Department of Water Resources, Arizona State Land Department, Audubon Arizona, City of Bisbee, City of Sierra Vista, City of Tombstone, Cochise County, Fort Huachuca, National Park Service, Natural Resource Conservation District, The Nature Conservancy, Town of Huachuca City, U.S. Bureau of Land Management, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, and USDA Agricultural Research Service.

17.4.2 The Middle Rio Grande Water Assembly

Originating in Colorado, the Rio Grande crosses New Mexico from north to south (Fig. 17.2) until it reaches Texas and forms the U.S.-Mexico border to the

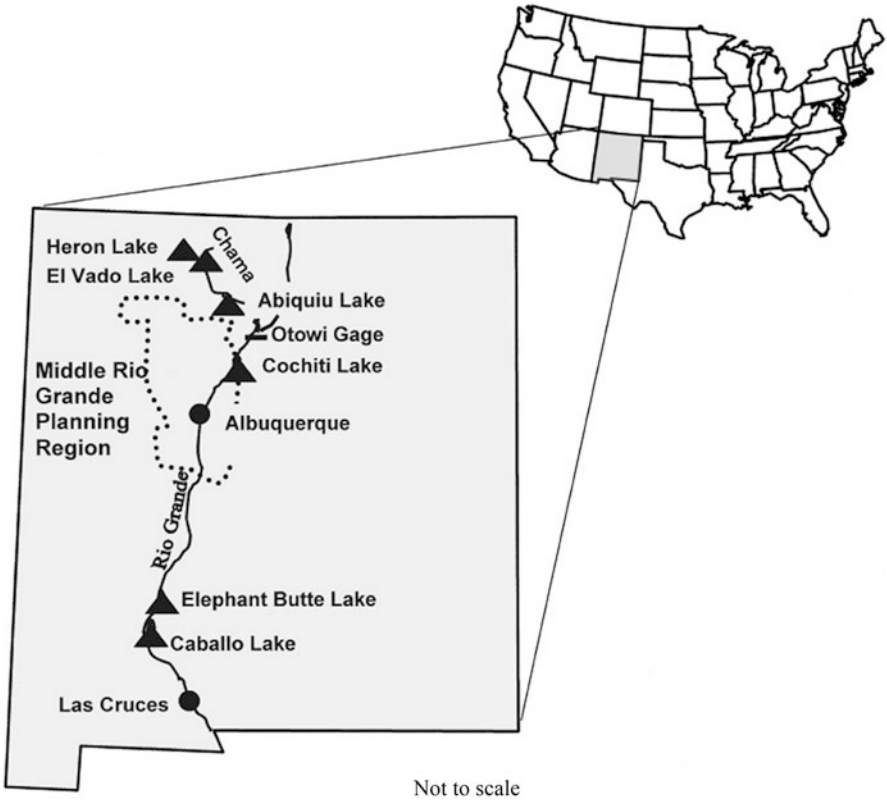

Fig. 17.2 The Rio Grande in New Mexico. The Middle Rio Grande region of north-central New Mexico is shown by the dotted line

Gulf of Mexico. The Middle Rio Grande in New Mexico supplies significant amounts of water for irrigation districts along the river, industrial and municipal uses, and cultural and environmental uses and services. A large portion of the water originates from snowmelt in the mountains of southern Colorado and northern New Mexico. The use of water in the region, as in most of the American West, is regulated by the prior appropriation doctrine, "first in time, first in right." Native Americans and descendants of Spanish settlers have some of the oldest water rights in the region. Although the state administers the rights to surface water, the water rights have not yet been adjudicated and they may actually already be over-allocated.[4] With the possibility of having to adjust current

[4] It is common in some U.S. Southwest basins that users hold more water rights than actual water resources available in the basin, which is known as over-allocation of water rights. Adjudication is a legal process to determine the extent and validity of existing water rights.

water use patterns due to over-allocation, water management in the basin is seeking to balance demands with existing supplies.

Following a state-wide water planning process in New Mexico, a voluntary group of diverse stakeholder representatives from the Middle Rio Grande planning region founded the Middle Rio Grande Water Assembly in 1997. A non-profit grassroots organization, the assembly is designed to raise public awareness of water issues in the region and encourages public participation and scientific analysis in the implementation of the Middle Rio Grande Regional Water Plan.

17.4.3 The Participatory Model Development Process

In the Upper San Pedro Basin and the Middle Rio Grande, DSS models were developed by academia and research institutions in collaboration with stakeholder groups to find management solutions and successful water conservation measures. Both cases benefitted from an open setting and a participatory process, trying to solve their water problems and sustainably balance demands with existing resources.

In the San Pedro Basin, the USPP decision support system was developed through monthly open meetings with the Technical Committee, in which stakeholder representatives and members of the public could participate. Representatives of the TC had to agree and decide on which management alternatives and conservation measures to include in the model (wastewater reuse, water efficient utilities, and retirement of agricultural fields), model assumptions, how to deal with uncertain parameters, and how model results should be displayed and visualized.

The development of the DSS, built into a software model at the University of Arizona, benefitted from strong science contributions and the collaboration with numerous local stakeholders and agencies conducting research in the basin. The model allows users to select different packages of water conservation measures to be implemented through time and space in the basin. After each simulation, estimates are obtained regarding the impacts and improvements of the selected measures on the water budget, groundwater levels in key locations, and other parameters such as the costs of implementing such measures. The model is able to represent impacts on the groundwater system and the riparian area that depend on the water conservation measures applied by the user. Linearized relationships between groundwater pumping and aquifer water levels were derived from a state-of-the-art groundwater model of the basin—a detailed physical model with higher spatial resolution—and included in the DSS for computational efficiency.[5] At every meeting, the modeler would present the inclusion of the last meeting's decisions into the DSS model, review them with the group, and discuss the next

[5] Detailed information of the development of the San Pedro Basin DSS model can be found in Yalcin Sumer and Lansey (2004) and in Kang and Lansey (2011).

steps of model construction, making it a collaborative, participatory, and transparent endeavor.

The Middle Rio Grande decision support system was developed by Sandia National Laboratories in New Mexico, in collaboration with the University of Arizona, using frequent interactions with stakeholder representatives and public participation. The management alternatives identified by the public and the scenarios developed by five assembly working groups were included in the DSS model, which allowed a quantitative comparison of the water conservation alternatives. In the end, the scenarios were combined to form a "preferred management plan" by the assembly, in close collaboration with the Middle Rio Grande Council of Governments (MRGCOG), which represented the local governments that would be responsible for implementing the final plan. In addition to helping planners (MRGWA) and decision makers (MRGCOG) compare and evaluate alternatives proposed by the public, the model was instrumental in engaging the public itself in the planning process (Passell et al. 2003).

The TC in the Upper San Pedro is the equivalent of the Cooperative Modeling Group in the Upper Rio Grande. In both settings, these technical groups were in charge of developing and synthesizing the technical and scientific information that would form the basis of the planning process, working with the DSS model development, and other related tasks. In both cases, there was an effort to build public confidence and trust through transparency and participation in the planning model as well as a sense of ownership. Indeed, the respective models and management alternatives were distilled from everyone's concerns and views (Serrat-Capdevila et al. 2008).

17.4.4 Parallelisms and Shared Vision Planning

Although the planning processes in the Rio Grande and the San Pedro River stem from different institutional drivers, the planning is structured around parallel organizations with similar roles. Neither the USPP nor the water assembly has any powers to impose policies or make management decisions, but their individual member entities have such powers within their particular jurisdictions. The understanding that comes from having to work together within a collaborative setting is key to influencing each other's decisions in terms of what actions are or are not sustainable or convenient. For example, after spatial representations of the impacts of groundwater pumping on the San Pedro River were developed and shown to stakeholders, everyone quickly understood that it was best to pump far from the river. It was also evident that water conservation and reuse was the path to follow. Most importantly, these planning and decision-support processes provide the opportunity to engage both the public and the actual decision makers well before decisions need to be made. Thus the process itself, even long before the DSS product is completed, likely will have significant positive contributions and important implications. Furthermore, the understanding of the physical system, of what is

or is not convenient for the common good, and of other stakeholders' needs and concerns can help identify trade-off solutions among competing needs.

The structure of the collaborative planning processes in the case studies of the San Pedro and Rio Grande can be analyzed through the shared vision planning (SVP) participatory planning methodology. SVP was developed and refined by planning practitioners who needed to solve planning challenges in their professional lives.[6] SVP is based on three principles: traditional and time-tested planning methods and techniques, structured public participation, and the use of computer models collaboratively developed to support the participatory planning process (Cardwell et al. 2009). To efficiently benefit from participation, SVP uses Circles of Influence as a way to structure involvement and engage stakeholders. Planners and model developers make up Circle A, integrating the work of others to develop planning alternatives and modeling tools to help decision making. They form the core planning team that facilitates communication across the different circles. Circle B is made up of stakeholder representatives and technical experts and can be organized around working groups on specific issues, providing information and advice. Those groups within Circle B validate the work of Circle A and evaluate proposed plans. Members of the general public make up Circle C. They should have representatives in Circle B and mechanisms should exist to allow their feedback regarding the work of Circles A and B. Decision makers are in Circle D. Because they are the ones who ultimately will decide what decisions are taken and what plans are implemented, they should be identified and actively engaged along the planning process so they can provide feedback and guidance.

Although the San Pedro and Rio Grande cases are independent from each other and did not have a conscious intent to follow the SVP approach, the two case studies and the methodology look very much alike. With slight differences, they can fit the same mold (Table 17.1). The Cooperative Modeling Team in the Middle Rio Grande and the Technical Committee of the Upper San Pedro Partnership essentially make up Circle A, the hands-on planners, in each basin. The Middle Rio Grande Water Assembly and the Upper San Pedro Partnership as stakeholder consortiums as a whole make up Circle B, providing information to Circle A and validating its progress. Circle C is the general public in both cases. Finally, the Middle Rio Grande Council of Governments and the Partnership Advisory Committee make up the cores of Circle D in each basin, with the possibility of other decision-making agents existing beyond those groups.

This type of framework provides an excellent setting for ongoing simultaneous discussions about specific issues and is critical to a better understanding of the

[6] Motivated by the 1988 drought, the SVP method initially appeared as the Drought Preparedness Study (Werick and Whipple 1994) with the goal of finding better ways to manage water during drought. Finding that drought responses are primarily behavioral and "their success depends on people understanding their role, and knowing how their actions fit in a larger response," it states that planning will be much more effective if it benefits from collaboration between government agencies and stakeholders. The method has been adopted by the U.S. Army Corps of Engineers in many conflict resolution efforts in water management regional disputes.

Table 17.1 The case studies through the lens of shared vision planning

Circle of Influence	Upper San Pedro	Middle Rio Grande
Umbrella Group	Upper San Pedro Partnership	Middle Rio Grande Water Assembly
Circle A: Modelers	The University of Arizona modeling team	Sandia National Laboratories
Circle B: Experts, advisors	Technical Committee of the USPP	Cooperative Modeling Group
Circle C: The public	Open to the public	Open to the public
Circle D: Decision makers	Partnership Advisory Commission & Executive Committee	Middle Rio Grande Council of Governments

overall behavior of a system, the nature of certain problems, and potential solutions. As observed in the case studies, the participants educate each other and stakeholders gain a better overall understanding of the physical system, particularly the spatial distributions of pumping, diversions, and land-use management impacts in the basin. In addition, such participatory processes allow for a better understanding of the drivers and constraints of each stakeholder and of the agencies and institutions represented. In this way, stakeholders can gain insights into the bases for their divergent viewpoints and, through increased understanding, identify potential strategies to negotiate trade-offs between opposing groups.

An important lesson learned from the case studies is the need to involve the decision makers from the beginning, as they make the final decisions. They need to be aware of the ongoing dialogue and the agreements, trade-offs, and alternatives that stakeholders are willing to accept. They also have to be able to consolidate and clearly communicate their decision criteria to the public based on available information. In other SVP projects, decision makers involved have been asked to make mock decisions based on the information available at different stages of the planning process. In other basins and projects, this practice helped clarify their decision criteria and enhanced the transparency of their decisions before final decisions were made, according to William Werick, father of the SVP approach (personal communication, 2010).

17.5 Uncertainty and Flexibility in Participatory Planning and Management Processes

The collaborative processes in the San Pedro and Rio Grande have had to grapple with the fact that data and information become partially but continuously available through time. Now that DSS models have been developed in both basins, keeping them up to date and functional is not a trivial challenge. Integrated water resources management is portrayed as a spiral in which the implementation of past plans is monitored and the process is re-evaluated and redirected based upon the most

current, new information. In other words, we have to plan for an uncertain future, deal with it when it becomes the present, and learn from it when it becomes the past. Such an acknowledgement is the basis of adaptive management.

How do DSS models deal with uncertainty? To what extent and how is uncertainty incorporated into DSS models and how is it communicated? Uncertainty is a difficult concept to work with and is often not well represented in models and decision support tools. While uncertainty can be accounted for in specific model components (physical land surface and hydrologic models), once the intention to do so is there, it may be harder to represent it accurately in system dynamics models, perhaps due to the inability to accurately represent and blend uncertainties from many different model components of the system (i.e., behavioral and socioeconomic components). There are many sources of uncertainty in simulations: uncertainty contained in the input data (climate change projections) and in the model structure formulation (recharge, runoff, and evaporation transformations), and uncertainty arising from issues related to boundaries and scales (e.g., regionalizing soil parameters). Uncertainty inherent to structural representations of the physical world reflects the lack of proper understanding of physical processes or our inability to represent them properly or across boundaries of scale.

When developing a DSS model, different sources of uncertainty can be represented in different ways. During a collaborative process, stakeholders and decision makers can decide on what sources and measures of uncertainty need to be explicitly represented in the model and which ones may be better addressed through other means. For example, uncertainty in climate change projections can be represented easily using ensembles. Used in hydrologic simulations, these yield an envelope of uncertainty for water availability (Serrat-Capdevila et al. 2007). On the other hand, there are uncertainties regarding issues that are difficult to quantify but still have important impacts on decision making, such as changes in economic drivers, land-use cover, institutions, and policies. These uncertainties may be better handled through scenario development, where alternative futures—independent of our decision-making processes—can be accounted for. In addition, information gaps identified during model development can help identify areas of uncertainty and consequently direct research and monitoring activities. In some cases, uncertainty can be constrained and minimized to a certain extent with further studies and research, but it will always be there, especially when trying to assess the future.

Acknowledging uncertainty, the concept and practice of adaptive management presents a framework for natural resource management that aims at reducing uncertainty through observations during and after management interventions. In other words, adaptive management is a decision-making process that attempts to manage systems to maximize both the short-term benefits of management and learn more about the system to improve management over the longer term. To accomplish the latter, adaptive management starts by characterizing the sources of uncertainty in the system. What are the poorly understood processes in our system and from where does the uncertainty arise? Then, by monitoring system responses after management actions, researchers and managers can determine if the system responds to management interventions as expected, or if we have to revisit our

understanding of the system. Management can be specifically geared towards tackling domains of the system where less is known about its functioning or where major uncertainties lie. This can conflict with short-term management goals to maximize the beneficial use of the resource but is considered a benefit for the long term, as it helps to better understand the system.

Flexibility is an important aspect of a good adaptive management practice. Institutions should be able to change past policies based on the observed impacts such policies had on the system. The key to this essential feedback linking the latest observations to the next decision-making steps is that it requires close collaboration between those who monitor, study, and interpret the behavior of the system with those who do the decision making. Traditionally, these groups of people belong to different institutions, and the communication among them is not necessarily fluid. Therefore, a true adaptive management mechanism must also foster new organisms and institutional strategies that can put new knowledge to use at a practical level. For management to be adaptive, the policies—not just the institutions—must be flexible.

As real-world systems are very complex, adaptive management must make use of modeling tools to properly simulate and understand how the system functions. Ideally, as previously mentioned, this forces decision makers, scientists, and model developers to work collaboratively in a cycle of management decisions, implementation, monitoring, interpretation of new data, and inclusion in conceptual and numerical models of the system to help validate past interpretations and provide new working hypotheses of how the system behaves.

To date, DSS models mostly have been viewed as a product that can be developed to help answer management and planning questions at a given time. It is only very recently that the models have started to be perceived as evolving tools. Rather than developing and using them once, they offer greater benefits when they are dynamically changed over time to represent the evolving present, becoming a working tool that may never be considered a finished product. In participatory planning processes, this allows the model to be a common representation of the system, and the DSS model and supporting documentation can provide an accountability trail of what has been done in the past. In adaptive management practice, a DSS model will have to be updated as ongoing policies and management actions are implemented. Model updates will reflect modifications in the engineered system layer (canals, pipes, wells, dams, water reallocations, changes in use efficiencies, changes in land-use cover, etc.) as well as new or modified understanding gained through adaptive management on how the system works.

The issues of model updates and institutional flexibility can be well illustrated by the worries of many stakeholders in the San Pedro that were collected in a study to evaluate the contributions of the collaborative process in the basin. Being able to feed current, accurate, and updated data into the model was a concern for the future that relates well with institutional limitations. A comment by one top-level policy expert illustrates the precarious institutional integration and the need for new flexible institutional arrangements: “The model will help us a lot in our planning and zoning, our municipalities and county entities, water districts, water planning,

etc. [. . .] my concern is how to keep it up to date with future science, options, and alternatives. If federal funding fails to help [the process] . . . if no more money comes, all will be lost" (Serrat-Capdevila et al. 2008).

An integrative modeling approach in adaptive management institutions will be essential in these types of contexts for many reasons. Decision makers benefit from medium- or coarse-resolution models in system dynamics platforms that incorporate findings of more refined models in a simplified but still accurate manner. As new information becomes available, the more detailed physical models that support and inform system dynamics simulations will accommodate new data properly and help improve the understanding of a system component. Then, the DSS model can be modified accordingly to accurately represent new findings in a simplified way. The full potential of adaptive management can only be reached when it is coupled with an integrative modeling approach and with continued research and observation.

17.6 The Future of Good Water Governance

Decision support systems have transitioned from engineering tools to systems that provide frameworks for stakeholder participation to guide, inform, and support decision making in a transparent and more sustainable way. Past research and experiences have shown that participatory planning and management processes can benefit greatly from an integrative and holistic modeling approach. Models of different resolution and complexity that serve different purposes can be used to inform each other through feedbacks. While high-resolution land surface models detail the processes in the physical environment (e.g., the land-atmosphere partitioning of water and energy, the role of vegetation, and the interactions between surface and groundwater hydrology), medium- and coarse-resolution models are typically better suited to modeling human interventions on the environment (e.g., land-use management and engineering infrastructure). Medium-resolution models allow us to represent water allocation and redistribution within the system and across uses, while coarse-resolution models are used to properly describe socioeconomic and institutional aspects of water management over the natural and engineered system, with a resolution at the scale of the sub-watershed. In addition to providing an efficient way to represent the coupled natural-human system, a major benefit of multiple resolution modeling is that information and findings can be readily transferred across models and used for model refinement. Information regarding natural processes, climate change impacts, and feedbacks in the natural system can be up-scaled to higher level models, while behavioral and policy feedbacks from the socioeconomic and institutional models can be used to drive lower resolution models and assess impacts on the natural system.

Thus, stakeholder participation through science-fed collaborative planning processes is essential for integrative science to be perceived as credible, relevant, and transparent, and thus acceptable to inform and guide decision making in the

public eye. In a participatory planning process, technical models used to support planning and decision making are developed collaboratively. That is, decisions embedded in models are a product of agreement—sometimes after extensive discussion—between scientists and stakeholders. Such model development forces the individuals involved to focus their communication on important issues, ranging from processes and features represented in the model to assumptions, conservation measures, and alternative scenarios.

This integrated modeling approach can be the scientific foundation for participatory planning processes and the collaborative development of decision support tools. The combination of structured stakeholder participation and the use of integrative modeling will allow the proper identification of problems and management objectives in the basin, as well as a better shared understanding of how the system functions and the development of future scenarios and management alternatives. Based on conflict resolution concepts, this methodology will not only lead to agreed-upon management solutions, but also to a well-informed and educated stakeholder community in the basin. Sustainable learning comes with a better understanding of the system as a whole; problem solving, over the long term, can benefit from the human capital among individuals involved in participatory processes and the groups they represent. Past studies have pointed out the importance of human capital in society over economic welfare, as well as the mechanisms for ensuring it (education, research, health care, social investments), as the key qualities required to address environmental and sustainability challenges. The reinvestment of resources towards human capital (knowledge) in a higher priority over economic capital can be in itself a definition of a sustainable system.

This resonates well with the learning goal of adaptive management. In the present time of rapid economic and environmental change, the future seems to be more uncertain than ever. With the influence of climate change, the premise of a stationary state on which much of water resources planning and management are based is now compromised. It is likely that we will have to change the ways in which we extract and use information from the past to predict the future. The implementation of efficient adaptive management mechanisms combined with integrative multi-resolution modeling capabilities will have to balance the search for new understanding and the short-term economic benefits of management.

Currently, the main challenge to achieving efficient adaptive management within existing institutional arrangements is providing sufficient flexibility and the capacity to close the feedback loop between system monitoring, modeling and scientific analysis, stakeholder participation, and iterative decision making. As this is accomplished, it will enable water resources management to shine through the lenses of economic efficiency, social equity, and environmental sustainability.

References

Cardwell H, Langsdale S, Stephenson K (2009) The shared vision planning primer: how to incorporate computer-aided dispute resolution in water resources planning. Available in: http://www.sharedvisionplanning.us/resReference.cfm. Accessed September 2013

Chambers R (1994) Participatory rural appraisal (PRA): challenges, potentials and paradigm. World Dev, Elsevier 22(10):1437–1454

Forrester JW (1968) Principles of systems, 2nd edn. Pegasus Communications, Cambridge, MA

Gupta HV, Brookshire DS, Tidwell V et al (2012) Modeling: a basis for linking policy to adaptive water management? In: Brookshire D, Gupta HV, Matthews P (eds) Water policy in New Mexico: addressing the challenge of an uncertain future, RFF Press, Resources for the future book series: Issues in water resources policy series. ISBN 978-1-933115-99-3

Kang DS, Lansey K (2011) Development of a water management DSS for the Upper San Pedro River Basin (in press)

Le Page C, Abrami G, Barreteau O et al (2010) Des modèles pour partager des représentations? In: Etienne M (ed) La modélisation d'accompagnement. Une démarche participative en appui au développement durable, Editions Quæ, pp 71–101

Liu Y, Gupta H, Springer E et al (2008) Linking science with environmental decision making: experiences from an integrated modeling approach to supporting sustainable water resources management. Environ Model Softw 23(7):846–858

Loucks DP, Stedinger JR, Haith DA (1981) Water resource systems planning and analysis. Prentice-Hall. ISBN 0-13-945923-5

Lynam T et al (2002) Adapting science to adaptative managers: spidergrams, belief models, and multiagent systems modeling. Conserv Ecol 5(2):24. Available online: http://www.consecol.org/vol5/iss2/art24

Maass A, Hufschmidt MM, Dorfman R et al (1962) Design of water-resource systems, new techniques for relating economic objectives, engineering analysis, and government planning. Harvard University Press, Cambridge, MA

Meadows et al (1972) The limits to growth. Universe Books, New York. ISBN 0-87663-165-0

Passell HD, Tidwell V, Conrad SH et al (2003) Cooperative water resources modeling in the Middle Rio Grande Basin, Sandia National Laboratories Internal Report, SAND2003-3653

Pahl-Wostl et al (2007) Social learning and water resources management. Ecol Soc 12(2):5. Available online: http://www.ecologyandsociety.org/vol12/iss2/art5/

Roach J, Tidwell V (2009) A compartmental-spatial system dynamics approach to ground water modeling. Ground Water 47(5):686–698

Serrat-Capdevila A, Valdés JB, González Pérez J et al (2007) Modeling climate change impacts—and uncertainty—on the hydrology of a riparian system: the San Pedro Basin (Arizona/Sonora). J Hydrol 347:48–66

Serrat-Capdevila A, Browning-Aiken A, Lansey K et al (2008) Increasing socio-ecological resilience by placing science at the decision table: the role of the San Pedro Basin Decision Support System Model (Arizona). Ecol Soc 14(1):37. Available in: http://www.ecologyandsociety.org/vol14/iss1/art37/

Tidwell VC, Passell HD, Conrad SH et al (2004) System dynamics modeling for community-based water planning: application to the Middle Rio Grande. Aquat Sci 66:1–16

Wagener T, Liu Y, Gupta HV et al (2005) Multi-resolution integrated assessment modeling for water resources management in arid and semi-arid regions. In: Wagener T, Franks S, Bøgh E et al (eds) Regional hydrologic impacts of climate change impact assessment and decision making, IAHS Redbook Publ. No. 295, pp 265–272

Werick WJ, Whipple W Jr (1994) Managing water for drought. National study of water management during drought. IWR Report 94-NDS-8, U.S. Army Corps of Engineers. Available in: http://www.iwr.usace.army.mil/docs/iwrreports/94nds8.pdfz

Yalcin Sumer D, Lansey K (2004) Evaluation of conservation measures in the Upper San Pedro Basin. In: Critical transitions in water and environmental resources management, Pcdgs. World Water and Environmental Resources Congress 2004

Chapter 18
Water Security: A Genealogy of Emerging Discourses

Chad Staddon and Nick James

18.1 From "Sustainable Water" to "Water Security": The Emergence of a New Discourse of Hydro-Governmentality

Over the last decade, the "water security" concept has emerged from its originary niche in studies of international security and hydropolitics to become much more widely used. Indeed, in some quarters, particularly official state ones, it seems even to be supplanting the hegemonic position hitherto occupied by the "sustainable water" concept. While the term water security was little used as late as the late 1990s, it has since become common currency in both policy and scholarly discourse (Waughray 2011; Global Water Partnership (GWP) 2000; Cook and Bakker 2012; UNESCO 2008). According to UNESCO (2008):

> Water security involves protection of vulnerable water systems, protection against water related hazards such as floods and droughts, sustainable development of water resources and safeguarding access to water functions and services.

Interestingly, the above definition seems to subsume key ideas within sustainable water management discourse as constitutive definitional elements while also importing the ideas of ecosystem functions and services and water as an object of geopolitical security discourse.[1] Similarly, the international relations

[1] Examination of the linkages between ecosystems services and water security would be interesting and useful but is beyond the scope of this chapter.

C. Staddon (✉)
Department of Geography and Environmental Management, University of the West of England, Frenchay Campus, Coldharbour Lane, Bristol BS16 1QY, UK
e-mail: Chad.Staddon@uwe.ac.uk

N. James
Open University, 45 Westward Road, Cainscross, Stroud GL5 4JA, UK
e-mail: n.james@open.ac.uk

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3_18,

and development discourse around the putative "human right to water" (cf. the chapters in Sultana and Loftus 2012) has often framed water security as the responsibility and even prerogative of a new state, or supra state, apparatus. While the environment has long been an issue captured by the state apparatus of virtually all governments, what is new here is the alignment of this state apparatus with harder rather than softer forms of power's exercise; the former emphasizes prescriptive treaties, laws, and regulations enforced by an overarching state apparatus, including possible recourse to military response, and the latter emphasizes democratic deliberative processes between equal stakeholders.

Further complicating things, different participants in this burgeoning discourse about water governance have tended to mobilize the concept differently. Political scientists and governments often have tended to prioritize the security element of water security, seeing it in terms of the relation between water and political and/or military interactions between sovereign states, preeminently in the contemporary Middle East. These studies and the resultant government policy orientations move the water security concept close to the already well-known ideas of hydropolitics and, as Schulz (1995) tellingly put it, the "hydropolitical security complex" (see also Ohlsson 1995; Klare 2001). Others have conceived of water security in terms of security not against the claims of other human users, but other water-related risks and hazards:

> Achieving basic water security, both harnessing the productive potential of water and limiting its destructive impact, has always been a societal priority. To capture this duality, water security is defined here as the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies. (Grey and Sadoff 2007)

Taking together the two definitions given above, it is possible to see a significant shift in governmental orientation when it comes to water management: away from finding the right balance between human needs and available water resources (the sine qua non of the sustainable water discourse that has dominated thinking since the publication of *Our Common Future* in 1987) and towards securing that balance through state intervention in both the demand habits of populations on one hand and the physical environmental threat of peak water on the other. Ever so neatly, concerns about the hydrological implications of climate change and domestic water behaviors are thus securitized, brought clearly within the orbits of the market and the state, becoming the discursive property of an emergent water security bureaucracy. More than the water itself, what is being securitized here are different properties that water can provide, including hydration of human populations, irrigation of food crops, local climate regulation, and energy production. Securitization of these qualities of water means transforming them into particular kinds of political and economic objects of specific administrative and regulatory processes.

It is therefore crucially important that scholars are clear about what water security—a proto-paradigm for water management in the twenty-first century—does and does not signify, how it is and isn't being used and, especially, the extent to which it can underpin a process of management based on deliberative democracy

rather than state or market fiat. To do this it is first necessary to further examine the concept of water security in terms of its history and the main themes associated with it, before turning to the careful consideration of how this constitutes a new form of what can be called, following Luke (1999), "green governmentality." This part of the argument draws heavily for its analytical perspective on lectures given by the historian and social theorist Michel Foucault at the Collège de France in 1977 and 1978 and their subsequent development by the environmental philosopher Tim Luke.

In those lectures, Foucault offered a radically new genealogy of the modern state, reinterpreting it as the institutionalization of reorganized relations between certain objects of political power, particularly population, security, and natural resources, and an immanent will to power. Even more tellingly he aligned this emergent mentality of government—hence governmentality—with a new master concept of "biopower," thus implying the ultimate extension of the state's reach to include all living things and processes. Governmentality is a philosophical term increasingly adopted in geography and the social sciences. It refers to the analysis of the conduct and ever-changing rationalities in managing populations derived from Foucault's historiography of modern forms of knowledge taken up by administrative powers. Early governmentality had "the population as its target, political economy as its major form of knowledge, and apparatuses of security as its essential technical instrument" (Foucault 2007, pp. 108–109).

For Foucault, governmental apparatuses taken up in the eighteenth century are intended to explain strategic forms of knowledge later constituting what was developed as a resource for politics in the twentieth century with respect to national populations. In contemporary geography, governmentality looks to changes in technologies and assumed global risks that are currently part of economic and political discourses. Governmentality therefore offers a critical eye, engaging with the spaces between the theories and rationalities of discourses, such as neoliberal economic theory and policy actions that enable and steer its practice of governance. Today, emerging arts of government have been unfolded to form complex, contested, and uneven geopolitical contexts. Within these contexts, water security fits with a globalized governmentality by relating an emerging understanding of environmental policy in an international context framed around the battles between sustainability and development and competitive national interests.

Having established the discourse of water security as a new evolutionary stage in the mentality of water governance, hydro-governmentality[2] if you will, it is then possible to discern between harder and softer paths towards security of water provision for all of the planet's human and non-human residents. Only in this way can one balance the needs of critical social theories of the environment to be both biophysically grounded and cognizant of the sociopolitical structuration of

[2] This neologism is designed to signify the specific way that neoliberal governments are thinking about water and the services it provides.

such key terms as environment, nature, and natural resources on one hand and population, security, and government on the other.

18.2 A Brief Genealogy of the Water Security Concept

The first explicit invocations of the water security concept appear to be associated with publications appearing in the early 1990s about the relations between water scarcity and political conflict in the Middle East (e.g., Anderson 1991; Shuval 1992). Although the potential for scarce water resources to exacerbate regional conflict in the Middle East had long been recognized, explicit linkage of water resources management to geopolitical security in, for example, the 1955 Johnston Plan,[3] did not yet lead to a discrete conceptualization of water security in the broader scholarly or policy communities. Part of the reason for this is that until recently there has been a tendency to treat the hydropolitics of the Middle East as a special case, from which it is difficult to extrapolate to other geographical contexts.

What, then, was happening by the early 1990s to stimulate diffusion of the water security concept into more common discourse? One factor of specific relevance to the Middle East was that while the Johnston Plan had helped lead to significant development and population growth in Israel, the Palestinian Territories had simultaneously languished. Geographically, much new Israeli development, particularly from the 1970s onwards, was directed away from the coastal fringe, which was historically reliant on groundwater resources, and towards the drier eastern and southern parts of Israel. By that time, Israel was not only seeking to dominate domestic water supplies, but was also extending its hydro-hegemony outside the country.[4] From a legal studies point of view, these moves to alter the actions of sovereign states to develop their own domestic water resources marked a paradigmatic moment in the articulation of water security discourse, as it flew in the face of centuries of international water law based on the principle of riparianism. In recognition of both the close relation between land and water management and the dimension of extraterritoriality in water politics, Shuval (1992) proposed a peace plan involving the exchange of land and water between Israeli and Palestinian authorities.

The emergence of water security as a discursively hegemonic concept was not, however, solely the product of events in the Middle East. At least three other factors

[3] Plans by Transjordan to dam the Yarmouk River in the early 1950s, which would have compromised the operation of the Israeli National Water Carrier (then under construction), led to escalating military clashes that U.S. President Dwight Eisenhower sought to resolve through a comprehensive regional water management plan. This 1955 plan, brokered by U.S. Ambassador Eric Johnston, was based on an even earlier plan developed by the U.N. in 1949 (Murakami 1995).

[4] As shown by its military opposition to the Lebanese plan to dam the Wazzani River, even though the Wazzani lies wholly within Lebanon.

have helped to both deepen and widen the hold of the water security nexus on policy, scholarly, and popular imaginations. The first is the simple fact that by the early 1990s other world regions were experiencing scarcity linked to their own versions of the water-security nexus. Obvious international case studies include the Mekong basin, where the world's 10th longest river is shared by six nations; the Nile basin, where population growth in the countries of the Lake Victoria basin (White Nile source) and the Ethiopian Highlands (Blue Nile source) have forced a wholesale rethinking of the preexisting water management status quo; and the Ganges basin, where Indian river developments have had significant downstream impacts, particularly on Bangladesh.

In fact, virtually every major world river basin is now subject to internal domestic disputes of some sort, driven by rising demand and decreasing supply and also by the associated impacts of water developments, including greater risk of flooding (Bangladesh and southern Vietnam) and degradation of downstream water quality (Sudan and Egypt). Intranational cases include the Murray Darling basin, where upstream riparian areas within Australia have refused to agree to reallocations of a declining water resource, and the Colorado River Basin, where the water allocations originally agreed upon in the 1922 Colorado River Compact were based on unrealistically high estimates of base flow. Some other water resource issues, such as the Columbia River Basin, which is shared between four American states and also the U.S. and Canada, are both intranational and international (Staddon 2010).

The second factor that has helped propel the development of the water security concept is the growing realization that climate change will alter the geographies of water resources upon which existing and future developments are based, heightening preexisting tensions around shared water resources. There is no longer any doubt that we live in an era of global warming, although the hydrosocial implications of this warming are likely to be highly variable and indeed volatile. There is general agreement that dry regions will get drier and wet regions wetter: "By mid-century, annual average river runoff and water availability are projected to increase by 10–40 % at high latitudes and in some wet tropical areas, and decrease by 10–30 % over some dry regions at mid-latitudes and in the dry tropics . . ." (IPCC 2007). Even relatively well-watered regions such as the United Kingdom (UK) are experiencing a mounting hydrosocial crisis (Fig. 18.1). Indeed, many regions in the UK already are considered water stressed, with parts of the Midlands and southwest even falling into this category. The case of the UK highlights another, perhaps surprising, facet of water insecurity: the reality of water insecurity even in advanced capitalist nations with long histories of water infrastructure development.

Globally, the hydropolitical situation has been further compromised by the almost universal tendency of water allocation agreements to grossly overestimate available water resources. Thus, as already noted, the original 1922 Colorado River Compact, based on what is now known to have been historic highs in river flow, allocated more water to basin states than actually exists according to longer-term averages. Another example is the Johnston Plan for the Middle East, which

Fig. 18.1 Average precipitation per capita, using 30-year average rainfall figures and 2012 population estimates, United Kingdom (Source: Authors)

allocated rights to 1,113 billion m^3/year of water in the Jordan River Basin to Syria, Jordan, Lebanon, and Israel, thereby considerably exceeding what is now known to be the sustainable abstraction capacity of that river basin (Murakami 1995; Shuval Hillel 1992).

While it is certainly unfortunate that these water allocations were agreed upon at a time when hydrological science was relatively poorly developed and when there appear also to have been historic super-abundances of water, the real problem is in fact a legal one. Because the principles of precedence and riparianism are so deeply ingrained in national and international law making, it becomes difficult to renegotiate prior allocation agreements, especially when more than 50 years of development have been predicated upon them. While this may at first look like a tragedy of the commons, the true state of affairs is closer to the opposite of this overworked cliché; it is precisely the historical granting of property rights in water that are not clearly time-limited or context dependent that has helped create the legal impasse (Staddon 2010).

Climate change awareness has come concomitantly with increased awareness of the water needs of the natural environment. In Europe, for example, the Water Framework Directive (2000) requires all member states to recognize and allow for the water needs of the natural environment. In some European Union (EU) member nations, such as the UK, this is already leading to significant reductions in water abstraction from surface and subsurface sources to protect natural environmental quality. Thus, even had there previously been a sociopolitical equilibrium with respect to the allocation of water resources around the world, environmental concerns would have upset it and helped bring the issue of water security to the fore in many regions around the world.

The third factor that has helped push the concept of water security ever up the agenda has been the realization that water is central to so many of life's other necessities. Writers and scholars have recently spoken about the water-energy nexus (Danish Hydrological Institute 2007), water and food security (Waughray 2011; Martinez-Cortina et al. 2010; Hadley and Wutich 2009; Shrivastava 2003), tourism and water security (Gossling et al. 2012), water quality security (Rose 2002), and even the security of water services infrastructure itself (Skolicki 2008). Briefly put, the water-energy nexus creates an indissoluble link between water security and energy security inasmuch as energy production requires water inputs and water services production requires energy inputs. Similarly, water is required for food production and food is (of course) required for the reproduction of the labor power that manages water services. The World Economic Forum meetings in Davos, Switzerland, in the winter of 2011 identified an almost mind-boggling proliferation of nexuses, of which water was one half of the binary including water-food, water-energy, water-trade, and water-health (WEF 2011). In addition, environmental security has received a great deal of attention, not just because of our growing realizations about climate change, but because of better science emerging over the last decade regarding the water needs of the natural environment and the rise of the ecosystems services perspective as a way of quantifying and monetizing the myriad services provided by ecosystems. In 2011 the UK government published two white papers, *Making Space for Nature* and *Water for Life*, both of which arguably are helping to position water, and our relationship to it, in terms of security discourse (DEFRA 2011a, b).

18.3 The Discursive Shift from Sustainable Management to Water Security

The one term common to all of the above is security. How has it come about that the obvious way to conceive of the challenges inherent in meeting demands for energy, food, water, and so on is in terms specifically of water security? How has the idea of water security become normalized in both popular and political discourse to such an extent that it often is not questioned, being seen as obvious and natural? What avenues for collective thinking and endeavor does this compound noun open up? What does it close down? And how might powerful actors such as governments and international governmental and non-governmental organizations articulate with and around such security discourses in ways that could, if left unexamined and unchallenged, serve their own totalizing interests?

How then can the concept of governmentality be deployed with respect to thinking through the genealogy and broader implications of water security? The emergence of water security provides a powerful case study of how modern liberal governmentality assimilates the incipient water crisis by creating new opportunities for the expression of its power in ways first diagnosed by Foucault (2007) and further developed by Luke (1999, 2005). First, the politics of (water) scarcity become the politics of (water) security when the existing state apparatus begins to configure water as an object requiring a new sort of approach, one based on both institutional approaches at many spatial scales and a popular discourse of cause and effect. Water security thus integrates water into politics as usual at the international level in terms of new global governance mechanisms (treaties, agreements, protocols) designed to ensure a sustainable allocation of water resources to all riparians in accordance with agreed legal principles such as prior appropriation and riparianism. Of course, the volume of allocations deemed sustainable and the problem of how to regulate riparian systems when conditions of criticality are approached are both intensely political issues. This is one reason why analyses of the hydrological implications of climate change projections have, in recent years, become so intensely political on the international and national levels.[5] It is also why governments around the world are reconfiguring water as a scarce commodity that can only be appropriately allocated domestically through marketized exchange mechanisms within state-backed (and ultimately militarily-backed) interstate allocations. The careful manipulation of the perception of the threat is critical here. Citizens must be continually shown that the threat is caused in part by their over-consumption—especially if that consumption is still based on the public service rather than the market ethos—to soften them up for further marketization. They must also be brought around to the view that a new global state apparatus is necessary for ensuring continuing security of supply.

[5] Climate change scholar Michael Mann's "hockey stick" has been hotly debated in the U.S. Congress, and partial records of email exchanges between climate change scientists in the UK became lightning rods for debate in 2010 during the so-called Climategate controversy.

The shift from sustainability to security when it comes to the prevailing approach to water management implies continuing a course of action largely understood to be working (i.e., towards sustainable water) but simultaneously imbuing it with a recognition of a widening and deepening geopolitical urgency. In other words, water security is counterpoised against the implied and undesirable outcome of water insecurity: a state of unreliable supplies of water of acceptable quality for nation-states faced with what Turton (2003) has called "basin closure." The concern with security therefore translates geographically into securing access and availability of water within and between nations. It therefore is centrally concerned with the potential risks both in terms of rights to water and threats that exist from external human or non-human controls over water. While the sustainability discourse recognizes the possibility of running out, it nevertheless tends to constitute itself in terms of the achievement of an abstract ecological balance. Security discourse, by contrast, is constituted more through threats and risks to immediate interests than opportunities for the articulation of common property regimes, and therefore tends to define the policy options negatively.

The use of the term security links in part to "securitization" and "speech acts" (Aradau 2009), therefore acknowledging increasing urgency, but also makes reference to "thresholds" and "tipping-points" below which situations of insecurity may become apparent. Securitization is therefore a catchall approach, in that it allows for narrow operation but at the same time captures the need to aim for overall targets. For example, water engineers will work to protect against water-related hazards (e.g., flood defense) and satisfy local demand, while the agricultural sector simultaneously focuses on water as an input for production that is also linked to food security (Cook and Bakker 2012). Thus, water security is frequently seen in the context of the proliferation of securities and rights. In fact, water security in the UK is also seen more prosaically in terms of the physical security of water infrastructure against environmental or terrorist threats. Ironically, it was while rehearsing countermeasures against a terrorist attack against critical infrastructure in July 2007 that one of England's biggest water companies was hit with the other threat, extensive flooding. But the policy prescription for both options, hardening physical targets within a civil defense command and control framework, actually militarizes our collective response. This widening and deepening of the water security paradigm, in terms of actual or potential crises, demands a shift in governance.

Simultaneous with this is a desire to draw on expertise and investment available outside of government. Collaborations have been established to address the problems of low-efficiency water use, associated in part with ineffective resource and supply systems management (e.g., GTZ 2007). Water security also has increased the emphasis on integrated management of all environmental issues, especially with respect to integrated water resources management (IWRM). International consensus on modern approaches to IWRM was substantially achieved under the four Dublin Principles on water and sustainable development produced during the run-up to the Rio de Janiero Earth Summit in 1992.

It may seem paradoxical that what was at the time framed as a feeder into the paradigmatic statement of sustainable development should be implicated in the

emergence in fact of its "other," namely water security. But this paradox is only apparent; as many commentators have observed, the discourse of sustainable development always contained within it the seeds of a darker purpose. Luke (2005) and others noted that mainstream sustainable development discourse always involved strong elements of coercion, blaming the victim, and statism. For example, almost immediately after pronouncing the now-dominant definition of sustainable development as "development which meets the needs of the present without compromising the ability to meet the needs of the future," *Our Common Future* goes on to declare that "Those who are poor will often destroy their immediate environment in order to survive: They will cut down forests; their livestock will overgraze grasslands; they will overuse marginal land; and in growing numbers they will crowd into congested cities" (World Commission on Environment and Development 1987, p. 28).

And the preferred solution to the problem of poor people is a technological and political instrumentalism, which helped propel the world towards direct interventions in regions where not just our political, but our environmental, interests are seen to be at stake. Reflecting on this, two decades after the Rio Summit, it is striking that so few commented on this at the time, though of course this is precisely what successful discursive interventions do: "Governing becomes the construction of certain truths and their circulation via normalizing and disciplining techniques, methods, discourses, and practices that extend beyond the state and stretch across the social body" (Foucault cited in Rutherford 2007, 293). Perhaps the shift away from sustainable water and towards water security may not be all that surprising, having been built, as Luke (2005) has argued, into the edifice of the former right from the very beginning.

Drawing on the recent review by Cook and Bakker (2012), four interrelated areas of governance are concerned with water security: availability, hazards, human needs, and sustainability. The primary concern when it comes to availability relates to calculations of the changing distribution of blue water resources as a function of climate change.

The concern with hazards can enlist the need for engineers as well as urgent security concerns for a "guns, gates, and guards" approach to water-based emergencies (Cook and Bakker 2012, p. 97). The loss of access to drinking water in Gloucestershire in 2007 following floods of June and July was considered a serious security issue (Severn Trent Water 2007). Even as the rains were still pouring down, the Gloucestershire County Council activated Gold Command, the highest level of civil emergency alert, giving a committee chaired by the county sheriff executive powers to mobilize fire, police, and military resources. The parts of Britain that were hardest hit were put under the equivalent of martial law, with police units bolstered by military personnel to provide emergency response and support to the designated refugee centers. Though similar responses to other sorts of water-related emergencies such as drought have not been activated, it is certainly not beyond the pale to suggest that such mechanisms could be brought to bear in the event of a recognized threat to food production or drinking water supply.

The third concern for human needs remains anthropocentric but is closely linked with livelihoods, food security, and the potential for agrarian development in different contexts and settings. Each individual is assumed to have access to sufficient, safe, and affordable water for drinking, washing, and other essential needs. Water security in this analysis becomes a subset of food security, which itself can be understood from different perspectives. In all, there are challenges to achieve water security either to sustain livelihoods or to transform and steer agricultural productivism (Evans et al. 2002). The insertion of external bodies to build dams and reservoirs and dig boreholes creates a new governmentality, with the local environment and livelihoods being drawn into the economic discourse of efficient resource management and notions of sustainability, the fourth concern. The governance based on this perspective dominates the overall global environmental policy and drives the notion that there are neo-Malthusian concerns for rising demand based on rising population. Whether or not the need for equitable distribution should be constituted as an enforceable right has been discussed elsewhere (Staddon et al. 2012).

Given the Dublin Principles, the Washington Consensus, and the current global economic crisis, it is only natural that such financing should come from private investment and indeed further privatization of services.[6] As Hildyard pointed out, "Underpinning Agenda 21, . . . is the view that environmental and social problems are primarily the result of insufficient capital (solution: increase Northern investments in the South); outdated technology (solution: open up the South to Northern technologies); a lack of expertise (solution: bring in Northern-educated managers and experts); and faltering economic growth (solution: push for an economic recovery in the North)" (1993, p. 31).

The questions relating to governmentality refer to the tactics and the construction of knowledge emerging out of the supra state settings. This refers to the ways in which particular technologies and experts are constructed and deployed (Dean 1999, p. 23). Water therefore connects the different spaces, local to global, territories, and places. The epistemes constructed disavow others, and there is an unfolding narrative of subjectivities and activities in that emerging understanding. This power is not held or central but flows very bountifully across "multiple sites, through different discourses, and often outside the traditional boundaries of the state" (Rutherford 2007, p. 294).

For the fourth area of governance, sustainability, the concern is with meeting basic needs as well as protecting ecosystems. For example, the overall approach of the Global Water Partnership (GWP) is in management of watersheds for life both for humans and the natural environment. However, the whole question about the

[6] Emerging in the early 1990s in response to the collapse of the Soviet Bloc, the Washington Consensus promoted the neoliberal mantra of privatization of assets and marketization of exchange relations. In 1992 the Dublin Principles applied these ideas to the water sector around the world and have since helped guide the policies of international development organizations (cf. Staddon 2010).

collapse, misuse, and abuse of the sustainable development and sustainability approaches has been widely debated (Sarre 2009). "Sustainability for ecological debates is now being used, and perhaps abused, in webs of questions and answers to refocus national economic prosperity as well as reposition present day cultural identity in a corporate material culture of more efficient, but still unsustainable, consumption" (Luke 2005, p. 1).

The uses of science operate simultaneously with individual understandings as well as the creative modes of governance to characterize the water security issue. The endeavors of mapping, measuring, calculating, and providing models make the multiple elements of water and the environment quantifiable, manageable, and controllable. Water, its contexts, and places are made to fit into the global economy. It is understood as a resource knowable and understood from expertise among ecologists, biologists, geologists, water engineers, and agronomists (Cook and Bakker 2012). In other words, "what was unknown has become fully knowable; what was mysterious is now readily imaginable; and the whole has become eminently governable" (Peace 2002, pp. 536–537). The emerging styles of management over water therefore easily link to neo-Malthusian notions such as carrying capacity and limits to growth (e.g., ecoscarcity). These well-rehearsed apolitical theories on population growth, modernization, and environmental change have become naturalized, and this ongoing social construction has led to the unquestioned management of water as a commoditized resource: "Encircled by grids of ecological alarm, sustainability discourse tells us that today's allegedly unsustainable environments need to be disassembled, recombined and subjected to the disciplinary designs of expert management" (Luke 1999, p. 142).

All of this adds up to an almost irresistible water security complex, which vests ultimate authority and power for meeting the hydrological challenges outlined above exclusively with sovereign states. Conversely, the state apparatus assimilates water scarcity as a security issue, and thus brings to bear the full range of state apparatus, including the military, to combat putative insecurity. The most common element of state-brokered efforts to improve water security involves privatization of water resources, or at least privatization of water supply services and other related activities. This process has been most prevalent in developing nations in Africa, Asia, and Latin America, but has not been wholly absent in North America and Europe (GWP 2000; Staddon 2010; Sultana and Loftus 2012).[7] This policy often has provoked strong opposition from civil society, which has sometimes been met with a (para)military response from a state apparatus unable to resolve challenges to its authority in any other way. Such hard measures are becoming increasingly commonplace in an increasingly water-scarce world.

[7] See Chaps. 6 (for Europe) and 7 (for North America).

18.4 Toward a Democratic Reconceptualization: The Soft Path to Water Security

There is no single point of origin in the burgeoning water security discourse in historical and geographical terms, although the struggle over water (and land) in the Middle East has exercised a strong influence on the thinking of scholars and policymakers about the fundamental risks linked to water security and insecurity. Many different specific twenty-first century challenges—food production, energy production, transport, urbanization—share scarce water as a key issue, if not the key issue. Moreover, global climate change and our growing understanding of the water needs of the natural environment compound our water challenges inasmuch as we now know that even maintaining the status quo, were that possible, would be untenable. In short, in a world characterized by more precarious precipitation, a growing human demand for water, and ever-better science underpinning the water needs of the natural environment, the concept of water security has emerged as a key discursive intervention. Indeed, it is likely that the science-policy relationship has become internally reinforcing, since both water science and policy reflect the social systems that gave rise to them. To date, states have preferred to address water insecurity by promulgating hard policies that are prescriptive, top-down, and devoid of any deliberative democratic content.

Against this trend, a softer path starts with the assumption that people's fundamental interests are in satisfying demands for water-related services such as food, hydration, waste disposal, and sanitation. Thus, society's focus should be not on the use of water per se but on the services and benefits provided per unit of water used and how best to fairly distribute these benefits notwithstanding current scientific uncertainties and the often-entrenched interests of political elites. For present purposes this means we need to start with a critical analysis of the way that problems of too much and too little water—flood and drought—become mobilized as the responsibility of a new administrative bureaucracy ultimately backed by the state's monopoly over the means of police or military violence. Our preoccupation, throughout the history of Western philosophy and science, with the intrinsic reality of entities such as water has been fundamentally misplaced.

Democratic water governance cannot be divorced from the prevailing mode of hydro-governmentality. The softer path towards water security would necessarily involve wresting control over water resources away from the increasingly bureaucratized, politicized, and militarized governance of water resources. What is needed is a countermovement of organizations led by civil society that refocuses attention on the need to distribute more broadly and equitably the benefits that water can bring—water services rather than water resources—and manage the dangers that it can pose. Thus, in developing regions, there is a mounting need for civil society to challenge doctrines of water privatization and technocratic administration. In regions of long-standing hydropolitical tension, there is a need for civil organizations that explicitly seek to build bridges between an otherwise antagonistic state military apparatus. In regions of increased vulnerability to flood and

drought, there is a need for a broader public debate over the status of water and of water services in our lives. These are not challenges that states or experts acting alone can address, and indeed leaving matters to states solely creates new and potentially more dangerous problems.

There are few examples of direct challenges to the prevailing mode of hydro-governmentality to date, and those that have occurred do not necessarily point towards softer paths to sustainable water governance. Civil opposition to water services privatization often limits its aims to the cancellation of particular state-backed plans for private sector involvement in water services rather than challenges the prevailing model of hydro-governmentality. Recent events in South Africa are more pertinent to considerations of the softer path inasmuch as they proceed from the testing of a constitutional guarantee of a modest level of water-related benefits in the South African courts. Although community organizations have not won unreserved victories (cf. Sultana and Loftus 2012), they have shown that it is possible to legally challenge even fundamental decisions by central authorities where there are clearly written constitutional guarantees not of outcomes but of opportunities. Similarly, studies of differential implementations of the European Water Framework Directive have shown that the WFD has provided civil organizations in some EU member states with formal avenues for redress of water-related grievances, as well as entree into a more democratic water governance system.[8] In all cases, the key to more democratic water governance has been building institutions that are state-backed but don't guarantee the state ultimate authority over water management decisions.

References

Anderson EW (1991) White oil. Geogr Mag (February), 10–14

Aradau C (2009) Climate emergency: is securitisation the way forward? In: Humphreys D, Blowers A (eds) A warming world. The Open University, Milton Keynes, pp 165–206

Cook C, Bakker K (2012) Water security: debating an emerging paradigm. Global Environ Change 22:94–102

Danish Hydrological Institute (2007) A water for energy crisis? Examining the role and limitations of water for producing electricity. DHI Group, Copenhagen

Dean M (1999) Governmentality: power and rule in modern society. Sage, London

Department of Environment, Food & Rural Affairs (DEFRA) (2011a) Making space for water: the natural environment white paper, HMSO

Department of Environment, Food & Rural Affairs (DEFRA) (2011b) Water for life: the white paper for the water industry in England and Wales, HMSO

Evans N, Morris C, Winter M (2002) Conceptualising agriculture: a critique of post-productivism as the new orthodoxy. Prog Hum Geogr 26(3):313–332

Foucault M (2007) Security, territory, population: lectures at the Collège de France, 1977-1978 (trans: Burchell G, eds: Davidson AI). Palgrave Macmillan, New York

[8] See Chap. 3.

Global Water Partnership (GWP) (2000) Towards water security: a framework for action. GWP, Stockholm
Gossling S, Peeters P, Hall CM et al (2012) Tourism and water use: supply, demand, and security. An international review. Tour Manage 33(1):1–15
Grey D, Sadoff CW (2007) Sink or swim? Water security for growth and development. Water Policy 9(6):545–571
GTZ-Deutsche Gesellschaft für Technische Zusammenarbeit (2007) Transboundary water management in the Southern African Development Community (SADC). GmbH Water and Sanitation Section, Eschborn, Germany
Hadley C, Wutich A (2009) Experience-based measures of food and water security: biocultural approaches to grounded measures of insecurity. Hum Organ 68(4):451–460
Hildyard N (1993) Foxes in charge of the chickens. In: Sachs W (ed) Global ecology: a new arena of political conflict. Zed Books, London, pp 22–35
IPCC (2007) Synthesis report, contribution of Working Groups I, II and III to the fourth assessment report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri RK, Reisinger A (eds)], IPCC, Geneva, Switzerland, 104 p
Klare MT (2001) Resource wars: the new landscape of global conflict. Metropolitan Books, New York
Luke TW (1999) Environmentality as green governmentality. In: Darier E (ed) Discourses of the environment. Blackwell, Malden, pp 121–51
Luke TW (2005) Neither sustainable nor development: reconsidering sustainability in development. Sustain Dev 13:228–238
Martínez-Cortina L, Garrido A, López-Gun E (eds) (2010) Re-thinking water and food security. Taylor and Francis, London
Murakami M (1995) Managing water for peace in the Middle East: alternative strategies. United Nations University Press, Tokyo
Ohlsson L (1995) Water and security in Southern Africa. Department for Natural Resources and the Environment, SIDA, Stockholm
Peace A (2002) Governing the environment: the programs and politics of environmental discourse. In: O'Farrell C (ed) Foucault: the legacy, Proceedings of the Foucault: the legacy conference held in Australia, 1994, Kelvin Grove, QLD, University of Queensland, pp 530–545
Rose JB (2002) Water quality security. Environ Sci Technol 36:247A–250A
Rutherford S (2007) Green governmentality: insights and opportunities in the study of nature's rule. Prog Hum Geogr 31(3):291–307
Sarre P (2009) Governing the international economy: growth, inequality and environment. In: Brown W, Aradau C, Budds J (eds) Environmental issues and responses. Open University Press, Milton Keynes, pp 363–402
Schulz M (1995) Turkey, Syria and Iraq: a hydropolitical security complex. In: Ohlsson L (ed) Hydropolitics: conflicts over water as a development constraint. Zed Books, London
Shrivastava GS (2003) Water resources and food security: a Caribbean case study. Proc Inst Civil Eng Water Marit Eng 156(4):351–353
Shuval Hillel I (1992) Approaches to resolving the water conflicts between Israel and her neighbors – a regional water-for-peace plan. Water Int 17(3):133–143
Skolicki Z (2008) Co-evolution of terrorist and security scenarios for water distribution systems. Adv Eng Softw 39(10):801–811
Staddon C (2010) Managing Europe's water resources: 21st century challenges. Ashgate, Farnham. ISBN 0754673219
Staddon C, Appleby T, Grant E (2012) A right to water – a geographico-legal perspective. In: Sultana F, Loftus A (eds) (2011) The right to water: politics, governance and social struggles, 1st edn. Earthscan, Abingdon, pp 61–77. ISBN 9781849713597
Sultana F, Loftus A (eds) (2012) The right to water: politics, governance and social struggles, Earthscan water text series. Routledge, London

Turton AR (2003) The hydropolitical dynamics of cooperation in Southern Africa: a strategic perspective on institutional development in international river basins. In: Turton AR, Ashton P, Cloete TE (eds) Transboundary rivers, sovereignty and development: hydropolitical drivers in the Okavango River Basin. AWIRU/Green Cross International, Pretoria/Geneva, pp 83–103

UNESCO (2008) Human security: approaches and challenges. UNESCO, Paris

Waughray D (ed) (2011) Water security: the water- food-energy-climate nexus, World Economic Forum. Island Press, Washington, DC

World Commission on Environment and Development (1987) Our common future. Oxford University Press, Oxford

World Economic Forum (2011) Water security: the water-food-energy-climate nexus. Earthscan Press

About the Editor

Graciela Schneier-Madanes is professor emerita at the National Center for Scientific Research (Centre National de la Recherche Scientifique, CNRS) in France. A specialist in urban planning and water governance, she is director of the CNRS Water Governance in the Americas Research Network and serves as an expert for governmental institutions and private companies. She was director of the CNRS Urban Water Research Network "rés-EAU-ville" and founding director of the Joint International Unit on Water, Environment and Public Policy with CNRS and the University of Arizona, where she led the U.S./EU team that was awarded the Sustainable Water ActioN (SWAN) program—the European Commission's first INCO grant in the U.S. Schneier-Madanes graduated as an architect from Universidad de Buenos Aires and received a doctorate in geography at Université Paris I Sorbonne. She has published extensively and divides her time among academic hubs in France and other parts of Europe, the U.S., Latin America, and China.

E-mail: graciela.schneier@univ-paris3.fr
Web: www.schneier-madanes.com

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3,

Appendix: Water Urbanisms: A Visual Illustration

Felipe Correa

Given its vital nature and ubiquitous presence in all forms of life, water as a medium has been critical to shaping settlements throughout history and across the globe. The Forma Urbis of most, if not all, cities is intrinsically linked to the universal rules of water and gravity. A selection of four extreme case studies presents visual profiles that examine specific acts of urbanization in relation to the larger material forces of water, establishing models of urbanization that partially emerge out of the logic imposed by water and man: Al Ain in the United Arab Emirates, Phoenix and Tucson in the U.S. Southwest, New Orleans in the Mississippi River Delta in the U.S., and Iquitos in the Peruvian Amazon. The work aims to single out the role of urban form and its formative process as a critical component in environmental studies.

Scarcity: Al Ain and the Phoenix-Tucson Megaregion

Also known as the Oasis City of the Emirates, the regional city of Al Ain, located in the most eastern edge of the Emirate of Abu Dhabi, can trace its origins to an initial infrastructure project that involved adapting water to transform the once remote desert caravan outpost into an arable garden and lush tourism hot spot. To achieve this, local tribesmen developed an irrigation system known as a falaj, man-made water channels that intercept the water table through several wells at the foothills of

F. Correa (✉)
Department of Urban Planning and Design, Urban Design Degree Program,
Harvard University Graduate School of Design, Somatic Collaborative,
888 Eighth Avenue (15M), New York, NY 10019, USA
e-mail: felipec@somatic-collaborative.com

G. Schneier-Madanes (ed.), *Globalized Water: A Question of Governance*,
DOI 10.1007/978-94-007-7323-3,

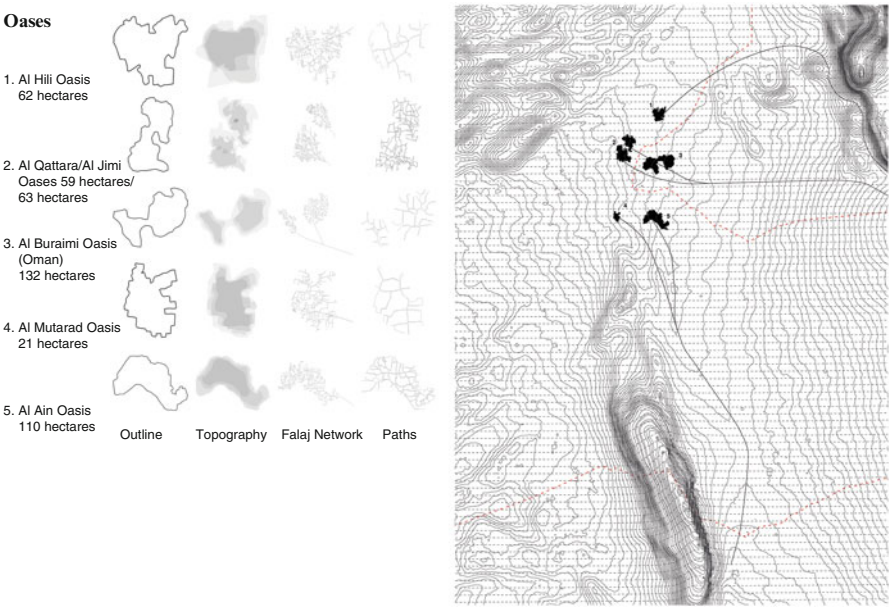

Fig. A.1 Major oases of Al Ain and the falaj structure embedded in each of them (Drawing: F. Correa and M. Puig)

a mountain, allowing the lowest points of the desert to become agricultural oases and urban outposts. Today, oil has supplanted dates as the region's major economy and the water table has drastically decreased. As a result, the oases of Al Ain are artificially maintained purely for heritage and tourism purposes using desalinated water pumped from the coast. As a city of approximately 300,000 people, Al Ain must rethink the future role of the oases and examine if newer irrigation technologies paired with a more diversified use of these spaces can sustain the oases for new generations (Figs. A.1, A.2, A.3 and A.4).

The Phoenix-Tucson megaregion in the southwestern U.S. also can be considered a man-made oasis. The two cities and the corridor that links them appear at first glance to be a barren landscape. In fact, the region is bounded by multiple rivers and, more importantly, sits atop one of the largest non-replenishable aquifers in North America. Urbanization over the course of the twentieth century has closely traced the contours of the aquifer below, resulting in a thin and overextended carpet of low-density residential development and its respective amenities. A critical reduction in the area's water supply, paired with disinvestment in public infrastructure, has introduced the need for a new paradigm that can help us think of the desert not as a blank canvas for the construction of artificial gardens, but as an ecology that must be incorporated into the everyday practices of the region's inhabitants (Figs. A.5, A.6 and A.7).

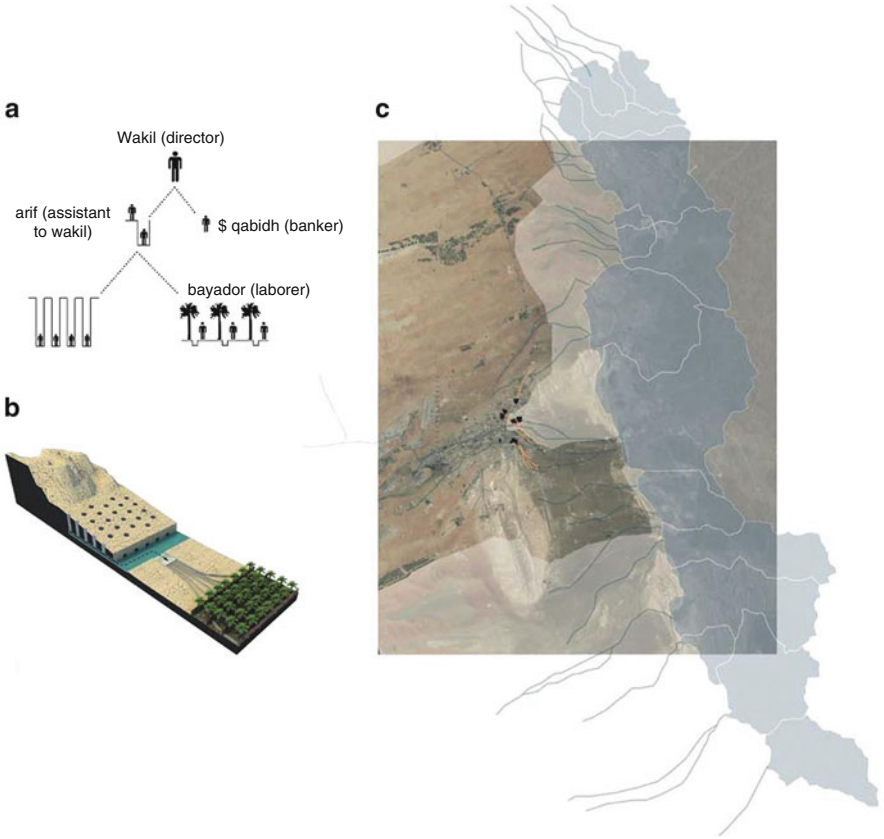

Fig. A.2 (**a**) Diagram showing the falaj water management structure. (**b**) Diagram of the falaj canal system and the flow of water into the oases. (**c**) Map showing the canals bringing water from the Hajar Mountains in present day Oman (Drawings: F. Correa, J. Fowler, and G. Wirth)

Overabundance: New Orleans and Iquitos

New Orleans and Iquitos share a similar set of relationships between urban settlement and water, with both cities constantly negotiating the complex dynamics of riparian contexts in which they exist. Driven by an overabundance of water, the urban form of New Orleans and Iquitos have developed from plans that allow an effective mediation between the strictures of urbanization and the volatility of the floodplain.

The underlying urban skeleton of New Orleans can be traced back to the French plantation model and the transformation of the lower Mississippi River into an agricultural Eden. For the French, the biggest challenge in transforming this territory entailed preparing ground suitable for agricultural production and creating

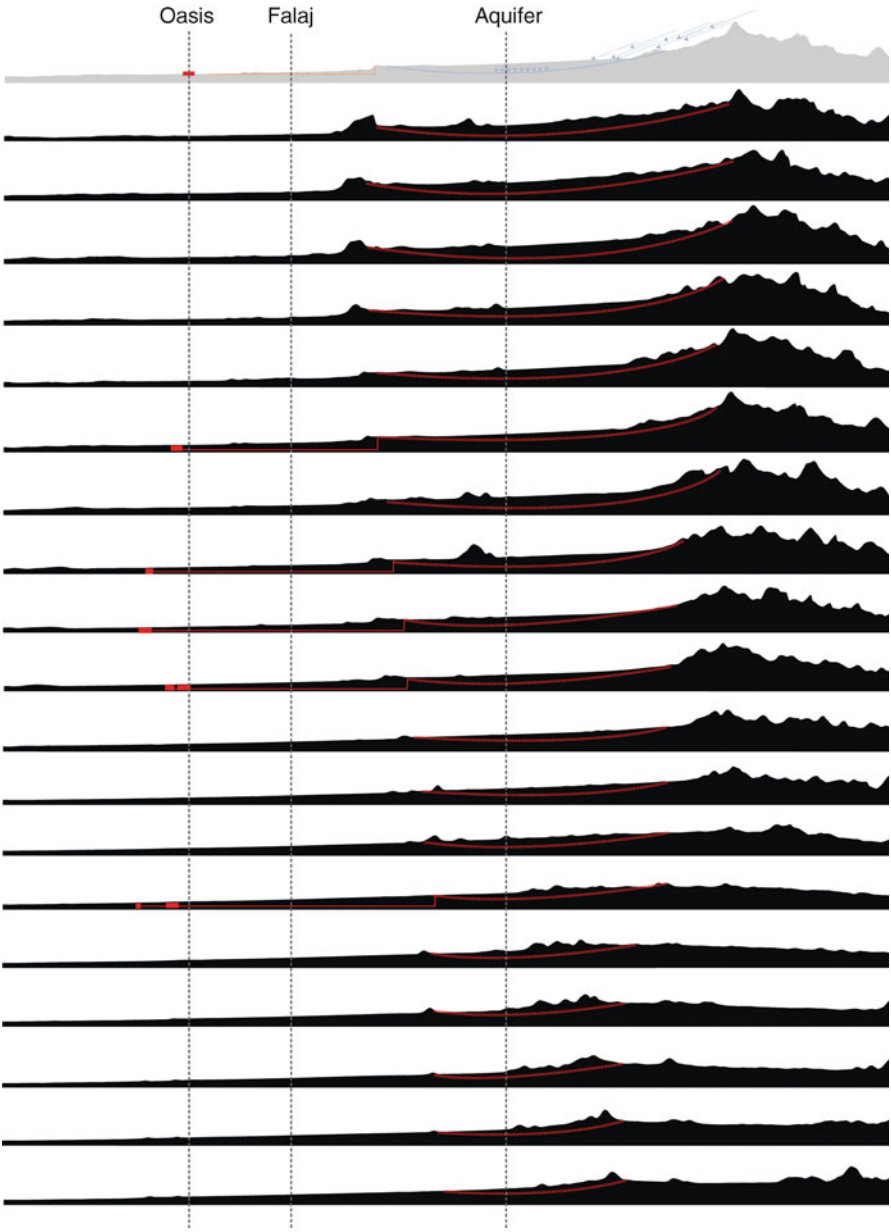

Fig. A.3 Sectional analysis of the Hajar Mountains and the falaj system as it relates to Al Ain (Drawing: F. Correa and M. Puig)

Fig. A.4 Aerial view of Al Ain around 1960 (Source: Abu Dhabi Authority for Culture and Heritage)

a new organizational structure along the river. By projecting lines that served as geopolitical demarcations, drainage infrastructure, and forms of circulation, the French capitalized on the river's slight natural levy to collect water for irrigation and drain it onto lower ground known as the backswamp. As the density of the city increased, the plantation lines became major boulevards and canals maintained the effective relationship between river and swamp. As New Orleans implements post-Hurricane Katrina plans, officials must take into account the success of this previous hydrological project. If one looks carefully at the floods caused by Katrina, the parts of the city urbanized over plantation grounds are the ones that remained driest (Figs. A.8 and A.9).

Iquitos, deep in the Peruvian rainforest, sits at the confluence of the Amazon and Napo rivers. Only accessible by air or boat, this frontier city peaked in the first decade of the twentieth century due to the abundance of rubber in the region. All buildings within the floating city are constructed on stilts, hovering between 3 and 5 m above solid ground. During the dry season, the lower ground serves as the main pedestrian and public space. Flooding occurs as the water level increases, transforming the public space into a series of canals traversable only by boat.

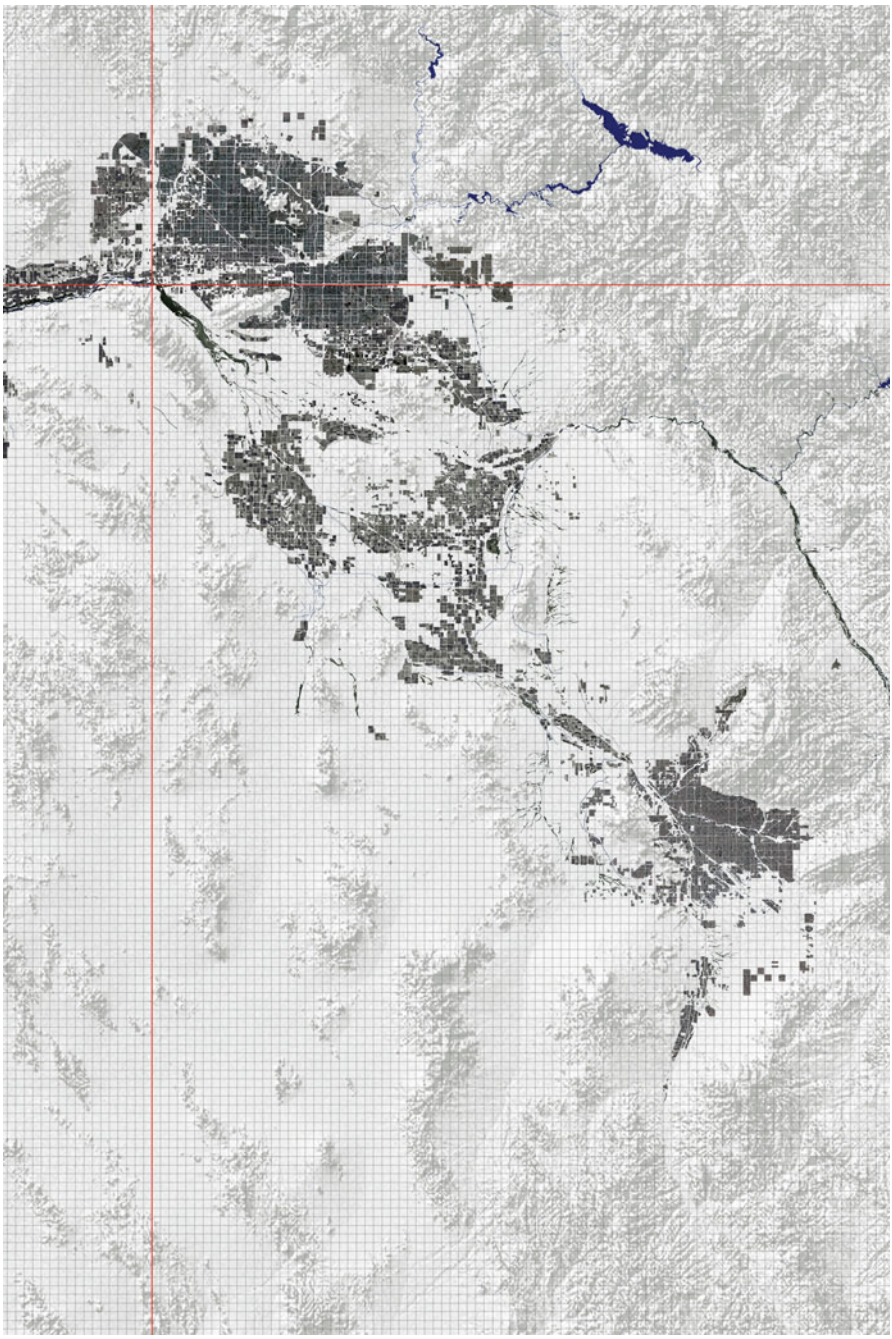

Fig. A.5 Plan view showing the urban and agricultural layers of the Phoenix-Tucson megaregion in relation to the square-mile grid (Drawing: Courtesy of Somatic Collaborative/F. Correa)

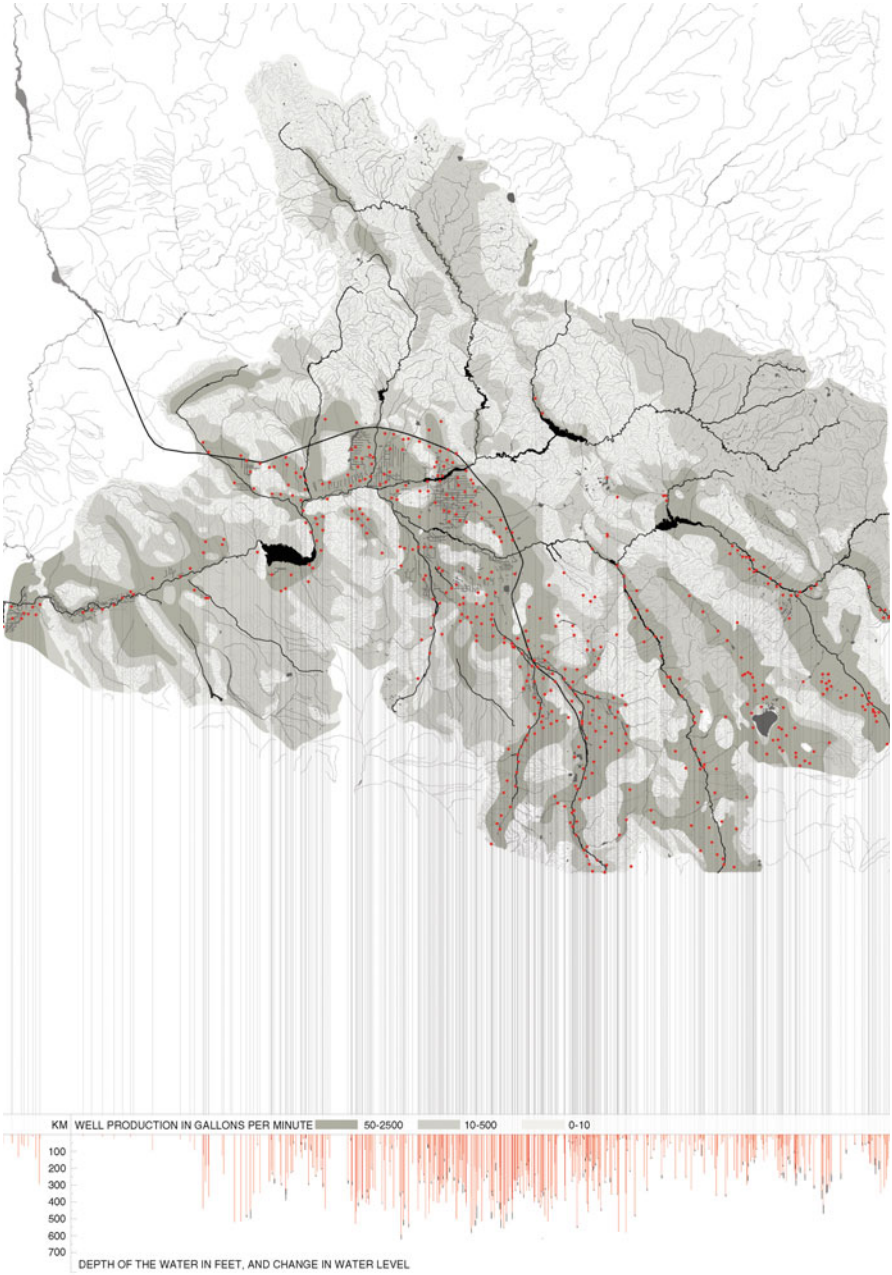

Fig. A.6 Plan and cross section showing the proliferation of wells built throughout the course of the twentieth century, their depth, and the distance to major aquifers in the Phoenix-Tucson megaregion (Drawing: Courtesy of Somatic Collaborative/F. Correa)

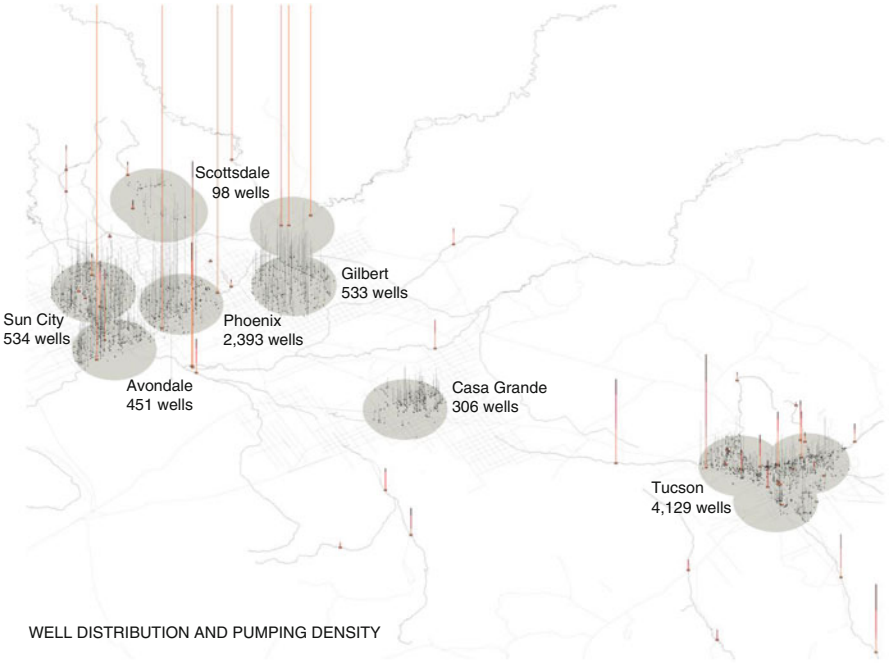

Fig. A.7 Axonometric showing pumping density samples in urban areas in the Phoenix-Tucson megaregion (Drawing: Courtesy of Somatic Collaborative/F. Correa)

Despite the fact that this water-born urban model, colloquially known as the Venice of South America, requires significant upgrades to basic services, it has proved to be a highly efficient way to mediate settlement and floodplain, particularly in the absence of government-sponsored public works projects (Figs. A.10 and A.11).

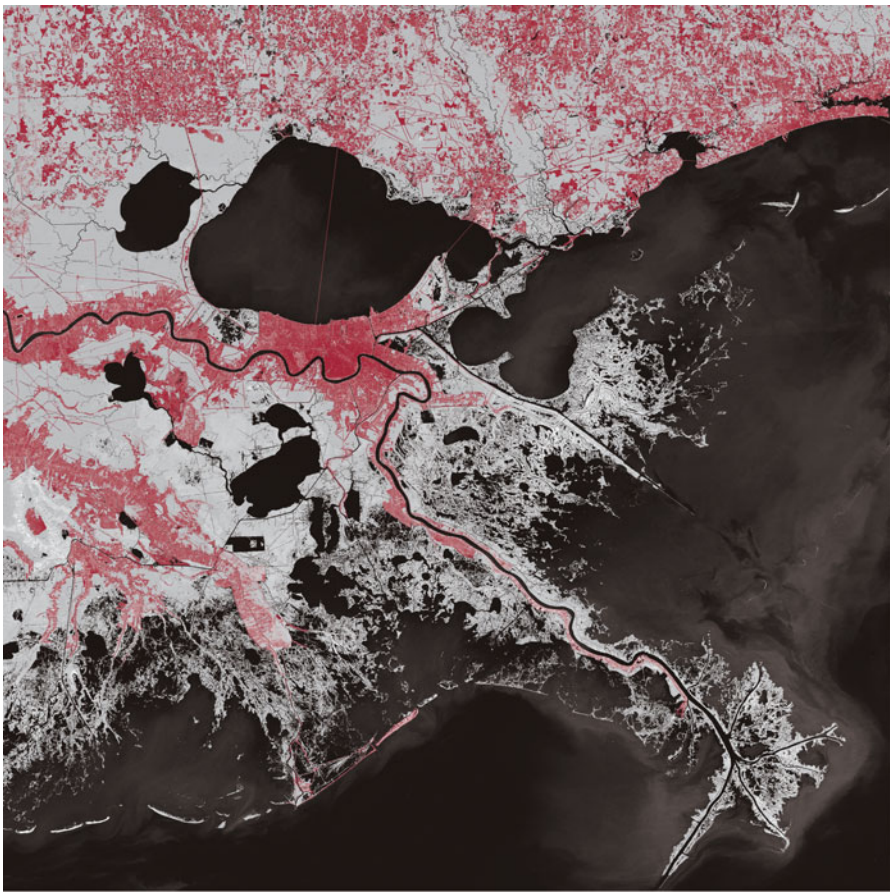

Fig. A.8 Plan view showing patterns of urbanization in relation to the floodplain of the lower Mississippi River (Drawing: Courtesy of Somatic Collaborative/F. Correa)

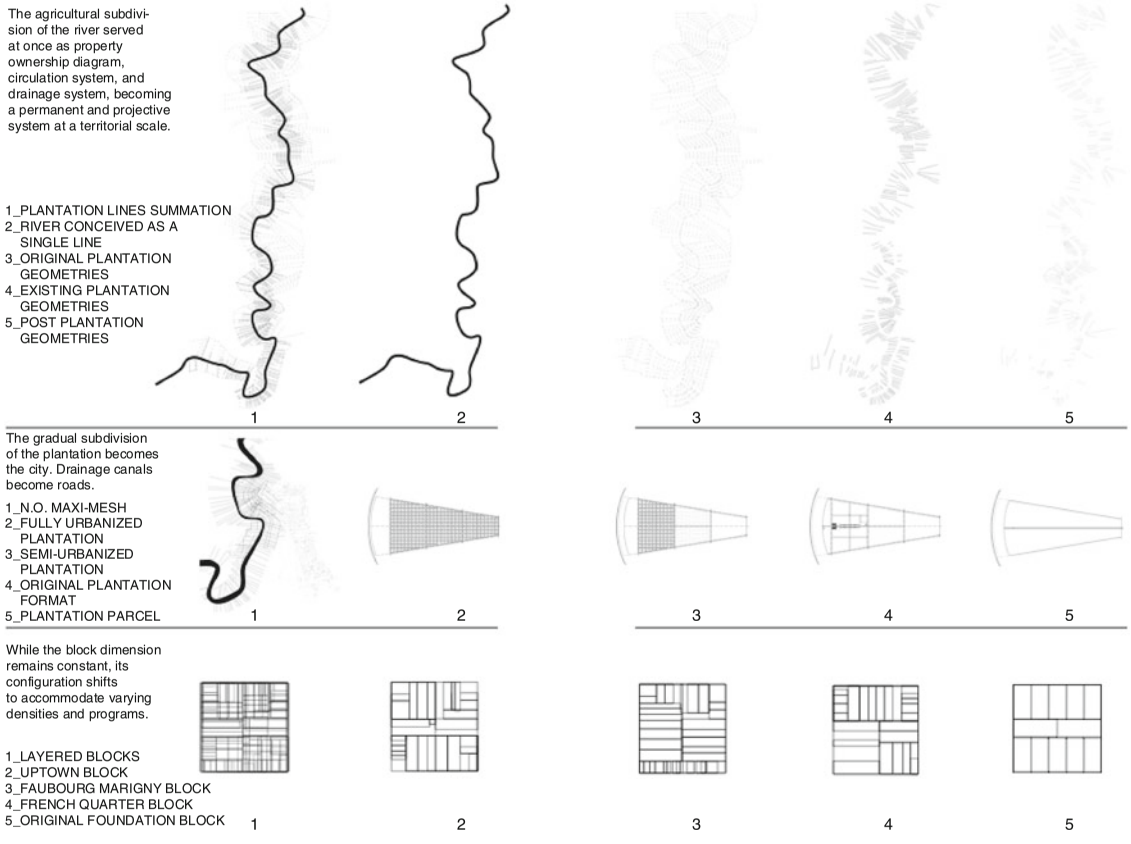

Fig. A.9 Morphological study of the French plantation subdivision and its relationship to the Mississippi River (Drawing: Courtesy of Somatic Collaborative/F. Correa)

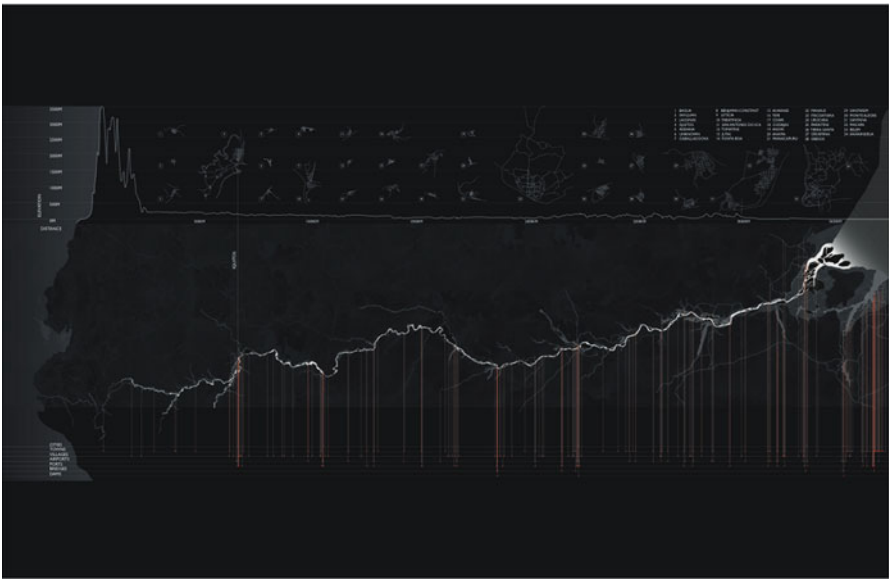

Fig. A.10 Map showing Iquitos as part of a larger urban ecology along the Amazon River (Drawing: Courtesy of Somatic Collaborative/F. Correa)

Fig. A.11 Aerial view of Iquitos (Photo: Musuk Nolte 2010)