Chapter 5
Water Resources Management in Italy: Institutions, Laws and Approaches

Emanuele Boscolo

Abstract Starting with Law no. 36/1994, later expanded on by the Italian Environmental Code of 2006, waters in Italy are no longer regarded as a production asset to be exploited, in a perspective of economic efficiency; they are finally seen as an environmental asset to be protected. All waters are public, so that the State may take care of them and preserve them for future generations. The State does not therefore act as the owner but, rather, as the custodian of waters. Water displays all the features of common pool resources (provision of non-excludable ecological services, scarcity, and vulnerability), and community self-governance instruments – such as river contracts – are increasingly widespread. District-scale planning has become standard practice, leading to a re-sizing of the role of concessions, which are being revised more and more often in the increasingly frequent water shortage situations. The integrated water service is regulated by the Italian Regulatory Authority for Energy, Networks and the Environment, which, mostly through the approval of pricing policies, drives operators towards efficiency improvements and infrastructural investments. Pricing has also taken on a social function, in that it must fund both water bill reductions for low-income households and measures designed to limit disconnections for payment default.

Keywords State-owned waters · Commons · Water service concessions · Water panning and regulation · Italian Regulatory Authority for Energy, Networks and the Environment

E. Boscolo (✉)
University of Insubria, Varese, Italy
e-mail: emanuele.boscolo@uninsubria.it

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5.1 Introduction: The "New" Water Law as the Point of Intersection of Key Issues

Over the last three decades, through a reform that started with Law no. 36/1994 and continued, in the wake of Directive no. 2000/60/EC (Water Framework Directive – WFD), with Legislative Decree no. 152/2006 (hereinafter also referred to as the "Environmental Code" or simply the "Code"), Italian water law has been radically redesigned by dismantling a legal structure that had stood strong for centuries (Lugaresi 1995). The most evident novelty is expressed in the statement according to which all waters, none excluded, are public, thus abandoning, once and for all, the traditional distinction between public and private waters that had been the backbone of the system since Roman times: "All surface waters and groundwaters, including where they have not been abstracted from the ground, are publicly-owned" (Article 144, Paragraph 1, of the Code). It must be immediately made clear that the extension of the condition of being publicly-owned to include all waters is based on a completely different rationale than in the past. Indeed, the change does not stem from a perspective of mere exploitation, but it is a prelude for the implementation of a rigorous environmental policy. This changed value system forms the backdrop against which the entire reform programme is based, also providing the framework for the preference now given to planning instruments that operate on a district-level macro scale over the traditional management model that relied on individual water withdrawal and water abstraction concessions. At a distribution network level, this scenario has resulted into a shift from a municipally-based public service, in which the feeding, distribution and water treatment systems were separate and fragmented, to an innovative organisational model, known as "integrated water service", characterised by vertical integration in the supply chain and organised on an "optimal-size" area (*Ambito territoriale ottimale* – ATO) scale, under the responsibility of optimal-size-area governments (*Enti di governo d'ambito* – EGAs) (which do not coincide with Municipal governments).

"Waters constitute a resource that must be protected and utilised according to principles of solidarity; all uses must be made in a manner that allows to safeguard the expectations and right of future generations to benefit from an intact environmental heritage" (Article 144, Paragraph 2, of the Code). Italian water law sits at the intersection between two key issues: the protection of water as an environmental asset and the need to ensure an efficient distribution of adequate quantities of water that are sufficient to meet the basic needs of each individual (Boscolo 2012; Casalini 2014; Pioggia 2015; Caporale 2017; Iannello 2013; Massarutto 2003; Massarutto and De Carli 2009; Alberton 2012; Alberton and Domorenok 2011; Pototschnig 1969). These two functions highlight the priority given to environmental values and the fundamental importance assigned to the right of each individual to rely on this vital non-replaceable asset. They cannot be hierarchised and, ultimately, require the harmonisation of water withdrawals (and the pressures that they generate) with the timescale and mechanisms for water renewal. They are two needs that must always prevail over demands for productive exploitation.

Indeed, unlike in the past, waters are no longer considered as a mere production asset that must be exploited to its full potential, in a perspective of economic efficiency. We have become aware that the water system is, first and foremost, a multifunctional environmental matrix, which must be protected as a fundamental part of our ecosystem (that is, despite its cyclical renewability, a particularly vulnerable component/container of an extraordinary biodiversity, as well as an irreplaceable element of all biotic processes), and that water itself is an essential and non-replaceable resource for humans, the consumption of which for drinking purposes is a vital necessity and access to which must therefore be guaranteed on a universal basis.

The deepest implications of this cultural and legal evolution hardly come to the surface with the necessary clarity, and the environmental bent seen in the "new" water law does not seem to have as yet translated into a fully-established paradigm. The process for the modernisation of water law is still under way and involves lawmakers as much as the judiciary, which has provided crucial indications to guide the transition.

Traditional water law – that is, the body of law which, after the unification of Italy in 1861, inherited the legacy of the various pre-unification laws and gave form to a systematising piece of legislation, Royal Decree no. 1775/1933 (Astuti 1958) – was based on the assumption that water was endlessly available, a powerful bias which resulted in the allocative function of administrative intervention remaining essentially unused. Water law had thus to be redesigned from a new perspective, consistent with the observation that water, also in consequence of the increasingly-severe effects of climate change, is a scarce resource that is not available in sufficient quantity to meet an inelastic and growing demand, which manifests itself not just in the basic human need for drinking water but also in an agricultural, industrial and energy-related economy that is still largely dependent on water. The Italian Constitutional Court, too, has made reference to the scarcity of water, in order to legitimise the move towards all waters being regarded as publicly-owned[1] undertaken with the above-mentioned Law no. 36/1994 and confirmed with Article 144 of the Environmental Code. The condition of water stress – once unusual in Italy, whereas now some parts of Southern Italy are at serious risk of desertification and even some areas in the Po Valley are exposed to prolonged periods of drought – has exacerbated many issues and has given momentum to the reform process. In the past, no water requirements remained unmet, with the growing rate of water withdrawal (well over the natural renewal rate) being also facilitated by a lack of

[1] Constitutional Court, judgment no. 259 of 19 July 1996. The Court stated that: "the 'public character of waters' regards the use of an asset that has become scarce, as a common pool resource"; this was a fundamental ruling, which was echoed in the more recent judgment no. 273 of 22 July 2010 by the same Court, which highlighted the "aim of lawmakers to regulate the collective use of an indispensable and scarce asset, such as water, in a systematic and planned manner", and the ensuing "resolution of lawmakers to regard all ownership-related aspects of the protection of public waters as subordinate to programming- and management-related aspects, a choice which is better-suited, in the opinion of lawmakers, to the purpose of regulating the correct use, by all citizens, of water resources, which they are entitled to access".

differentiation in terms of applied fees and prices. Today, the idea is beginning to take hold that an inevitable balancing exercise must be undertaken, through which some uses (industrial) must be legitimately sacrificed. In this view, specific allocative rules must be defined, based on a classification of the various types of water withdrawals and according to a pricing structure designed to promote the protection of water ecosystems and biodiversity, which sits at a definitely higher position than general economic demands.

As part of the values that inform the system, a crucial role is also played by solidarity (Article 144, Paragraph 2, of the Code) (Pototschnig 2000), which must be carefully balanced with the qualification of water distribution as a public service of an economic nature[2] and the WFD principle of "full cost recovery" (according to which, as reiterated by the Constitutional Court,[3] the water price must fully reflect both the environmental costs of the resource and the production costs of the service). Such a balancing effort calls for a water distribution system that is disengaged from rigid market-driven patterns (Gambino 2004), which would predictably lead to some groups of citizens being unable to rely on an adequate quantity, thus failing to uphold the right of all to water (Staiano 2011; Violini 2017; Frosini 2010).

In operations management terms, after the 2011 referendum on local public services – which showed how the topic of water can be politicised and used for easy rhetoric, based on the confusion between the public character of water and the call for a public management of the distribution service – the "in-house" operator system has become largely prevailing and the creation of the conditions for public tendering and competition among operators no longer appears to be, unlike in the previous decade, an objective. Having fallen seriously behind against the agenda drafted through Law no. 36/1994, with a consequent prolonged lack of action in infrastructural investment, the situation radically changed in 2012, with the assignment of extensive regulatory powers – comparable to those that allowed for the modernisation of the energy sector – to the Italian Regulatory Authority for Energy, Networks and the Environment (*Autorità di Regolazione Energia Reti Ambiente* – ARERA). The authority is an independent body responsible for regulation in the energy, water and waste collection sectors (Boscolo 2017a), which is entrusted with the task of ensuring efficiency (for example, through pricing models that encourage productivity improvements and higher investments) and fairness (through pricing differentiation and the definition of user contracts and social measures designed to assist users who are struggling to afford their water bills). Regulation is key in a sector that seems to have chosen to do without the natural forces and corrections of competition and needs external intervention to prevent the recurrence of a scenario in which State companies, at a high risk of politicisation, inadequate in size and in constant deficit, are unable to improve the services they provide or even to carry out essential work on both water distribution networks and treatment facilities (Pioggia 2012). In this sector, regulation is not meant to protect competition, as it is in the

[2] Constitutional Court, judgment no. 325 of 17 November 2010.

[3] Constitutional Court, judgment no. 26 of 26 January 2011.

liberalised sectors of telecommunications and energy. Rather, it aims to drive operators towards the pursuit of greater efficiency, with effects on both the quality of the service and the prices charged to users.

Last but not least, it must be noted that water pricing continues to act as "the 'prism' through which the values involved can take on a tangible form" (Travi 2014). ARERA is entrusted with the task of defining the general criteria (the pricing "model") to which all pricing plans prepared by the various optimal-size-area governments must conform. If in the past the whole matter revolved around the determination of the price to be charged to users and the consequent impact on their family budgets, in the current scenario, the pricing function has taken on a variety of different purposes. ARERA has defined a pricing model of incentives and penalties that seeks to direct the choices and behaviours of system players towards its desired results. Through the modulation of pricing criteria, optimal-size-area governments and operators are driven towards the pursuit of infrastructural investment and service quality improvement. Similarly, price differentiation (that is, the assignment to progressive price bands based on consumption and user category) allows to implement a progressive charge system and, most of all, to reward users with lower prices in response to a reduced and more environmentally sustainable consumption. Pricing models are the main operating instrument in the broader water policy defined by the regulatory authority, and the prices charged to users reflect a wider-reaching approach and the harmonised result of competing interests.

5.2 The "Custodial" Role of the State and the Participatory Management of Commons

Viewed from this perspective, traditional approaches and tools – essentially functional to regulating production uses, and based on the idea that water withdrawal requirements must be met as the available water resources exceed water demand – are showing their deep and manifest inadequacy. The critical revision regards, first and foremost, the civil-law-derived ordering scheme that, for centuries, has confined normative thinking in this field into the narrow dichotomy between public and private ownership of waters (Carapezza Figlia 2008). Water law may no longer be constrained within the tight framework of the theory of goods and is now part of the wider scope of environmental law. True, lawmakers keep stressing that waters are publicly-owned, but reference to this categorisation is only made to mark a clear break with the past. The underlying attribution scheme is not aimed at granting the State dominion over the *res*, but rather at entrusting the public authority (that has the necessary powers) with the purpose-driven task of protecting waters. This is an attribution scheme that is devoid of any purely property-centered dimension (Giannini 1963; Cassese 2007) and thus stands apart from both the Roman-law-derived property law model that was championed during the time of legal absolutism (Rodotà 1990) and the traditional interpretation of the notion of being

publicly-owned that was developed as part of the Italian administrative legislation. With European Union (EU) law remaining silent on the topic of actual ownership, water law is remodelled based on a new approach to the legal relationship between public authority and the water system, one in which the condition of being publicly-owned, far from responding to an anti-historical call for complete submission to public ownership and control, originates from the need to ensure full implementation of the most rigorous environmental policies (in both quantity and quality terms) for the protection of water resources and the prioritisation of drinking use over any other form of water exploitation. Water – just as the Italian Constitutional Court has explained – "belongs to us all and, as such, must be distributed according to rational and impartial criteria that must be established through specific administrative rules": from the dual principle of public property and fair allocation "stems the consequence that water use must be regulated and planned by the public authority, in an effort to ensure a balanced consumption for purposes other than domestic ones".[4] The above translates into a total exclusion (Cassese 1967) of any possibility of private ownership of individual water bodies, which is deemed to be incompatible with the characteristics of unity and indivisibility of the water system, correctly perceived, from the point of view of science, as a complex adaptive system, vulnerable and not very resilient (Cafagno 2007).

The difference is obvious compared to the previous approach, according to which only waters that are capable of being usefully exploited must be regarded as public, as famously worded under Article 1 of the already mentioned Royal Decree no. 1775/1933: "All spring, river and lake waters, including where artificially abstracted from the ground, redesigned or expanded, which, considered either in their individuality, and thus in terms of their flow rate or size of their water catchment area, or as part of their overall waterway system, are or may become capable of being utilised for public interest purposes are to be regarded as public". The reference to the condition of being publicly-owned, as defined in the Italian Civil Code (Articles 822 and following), needs to be clarified. Behind the newly-developed notion of all waters being publicly-owned lie the traits of an innovative form of shared ownership: the "property of all", as defined in purposely evocative terms first by the Constitutional Court and then by the Court of Cassation, which spoke, in particular, of a dual ownership of environmental assets, in light of which reference to the "'condition of being publicly-owned' expresses both ownership by the general public and ownership by the public authority, the latter (ownership of the asset in the strict sense of the word) operating as a sort of stewardship [*appartenenza di servizio*], stemming from the fact that the public authority is the entity that can, and must, guarantee the conservation of the specific characteristics of the asset and their continuing availability for use".[5]

In this perspective, the public character of waters calls for a State that acts as the custodian of the water system, as well as for the submission of all forms of

[4] Constitutional Court, judgment no. 273 of 22 July 2010.

[5] Court of Cassation, Joint Sects., judgment no. 3813 of 16 February 2011.

exploitation to prior screening by the public authority and to an assessment of compatibility against the existing environmental and drinking water requirements. It is once again the Constitutional Court that pointed out that "it is the responsibility of the competent public authority to programme, regulate and monitor a correct use of water in a given area, not for the mere protection of a publicly-owned asset, but for the purpose of achieving a balance between the public nature of water and its call to meet the domestic and production-related needs of citizens. These are entitled to use groundwaters, in accordance with the administrative rules that have been established to ensure the conservation of water resources, which may not be indiscriminately depleted through unregulated water withdrawals".[6]

Waters are not "State property" as such: an innovative interpretation of the notion of being publicly-owned has emerged, according to which the public authority acts as a custodian and is "only" called on to exercise the conservation and distribution functions that are strictly required (Caputi Jambrenghi 2004) to implement a value system informed by the indivisible ideas of sustainability and solidarity. As incisively stated by the Court of Cassation, "ownership by the State (as State-community, that is, as the entity that represents the interests of all) is not an end in itself and is not relevant only in terms of expressing title to an asset; rather, it carries with it all the duties of a type of governance that seeks to enable all the various forms of public use and enjoyment that are inherent in the asset".[7]

This profound revision of the notion of being publicly-owned has opened up a space for an even deeper reforming effort, stemming from the ontological features of water resources. Waters provide fundamental and indivisible ecological services and, now more than ever, are exposed to depletion due to over-abstraction and pollution. As such, they can be structurally classified as "commons" or "common pool resources" (Nespor 2013), not to be confused, as it is often the case in an unjustified effort to bring the past into the present, with the category of *res communes omnium*, which in archaic Roman law was used to describe resources that were available in unlimited quantity, individual access to which was to be granted to everyone, as demanded by a subsistence economy (Fiorentini 2010). The Italian debate on common pool resources is still open and has not always followed a straight line (Bombardelli 2016; Gambaro 1995). Two things are clear, though. First, the inadequacy of the traditional categorisation of public goods, as expressed in the Italian Civil Code, is widely recognised (Renna 2004; Renna 2006; Della Cananea 2011; Napolitano 2010, 2015; Palazzotto 2017; Andreis 2015; Castorina and Chiara 2008). Second, there does not seem to be any doubts that viewing environmental assets as common pool resources is a useful line of reasoning (Boscolo 2017b, 2019), resulting also into the possibility of including both publicly-owned assets (such as waters) and privately-owned assets (such as micro-lots of land, woodlands and landscape elements) into a single classification category, carrying specific duties of conservation and transmission to future generations. Recent noteworthy

[6] Constitutional Court, judgment no. 273 of 22 July 2010.

[7] Court of Cassation, Joint Sects., judgment no. 3813 of 16 February 2011.

openings by the judiciary and the ensuing debate (Cortese 2011; Marella 2011; Saitta 2011) call for a verification of the correspondence between the idea of waters being publicly-owned, with the State acting as a custodian, and the notion of common pool resources that has become popular in international socio-economic literature.

A comparison with the theory of the commons highlights remarkable similarities with the Italian case. The condition of massive pollution and systematic depletion from over-abstraction that has been the terrible norm for some decades, is the almost literal transposition of the metaphor that was labelled by Garrett Hardin – towards the end of the 1960s – as the "tragedy of the commons" (Hardin 1968). Exploitation by many, albeit rational at an individual level, eventually causes the depletion of the commons. Therefore, the sum of individual choices leads to "tragedy". The limits of collective decision-making have traditionally been used to support the argument that private management of natural resources is in fact a more efficient option. Faced with the same problems, however, Italy would appear to have responded with the traditionally opposite alternative: the all-public approach, the "institutional" solution, placing the concerned resources under the ownership and centralised control of the State, which is then able to rely on its huge powers. The choice of regarding environmental assets as publicly-owned would seem to be at the polar opposite of both the notion of private property and the communitarian and cooperative-based models identified by Elinor Ostrom in the extensive research she had conducted over the previous decades (Ostrom 2006; Napolitano 2007), and which expresses a sort of counterpoint against the allegedly inevitable dichotomy between public and private and promotes the adoption of local self-governance solutions.

In spite of appearances, however, Italy has to some extent gone past the public-private dichotomy. Indeed, there is no point in continuing to wonder whom the waters belong to. The debate on ownership may sit in the background (Casertano 2008): environmental assets raise, first and foremost, a question of identifying the government body that should be entrusted with the task of preserving them in the long term. We speak of a body that can make decisions that are efficient, but also open and democratic – the latter requirement being the reason why preference is now given, and has been given for some time (in the Italian system, too), to responsible self-governance solutions. In this direction, an exceptional legitimating factor is found in Article 118 of the Italian Constitution, according to which "State, Regions, Metropolitan Cities, Provinces and Municipalities are called on to facilitate the independent initiative of citizens, both as individuals and as associations, in the performance of activities of public interest, based on the principle of subsidiarity". Typical communitarian arrangements, based on the notion of horizontal subsidiarity, are seen across the structure of the Italian water system, with tangible examples including irrigation consortia or the more recent rediscovery of the so-called "civic uses", or public use of land (Grossi 1977; Cerulli Irelli 1983), as redesigned, from an environmental perspective, by Law no. 167/2017.

The most interesting instrument, however, is certainly that of river contracts (the equivalent of the French and Belgian *contrats de rivière*), now regarding more than

eighty water bodies all over Italy (Bastiani 2011; Boscolo 2012; Duret 2015).[8] Indeed, in practice, a management model is emerging that, in many respects, goes beyond the legislation in force, and opens up a concrete space for a number of forms of active involvement of river population and water users. River contracts have rapidly taken hold and have allowed to achieve significant results in terms of river restoration, through the convergence of various user categories, the local communities and the public authorities on new value systems and shared agendas (Magnaghi 2006). These results would not have been achieved through authoritative instruments. Even national lawmakers, following in the footsteps of previous regional laws, have acknowledged the significance of river contracts (or lake contracts, landscape contracts and ecological network contracts), leading in 2015 to the introduction in the Environmental Code of Article 68-*bis*, according to which "River contracts are involved in the definition and implementation of river basin and sub-basin district planning instruments, operating as voluntary strategic and negotiated programming instruments for the conservation and correct management of water resources, the promotion of river areas and the prevention of hydraulic risk, contributing to the local development of such areas". In addition to giving these consensus-based instruments formal recognition, the above provision grants them an active role as from the initial stage of goals definition, thus entrusting them with a wider function than a purely complementary one in the implementation of district planning. River contracts have become key instruments for the promotion – including on a financial level – of the relationship between communities and water resources, and have taken on the function of providing a legal and administrative framework for the "spontaneous convergence of participatory resources, technical competences and local decision-making" (Boscolo 2012), finally enabling access of non-institutional entities to water governance and the shift from participation to co-governance (Duret 2015).

A system has appeared in which local stakeholders are attributed a role and responsibility in respect of specific water bodies, a trend which – because it acts on a different level – can co-exist with the notion of waters being publicly-owned in their entirety, as well as with macro-level district planning. In observing these trends, however, we must clearly recognise their complementary value within the multi-scalar dimension of the water system and the related governance instruments, creating a model in which the act of "taking responsibility" by the local communities is referred exclusively to individual water bodies or portions thereof, and is in addition to, rather than in substitution of, the functions of protection and sustainable governance exercised by the public authorities. In this perspective, and having made this essential clarification, it now makes sense to speak of a "third way", finally setting aside the public-private categorisation. That is, it makes sense to speak of waters as common pool resources, in terms that are not in contrast with the idea of waters being publicly-owned, with the State acting as a custodian.

[8] On river contracts, and public participation more generally, see, in this volume, Chap. 19 by Fasoli, Bastiani and Puma.

5.3 The (Difficult) Priority of Planning

Another distinguishing aspect in the evolution of Italian water law is represented by the rebalancing effort in the relationship between concessions and planning, historically characterised by a marked bias in favour of the former (Pototschnig 1969; Boscolo 2012). Water concessions were once the backbone of the entire system, epitomising the overall legal structure of a management model that had become established starting from the second half of the nineteenth century. With decades of delay (Colucci et al. 1974), the process has started for a gradual disengagement from the traditional governance system, heavily dependent on demand and fitting only with a (once unconditionally-prevailing) model of maximum exploitation of all waters capable of being usefully abstracted.[9] In this perspective, planning has become the core of a policy approach designed to pursue the conservation of waters and their programmed sustainable use.

The WFD called for a reorganisation of planning policies on a district-level macro-scale (a matter of "optimal size") (De Benedetto 2017). In Italy, however, the difficult and decades-long transition to a river basin scale, which, after the devastating Florence floods of 1966, had been indicated as the most appropriate scale to control diffuse externalities, finally came to an end with the adoption of the law on the protection of soil (Law no. 183/1989). Now, in view of the need to comply with EU requirements, the Code (hurriedly) provided for the aggregation of the previous river basins into river basin districts, but following lines of reasoning that, at times, seem to make little hydrographic sense. This new administrative (no longer hydrographic) arrangement was then rationalised with Law no. 221/2015, which amended Articles 63 and 64 of the Code. These have now provided for the elimination of the previous river basin authorities and the transferral of their competences to seven river basin district authorities (Eastern Alps, Po, Northern Apennines, Central Apennines, Southern Apennines, Sicily and Sardinia), which have been assigned the task of preparing the river basin district plans and the related operating plans (including the river basin district management plans). District authorities have also been assigned key competences in terms of the hydrogeological protection of soil and are responsible for implementing the WFD, as transposed into Italian law by Legislative Decree no. 49/2010, as relates to the protection from flood risks (first and foremost through the approval of flood risk management plans).

[9] It is perhaps just worth noting that this same value system had provided the basis for the institution, in 1933, of a special water jurisdiction (on the history, functions and current structure of the water jurisdiction system, see Conte (2006), Parisio (2009) and Palazzolo (1999)). The whole water jurisdiction system, consisting of eight Regional Courts of Public Waters and a High Court of Public Waters based in Rome, was provisionally reorganised under Law no. 45/2004, pending a more systematic reform, also addressing the issue of participation in technical boards (on this matter, see the statements and observations made by the Constitutional Court in judgment no. 353 of 17 July 2002). For a summary of the debate currently under way, see Marchetti (2011) and Mastrangelo (2009).

Over the last decade, water planning activities have translated largely into the approval of district management plans, starting from 2010 (Alberton 2011; Boscolo 2012). These instruments have marked the turning point that the river basin plans required under Law no. 183/1989 had been unable to achieve, and represent the most important example of a new process-based and adaptive planning model, which has been made possible also through a series of structured procedures designed to pursue the centrality of knowledge, as well as to promote authentic participation and an analytical evaluation of the effects produced. The need for a greater flexibility and adaptivity than in traditional planning instruments stems mostly from the newly-acquired awareness of the limitations that are inherent in the ability of lawmakers to predict how things will develop when faced with complexity, of which water systems represent one of the most significant examples.

The heart of the planning procedure is the construction, open to participatory contributions, of the knowledge basis that forms the true gravitational core of the plan itself. This activity goes well beyond the mapping of the basin and the compilation of a user register (absurdly still missing in many parts of the country, despite its creation being a requirement under Article 5 of Royal Decree no. 1775/1933). It is, in fact, a much more analytical exercise, including, as expressly required under the WFD, a detailed "characterisation" of district water bodies, which is functional to the assignment of specific quality and quantity objectives for each of them (Maier 2010). In so doing, attention shall be paid to the territorial specificities of the water body, which is seen not just as part of a geographical basin but also as belonging to a differently-designed ecological area: indeed, and although it may seem counterintuitive, the search for the most appropriate model has led to distributing surface water bodies into multiple hydro-ecoregions, each featuring its specific characteristics and criticalities. This methodological approach represents the prerequisite for the development of a finally objective and up-to-date picture of the actual morphology of the surface water network, of groundwaters and of transitional coastal waters, also including a map of uses and mutual interdependencies between quantity- and quality-related availability of waters, determinants and pressure factors. The knowledge basis for each plan is completed with the identification of the carrying capacity for each hydro-ecoregion. In the more strictly programming-related part of the plan, the various hydro-ecosystems are assigned their respective objectives, to be achieved through a series of measures that are also identified in the general management plan, with a requirement for precise indications on policy funding means. Management plans place key importance on economic analysis, as they seek to identify, in line with the most recent developments in environmental economics, the actual value of the natural capital that may be associated with the various water bodies as well as the costs of any purely exploitative models that are still being implemented (Boscolo 2018).

The district plan is structured in a manner that is comparable to a mosaic of frames and is formed bottom-up starting from each individual hydrological unit of significance, while retaining the ability (scalability) to indicate actions and decisions that must necessarily be made at a district level (De Bellis 1984). The opportunity has opened up for the involvement of Regions and Municipalities in the

characterisation process, as a key condition for the development of a genuinely scalable and integrated planning model, within which each local authority, remaining within the framework established by the central authority, may describe, in as much detail as necessary, the (secondary) water network that innervates its territory and participate in identifying the necessary governance actions.

Trans-scalar plans are, indeed, the only possible response to the risk, which is always very high, that planning documents formed at a district level (too large: just as an example, the Po River Basin District covers roughly one fourth of the entire Italian territory) lead to an excessively schematic representation of physical and ecological features of vast areas, for which only a more analytical approach may highlight significant differences, clusters, fracture lines and different habitats. An erroneously homogenising approach would end up losing sight of the need for policies to focus on each one of these smaller units separately. The response to such an ungraspable complexity – with its many connections and interdependencies – is now even more difficult following the repositioning of water policies on a much wider scale, based on a purely administrative subdivision into river basin districts. Planning – with huge delay – is finally set to become the essential core of the system and, judging by the first procedures implemented by district authorities for the preparation and approval of management plans and flood risk plans, it shapes up as being based on the priority of knowledge, as well as on the participation of all stakeholders (involved in environmental, industrial and agricultural policies) and institutional authorities (Regional, Provincial, Municipal).

5.4 Water Withdrawal Concessions in a Condition of "Certain Uncertainty"

Not less crucial, as previously mentioned, is the matter of the structure of water withdrawal concessions and the legal regime applicable to them. Just to give an idea, it is estimated that approximately 70% of natural water flows within the Po river basin are withdrawn and intensively exploited. Of course, a clear distinction must be made between dissipative uses and other forms of exploitation, such as surface irrigation, which return much of the water back into the ground. This distinction, however, the need for which has been pointed out by many, goes hand in hand with the observation that all water abstractions cause a deep alteration in the delicate ecological and hydrological balances of the water system and contribute to reducing its self-purification capacity, as well as its biodiversity (Greco 1983). Paradoxically, an exceptional use of the resource – with the ensuing prejudice caused in terms of both damage to the ecological mechanisms and limitations on general uses by the community – does not even translate into an actual return on the investment, as the lack of differentiation in prices, which are kept low by policy, prevents a selection among competing claims and leaves room for decidedly suboptimal (and thus less profitable) uses.

The overhauling of the concession model is therefore another necessary step in the path towards a new water law, as the measures defined in management plans often have to reckon with a reality made of water withdrawal concessions (and discharge authorisations) that are very much in need of extensive and unpostponable revisions. The traditional instrument of the water concession (Costantino 1975), long regarded as some sort of paradigm in the general category of administrative concessions (D'Alberti 1981), needs to adjust to a scenario in which withdrawal rights may no longer be guaranteed in the long term and even quantity continuity has to be subordinated to the imperative call for the conservation of water ecosystems, leading, first and foremost, to a requirement for adaptability.

In the original view of Royal Decree no. 1775/1933, water was a "means" for the achievement of economic and production-related results (irrigation, hydropower, driving power, cooling power, etc.) (Pastori 1996). The concession process came down to a verification of resource availability and use cost-effectiveness, conducted on the basis of hydraulic compatibility assessments made on a local micro-scale level (partly due to the inability of modelling the full effects of withdrawals on the specific balances of the entire basin). One of the most significant consequences of this approach was the particular rigidity of concessions. The only adaptation clauses (revocation and revision) were associated with the extremely rare cases of significant alteration of available quantities due to natural events causing a radical change in the water flow: a condition that was set out, in very stereotypical terms, by both the law and the individual concessions. This was, however, a remote possibility and, in practice, concessions were basically unassailable. Consistently with the values on which the system was based, it is emblematic that, in response to the then-prevailing demands for production efficiency, a compulsory concession transfer instrument was developed with a view to making sure – in a Pareto-efficiency perspective – that preference could always be given to the user with the greatest exploitation capacity (with termination of the existing concession and obligation for the new concessionaire to indemnify the previous concessionaire).

This system has now entered an irreversible crisis. In the current picture, the typical rigidity of traditional concessions is being radically redesigned, in the light of an increasingly pressing need to conserve water ecosystems in an optimal condition – a need that can be met, first and foremost, by ensuring that water flow is maintained at a rate that is compatible with the preservation of biodiversity. With a radically changed hierarchy of values, environmental demands call for a (continuous) verification of the compatibility of withdrawals with parameters that were once unheard of, such as the minimum vital flow (or environmental flow), an important descriptor of the quantity-related values that must be guaranteed in order to ensure the preservation of biocoenosis in the river bed (safe minimum standard). In the increasingly frequent periods of low water, these checks may lead (Article 95, Paragraph 3, of the Code) to the imposition of compulsory releases or withdrawal

reductions, which are noticeably not accompanied by the payment of indemnities,[10] not even where the expectations of concessionaires for a profitable exploitation of the waters are affected.

Situations of direct competition among different uses are arising at a worryingly systematic rate, partly following a reduction in the amounts of water that are available at a given time during the various seasons. As these issues are directly linked with the particularly inelastic nature of water demand, they cannot be resolved only through conventional allocation rules. In an effort to incorporate the environmental dimension into the concession procedure (thus working on a different level than the minimum vital flow, which rather operates like an externally-imposed restriction), the demanding obligation has emerged to verify the compatibility of withdrawals against a newly-developed indicator, known as the river basin balance (expressing the ratio between needs and the available/activatable quantity in a given water body, net of the minimum vital flow: Article 145 of the Code). The entire system is moving away from a needs-based approach, which saw technical skill and financial capacity as the only limitations to exploitation. On the same front, we will soon also see the first tangible results of a programming action for dissipative and river-basin-changing uses (at a water body level) that is designed to be respectful of the river basin balance and identify interdependencies (environmental and economic) between multiple uses along the river.

The above changes are all part of a general concession overhaul process that also regards concession duration and fee structure, which is now required to incorporate – as prescribed by both the WFD (user-pays principle) and the Decree of the Italian Ministry for the Environment no. 39 of 24 February 2015 (*Regolamento recante i criteri per la definizione del costo ambientale e del costo della risorsa per i vari settori d'impiego dell'acqua*) – a component aiming to compensate for the uses and environmental functions of water that are no longer possible due to the reduction in available quantities and the externalities produced by withdrawals. Such a revision of the fee determination system, in addition to responding to a pressing need for greater recognition of the full value of public goods, is also part of a wider discourse invoking the use of the economic lever as a means to encourage a more responsible consumption (Cafagno 2015). Such an approach to water law should be largely used, since the current scenario is affected by a significant distortion in the recognition of operator preferences (willingness to pay) due to the fact that fees and prices have long been kept low "by policy" and have been inadequate to ensure the internalisation of environmental costs by those who are permitted to exploit common pool resources for their own purposes.

The legal structure of concessions is changing, with significant consequences not only with regard to the granting of water withdrawal rights, but, first and foremost, with regard to their term. The conditions are arising for environmental interests to finally prevail, including when it comes to historically long-term concessions (Casalini 2010). Such deep transformations are resulting into a new concession model that has a much more differentiated structure than in the past (D'Alberti

[10] The Italian Court of Cassation (judgment no. 28268 of 21 December 2005) confirmed the legitimacy of a reduction in quantities available for withdrawal, with no indemnification to be paid, in two Sardinian basins following calculation of the minimum vital flow.

1986), but is also very different from the models outlined by the general law on administrative procedure (Law no. 241/1990): one may think of the issue of the revocability of concessions, which, in this field, are required to waive any forms of relief for any prejudice suffered by the concessionaire, by reason of the inevitable uncertainty regarding assignable quantities. Indeed, as a derogation to Article 21-*quinquies* of the afore-mentioned Law no. 241/1990, a water concession may be revoked with no indemnification when responding to the need to ensure the priority of environmental and drinking-water demands, in all situations where the maintaining of withdrawal rights (and of the quantity levels granted in the concession) would endanger the fragile balance of the water body.[11] Such a form of revocation option confirms once and for all that water withdrawals for economic purposes are subordinate to environmental and human demands. In this framework – representing the reflection into legislation of the general ontological value attributed to the water system – revocation (which does not have to lead to termination, but could simply involve a temporary limitation on the quantities granted through the concession) is the only instrument that can ensure constant alignment between withdrawals and quantity available for withdrawal (that is, net of any amounts that may not be withdrawn for environmental reasons). This fact gives the revocation-adjustment discretion a key role among the range of active instruments that may be used by the public authority for environmental protection purposes.

From the priority given to environmental care stems the impossibility for the concessionaire to call for "reinforced" protection, both in relation to the preservation/non-adjustability of its water withdrawal rights and in terms of indemnification/compensation, with the additional consequence that the exercising of such discretion upon arising of the relevant environmental conditions takes on the character of necessity that is typical of those measures that are designed to guarantee a "high" level of environmental protection and the priority of drinking water uses – as well as the pre-eminence of agricultural over industrial uses[12] (Tonoletti 2008). The concession relationship is structurally characterised by the possibility of terminating or reducing (adjusting) its subject matter. It therefore seems fair that – where, in the technical opinion of the public authority, the conditions arise for the adoption of specific protection measures – no financial indemnity needs to be paid to re-establish a balance that, by definition, may not be aspired to right from the start.

[11] "With reference to Articles 2, 3, 41, 42 and 43 of the Italian Constitution, this Court deems the question of the constitutional legitimacy of Article 43 of the Consolidated Act on Water (as approved by Royal Decree no. 1775/1933) – in the part where it requires the holder of a water abstraction concession for the production of electricity to release the water, with no right to indemnification, whenever required by the concession grantor in the public interest – to be manifestly unfounded. The particular legal treatment of public waters means that the rights of a private concessionaire can never qualify as ownership rights and are always subordinate to the needs (including extraordinary needs) of the public, whose right to use the waters is always latent and can resurface at any time, with the consequence that the concessionaire, who is fully aware of said limitation, may only request an adjustment of its fee in proportion to its reduced use of water": Civil Court of Cassation, Joint Sects., judgment no. 23196 of 3 November 2009, in *Giustizia civile – Massimario annotato della Cassazione*, 2009, p. 1532.

[12] "In periods of drought and in all cases where water resources become scarce, during which quantities available for withdrawal are adjusted, priority must be given, immediately after human consumption, to agricultural use": Art. 167 of the Code.

To complete the picture, we also need to point out the inflexible approach undertaken by the Constitutional Court in stressing that concession awards (as instances of allocation of a scarce resource) need to always be preceded by a call for tenders. This stance has provided the basis for crucial arguments in support of concession renewal prohibition.[13] Also, it sanctions the principle according to which – given that the water quantity available for withdrawal represent a sort of "essential facility" in relation to the possibility of performing certain economic activities – water must be assigned in a manner that places all aspiring concessionaires on the same level, with "incumbents" no longer being able to rely on their privileged positions. Calls for tenders are the only instrument that is capable of directing awards towards a form of "dual efficiency", favouring applicants who promise to undertake greater efforts in environmental terms (reducing consumption, reconverting production systems, updating irrigation systems, switching to less water-intensive crops, etc.) as they are able to make a more economically-efficient use of the limited amounts available for withdrawal.

To conclude, we can now recognise the existence of two interests – an environmental interest and an interest in the withdrawal of drinking water (really, two sides of the same sustainability/solidarity argument) – that are clearly prevailing, and another interest – linked to the exploitation of waters for irrigation-related purposes – that is subordinate to the first two, but prevails over any interests associated with industrial exploitation. From this hierarchical classification of public interests, radical changes stem in the structure of concession procedures and the content of concession instruments. This, in turn, leads to a scenario in which reflecting on the concession system can provide extremely useful indications for administrative law in general, which is increasingly faced with the task of allocating scarce assets and utilities and awarding concessions in a condition of "certain uncertainty", that is, a situation where the only certainty is uncertainty regarding the quantity of water that will be available in the future (Boscolo 2013). From this the need arises to identify suitable concession models that are able to incorporate a requirement for adaptability as to both term and assignable amounts (Rodolfo Masera 2017).

5.5 Technical Regulation and Water Pricing

The value of solidarity expressly pointed out by Article 144 of the Environmental Code is concretely implemented in the integrated water service[14] (Parisio 2013, 2018; Bruti Liberati 2010; Carbone et al. 2017; Bercelli 2006). It is not sufficient that all waters are public, it is also essential that the daily amount of good-quality water that each person needs is made available to everyone. When it comes to water

[13] Constitutional Court, judgment no. 339 of 12 December 2011, concerning a law issued by the Lombardy Region; Id., judgment no. 114 of 10 May 2012, concerning a law issued by the Autonomous Province of Bolzano.

[14] On the integrated water service see, in this volume, Chap. 13 by Parisio.

distribution, public intervention must take on the form of a structured public service in charge of allocating a vital and non-replaceable asset. In order to effectively answer its call to fulfil the right to water, as recognised by both international law and Italian constitutional law,[15] the distribution service must be able to ensure universal access, both in a geographical sense (water supply must be made continuously available in all parts of the country) and in a financial and social sense (access to water by each person must not be prevented by insurmountable price barriers). At the same time, the water treatment segment must make sure that all wastewater is adequately treated and returned, with a view to improving the quality of water in water bodies, in accordance with the goals set out in the WFD and detailed in the above-mentioned district management plans. The organisational efficiency that is requested from the integrated water service is measured against the following objectives: operational efficiency, that is the ability to organise operations management effectively, and economic efficiency, that is the ability to achieve a sound economic management, with an eye to long-term financial balance indicators and the funding of asset-renewal programmes. The above is always to be balanced against the need for social redistribution initiatives, seeking to respond to cases of water poverty.

More than twenty years after the adoption of the reform law (which was later transposed into the Environmental Code), the system is still far from having met the abovementioned goals and has only just recently shown a possible shift in trend (Massarutto 2011). The system has suffered the consequences of extensive fragmentation (the legacy of the long history of a service that was designed in the nineteenth century on a municipal scale) and a huge lack of investment, which has led to significant plant deterioration (with network losses, poor service quality in some areas and obsolete water treatment services almost everywhere). For a long time, even the ability to design a valid pricing policy had been lacking: in contrast with the principle of full cost recovery, mandatorily introduced by the WFD, the system was based on a sort of distorted balance between low service quality and prices that were kept low by policy. And, most of all, despite the countless legislative interventions, the system was unwilling to reduce public operations management – which was often inefficient and politically-biased – and open up to competition.

The distribution service displays the particular feature of being a local natural monopoly (Ogus 2000), mostly due to the non-duplicability and non-shareability of distribution networks (Polo and Denozza 2001). Just like for other public services, many have suggested that competition could drive the system towards greater efficiency in operations management. In the case of the integrated water service, however, because of the barrier represented by the existence of only one network, the competition model can only be applied in the form of competition *for* the market (and not *in* the market), that is through a tendering process, accompanied by a guarantee by the concessionaire that it will make the service available to users through the network, which remains publicly-owned (Bartolini 2008; Di Porto 2008) and is made neutral in accordance with the essential facilities doctrine (Bastianon 1999;

[15] On the right to water in Italy see, in this volume, Chap. 11 by Turrini and Pertile.

Salonico 2001; Durante et al. 2001). For a long time, the creation of a competitive system was made pretty much impossible also by the lack of a truly independent regulator (Napolitano 2017) – one having the necessary powers to collect the required information and not exposed to the risks of being "captured" or lacking neutrality – that would be somehow comparable to the Ofwat authority in England and Wales.

In 2012, the scenario changed radically with the attribution of a regulatory function to the body that was then the regulatory authority for energy, and is now responsible for regulation also in the water and waste collection sectors and has thus been recently renamed as the Italian Regulatory Authority for Energy, Networks and the Environment (the abovementioned ARERA). Right from the start, regulation in the water sector showed some unusual traits, not fully in line with the economic theories of regulation. This was in consequence of choosing a system that was once again not very much inclined to competition. Indeed, the referendum of June 2011 had been an occasion for lacerating ideological clashes between two irreconcilable views: on the one hand, the supporters of a water service in the hands of private operators, chosen through transparent tendering procedures, and, on the other, the large army of supporters of the (distorted) belief that public ownership necessarily entails public operations management. After the clear victory of the latter position, management through in-house companies became (and still is) the most widespread model all over the country.

In this context, regulation has become a sophisticated technical activity, aimed at guiding – administratively – the behaviour of system players (Boscolo 2017a). Regulation activities are not directed at the creation of the conditions for competition, but rather at emulating its incentives, in an effort to lead the organisation and management of a service in public hands towards a condition of maximum efficiency and protection of user rights (in terms of both contractual performance and availability of social measures). The particular form of regulation in the water sector is called for to prevent operators that have been directly appointed, with no competition involved and no real external supervision, from ending up in charge of a monopoly and acting, through opportunistic behaviours, to the detriment of users. Regulation in the water sector has thus taken on the function of preventing the "all-public" approach, implicitly dominating, from re-proposing, in the medium term, the typical sub-optimal results that can be expected from operators that have not been adequately directed towards maximum efficiency.

The key role entrusted to ARERA is confirmed in the Decree of the President of the Italian Council of Ministers of 20 July 2012, which lists the duties assigned to the regulatory authority. As established under Article 2 of the decree, ARERA must ensure "the provision, availability and quality of the service to users", the "definition of a fair, certain, transparent and non-discriminatory price structure", the "protection of the rights and interests of users", the management of the integrated water system according "to a condition of efficiency, balance and non-discrimination" and, last, the "implementation of the EU principles of 'full recovery of costs', including environmental and resource costs, and 'polluter-pays'". Based on this value system, defined in its normative details, Article 3 lists, again with remarkable

accuracy, the regulation and control functions that are entrusted to the regulatory authority. Said list includes, but it is not limited to, the definition of service quality objectives and minimum levels (including through a system of incentives and penalties), the preparation of the model agreement for the regulation of relations between awarding authorities and operators, the definition of cost components ("including the financial costs of investments and operations") for the determination of prices, the definition and regular review of the pricing method. The list goes on to include the review of optimal-size-area plans, with possibility of giving binding prescriptions as required, the approval of prices proposed by the local authorities and the provision of guidelines for accounting transparency. Finally, the list mentions the role of the regulatory authority as the body in charge of protecting user rights, a function which it can exercise also through the examination of complaints, requests and observations. In addition to the above, Italian Law no. 221/2015 has also vested the regulatory authority with the task of introducing appropriate measures in the pricing model to address the matter of payment defaults and the provision of a minimum guaranteed amount of water to low-income users. Regulation is therefore also responsible for taking into account social concerns in the management of the integrated water service.

On a local level, the organisation of the integrated water system is based on the creation of optimal-size-area governments (the abovementioned EGAs), which have taken over the role that was previously assigned to Municipal governments (De Benedetto 2017). The 62 EGAs (whose number is being consistently reduced due to continuous rationalisation and institution-building efforts not as yet concluded) are responsible for the preparation of the optimal-size-area plans, the definition of the optimal-size-area prices and the awarding of the service. The assignment of regulatory functions to ARERA has shifted the organisational model towards a partial centralisation, which has meant that ARERA has taken on a role of verification and re-direction of strategic choices by local authorities. Upon approval of prices (that is, of the draft price structure proposals submitted by each EGA, together with the economic and financial plan and investment programme for the strengthening of infrastructural networks and the organisation of the service at an optimal-size-area level), the regulatory authority is called upon to issue a binding opinion – "under penalty of invalidity" – on technical and economic aspects and on the concession agreement clauses. ARERA thus plays a key role in the planning process by expressing opinions on draft plans that, more than once, have led to radical changes in locally-made decisions. The approval of optimal-size-area plans, which goes well beyond the purely formal checking of draft plans, has made the regulatory authority able to guide the planning process towards a unitary model. Such a model is based on advanced assessments in terms, on the one hand, of consistency with technical knowledge on economic and infrastructural aspects and, on the other, of regular measurement of results aimed to enable adaptive and self-corrective processes. Again, when approving the price structure to be applied in each optimal-size area, the regulatory authority is also called on to express an assessment in relation to the infrastructural intervention programme, the economic and financial plan (for the purpose of verifying sustainability over time for both operations and investment)

and the operation agreement. The latter function is exercised by ARERA with a view to ensuring the adoption of a uniform pricing method and the effective economic sustainability of the investments provided for in the infrastructural intervention programmes.

For an idea of just how complex some of the matters dealt with by ARERA are, it is worth taking a quick look at its activities regarding price regulation and the preparation of the model concession agreement.

As to the latter issue, with Resolution no. 656/2015/R/IDR, the regulatory authority has adopted the model for the regulation of the relationship between awarding authorities and operators in the integrated water system. The model indicates the layout and content of the agreement, working on the assumption that said instrument is called on to regulate the contractual relationship between the parties in full, both *ex ante* (that is, during the awarding process) and *ex post* (during the concession period). In addition to providing a clear and up-to-date overview of the key contents of the concession instrument, the model also analyses the problems that may affect a long-term agreement that fails to address all the relevant issues, leaving the public party at risk of finding itself in a condition of bounded rationality, due to serious information asymmetries, which would heavily affect its ability to deal with the various situations that may arise in the course of the concession period (Petretto 2007; Cavallo Perin 1998).

However, the most important activity undertaken by the regulatory authority so far is certainly the approval of the pricing method (Vaccari 2018). Before the regulatory authority took action, the pricing formula, which was not an accurate reflection of costs, was established under the Decree of the Italian Minister for the Environment of 1 August 1996 (*Metodo normalizzato per la definizione delle componenti di costo e la determinazione della tariffa di riferimento del servizio idrico integrato*). ARERA has designed a new system based on the principle of full cost recovery (with only actual costs being recognised in the price) and has transformed the pricing method into a means to pursue strategic system-upgrading objectives, with a particular focus on the promotion of infrastructural investment.[16] Through its pricing policy, the regulatory authority seeks to achieve a range of objectives of an environmental, social and economic/financial nature (ARERA 2018). Pricing "allows to pursue policies for reducing consumption and promoting a rational and efficient use of resources, as well as the protection of their quality and quantity, while directly affecting water use by imposing payment of a price for its consumption; it is crucial for the economic and financial balance of operations and for the planning of investment" (Caporale 2017). Pricing must, first and foremost, guarantee a full recovery of efficient expenditures, ultimately implementing the principle set out under Article 9 of the WFD and confirmed by EU Communication COM/(2000)477.

ARERA has defined a pricing model of incentives and penalties that seeks to direct the choices and behaviours of system players towards its desired results.

[16] On water pricing see also, in this volume, Chap. 17 by Massarutto.

Through the modulation of costs that can be recognised in the price and the guarantee of a fixed level of earnings for operators, pricing criteria drive the system towards unpostponable infrastructural investment, as well as efficiency and quality improvements. Similarly, price differentiation – that is, assignment to progressive price bands based on consumption and user category – allows to implement a progressive charge system and, most of all, to reward users with lower prices in response to a reduced and more environmentally sustainable consumption. Prices must also remain affordable and must not lead to an amplification of the phenomenon of water poverty (Barraqué and Montginoul 2015).

ARERA began working on its pricing model back in 2012, with the approval of a transitional method (MTI-T), which was later followed by the first full-performance method for the 2014–2015 period (MTI-1) (Massarutto 2015). In December 2015, after two consultation documents (Resolutions nos. 406/2015/R/idr and 577/2015/R/idr) which gathered countless qualified contributions, the pricing method was approved for the second period covering 2016–2019 (MTI-2) (Resolution no. 664/2015/R/idr). In the search for an increasingly satisfactory solution, the new method, following in the footsteps of the previous one, further expands the range of modulation options included in the regulatory model, so as to allow for maximum flexibility in response to the differences that characterise the various areas in terms of demographic profile, organisational structure of the integrated water system, willingness to invest, etc. It is an asymmetrical model, designed to prevent generalised price increases that are disconnected from the individual situations in the various EGAs and their respective upgrading programmes. The MTI-2 method is comprised of six different pricing matrixes,[17] based on the incidence of required investment compared to the value of existing facilities, implementation of aggregation processes/quality improvements and the value of operating costs per citizen served compared to the national average, with the possibility of applying higher price increases where investment capacity is greater (through the action of the "theta" price multiplier). Identification of the applicable pricing frame by each EGA reflects its positioning in respect of crucial elements that define the quality of operations (including in terms of investment requirements, ratio of operating costs compared to national average, implementation of river basin aggregation processes and awarding to a single operator) and, mostly, shows the gap between the existing situation and the ideal paradigm of maximum efficiency – which acts as a benchmark – to be pursued by each EGA.

In order to guarantee the sustainability of water prices, ARERA sets a cap to the maximum increase that can be applied through the ϑ (theta) multiplier, which represents the upper limit to the amount of operating costs borne by the operator that can be transferred onto consumers. The theta coefficient varies, penalising operators that are less efficient or are lagging behind in terms of rationalisation processes and investments.

[17] In the MTI-1 method, there were only four pricing matrixes.

The price regulation system also operates as a powerful disincentive in respect of anomalous situations, which each EGA must put right in as short a time as possible. The disincentive measure entails the blocking of all price value adjustments, with major consequences on profitability, where, for example, operators have seen their right to operate the service being held invalid by a court, have not complied with the obligation to hand over the water networks to the single optimal-size-area operator, or have failed to adopt the Service Quality Charter[18] by the relevant deadlines. Finally, the regulatory authority has also set a 10% decrease in prices chargeable to users for operators that have failed to comply with their obligation to provide the data and documentation required for price structure definition (thus confirming once again the crucial value assigned to information by the regulatory authority).

Approval of draft price structure proposals is also an occasion for reviewing the adequacy of initiatives undertaken by each EGA in terms of infrastructural-technical as well as contractual quality improvements. With regard to the first aspect, ARERA (with its Resolution no. 917/2017/R/idr) has defined a series of infrastructural adequacy indicators, aimed at measuring interventions in terms of water loss reduction (a water conservation matter linked to aging pipes), continuity in supply, quality of the water supplied and water purification levels (which are key to avoiding any additional infringement proceedings for breach of EU Directive no. 917/271/EEC). With regard to contractual quality (Resolution no. 665/2015/R/idr), ARERA has defined a set of assessment parameters designed to evaluate aspects such as how long did users have to wait, availability of information, invoicing system, etc. In terms of quality improvement, it is also worth noting that the regulatory authority has envisaged a measure prescribing automatic payment of an indemnity (€ 30 per user) where quality obligations are not fully met.

Undoubtedly, pricing has also social implications. Albeit water prices in Italy are still much lower than in other European countries (the price of one cubic meter of water is € 1.53 in Rome, € 2.04 in Italy on average, € 2.45 in Madrid, € 3.44 in Amsterdam, € 3.59 in Paris and € 4.414 in Berlin), initial adjustments, involving significant increases in water bills, have brought into the limelight the issues of bill reductions for low-income families and payment defaults (Cauduro 2017). As to the matter of universal access to water, Article 60 of Italian Law no. 221/2015 requires ARERA to identify appropriate solutions to ensure the availability of water at a reduced price to low-income households. As to the matter of payment default, Article 61 of the same law requires ARERA to issue guidelines for reducing payment default by users, while ensuring coverage of costs and the supply of the minimum life-sustaining amount.

This issue, which witnesses a tug of war between efficiency and fairness, as well as between cost-effective management and the right of all to water (Zolo 2005; Staiano 2011), may not be addressed through a traditional social intervention scheme funded through taxes. Funding of social measures must take place through

[18] The Service Quality Charter, or simply Service Charter (*Carta della qualità dei servizi* or *Carta dei servizi*) is a document setting out the service quality standards and the duties of the operator toward the users.

pricing, in a perspective of cross-subsidisation. Thus, the abovementioned social actions must be covered through pricing differentiation by consumption band and use, as confirmed by the Decree of the President of the Italian Council of Ministers of 13 October 2016, according to which "*the cost of supplying water to low-income users at reduced prices must be covered through specifically-designed pricing mechanisms*": a typical redistribution measure.

Indeed, as previously mentioned, ARERA has also undertaken an incisive action in terms of price differentiation, in an effort to guarantee progressive pricing and recognition of different uses, as well as to direct users towards reducing unnecessary wastage. The final price is made up of a fixed component and a consumption-based component, which is calculated according to a progressive price band system. Progressive pricing translates into a first reduced price band for domestic uses,[19] ensuring – in a social assistance perspective – the provision of the minimum life-sustaining amount (corresponding to 50 litres per day per citizen, as set out under the Decree of the President of the Italian Council of Ministers of 13 October 2016), followed by one basic price band and three progressive price bands. Greater consumption quantities are penalised through the application of higher prices. When progressive pricing is applied to highly-diverse households, the problem inevitably emerges of linking the price charged with the number of members in each household, as the price increase associated with greater consumption should not hit more numerous households. From this perspective, prices per person introduced in some EGAs are to be looked upon with favour, as they are certainly fairer in reflecting the inelastic and non-voluntary nature of higher consumption levels in larger households, who would otherwise end up subsidising single-person households, making it easy for the latter to maintain their consumption levels within the lowest price bands.

5.6 Conclusions

Since the 1990s, Italian water law has undergone a process of authentic rewriting. For centuries, this field of law had been dominated by the dichotomy between public waters and private waters and, more in general, by attribution issues. Today, however, awareness that water constitutes an environmental matrix able to guarantee essential ecological services prevails. Such a different framing of waters as an

[19] It must not be forgotten, however, that, absent income-related prerequisites (unlike in the *Low-Income Tariff for Eligible Households* operating in Great Britain), users to whom the reduced price band is applied differ significantly in terms of preferences (consumption habit and aptitude for reducing consumption) and income level and always carry a minimum demand that cannot be lowered further. These differences mean that the reduced price produces different results for different users. For some users, the reduced price is a real social measure, while for others the cost reduction has basically no effect. This same reasoning applies to the higher price bands, designed to act as disincentives, which produce different effects depending on user income.

environmental good, rather than a good subject to exploitation, brought about the development of a highly original and innovative legal framework that entails the rethinking of some of the constitutive notions of general administrative law. This process invested the issue of State property: if, in the past, waters were considered public with a view to ensuring their most rational and intense exploitation, today State property has a merely "custodial" function inasmuch as the public administration is in charge of guaranteeing the protection and intergenerational transmission of water resources. Planning has taken on an unprecedented, central role. In the space of a few years, local authorities have approved plans at a wide-area (*area vasta*)[20] level, based on hydrological geography and aiming at a double objective: on the qualitative level, retrieving the chemical-physical quality of single watercourses; on the quantitative level, limiting withdrawals that are harmful to aquatic ecosystems. However, we have also seen how, based on the principle of horizontal subsidiarity, planning has favoured the spread of river contracts. These, thanks to the convergence of local governments and non-State actors, enabled the attainment of water-body rehabilitation objectives that would not have been possible otherwise and, above all, the recovery of the identity value of rivers and lakes for riparian populations, as well as an increased accountability on the users' side. In the past, withdrawal concessions represented the core of public policies in the water sector; today, they belong to the sustainability framework that is provided for through river-basin-district management plans, and have been made "flexible" so as to adapt to the uncertainty of available flows. As a result, concession-holders increasingly face withdrawal restrictions without being entitled to ask for compensation. This situation has been defined as one of concessions under conditions of certain uncertainty: the only certainty being the uncertain availability of water resources, the relationship between the concession-holder and the public administration cannot aspire to any kind of stability, and it is thus flexible since the beginning.

Italian water policies have been redesigned when scarcity problems became evident. Alpine reserves (glaciers) are shrinking and big portions of Southern Italy are by now exposed to the risk of desertification. Such a condition of water stress endangers the agricultural sector but may also potentially impair the drinking water supply. Therefore, all water policy measures are geared towards the rationalisation and reduction of withdrawals by setting a rigid hierarchy that gives primacy to environmental functions and drinking water consumption while sacrificing – in this order – industrial and agricultural exploitation.

In this respect, waters can be categorised as commons, with two consequences: on the one hand, each use must not impact on the reproduction and integrity of the resource; on the other hand, planning and management activities have to open up to the democratic involvement of citizens, through processes that – as we have

[20] The so-called *area vasta* (introduced with Law no. 56/2014) refers to the inter-Municipal or Provincial administrative levels, and to the idea that territorial planning and resource management are best organised at a level between the Regional and the Municipal ones. Wide areas act through wide-area-level plans (*piani di area vasta*).

seen – guarantee a growing level of transparency in administrative procedures, making sure that the latter's technical character does not prevent public participation.

Protection of waters as an environmental resource necessarily goes hand in hand with distribution policies, aimed at making sure that everyone has access to a daily quantity of good-quality water. Such a twofold goal of the administrative action is summarised in Article 144 of the Environment Code. This norm defines the underlying principles of water policies and provides for waters to be protected for environmental reasons and, at the same time, distributed according to a criterion of solidarity – that is, through an efficient public service capable of guaranteeing that the right to water is effective for everyone.

To conclude, the analysis conducted above has confirmed that water law constitutes nowadays a central and innovative sector of environmental law, aimed at sustainability. This marks an important shift vis-à-vis the tradition that, starting in the nineteenth century, had conceived water law as an instrument for the allocation of water resources with a view to the country's economic development. At the same time, water law also constitutes the experimental space of a model that brings together the values of intergenerational responsibility and distributive efficiency, in order to overcome all territorial and social inequalities in the supply of a fundamental good.

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Emanuele Boscolo is Full Professor of Administrative Law at the Department of Law, Economics and Cultures of the University of Insubria in Varese and Como. He has authored more than 160 publications, including four monographs, in matters of water, the environment, common goods, territory, administrative procedures and public services. He is a founding member of the Italian Association of Environmental Law Professors and member of the steering committee of the Italian Association of Urban Law.