

XIV IWRA WORLD WATER CONGRESS

GOVERNANCE AND WATER LAW THEME – SUB-THEME GL1

TRENDS AND DEVELOPMENTS IN CONTEMPORARY WATER RESOURCES LEGISLATION: A COMPARATIVE STATE-OF-THE-ART PERSPECTIVE

by Stefano Burchi
Chair, International Association for Water Law (AIDA)

Abstract

Key trends are detected in contemporary water legislation. They are: the steady attraction of water resources in the public domain of the state, and in the scope of governmental (or judicial) allocation authority; checking the government authority to allocate and re-allocate water resources, and improving the quality of relevant decision-making, through EIA requirements, water resources planning determinations, ecological flow requirements of rivers, and the “reserve”; controlled trading of water rights; raising the profile of the environment in the allocation and management of the resource (also referred to as the “greening” of water laws); charging for the use of water resources, and acknowledging the economic value of water through the “user pay” and the “polluter-pay” principles; capturing in varying degrees the land-water connection in regard to the control of water pollution from “non-point” sources, the protection of the recharge areas of aquifers, and flood control; the participation of water users in decision-making and implementation regarding, in particular, water sources under stress, and through their representation in the internal structure of the government special-purpose river basin administration; and the interface between statutory and customary water rights. These trends point to a few key issues which will inform the agenda of water law reform in the 21st century: reconciling security of tenure with risk and uncertainty; pursuing opportunities for efficiency gains in resource allocation, without neglecting equity; raising the profile of the environment in the allocation and re-allocation of water resources to competing uses; re-kindling the connection between water resources management regulation (and administration) and land use regulation (and administration); empowering users to shoulder greater responsibilities; and mapping out the interface between customary and statutory water allocation systems.

Keywords: water laws – water management regulation – land/water interface regulation

1. Introduction

Concern for the long-term sustainability of water resources development and use has gained definitive prominence on the agenda of the world community at the Second World Water Forum and Ministerial conference held at The Hague, in March 2000. In particular, the concept and goal of *water security* were loosely articulated there, by reference to “key challenges”, namely, meeting basic needs; securing the food supply; protecting ecosystems; sharing water resources; managing risks; valuing water; and governing water wisely. As such, *water security* appears to go beyond just concern for the maintenance of supplies of drinking water, and to be of relevance not only to arid countries. Subsequently, in the Ministerial Declaration issuing from the International Freshwater Conference held in Bonn, in December 2001, preparatory to the United Nations World Summit for Sustainable Development (Johannesburg, 2002) and to the Third World Water Forum (Kyoto, 2003), *water governance*, including a supportive legal and institutional framework, was seen to play a central role in achieving water security. The policy pronouncements which have been articulated since then, and, in particular, the Ministerial Declaration which issued from the latest (fifth) World Water Forum (Istanbul, 2009), confirm that water security and governance, and a legal and institutional framework conducive to the attainment of the relevant goals, have definitively earned the attention of the international community, and found their place in the latter’s agenda for the 21st century.

Based on prior analyses of water resources legislation by this author (Burchi 2001-2008), this paper takes stock of the salient features and main trends detectable in the contemporary water resources management legislation of a wide spectrum of countries. The issues emerging, and the challenges ahead, are presented and discussed, for the inspiration of lawmakers as they chart the scope and the

agenda of water laws reform in support of water security and water governance policies and goals in the 21st century..

2. Salient features and trends of contemporary domestic water resources legislation

A comparative analysis of contemporary legislation for the management and development of water resources discloses a number of discrete trends, some of which are novel compared to the consolidated direction of mainstream water legislation. The trends, known and emerging, one can detect in the water laws enacted in the last two decades astride the twenty-first century, can be summarized as follows:

2.1 Steady attraction of water resources in the public domain of the state, and in the scope of governmental (or judicial) allocation authority

Groundwater in particular, and riparian rights in surface watercourses and in groundwater, have been steadily attracted into the ever-expanding sphere of “public” domain waters. Public waters may include those waters held in the public domain (ownership) of the state, as in the water laws adopted in Italy in 1994, in Morocco in 1995 and in Zimbabwe in 1998, all of which bring, in particular, groundwater resources within the public domain. Alternatively, water resources have been vested in the state in trust for the public, as in South Africa’s 1998 *National Water Act*, or vested in the President in trust for the public (Tanzania, *Water Resources Management Act*, 2009), or the state may be vested with superior user rights, as in Uganda’s 1995 *Water Statute* and in the Australian state of New South Wales’ *Water Management Act* of 2000. Whatever the legal underpinning, the result has been the same, i.e., to extricate a nation’s water resources from the ownership or control of landowners, and to bring the resource and the relevant allocation under the scope of governmental authority.

As a result of water becoming public property, individuals can only claim and obtain user rights in water. Such rights generally accrue from a grant made by the government (or by the courts, as in some Western states of the United States), and are recorded in an administrative permit, licence, concession or the like instrument. Grants tend to be time-bound, are qualified by terms and conditions, and are subject to review and adjustment to reflect new circumstances. As a general rule and trend, the regulation of abstraction licensing seeks to reconcile the security of water rights tenure implicit in the government grant of an abstraction licence, permit or concession, and the flexibility which is desirable to adjust allocation patterns to the ever changing circumstances of water availability, of evolving abstraction and use technologies and economics, and of shifting policies, priorities, and political agendas.

2.2 Checking the government authority to allocate and re-allocate water resources, thereby improving the quality of allocation decisions

The discretionary authority the government enjoys in making abstraction grants and allocating water has traditionally been checked by the courts of law or through the hierarchical review (appeal) opportunities available through the granting process. These traditional review mechanisms are available after an allocation decision had been made and a permit granted. By contrast, a new generation of fetters tends to operate before such decisions and the relevant grants are made.

These are basically aimed at improving the quality of decision-making, thereby minimizing opportunities for judicial or administrative review and litigation. The allocation authority of government is increasingly qualified by:

- legislation imposing Environmental Impact Assessment (EIA) requirements in respect of proposed water abstractions (e.g., Nicaragua’s *General Law on National Waters*, 2007; Paraguay, *Law on Water Resources*, 2007). In what appears to constitute an effective extension of the standard scope of EIA provisions in relation to water resources, Tanzania’s *Water Resources Management Act* (2009) mandates EIA requirements in respect of “any proposed development” in a water resource area (no definition provided, however) or watershed. Moreover, a Strategic EIA is required of “major” water projects (no definition provided either, however, of what constitutes a “major” water project);
- legislation prescribing water resources plans, especially where these have a binding effect on government decisions;

- legislation prescribing the imposition of minimum ecological flow requirements in respect of surface watercourses, which seek to protect the ecology and fish life of watercourses and act as a limit on the government's allocation authority by barring new abstractions above established limits, and by forcing review and the downwards adjustment of abstractions in progress (see the discussion at 2.4 below, 4th bullet). For instance, in Spain, the minimum environmental flow requirements of rivers provided for by the consolidated *Water Act (2001)* have priority call on available river flows under the *Law on the National Water Plan, 2001*. In Chile, the minimum ecological flow requirements mandated by the 2005 reforms to the 1981 *Water Code* act as a barrier to the grant of new abstraction rights, but do not affect the abstraction rights already in existence; and
- legislation prescribing the formal reservation of water quantities or flows for a specific purpose – notably, the satisfaction of basic human needs and the protection of ecosystems –, which also puts limits on the government's allocation authority insofar as the water reserve cannot be allocated except for the reserved purposes. The concept and mechanism of the “reserve” were pioneered by the 1998 *Water Act* of South Africa, and found their way in, among others, the 2002 *Water Act* of Kenya, the extensive 2004 amendments to the *Law on National Waters (1992)* of Mexico, the *Kyrgyz Water Code (2005)*, the 2005 reform to the 1981 *Water Code* of Chile, the *Water Resources Management Act* of Namibia (2004), the *Water Resources Management Act* of Tanzania (2009). The environmental reserve features also in Spain's *Law on the National Water Plan (2001)*.

2.3 *Controlled trading in water rights*

Increasingly, lawmakers have been turning to trading in water rights in the pursuit of efficiency of water allocation and use. Because trading of water rights empowers users to make allocation decisions instead of government, part of the expanding allocation authority vested in the government, which was observed earlier, is returned to the users.

Unregulated water trading is known to operate perhaps only in Chile. There, water is regarded as a commodity which can be freely traded through the sale of the relevant government grants. However, economic correctives to discourage, in particular, the hoarding of water rights and speculation on them, were introduced in 2005 through a legislative reform of the 1981 *Water Code*. Elsewhere, as under Mexico's *Law on National Waters (1992, extensively amended in 2004)*, and under the *Water Acts* of most Australian states, regulations on water trading seek to minimize unwelcome “third-party” effects, such as effects on the environment, on the interests of the area from where water is taken for use in another area, on cultural values, on resource availability to meet priority requirements and, generally, on marginal groups. This tends to be accomplished by subjecting trades to prior government scrutiny. Occasionally, only intra-sector trades are allowed, i.e., water under a licence or concession cannot be traded and applied to a different use. To varying degrees, this is the approach reflected in the water laws of Namibia (2004), Mauritania (2005), Nicaragua (2007), Paraguay (2007), Tanzania (2009). In Mexico and Tanzania, wastewater disposal permits are also tradable, under the same controlled conditions as abstraction licences. There are a number of countries, however, like Morocco, Indonesia, Mauritania, and Venezuela where water has traditionally attached to the land where it is used, and where the trading of water rights separate from land rights is explicitly forbidden by the current *Water Acts* or *Water Codes* (dating, respectively, from 1995, 2004, 2005, and 2006).

2.4 *Raising the profile of the environment in the management of water resources (the “greening” of water laws)*

The growing realization of the need to manage, develop and use freshwater resources in a more environmentally sustainable manner has raised the status and importance of water for the environment, to a dignity which nowadays stands on a par with other societal needs and wants. As one author put it, “(F)undamentally, the objective is to find a balance between water for human and economics-based demand and water for maintaining ecosystem integrity and environmental sustainability.” (UNEP 2010) or, put another way, the issue is reconciling the goals of socio-economic development and those of environmental protection and conservation. The resulting process of re-assessment of priorities and of water laws has been described as a “greening” of water laws (Burchi 2007, UNEP 2010).

A majority of the mechanisms of resource allocation reviewed at 2.2 above attests to the “greening” of water laws. Additional evidence of the “greening” process can be gleaned from a few other mechanisms of resource management and use, as reflected in the provisions of water laws governing:

- water trading (and water trusts), insofar as invariably the water laws restrict trades having a “third-party” effect on the environment (this point has been illustrated at 2.3 above). Moreover, under the state of Oregon *Instream Water Rights Act*, that state may purchase water or lease water rights, mostly from farmers, and earmark them as trust rights for instream use for the protection of aquatic habitats
- the extraction of groundwater, and restricting it to ensure its ecosystem support function. For instance, the New South Wales *Water Management Act, 2000* provides for an “aquifer interference activity” approval by the government, and in any event, the activity must avoid land degradation such as the decline of native vegetation, increased acidity, and soil erosion. The management plan for the relevant area where such controlled activity occurs must identify the nature of the aquifer interference having any effect, including cumulative impacts, on water sources or their dependent ecosystems, and the extent of those impacts. Plans for such controlled activity also deal with undertaking work with a view to rehabilitating the water source or its dependent ecosystems and habitats. The Namibia *Water Resources Management Act 2004* empowers the Minister to establish the ‘safe yield’ of aquifers when making determinations regarding its use, where ‘safe yield’ refers to the amount and rate of abstraction which would not cause damage to the aquifer, quality of the water or the environment. An identical provision features in Tanzania’s *Water Resources Management Act (2009)*. In the state of Texas, a cap on extractions from the Edwards Aquifer has been imposed under the *Edwards Aquifer Authority Act, 1993* with a view to, among other goals, protecting endangered and threatened species and ensuring the water quality of the aquifer and of the discharging springs. Under the 2000 EU *Water Framework Directive (WFD)*, the quantitative status of groundwater is given particular importance also in view of the protection of the ecological quality of surface waters and terrestrial ecosystems associated with a groundwater body. The WFD considers that a certain amount of the annual groundwater recharge is needed to support interrelated and dependent ecosystems, such as wetlands
- the prior appropriation system of water allocation controlling in the arid Western states of the United States, insofar as leaving water in the stream for recreation and wildlife is now being deemed a beneficial use. In the state of Colorado, in particular, the notion that leaving some water where it is constitutes a beneficial use has been described as a rather radical departure from prevailing legal thinking in the law of prior appropriation (personal communication)
- water permitting and licensing, to the extent that (a) environmental protection criteria, alongside other criteria, are prescribed to inform the terms and conditions of water abstraction licences and of wastewater disposal permits, as in Namibia’s *Water Resources Management Act, 2004*; (b) exceptionally, allocations to meet environmental water requirements take precedence over allocations for all other competing uses, as under the *Water Management Act, 2000* of New South Wales, or take qualified precedence, i.e., precedence over all other competing uses except for human consumption, as under the *Law on Water Resources of Paraguay (2007)*; and, more generally, (c) ecologically sustainable development principles are incorporated in various ways in the water resources management laws, such as those adopted by most other Australian states in the last decade (Fisher 2009). Moreover, retrospective review and a downwards adjustment, without compensation, of allocations granted under water abstraction licenses in progress may be prompted by the changing circumstances of the environmental protection requirements mandated by the law, as the relevant provisions of Spain’s *Water Act*, and the case law which the administration of those provisions has generated, show (Brufao Curiel 2008). And the extension of the all-purpose environmental permitting mechanism for environmental regulation, inaugurated in England and Wales by the *Environmental Permitting Regulations 2010*, to the discharging of wastes into freshwater bodies may herald a turnaround where environmental regulation turns “blue” and attracts within its fold a significant segment of water resources management regulation.

2.5 *Charging for the use of water resources, and regarding water as an economic good*

Charging for water abstraction (also known as “user pays” principle), seeks to influence the demand for water and constitutes the chief non-regulatory mechanism available to curb water abstraction and use. It is generally practised in combination with the regulatory mechanisms described earlier. The criteria

governing rate-setting vary, from the relative scarcity of water resources and the different kinds of use, as in Mexico, Colombia, New South Wales (Australia), Tanzania, to the volume, kind of use, location and source, as in France, to the recovery of the operating costs of the government water resources administration, as in England and Wales. Costa Rica, in particular, has added an environmental services component to the complex and articulate charging schemes for water resources use inaugurated by a decree issued in 2006. So have, at least in principle, neighbouring Nicaragua in the *General Law on National Waters* (2007), and Tanzania in the *Water Resources Management Act* (2009).

2.6 *Curbing water pollution, in particular from “non-point” sources*

Well-tested regulatory and economic instruments for the prevention and abatement of water pollution from point sources (notably, industrial outfalls and municipal sewers) feature in the contemporary water resources laws. Such instruments range from discharge permits linked to effluent quality standards and to quality objectives/standards for the receiving water source, to charging for discharging waste in water bodies (the well-known “polluter pays” principle).

The more recent statutes bear evidence of a growing concern for pollution of, in particular, groundwater resources from diffuse sources, such as the runoff and drainage of cropland in rural areas. In that context, the focus of regulation has shifted from the discharge itself to the land use giving rise to a diffuse discharge. Already in the early 1970’s, the US Clean Water Act had required that states establish procedures, including local land use requirements, to control non-point (and point) sources of pollution. Although federal funding for this provision ended in 1980, its mandate of a local land use planning scheme still stands as the law (Hoang and Porter 2010). Cultivation practices, in particular, have been increasingly attracting regulatory restrictions aimed at preventing, abating or minimizing pollution from substances such as, notably, the nitrates employed in agriculture. In December 1991, for example, the European Union adopted Directive 91/676 directing member states to designate nitrate-sensitive (or nitrate-vulnerable) areas and to draw up a code or codes of “good agricultural practice.” Within the designated areas, the provisions of such code or codes become mandatory for farmers. In similar fashion, changes in land cultivation, and the application and storage of pesticides and fertilizers in government-designated “water management areas”, are the target of restrictions provided for by the *Water Resources Management Act* (2004) of Namibia, for the protection of water resources and of water-dependent habitats and ecosystems from depletion, contamination or eventual extinction. A similar approach is reflected in the *Water Code* of Kyrgyzstan (2005), in relation to designated “water protection areas”.

2.7 *The land-water connection*

The connection between land and its uses, and the quality of water resources, both surface and underground, is readily apparent from the analysis of the regulatory approaches to the diffuse pollution of water resources illustrated under the previous heading. The connection can be equally compelling in regard to water quantity management, and in relation to, in particular, flood control and the natural recharge of groundwater. Regarding the former, it is a known fact that urban development and human activities located in the flood plains can interfere with the natural flow of water, and expose human life and property to the risk of damage from excess stream flows. The link of this particular aspect of the quantitative management of water resources and land use – or town and country planning – regulation is readily apparent. Yet, evidence of it in the relevant mainstream water legislation is scanty at best. The EU *Water Framework Directive* (2000) (WFD) held out some promise, to the extent that the mandatory River Basin Management Plans it provides for could, arguably, afford an opportunity for water resources management to interplay with town and country planning policy and mechanisms. However, none of this is made explicit in the Directive. The subsequent EU *Directive on the Assessment and Management of Flood Risks* (2007) (FD) focuses on the assessment and management of flood risk and, in contrast to the WFD, it does not pursue an environmental objective but rather one of disaster prevention. The missing link between water resources/flood management and land management and regulation in the FD notwithstanding, the Flemish Region of Belgium has adopted in 2007 legislation (technically, an amendment to the 2003 *Decree on Integral Water Policy*) integrating water quantity management into town and country planning policy and regulation. This is achieved through the instrument of the “water assessment”, which is a legal tool aiming to prevent, avoid or minimize the harmful effects of town and country plans and of relevant permit decisions on the water systems. The concept is mirrored in the town and country planning law (the Flemish Code

on Spatial Planning, 2009), which prescribes that a water assessment has to be taken into account before a permit is granted under that law (Herman 2010).

Natural recharge of groundwater reserves and of aquifers occurs on the land above, where surface runoff and precipitation infiltrate the ground, and replenish groundwater stocks. If the connection is interfered with, or severed, as a result for instance of urban development, or of deforestation and cultivation, groundwater reserves may be at risk of eventual depletion, let alone pollution from the diffuse sources mentioned under the preceding heading. The connection and interface between, in particular, groundwater management regulation and land use regulation in the recharge areas of aquifers tend to be lost on the water legislation, or is not readily apparent in the legislation empowering or mandating the government to designate areas for the protection and conservation of groundwater reserves which are at risk of, in particular, depletion, and to institute land use restrictions in such areas. Kyrgyzstan's *Water Code's* "groundwater protection areas" provisions are a pertinent example. Elsewhere, no explicit mention is made of land use restrictions for the purposes of groundwater protection from, in particular, depletion. The relevant provisions in Kenya's 2002 *Water Act* are a case in point, although one could imply recourse to land use restrictions from the sweep of the regulatory authority in the matter of "groundwater conservation areas" which has been vested in the government. Another pertinent example is the EU WFD, under which EU member states are required to designate areas where surface water and groundwater require protection, both from a qualitative but also from a quantitative standpoint, and areas where habitats and species directly depending on water require conservation. The list of standard "protected" areas (appended as Annex IV to the WFD), however, does not include, nor make reference to, the recharge areas of aquifers, nor do land use restrictions feature on the lists of measures, mandatory and optional, member states are to take to achieve the WFD objectives (although one could imply such kind of restrictions from the generic terms used to describe, in particular, the optional measures listed in Appendix VI). By contrast, Tanzania's *Water Resources Management Act* (2009) explicitly canvasses land "draining into" (i.e., naturally recharging) an aquifer in the scope of its Protected Zones provisions, and, in particular, in the scope of the government's authority to prohibit or restrict "any activity" in a designated zone.

In general, it appears that the water laws by and large fail to make the necessary connection with the uses of land where natural recharge occurs, and, in particular, with the town and country planning regulations. They also fail to mandate the necessary coordination between the separate branches of government respectively in charge of administering the water resources laws on one hand, and the town and country planning, and the urban development, laws and regulations on the other. The Indian state of Andhra Pradesh *Water, Land and Trees Act, 2002* may point in the right direction, insofar as it explicitly links the artificial recharge of groundwater pursued through the mandatory installation of rainwater harvesting equipment in residential, commercial and other premises to local building regulations, and, in particular, to building construction approvals by the local authorities (and to the provision of water and power connections to such buildings by the relevant utilities). The statute, however, focuses on the artificial recharge of groundwater, leaving natural recharge processes outside its ambit of operation. Still, the approach of functionally and operationally linking two separate sets of laws, and of applying them towards a common purpose, is noteworthy.

2.8 *Participation of water users in the management of water resources*

The formation of groupings of water users for the development and management of sources of irrigation water is widely practised and regulated in most of Latin America, in Spain and Italy in Europe, and in many South Asian countries. Customary practices also play a dominant role in some jurisdictions, such as the island of Bali (Indonesia), and in many oases in the Saharan and Sahel regions of Africa (the role of customary law is elaborated on under the next heading). Elsewhere, water users are called upon by the legislation to shoulder increasing responsibilities in the management of water resources under stress, and to make up the membership structure of the internal organs of the government water administration.

The direct involvement of users in the management of water resources under stress is a regular feature in much contemporary water legislation. Often, this is in connection with groundwater resources in areas experiencing accelerated groundwater depletion and/or severe groundwater pollution. In the state of Texas (United States), user-level Groundwater Conservation Districts are formed at government's instigation in so-called "critical areas," i.e., areas experiencing overdraft, insufficient supply or contamination. Whereas these districts have varied powers including issuing permits, spacing wells and setting the amount of withdrawals, most have not imposed mandatory restrictions, and have opted instead

for voluntary self-restraint and educational programmes. As such, they do not interfere with the landowners' rights to pump groundwater. Under New South Wales' *Water Management Act, 2000*, water users must be represented in the groundwater management committees established for the management of aquifers under stress.

In Spain, the 2001 consolidated *Water Act* provides for the compulsory formation of water users' groups from among the users of an aquifer which is, or is at risk of becoming, overexploited. These groups are to share groundwater management responsibilities with the government, in particular in the management and policing of groundwater extraction rights. The very same approach is reflected in the 2005 reform to Chile's 1981 *Water Code*. In Mexico, since 1995 a number of "Groundwater Technical Committees" (COTAS) have been established under the auspices of the federal Water Authority, with a view to engaging users, together with federal, state and local agencies, in the formulation and implementation of programmes and regulations for aquifer preservation and recovery. Water User Groups (WUGs) for the management of water supply points, and Water User Associations grouping any number of WUGs, are provided for and regulated by Uganda's 1995 *Water Statute*. South Africa's 1998 *National Water Act* also provides for the formation of water user associations from among water users wishing to undertake water-related activities for their mutual benefit.

Water users and their interests are represented in the organs which make up the internal structure of river basin authorities and agencies. Thus, for instance, Spain's River Basin Authorities (*Confederaciones Hidrográficas*) include users' representatives in their decision-making and advisory organs. Similarly, users' representatives make up at least two-thirds of the total membership of the board of directors of France's Water Agencies (*Agences de l'eau*). They are also represented on the Agencies' advisory Basin Committees. Irrigators hold a minority of seats on the board of directors of Morocco's new Basin Authorities, which have been formed pursuant to the 1995 *Water Act*. In South Africa, water users and environmental interest groups will be represented in the decision-making structure of the new Catchment Management Agencies established under the 1998 *Water Act*. A similar approach is reflected in the *Water Acts* of, respectively, Kenya (2002), Swaziland (2002), and in Panama's 2002 *Law on the Management, Protection and Conservation of River Basins*. Under Brazil's 1997 *Federal Water Act*, water users will be represented in the basin committees, alongside the representatives of civil society and of the federal, state and municipal governments concerned. Under the extensive amendments adopted in 2004 to Mexico's *Law on National Waters* (1992), water users will form no less than one-half the total membership of Basin Councils. Water users have a purely nominal representation instead in the internal structure of Mexico's new River Basin Agencies, which are branches of the government water administration. Of note, the functions of the Brazilian committees and those of the Mexican councils are essentially of a consensus-seeking nature. Water users are to enter the membership structure of the executive Basin Water Boards, and of coordinating and problem-solving Catchment and Sub-catchment Water Committees, contemplated in the *Water Resources Management Act* (2009) of Tanzania.

2.9 *Interface between statutory and customary water rights*

Customary law in many countries still plays an important role in water management, particularly at the community level. Customary water laws are rarely a single and unified body of norms, and vary widely from region to region, sometimes even between villages in the same region. Customary rules governing access to water have been documented in many countries, the best-known example being perhaps the allocation system of irrigation water and relevant water rights practised since time immemorial on the island of Bali, Indonesia. Another example of customary law is riparianism, which is or has been practised in a variety of forms in many common law countries.

Despite the social and economic significance of customary systems and practices, their interface with statutory law has seldom been mapped out and regulated in the legislation. Namibia's *Water Management Act, 2004* reflects perhaps the most articulate effort to weave consideration of customary water rights and practices in the fabric of water abstraction and wastewater disposal permitting. Under that Law, the government is under a duty to take due account of existing customary practices and rights in granting statutory water abstraction and waste disposal permits. The documented existence of such rights and practices will not only influence the grant or denial of an administrative permit; it will also attract special terms and conditions to be entered in the permit, for the specific purpose of protecting existing customary rights and practices. Other laws provide other mechanisms seeking to reconcile the customary and the "modern" water rights, and to prevent or address conflict situations on

the ground. In Chile for instance, under the *Ley Indigena* (Law on Indigenous Peoples), the government is under a duty not to grant a water abstraction concession if the water rights of designated traditional peoples are affected, and no alternative source of supplying their properties with water has been provided first. In Mozambique, the *Water Licensing Regulations, 2007* not only accord the traditional and customary rights practised in the rural areas freedom from regulatory controls, they moreover accord these rights priority of allocation of available water resources, and place the government under an affirmative duty to facilitate the enjoyment of the rights by creating the necessary easements of access to the relevant water sources. The customary rights of traditional communities have priority call on available water resources also under the *Law on Water Resources* of Paraguay (2007), and statutory grants of water abstraction rights are subject to such customary rights.

In a vast majority of cases, however, the issue has been skirted, or touched upon only superficially, in the water laws or in other laws. Guyana's *Water and Sewerage Act, 2002* carried an explicit statutory acknowledgment and safeguard of customary rights in water in general, subject however to qualifications which have never been tested on the ground, and have remained indeterminate as a result. A similar approach is reflected in Mali's and in Russia's respective *Water Codes* (2002 and 2006, respectively), in Indonesia's *Law on Water Resources* (2004) and implementing *Irrigation Regulation* (2006), in the *General Law on National Waters* of Nicaragua (2007). Tanzania's *Water Resources Management Act* (2009) seems to be on the same page. These statutes bear evidence of the awareness of lawmakers of the existence and significance of customary or traditional water rights in the field. These are dealt with, however, by basically separating them out of the mainstream "modern" water rights regulated by statute, and by creating a separate legal space for them. For want of particulars, however, such legal space comes closer to a legal limbo, which does not prevent the two sets of water rights, the "modern" and the customary, from mutually interfering at some point, and from clashing eventually. This is probably why the Argentine Province of Tucuman has chosen to mainstream traditional water rights in the 2001 *Water Code*, through their transformation into administrative concessions on the initiative and request of the rights-holders, and at the discretion of the government water administration. This features as an option available to customary rights holders also under Tanzania's *Water Resources Management Act* (2009). It should be added that opportunities for customary water rights to be reckoned with are routinely afforded, at least on paper, in the process of scrutinizing applications for a water abstraction/development licence or concession, or for a wastewater disposal permit, and of litigating relevant administrative decisions through the administrative or judicial review processes. As the rich experience in this specific matter of Canadian Provinces, and in particular of British Columbia, prove, settlement of customary water rights via conflict and litigation with "modern" water rights is painful and costly, and the outcome is unpredictable (Burchi 2005). Besides, it is a course of action which does not bode well for the peaceful coexistence of the traditional and the modern water rights after a challenge in court has run its course, and a verdict laid down.

3. Conclusions and pointers for the future

The attainment of water security and water-related governance goals, as they come into sharper focus, will no doubt require supportive legal and regulatory frameworks at the domestic level. The evolution to-date and the level of sophistication attained by contemporary domestic water legislation indicate that the agenda of, and the scope for, water law reform will be driven by a few paramount issues emerging from the contemporary trends highlighted in this paper, namely:

3.1 *reconciling security of tenure with risk and uncertainty*

Water allocation mechanisms and relevant legal instruments are growing in complexity and sophistication, in an effort to reconcile the security of water rights tenure with changing socio-economic development policies, and changing hydrological, hydro-geological, technological, economic, environmental and political circumstances – in one word, in the effort to force risk and uncertainty onto the stability of tenure and the dependability of rights sought by water-sector investors. This will call for the creative use of classic regulatory instruments, which must be time-bound and adaptable to rapidly changing circumstances with minimum conflict. This will require doing away with grants and rights of indefinite duration, fine-tuning grants to actual or predictable water availability,

scaling existing grants downwards to reflect a variety of changing circumstances, including those driven by climate change, and releasing the surpluses for further allocation to where priorities dictate;

3.2 *pursuing opportunities for efficiency gains, without neglecting equity*

Where cultural and religious barriers do not oppose it, the use of market mechanisms opens up opportunities for efficiency gains in the allocation and use of water resources. This will require relaxing the rigidities built in water allocation systems based on government water abstraction licensing, where grants are tied to a specific use or to use at a specific location or on a specific piece of land. Markets for water rights, however, must be regulated to protect third party's interests and such intangibles as environmental, amenity, and cultural values. Moreover, equity cannot entirely be sacrificed to economic efficiency. To a large extent, these concerns are reflected in the water laws of a vast majority of the countries which have accepted the market as a legitimate mechanism for the allocation of water resources to competing uses. Giving equity its due, however, and creating an enabling regulatory and institutional environment for the functioning of a market mechanism of water resources allocation, are challenging tasks ahead;

3.3 *raising the profile of the environment in the allocation and re-allocation of water resources to competing uses*

In a fair and transparent process for the allocation and re-allocation of water resources among competing sectors and users through the available regulatory and economic instruments, the environmental requirements of freshwater bodies, and those of water-dependent habitats, will need to be granted a standing and dignity equal to, and maybe higher than, development needs. To some extent this is already happening through a number of regulatory instruments and statutory requirements which prioritize the health of surface and groundwater systems, and the survival of water-dependent habitats, in the process of the initial allocation of water resources to competing uses, and of the subsequent review and adjustment of allocations already made. However, the implementation of the new and emerging mechanisms alluded to here can be controversial and not immune from legal challenge, particularly when implementation implies a review of allocations made and a re-allocation of resources. Moreover, such mechanisms tend to be complex and to require as a result a considerable capacity of implementation and administration;

3.4 *re-kindling the connection between water resources management regulation (and administration) and land use regulation (and administration)*

Legislation regulating the development and use of water resources in general and, in particular, of groundwater resources, and the legislation governing town and country planning, and urban development, tend to go their own separate ways, and are administered by branches of government operating at different levels under the authority of different statutes, without coordination. This is a grey area of water legislation which needs revisiting, in conjunction with a parallel re-visitation of town and country planning and urban development legislation, with a view to weaving in the fabric of both sets of laws a tightly-knit web of consistent substantive and procedural requirements aimed at a common purpose – that of ensuring the long-term sustainability of renewable groundwater reserves and aquifers by (a) enabling recharging processes to go on un-impaired by human activities on the land above, and (b) controlling land uses which are the source of diffuse pollution of groundwater reserves, but also of streams and lakes. There is much scope for improvement on this score also as regards the linkages between managing the harmful effects of flood waters and regulating urban development and land use in the floodplains of rivers and streams;

3.5 *empowering users to shoulder greater responsibilities*

With a view to minimizing conflict, critical decisions for the adaptation of water allocation patterns and of water abstraction rights to changing circumstances – notably, with respect to resources at high risk of contamination or depletion – will need to be taken and monitored by, or with the participation of, the users concerned. This will require legislation enabling the formation of legally-constituted groups, and empowering them through the devolution or the delegation of the required authority. Existing legislation is quite advanced on the former aspect, while delegation and devolution offer room for further development;

3.6 *mapping out the interface between customary and statutory water allocation systems*

So far, customary water allocation systems have attracted, at best, the benign neglect of much contemporary water resources legislation. Yet, it stands to reason that opportunities for conflict between customary water allocation and use systems and allocation systems regulated by statute should be minimized, and that the full scope of the interface between the two systems should be mapped out if co-existence is to be pursued as a serious option. This is an area of water legislation which invites innovative thinking, in the search for viable and workable mechanisms for the accommodation of traditional systems and for their co-existence alongside statutory systems of water resources allocation and use.

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