1 Policy context

Water is the basis of all things.

Thales (640 BC)

1.1 INTRODUCTION

Water is the stuff of life – 70% of the planet,[1] 60% of the human body.[2] Its symbolic and cultural aspects are represented in religion,[3] philosophy,[4] and every branch of the arts. It is a topic of academic study – in the hard sciences, by hydrologists and geologists, biologists and chemists, geographers and engineers, and of course ecologists, not to mention the medical professions. In the social sciences, it is studied by economists, sociologists, political scientists – and lawyers. As the precious resource is put under increasing pressures, more and more professionals are engaged; too often, the role of lawyers is overlooked save in the negative – 'we'll have to bring the lawyers in' – almost a threat, and equally unwelcome to every party round any table. Yet the law creates the framework and the ground rules within which the resource is managed, and provides the mechanisms by which subsequent disputes are resolved. Logically, the better the provision for the former, the fewer occasions arise for the latter.

The title of this book is *Frameworks for Water Law Reform* and the aim is to consider what provision should be made when reforming a national water law. The ambit will include the principal elements of water resource management, including water allocation and water quality, and also water services (defined here as the supply of drinking water and sanitation services). It will make a comparative analysis of four jurisdictions where water law is currently being, or has recently been, reformed – England, Scotland, South Africa and Queensland, Australia. It does not offer a 'model', in the sense of a single or best solution. Rather, it sets out a framework, identifying the key elements of a modern water law and the various ways in which these could be established. It is hoped the results will be useful to those engaging in or considering a reform process, not just to states or public agencies, but also to other parties, including non-governmental organisations (NGOs), as well as water professionals, students and, of course, lawyers in academia and in practice.

1.1.1 Human and social issues

To say there is a world water crisis is trite, yet it may bear repetition. The 'headline' figures are well known – still nearly 800 million people without access to improved drinking water supplies, still around 2.5 billion without improved sanitation.[5] Of the top five communicable diseases worldwide, two – diarrhoea and malaria – are directly linked to water, and all are affected by the lack of sufficient water and, especially, sanitation.[6] An estimated 10% of the total global burden of disease, and 6.3% of all deaths, could be prevented by access to improved water, sanitation and hygiene.[7] There is a disproportionate effect on young children and the elderly, on women (in terms of maternal health and the burden of caring for the sick), regionally in sub-Saharan Africa and Southern Asia, and globally for those living in extreme poverty. Better provision directly affects social and economic wellbeing, enabling more time to be spent on productive activities and more girl children to attend school. Meantime the global population is increasing,[8] and so are the pressures on the resource. Approximately one-third of the world's population lives in countries that are water stressed, and this is predicted to increase to as much as two-thirds by 2025.[9] Water is a cross-cutting issue: it affects public and individual health; it is a critical resource for primary and secondary production; it impacts directly and indirectly on economic and social wellbeing; and it disproportionately affects the poor and dispossessed.

[1] Pidwirny (2006).
[2] Although the figure is variable, dependent on age, gender and levels of fat; see 'MadSci Network' http://www.madsci.org/posts/archives/may2000/958588306.An.r.html.
[3] Every creation myth begins with the emergence of life from some great ocean, physical or metaphysical; see, for discussion of the universality, Ball (2002).
[4] The early philosophers studied the natural world; Thales, 640 BC, wrote that 'water is the basis of all things', see 'Ancient Greek Philosophy' http://www.iep.utm.edu/g/greekphi.htm. For an alternative perspective on the abstract and spiritual nature of water, see Emoto (2004).
[5] WHO/UNICEF (2012). The statistics, and the terminology, will be discussed in Chapter 5.
[6] UN-Water (2006).
[7] Pruss-Ustun *et al*. (2008).
[8] Currently around 7.2 billion, and predicted to rise to 9.6 billion by 2050; UNDESA (2012).
[9] UN-Water (2009).

1.1.2 Environmental issues

Whilst 70% of the world's surface is covered in water, only 2.5% of that is freshwater, and nearly 70% of that is locked in the Arctic and Antarctic.[10] Of the remainder, some 30% is groundwater, permafrost or swamp water; these sources include 97% of water available for human use. Surface waters (rivers and lakes) amount to just 0.3% of global freshwater, and the total available freshwater supply for humans and ecosystems is less than 1% of the whole freshwater resource, and 0.01% of all global waters. Whilst the freshwater cycle is theoretically self-cleansing and renewing, as pollutants enter the cycle and the resource is over-exploited it becomes more difficult to sustain this natural process. Meantime climate change affects the water cycle and water availability in numerous ways, not all of them predictable, but likely to include more extreme weather events, including storm, flood and drought, and the melting of the glaciers. The net effects will be felt not just by human populations, but by all the interconnected ecological systems on which life depends. Water can be a source, a pathway and a receptor; but for humans it is also a driver of change. Populations must move to find water, societies cannot develop without water, it is non-substitutable, and without it there is no life as we know it.

1.1.3 Why water law?

Given the scale of the problems, one might ask how law could play more than a bit part. Law gives the structure within which other actors play their roles; it provides mechanisms for decision-making, participation and conflict resolution. Because it sets the structure, once in place, other socio-economic and political activities work within that legal environment, and actors in those realms generally consider 'the law' to be a set of unchangeable factors, at least in the short to medium term. It is important to get the framework right.

Water law operates at different levels: international, transnational and national. International law concerns the relations between states, in the form of treaties or conventions, as well as customary international law. Transnational law is a term used to address the convergence of laws in a globalising world, especially in world trade, but also international investment, including some aspects of water services law. National law operates within states, or at sub-state level, such as local laws, as well as customary law, and it is national water law with which this work is concerned. All over the globe, as states reform their water management provision in line with global policies, they also review their national laws. However, although there are extensive academic writings on different aspects of water law and laws, including comparative approaches and approaches to reform,[11] it may be helpful to have a framework within which to analyse existing laws and future reform proposals.

Law implements policy, and as water (like environment) is of global as well as national concern, the policy contexts relevant to water management are often developed at global level. The next section will consider these global policy agenda(s), and the key players involved in their creation and implementation.

1.2 GLOBAL POLICY AGENDAS

It is arguable that there is no such thing as a global agenda, in water or any other policy area. Nonetheless, over the last 30 years, it is possible to trace the development of a set of policies, in the fields of both water resources and water services, which inform and shape the emerging legal rules that in turn give effect to those policies. These are not always cohesive; especially at a global level, there are competing priorities. In the domain of urban water services, analysed in Chapter 5, there has been a real dichotomy, perhaps even schism, between those who promote a market solution and those preferring a more traditional social policy. Nonetheless, even in water services, although the policy developments may have been schizophrenic, they have been directional; the absence of basic services for so many people has kept water at the policy forefront. In water resources, there has been more agreement, with the introduction of the holistic concept of integrated water resource management (IWRM); yet here, as the practice has developed, there have been questions over the efficacy of the theory. These debates will be explored in later chapters; but first it is worth examining developments in the global arena and identifying in the process some of the actors and organisations that have played key roles.

1.2.1 Networks, agencies and actors

Key stakeholders nationally include national and local governments, agencies of the state, relevant professionals and civil society groups, but also those whose livelihoods depend on water, or who struggle to gain access to basic services. Their engagement will be important to later chapters in this book; but in terms of global policy, there are other players whose roles and interests should be noted.

The United Nations (UN) is the primary global agency, and it has already brought together a set of UN agencies and external partners under the umbrella of 'UN-Water', which is responsible for the World Water Assessment Programme and the World

[10] UNEP (2008).

[11] See, e.g., Dellapenna and Gupta (2008), Hodgson (2006), Salman and Bradlow (2006), Bruns *et al*. (2005); and see also UN-Water (2012).

Water Development Reports,[12] as well as a series of policy papers. The umbrella also covers some of the work on water and sanitation services of the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF).

The World Bank funds many water projects. In the 1990s the Bank, in tune with the prevailing political consensus, stressed the use of market models, private sector participation and competition,[13] but in 2003 it revisited its high level strategy on water,[14] and in the last decade other circumstances have tended to modify such a theoretical stance, especially the move away from investing in long-term concessions in water services.[15] Although, unsurprisingly, much of the Bank's analysis is economic, there is a constant theme of the need for better legal, institutional and regulatory mechanisms, both for service provision and in the management of the resource, particularly water rights and allocation and especially in large infrastructure projects. The development banks have been active in the governance agenda (Chapter 2); water services will be explored in Chapter 5.

Non-governmental organisations play a major role in water. As well as the international environmental groups (e.g., the World Wide Fund for Nature (WWF) or the International Union for the Conservation of Nature), there are a number of new global NGOs specifically concerned with water resources. In the 1990s, after the Dublin Conference (below), two international organisations were established, the World Water Council, an international 'think tank',[16] and the Global Water Partnership (GWP), with a mandate to support water resource management in developing countries. The GWP is a lead institution on IWRM and provides policy advice and guidance through regional partnerships.[17] The World Water Council has been active in organising the World Water Forums; to date there have been six of these. Whilst the specific themes have been different, the general concerns have remained very similar: participation and capacity building; safe clean water for all; institutional, technical and financial innovation. In the Forums, as in the work of the GWP, the need to reform institutions and laws has been a recurring issue.

This section has identified just a few of the organisations and institutions involved on the international stage, but there are many others, governmental, professional and civic; whilst they may contribute to data and to policy, it is also arguable that there are too many players, that their efforts are diffuse and the results sometimes indifferent.[18] Further, whilst in the mid twentieth century the emphasis was on the hydrological sciences and identifying the physical resource base, now it has shifted to a 'softer', governance and management agenda. Both are important, but all the management principles in the world are unlikely to substitute for an understanding of how much water there is in a basin. Although this book looks at legal frameworks, the interdisciplinary nexus with the water sciences is fundamental if those frameworks are to be properly designed.

1.2.2 Policy developments

Whilst it is feasible to trace modern international policy statements on water back to the Stockholm Declaration in 1972,[19] or the Mar del Plata conference in 1977,[20] this analysis will begin in 1992, when the UN Conference on Environment and Development[21] produced *inter alia* Agenda 21.[22] Agenda 21 devoted a chapter to freshwater resources, whereby state signatories agreed to take action in areas including water resource management, allocation, pollution control and the supply of water services – the four substantive topics of study in this book. In each set of actions, there was recognition of the need for reform of the legislative and regulatory environment.

Agenda 21 was preceded by the Dublin International Conference on Water and the Environment, which had resulted in the 'Dublin Statement'.[23] This set out four principles: that freshwater is a finite and vulnerable resource; that its development and management should be based on a participatory approach; that women play a central part in water management; and that water has an economic value in all its competing uses and should be recognised as an economic good.

These were subsequently reformulated into three principles by the World Bank: the ecological principle – river basin management, environmental protection, and managing land and water together; the institutional principle – subsidiarity and the inclusion of all stakeholders; and the instrument principle – a scarce resource requires incentives and economic instruments to manage effectively.[24] These are sometimes described as the IWRM principle, the 'decentralisation' (or participation) principle, and the 'privatisation' or economic principle. As regards the last, it is important to note the recognition in the Dublin sub-text that firstly there is a basic right of access to

[12] UN-Water (2003, 2006, 2009, 2012a). In future, these will be annual, and targeted.
[13] See, for a trenchant critique of the World Bank approach to water, Finger and Allouche (2002), especially Chapter 3.
[14] World Bank (2004). [15] Marin (2009).
[16] 'World Water Council' see generally http://www.worldwatercouncil.org/index.php?id=1.
[17] 'GWP' see generally http://www.gwp.org/.
[18] See, for a critical analysis, Varady and Iles-Shi, 'Global Water Initiatives: What do the Experts Think?' in Biswas and Tortejada (2010).
[19] UN (1972). The Stockholm Conference agreed that states had a right to exploit their own environment, but also a responsibility to other states; still a founding principle of modern environmental law.
[20] UN (1977). [21] UN (1992).
[22] UN (1992a) (Agenda 21). Chapter 18 specifically addresses freshwater resources.
[23] Dublin Statement (1992). [24] World Bank (2004).

water. Otherwise the 'special nature' of water risks disappearing in a purely economic analysis of service provision and cost recovery, at the expense not just of the basic human needs of those who cannot pay, but also of ecological needs, and of what might best be described as the spiritual aspects of water. This special nature is reflected in the European Community's Water Framework Directive: 'Water is not a commercial product like any other, but, rather, a heritage which must be protected, defended and treated as such.'[25]

The debate around the Dublin Principles has been dominated by principle four, and the promotion of the market-oriented approach; this has fostered the schism in the debate around water services. It has also significantly affected approaches to the management of the resource, including IWRM and reform of water rights, such as the ideologically driven reforms of water markets in Chile,[26] or developments in India.[27] The need for law reform is still apparent.

The Johannesburg Summit on Sustainable Development, 10 years after Rio, took forward the global sustainable development agenda with the emphasis on delivery rather than new policies.[28] There was a specific requirement for all signatories to produce IWRM and water efficiency plans at all levels by 2005. There was also provision for better water pollution control, recognising that this benefits public and ecosystem health. Efficient use and better mechanisms for access and allocation were called for, and water and sanitation issues were still a priority. All of these policy areas are relevant to the analysis in later chapters of this book. All the policy documents surveyed above make mention of stable and transparent regulation as one tool for better management.

1.2.3 The Millennium Development Goals and Sustainable Development Goals

At the start of the twenty-first century, the broad policy objectives received new focus with the production of the Millennium Development Goals (MDGs).[29] Goals in relation to water included halving the proportion of people without safe drinking water, or access to basic sanitation,[30] by 2015. Water is recognised as a cross-cutting issue, relevant to all the MDGs. In the most recent reports, the drinking water target is being achieved, but not that for sanitation, with the biggest deficits in sub-Saharan Africa and southern and eastern Asia.[31] The MDGs will not all be realised by 2015, and the international community is taking the agenda forward following the 'Rio +20' Summit in 2012.

This took place in a very different political and economic environment. Following the global financial crisis, and the failure to meet many of the MDGs, it is perhaps not surprising that the international community has not shown the common cause and purpose that seemed evident in the outputs of Rio in 1992, or even Johannesburg in 2002. The 'outcomes' document from 2012 is very different, and relatively limited.[32] It reaffirms many existing high level commitments, including the water and sanitation MDGs, and sustainable development and poverty eradication. It emphasises the importance of good governance, and of human rights, including the human rights to water and sanitation. In the few paragraphs on water, there is commitment to the progressive realisation of these rights, as well as the role of ecosystems, the need to manage water pollution and treat wastewater, the management of flood and drought and the use of non-conventional water sources.[33]

The international community is now considering what should be done to take forward the work of the MDGs after 2015, including the creation of sustainable development goals. In water, there have been three thematic sub-groups: water, sanitation and hygiene; water resources management; and wastewater and water quality. At the time of writing, this process is still under way, but a report has been produced.[34] It stresses the need to move away from narrow goals and silos, build collaboration, and recognise that water will continue to cut across all development and poverty-alleviation activities. It suggests ambitious goals and targets, including universal access to basic services, and further that a rights-based approach to water needs to move beyond a narrow perception of water and sanitation and recognise policy interlinkages, especially with food, as well as the inter-generational principle of sustainable development. The relationship between water and other critical sectors – the water/food/energy nexus,[35] and the multiple impacts of climate change – is identified. So too is the need to address water for nature, to ensure the continuation of the services that ecosystems provide. On wastewater and water quality, there is recognition that a combination of urbanisation and population growth means we are all downstream users now. The report urges the collection and treatment of wastewater; as with solid waste, there is a critical need to manage this as a valuable resource base, and to overcome some of the taboos and negative perceptions which, as with sanitation, move this issue too far down the policy agenda. As might be expected, there is recognition of a growing debate around water security (itself a term with many meanings);[36] the

[25] Directive 2000/60/EC (WFD), Preamble.
[26] Bauer (2004).
[27] See, e.g., Olleta 'The Role of the World Bank in Water Law Reforms' in Cullet *et al*. (2010).
[28] UN (2002).
[29] UN General Assembly (2000).
[30] The sanitation goal was introduced at the Johannesburg Summit, UN (2002) para. 25; and see also Chapter 5.
[31] WHO/UNICEF (2012).
[32] UN (2012).
[33] UN (2012) paras. 119–124.
[34] UN-Water/UNDESA/UNICEF (2013).
[35] See, e.g., Bonn Nexus (2011), UN-Water (2012).
[36] Wouters (2010), Magsig (2013).

need for governments to work with many stakeholders; the need for capacity development; and, of course, the need for finance.

Whilst it would be possible to write more extensively on these policy formulations, the ends, if not necessarily the means, have a degree of consistency. Provision of drinking water and sanitation, access to water for other uses especially agriculture and food, the links to economic activity, personal and public health, and societal wellbeing are all prominent, as is the need to protect both surface and groundwater from over-extraction and pollution. The problem is not a lack of freshwater, but the failure to manage that water effectively to provide for the needs of the global community, by the application of adequate funding, backed by political will.

1.3 SCOPE AND APPROACH

This book provides a legal analysis, taking a comparative approach with reference to primary materials, principally national and supranational legislation, and policy documentation both national and international. There is no intention to develop a single or best model; it does not aspire to provide a normative framework. However, each chapter has some normative content, identifying the policy context(s) for the development of the law within each of the core areas. These contexts, at least to an extent, prescribe norms of conduct, and/or the values that underpin them, by setting policy goals that states and others should achieve, *inter alia* through regulation. The goals of efficiency, equity and environmental (or ecological) sustainability – the 'three E's' of water management – are predominant in this regard, and may be expressed as principles or purposes within legislation. To this extent the book supports the approach of the Realist school[37] in recognising the interdependence of the law and of institutional arrangements within the broader social and economic milieu, but it does not purport to provide a sociological or economic analysis *per se*, any more than it is an empirical study. Similarly, it will make reference to the role of other disciplines in policy formulation and legal development, without claiming to be an interdisciplinary study.

The analysis of the policy context has normative elements but the analysis of the law is predominantly positivist. It examines the law as it exists, but to an extent it also considers both the practice of its implementation and the intentions of the policy-makers and the legislators. This last in particular will connect the subsequent legislation to the policy context, and some conclusions will be drawn as to the success or otherwise of achieving the policy goals through the various options considered, but there is no systematic attempt to make value judgments about the extent to which the policy goals have been reached, as the objective is to examine various options, all of which may be seeking to achieve the same or similar results.

Whilst the analysis of the law and practice is essentially positivist, albeit contextualised, it is also reflexive. Analysis of the law in force is made in the context of the policy drivers, and the conclusions consider the structural elements of a reformed law that will be essential to meet the policy goals, as well as (in part) the ability of a particular option or legal model to achieve these goals. The underpinning legal philosophy is the concept of pragmatic cosmopolitanism.[38] This recognises the increased globalisation of law, and the impact of global agendas on national regimes – the concept is closely linked to transnationalism, or transnational law. It is also fundamentally pragmatic, as it seeks to analyse what the law is and what it can be; it is aspirational, certainly, insofar as there are normative elements, but essentially it is intended to be realistic, and grounded in practice and achievability.

1.3.1 Scope: what is 'water law'?

Before proceeding to the substance, it is perhaps useful to consider briefly the scope of this book, in two aspects: firstly, what is included in 'water law'; and, secondly, some discussion of the choice of jurisdictions, along with some supporting information about those countries, their legal systems and constitutional arrangements, and their water use.

This book looks at the components of a reformed 'water law', but what is 'water law'? The core elements identified are water resource management; water rights and allocation; water quality and pollution control; and water services, here used to mean the supply of drinking water, wastewater and sanitation services (often described as urban water services). Each merits a separate chapter. The first is described herein as strategic, and the others as functional, or operational.

These choices may be obvious, but there are other operational control regimes pertaining directly to water. In addition there are other strategic regimes, such as land use planning, which affect management of the water environment and support its reform, as well as many sectors whose activities affect the resource and may have their own separate legal provisions.

Water resource management, along with rules on abstraction and pollution, forms a coherent whole which may be reformed within a single legislative framework. Water services are not usually an integral part of such a unified reform package, and it is not necessarily, or indeed usually, desirable to reform water services within the same legislative framework or at the same time. Further, it is arguable that urban water services are a

[37] The US school; especially, the work of Oliver Wendell Holmes, Karl Llewellyn and Jerome Frank. For an introduction, see, e.g., Freeman (2001), Chapter 9.

[38] See, e.g., De Waal (2005), Samuel (2003).

sectoral use of water, and certainly in terms of the proportion of global water use it is far less significant than irrigation water (see Table 1.2 below). Nonetheless, there are arguments for addressing water services in this work.

Firstly, the provision of drinking water and sanitation is an area of acute unmet need, as evidenced by the global policy agendas set out above, and this imperative has also driven forward the broader agenda for reform of water resource management. Secondly, the management of irrigation water takes place squarely within the broader water resource management framework for abstractions and water quality control, albeit with a wealth of detailed specialist provision, but regulation of water services brings a different dimension. Thirdly, in developed northern countries, such as Scotland and England, a significant proportion of water used is delivered via the water services providers.

The figures here provide conceptual models for national water law. Figure 1.1 shows what is herein described as the water law meta-regime, with the core operational elements of allocation, pollution and water services, subsidiary to the strategic framework of IWRM. The other operational regimes shown here, such as flood and drought, or coastal and marine waters, still pertain directly to water, but also raise other issues. These will ideally be integrated through a broad IWRM framework; this book will touch on them, but will not analyse them in detail. Figure 1.2 shows other strategic legal regimes that support water management, and also key sectoral uses. Many of the strategic regimes, such as land use planning or environmental protection, would exist as another meta-regime similar to water law; the environmental law meta-regime is also considered in Chapter 4.

Following this introduction, Chapter 2 will address integrated water resource management, and also links between water law and other regimes. Just as resource management sets the framework for the operational aspects of water law, so Chapter 2 will set the framework for the rest of the book. It will include discussion of governance and stakeholder participation, which are contextual throughout, and consider briefly other strategic regimes, and some other aspects of water law.

Chapter 3 will look at water rights; at abstraction and allocation. This will include some discussion of pre-existing regimes

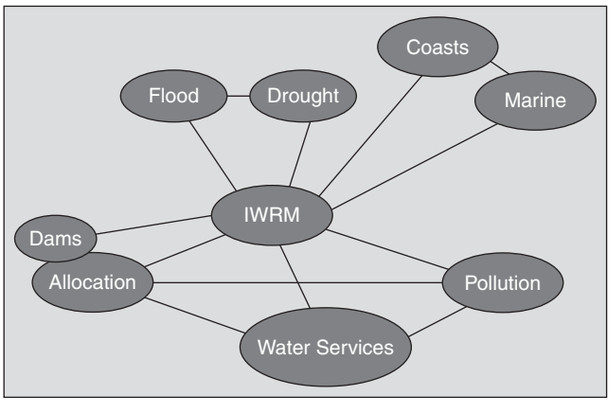

Figure 1.1 Water law meta-regime.

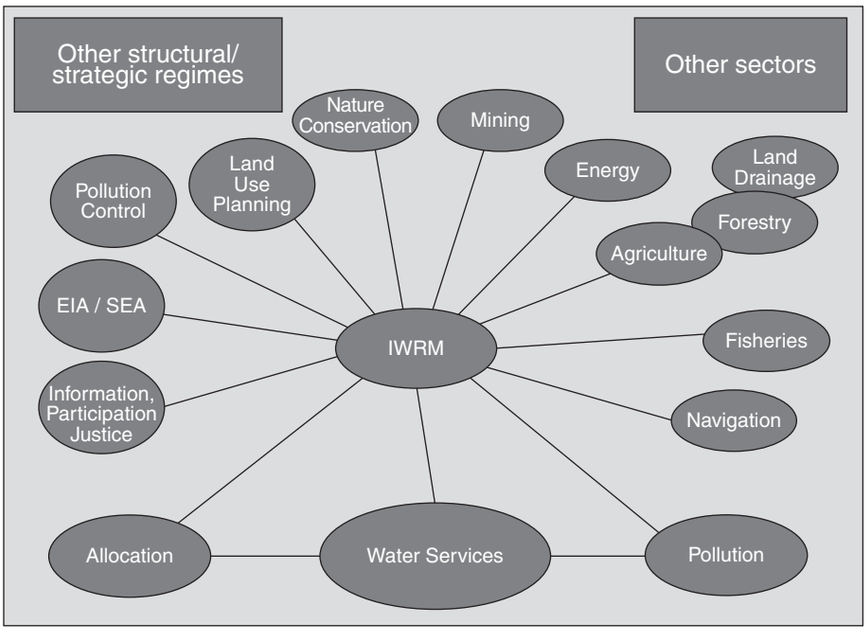

Figure 1.2 Other related legal regimes.

for water rights and water use, particularly riparianism, and the issues surrounding reform of such rights, which may have the characteristics of property rights. It will then address the new provisions for allocation of rights in water, including the status of existing users and whether any exemptions are made from the licensing requirement, e.g., for subsistence use or small abstractions. Licensing regimes generally will be considered in this chapter. It will look at bulk supply and water pricing, and end with discussion of water rights trading, particularly in Queensland.

Chapter 4 will look at water pollution and water quality, in the context of environmental protection meta-regimes in each of the countries involved, and the emerging paradigm of an ecosystems approach. It will address the use of standards or guidelines, and the relative merits of departmental or independent regulators. It will also consider the developing mechanisms for assessing ecological quality, again leading on from the work in Chapter 2. Whilst environmental protection from point sources may be well established, the management of diffuse pollution and ecological degradation are continuing problems for the twenty-first century.

Chapter 5 will consider urban water services. It will look at the debate over the 'human right to water' and consider the relevance of the human rights agenda to meeting basic needs. It will look at the models for water services provision – public sector, private sector and hybrid models – and consider whether and how the components of the service might be disaggregated. Without developing into an economic analysis, it will look at legal structures underpinning regulation of water services, and will assess the functions and duties of providers, finishing with consideration of water conservation and demand management, including wastewater reuse.

Chapter 6 will draw general conclusions as to a framework for reforming water laws.

1.3.2 Scope: the choice of jurisdictions

The choice of jurisdictions is of importance to any comparative study. All of the jurisdictions studied here have either recently undertaken, or are in the process of, major reforms to the legal and management frameworks for water resources, and the specific drivers for these reforms will be an integral part of the analysis.

Whilst Scotland and England are northern countries, with a preponderance of urban domestic and industrial water use and very little irrigation, in both Queensland and South Africa the proportion of water used for irrigation is closer to the global norm. The United Kingdom (UK) jurisdictions are within the European Union (EU), which is a driver for change, but which can also be analysed in its own right as an exemplar of certain approaches to water management, especially in water resources management and water quality. The Scottish case is interesting here as Scotland has been very proactive in implementing EU water law, going beyond the requirements of EU directives in the national reform programme. Both England and Scotland have very particular models for water services, including a fully divested industry in England and a highly regulated public provider in Scotland.

Australia as a whole provides many options for water law and management, including a developed water trading regime within a federal system, and since the 1990s there has been a series of Commonwealth policy initiatives relating to the environment and to water, which will then be transposed into state legislation. In many ways it is these Commonwealth initiatives that make Australia an exciting and relevant comparator for this book. However, as water is a state function, it is also necessary to select a particular state. When the original research for this work was done, in 2002–2006, Queensland was selected as it was implementing Commonwealth reforms somewhat later than other states, and benefiting from their experience. In the intervening period, some aspects of the state law have been extensively reformed, and this process is ongoing, which presents challenges, but also makes for some interesting analysis as to the purposes of the various reforms. To an extent, this is also true in England. The law is rarely stationary and at the time of writing all of the jurisdictions are making some new changes, which will be considered as appropriate. It should be noted here that, generally, all references to legislation are to the current amended versions of the principal rules, unless there is a reason to specify the amending rule. Similarly, as departments may change their names and functions, these will generally be referred to in the text by their current name, unless the context requires otherwise; but documents will be cited using the name of the department as it was when the document was written.

South Africa brings lessons for both developed and developing countries, and has been written about and commented on extensively. The post-apartheid reforms led to a complete review of all aspects of water law in a situation with a real political will for change, and South Africa is also a major regional influence. As a country with an arid or semi-arid climate, huge variability in wealth and in access to both resources and services, and a predominantly rural subsistence economy, it provides many contrasts to all the other jurisdictions. In water services in particular, it is important to consider a jurisdiction where at least some of the population share in the current crisis in services provision in the developing world.

Between these jurisdictions there is sufficient variety to provide meaningful comparisons, whilst in each of them, at least some aspects of their water laws are capable of being considered a worthy example for others to consider.

1.3.3 Relevant constitutional arrangements

The United Kingdom of Great Britain and Northern Ireland consists of four countries – England, Wales, Scotland and Northern Ireland. The provisions of the Scottish Act of Union[39] were such that Scotland has retained her own legal system, and separate system of private law; and in areas affected by the historic private law, including property law and therefore water rights, Scots law has developed differently from that in England. The UK Parliament has sovereignty but unlike the other jurisdictions (indeed unlike almost any other country in the world) has no written constitution. Recent devolution has given Scotland a new Parliament,[40] which holds devolved powers regarding the environment, private property rights, water, and the implementation of relevant EU law. At the time of writing, there is to be a referendum on Scottish independence, in autumn 2014.

The UK is a member of the EU,[41] a regional organisation with a highly developed supranational legal system. EU law must be applied by Member States; it has supremacy over national law, and the EU has legislated extensively in the field of the environment and water. EU water law will be analysed throughout this book.

The Commonwealth of Australia comprises six states and two major territories, and was established by the Constitution of Australia Act 1900.[42] This sets out the powers and functions of the Commonwealth (also known as the Federal Government or the Government of Australia); any functions not specified are state functions. Naturally, in 1900 no mention was made of the environment. The Commonwealth has competence in external affairs and, as the state entity for international law purposes, is the signatory to international conventions, declarations etc.; in that case there may be legislation implementing those agreements at Commonwealth level. It acts in the field of the environment where there are issues affecting the whole of Australia, and often in conjunction with New Zealand; there are a number of Ministerial-level bodies establishing policy across both countries. There is a Council of Australian Governments (COAG) which initiates policy reforms in areas that affect all states, including aspects of water reform.[43]

The Republic of South Africa rose from its apartheid past with the first free and fully franchised elections in April 1994. Subsequently, a draft constitution was consulted upon, reviewed, approved by the constitutional court and came into effect in 1997.[44] The Constitution has many model features including a founding principle of cooperative government,[45] and specific rights to a clean environment[46] and to water.[47] There are nine Provinces, and the Parliament consists of both the National Assembly and the National Council of Provinces.[48] In addition, there are metropolitan and district municipalities. The principle of cooperative government leads to some overlap for responsibilities in the field of the environment, but this is less problematic for water, where resource management is a national function, whilst water services are provided by local government.

1.3.4 Country data and analysis

Table 1.1 gives some general information on land area, population and available water resources for the jurisdictions under review, to provide a context for the study of their water resource management provision.[49]

The information given demonstrates the disparities. South Africa's land area is comparable to that of Queensland, and both have arid areas and large expanses of land with low population; Queensland's population density is extremely low; England's is significantly higher than any of the other comparators. All jurisdictions have variable rainfall but Queensland's is the most extreme; the northern wet tropics have the highest rainfall in Australia, higher than the west coast mountains of Scotland. High rates of evapotranspiration mean that very little of South Africa's runoff reaches the sea. Regarding available water resources, countries with less than 1700 m^3 per capita are

[39] Treaty of Union 1706; Act of Union 1707 c.7.
[40] Scotland Act 1998 c.46; this has significantly increased the scope for law reform, after many years of limited Parliamentary time at Westminster for Scottish matters. The Scotland Act 2012 c.11 extends the devolution settlement, pending the referendum result.
[41] Since the European Communities Act 1972 c.68.
[42] Constitution of Australia Constitution Act 1900 63 & 64 Vict. c.12, as amended.
[43] COAG was initiated in 1992 and comprises the Prime Minister, State Premiers, Territory Chief Ministers and the President of the Australian Local Government Association. In water reform it has been particularly concerned with competition policy, water rights and water trading, and will be of relevance to many aspects of this book.

[44] Constitution of South Africa Act No.108 of 1996.
[45] Constitution of South Africa ss.40–41.
[46] Constitution of South Africa s.24.
[47] Constitution of South Africa s.27.
[48] Constitution of South Africa s.42.
[49] The information in Table 1.1 is taken from the following sources: 'Australian Bureau of Statistics' http://www.abs.gov.au/; 'Australian Government Bureau of Meteorology' http://www.bom.gov.au/climate/current/annual/qld/summary.shtml; 'Australian Government Geosciences Australia' http://www.ga.gov.au/education/geoscience-basics/dimensions/area-of-australia-states-and-territories.html; Government of South Africa (2013); 'Government of South Africa: About South Africa' http://www.gov.za/aboutsa/geography.htm; 'Population Estimates Scotland' http://www.gro-scotland.gov.uk/files2/stats/population-estimates/mid2012/j29078400.htm; 'Queensland Government Statistician's Office' http://www.oesr.qld.gov.au/products/briefs/pop-growth-qld/qld-pop-counter.php; 'Scotland Info' http://www.scotlandinfo.eu/weather-climate.html; 'UK Government Office of National Statistics' http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=Population; 'UK Meteorological Office Climate and Rainfall' http://www.metoffice.gov.uk/climate/uk/actualmonthly/; 'World Bank Renewable Internal Water Resources' http://data.worldbank.org/indicator/ER.H2O.INTR.PC.

Table 1.1 *Country data*

	South Africa	UK	England	Scotland	Australia	Queensland
Land area (km^2)	1,219,090	241,930	130,422	78,772	7,659,861	1,723,936
Population (millions)	51.78	63.23	53	5.29	23.4	4.72
Population density (/km^2)	42	261	406	67	3	2.7
Long-term average rainfall (mm/annum)	450	1160	840	1560	486	623
Long-term average rainfall variability (mm/annum)	<200 – >600	<600 – >3000	<600 – >1200	<800 – >3000	<200 – >4000	<200 – >4000 m
Resources per capita (m^3)	886	2311			22,039	

considered to be water stressed, and those with less than 1000 m^3 per capita are water scarce.[50] The Australian figure is distorted by the northern tropics, and the low population density.

In the UK, Scotland includes the wet north and west highlands, and the relatively flatter and drier east coast. In England, the southeast is considerably drier than other regions and also has a very high population density. Neither jurisdiction has the same extremes of climate as South Africa or Queensland. The Gulf Stream, bringing warm water to the western coasts of the British Isles, keeps temperatures significantly warmer than would be expected at such northerly latitudes. The British Isles have a variety of aquatic ecotypes, but no great rivers as are found in the Americas or Africa. Water resources are not stressed in the UK as a whole, but are in the southeast of England.

In Australia, Queensland runs down the east coast from the wet tropics in Cairns and further north, to Brisbane and the Gold Coast above New South Wales, with the Murray–Darling river system as its southern boundary. The sparsely populated western hinterland towards South Australia is arid desert, and the bulk of the expanding population live in the greater Brisbane area in South East Queensland. The Murray–Darling is the only significant river system in Australia and its management will be considered in Chapter 2.

In South Africa, there is great variety of climate from the arid desert in the northwest towards Namibia, to tropical forest on the east towards Mozambique. The majority of the population live on the coast and in the east, whereas the northwest is sparsely inhabited. Many of South Africa's rivers have intermittent flow, and only the Orange and the Limpopo maintain permanent channels to the sea. South Africa has land borders with five states and also encloses the Kingdom of Lesotho, and has international agreements with all of these regarding water.

Table 1.2 gives some comparative data regarding water use.[51] Figures on sectoral water use are difficult to obtain and often inconsistent; for example, results will vary on whether industrial use includes water for cooling and for hydro; whether agricultural water includes water for fisheries, or water delivered through the mains as well as water directly abstracted; and whether urban domestic water (which may also be called municipal water, or water delivered as public supply) includes mains water for industry (and indeed agriculture).[52] A range may be more reflective of the debate, which often concerns measurement, monitoring and assessment as much as analysis of the results. This points again to one of the underlying themes of this book, which is the often difficult relationship between policy-into-law and the scientific evidence base, which ideally should underpin that policy and hence the emerging law.

In Queensland and South Africa, withdrawals for agriculture (primarily irrigation) are comparable to global averages. In the UK, the low proportion for agriculture reflects both the proportionately high industrial use and the preponderance of rain-fed farming. There is some irrigation, especially in the south of England (as much as 16% of withdrawals in East Anglia) and to a very limited extent in the northeast of Scotland; flooding and land drainage are also major localised issues. Regional figures are so variable, and so difficult to compare, that it was decided not to attempt to give values for England and Scotland. In Queensland, rural domestic use is usually supplied via irrigation networks and therefore may be included in agricultural use and not as municipal supply. Per capita use reflects differing global norms – Australia generally has very high levels of domestic consumption, similar to the USA, though Queensland is lower than other states; the UK is still a middle-ranking consumer. In South Africa, the variation is more informative than the average, with the rural poor subsisting on marginal consumption, and the richest citizens consuming as much as anyone in the developed world; the upper bound cited is probably an underestimate.

[50] UNDP (2006) p.135.

[51] Figures in Table 1.2 are taken from the following sources: EA (2011); DERM (2012); Earle *et al*. (2005); 'South Africa Water Resources Council' available at http://www.wrc.org.za/Pages/Resources_Regionalstats.aspx; UN-Water (2009); WaterWise (2007); 'World Bank Annual Freshwater Withdrawals' available at http://data.worldbank.org/indicator/ER.H2O.FWAG.ZS/countries.

[52] For a discussion of the difficulties, see Krinner *et al*. (1999) Chapter 3.

This chapter has set out some of the key issues affecting management of water, and the policy contexts that drive law reform. It has attempted to show the relevance of water law, its relationship to other legal regimes, and the need for frameworks to guide reform. It has set out some basic information about the jurisdictions under review, and the structure of the chapters to follow. Chapter 2 will now proceed to assess the legal frameworks for the strategic goal of integrated management of water resources.

Table 1.2 *Sectoral water use*

	South Africa	UK	Australia	Queensland	Global
Agriculture	57–67%	3–16% (regional variation)	74%	62%	70%
Domestic	22–31%	40–57%	16%	12%	10%
Industry	6–11%	33–45%	11%	26%	20%
Groundwater use	13%	7–33% (regional variation)	31%	35%	20%
Per capita use	<50 – >250 LPD	145 LPD		220 LPD	