

BLUE GOLD

THE UTILISATION OF THE
NUBIAN SANDSTONE AQUIFER SYSTEM
IN LIGHT OF ISLAMIC NORMS
AND ITS IMPACT ON THE EMERGING
LAW OF
TRANSBOUNDARY FOSSIL AQUIFERS

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ABSTRACT

The Nubian Sandstone Aquifer System is one of the world's largest transboundary fossil aquifers and stretches underneath the territories of the North African States of Egypt, Libya, Sudan and Chad. All four States have strong Islamic cultural backgrounds, and Egypt, Libya and Sudan have enshrined Shari'a as a fundamental source of law in their constitutions. This thesis assesses the extent to which the *2008 Draft Articles on the Law of Transboundary Aquifers*, proposed to the UN General Assembly by the International Law Commission, are compatible with general principles of Islamic water law.

Both the *2008 Draft Articles* as the current culmination of international groundwater law and Islamic law suffer from certain shortcomings. Whilst the former lacks the same binding authority Islamic law enjoys and to date does not elaborate the potential issue of water commercialisation in water scarce regions, the latter lacks the transboundary perspective in relation to groundwater. This highlights the impact Islamic law could have on the on-going negotiations between the NSAS Aquifer States, whereby specific Islamic provisions could provide stepping-stones towards an innovative utilisation framework for the NSAS that adequately addresses the need for precaution and intergenerational equity, which, inter alia, could instil new impetus for a refined set of *Draft Articles*. An alternative future is likely to evolve along the lines of separate agreements and a more fragmented corpus of international law rather than a coherent body of codified international law on transboundary fossil aquifers, which would run counter to the International Law Commission's objective.

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LIST OF ABBREVIATIONS AND ACRONYMS

CEDARE	Centre for Environment and Development for the Arab Region and Europe
CESCR	Covenant on Economic, Social and Cultural Rights
ECE	Economic Commission for Europe
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GMMRP	Great Man-Made River Project
IAH	International Association of Hydrogeologists
ICJ	International Court of Justice
IICJ	International Islamic Court of Justice
IIL	Institute of International Law
ILA	International Law Association
ILC	International Law Commission
ILO	International Labour Organization
ITLOS	International Tribunal for the Law of the Sea
MENA	Middle East and North Africa
NARIS	Nubian Sandstone Aquifer Regional Information System
NSAS	Nubian Sandstone Aquifer System
OIC	Organization of Islamic Cooperation
OSS	Observatoire du Sahara et du Sahel
PCA	Permanent Court of Arbitration
PCIJ	Permanent Court of International Justice
SASS	Système Aquifère du Sahara Septentrional
SR	Special Rapporteur
TARM	Transboundary Aquifer Resource Management
UNCESCR	United Nations Committee on Economic, Social and Cultural Rights
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNGA	United Nations General Assembly
USGS	United States Geological Survey
WCED	World Commission on Environment and Development

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INTRODUCTION

The twentieth century witnessed new heights in human development. In the natural resources sector the establishment and expansion of a modern petroleum industry arguably represents one of humanity's great success stories. Modern society would be unthinkable without the products derived from crude oil, natural gas and their derivatives. Yet, perhaps the most fundamental resource underpinning human existence – fresh water – still struggles to escape its limbo in international law. In the early nineteenth century, Lord Byron had already highlighted in *Don Juan* that 'till taught by pain, men really know not what good water's worth'.¹ Almost two centuries later, humanity still has not managed to universally accept a comprehensive utilisation regime for shared fresh water resources, exemplified by decades of poor management and governance of transboundary groundwater.² It is thus remarkable – but also unsurprising – that current models addressing the world's water budget rely on groundwater estimation studies from the mid-

¹ Byron, G. G. B. (1832) 'Don Juan', Canto II, LXXXIV, in *The Complete Works of Lord Byron, Vol. IV* (Paris: Baudry's Foreign Library), p. 65.

² Although the *1997 Convention on the Law of the Non-Navigational Uses of International Watercourses* entered into force on 17th August 2014 (more than 17 years after having been adopted by the UN General Assembly), it only addresses watercourses and their connected water bodies but omits transboundary aquifers not connected to the hydraulic cycle.

1970s.³ Even more recent calculations have ultimately drawn on the same 40-year-old estimates.⁴

For millions of people safe drinking and drainage water predominantly comes from transboundary aquifers.⁵ These subterranean strata of water-bearing geology often constitute vast groundwater reservoirs spread across national borders.⁶ Global groundwater supplies dwarf, by a factor of one hundred to one, all of the water supplies found in rivers, lakes and other surface fresh water. According to McCaffrey, groundwater constitutes almost 97% of global fresh water supply, excluding polar ice and glaciers.⁷ Presenting the opposite side of the same coin, Eckstein and Eckstein account that the combined amount of fresh water in lakes, streams and wetlands comprises no more than 0.00008% of global fresh water reserves, and less than 0.0003% of the global volume of fresh water whereas aquifers constitute ‘slightly more than 30% of global fresh water resources’.⁸

However, despite the importance of aquifers to fresh water supply, the international law governing their equitable utilisation is underdeveloped.⁹ Transboundary aquifers are frequently considered alongside ordinary river basins because they are hydraulically

³ Garmonov, I.V., Konoplyantsev, A. A. and Lushinkova, N. P. (1974) ‘The World Water Balance and Water Resources of the Earth’, in Korzun, V. N. (ed.) *Atlas of the World Water Balance* (Leningrad: Hydrometeoizdat), pp. 48-50; L’Vovich, M. I. (1979) *World Water Resources and their Future* (Washington: American Geophysical Union), pp. 13-23.

⁴ Schneider, U. et al. (2014) ‘GPCP’s new land surface precipitation climatology based on quality-controlled in situ data and its role in quantifying the global water cycle’, *Theoretical and Applied Climatology*, Vol. 115(1), pp. 15-40; Chahine, M. T. (1992) ‘The hydrological cycle and its influence on climate’, *Nature*, Vol. 359, pp. 373-80.

⁵ United Nations (2003) *Water for People, Water for Life: United Nations World Water Development Report* (Barcelona: UNESCO/Bergahn Books), p. 39.

⁶ Art. 2(c), *2008 Draft Articles on the Law of Transboundary Aquifers*; Eckstein, Y. and Eckstein G. E. (2005) ‘Transboundary Aquifers: Conceptual Models for Development of International Law’, *Ground Water*, Vol. 43(5), pp. 679-690.

⁷ McCaffrey, S. (1991) *Seventh Report on the Law of the Non-Navigational Uses of International Watercourses*, UN Doc. A/CN.4/436, p. 14.

⁸ Eckstein, G. and Eckstein, Y. (2003) ‘A hydrological approach to transboundary ground water resources and international law’, *American University International Law Review*, 19(2), p. 203.

⁹ Duda, A. et al. (2012) *Contributing to Global Security. GEF Action on Water, Environment and Sustainable Livelihoods* (Washington: GEF Secretariat), p. 25.

connected to them but logically cannot be made subject to flow controls central to watercourse agreements such as the *1997 Convention on the Law of the Non-Navigational Uses of International Watercourses*¹⁰ (hereinafter *1997 Watercourse Convention*).¹¹ Water in general, but groundwater in particular, is a fugitive resource, which neither conforms to political boundaries nor commonly accepted notions of fairness and equity. The fact that it cannot be readily substituted underscores its preciousness. Transboundary groundwater resources are thus at risk of sustaining irreversible damage from disputes over its control or, if managed inadequately, through pollution or excessive drilling that causes reservoir pressure to drop.¹² The situation is made more complicated by the various types of aquifers and the different legal challenges they present. As will be explored further below, while ordinarily aquifers are connected to the hydraulic cycle and can thus be made subject to the *1997 Watercourse Convention*, a specific variety of aquifers are of a ‘confined fossil’ nature and thus do not connect with the hydraulic cycle. Existing binding international law therefore does not capture this type of aquifer.

Whilst it is the case that international law has only taken small steps towards the establishment of a comprehensive legal regime of transboundary ‘confined fossil’ aquifers, it must also not be forgotten that the task of cataloguing the world’s transboundary water resources is monumental. In 2000, the UNESCO International Hydrological Programme launched the Transboundary Aquifer Resource Management (TARM) initiative to counter the poor recognition of such water resources.¹³ Whilst the initiative managed to enlist the support of the United Nations and other international bodies – including the Southern

¹⁰ *Convention on the Law of the Non-navigational Uses of International Watercourses*, 21 May 1997, ILM Vol. 36, pp. 700 ff.

¹¹ Puri, S. (ed.) et al. (2001) *Internationally Shared (Transboundary) Aquifer Resources Management. Their Significance and Sustainable Management* UNECE Series on Groundwater, No. 1 (Paris: Intl. Hydrological Programme), p. 29.

¹² *Ibid.*, p. 41.

¹³ Puri, S. and Aureli, A. (2005) ‘Transboundary aquifers: a global programme to assess, evaluate and develop policy’, *Groundwater*, 43(5), pp. 359-66.

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African Development Community, the Organization of American States, and the Economic and Social Commission of Western Asia – it was only in 2009 that the TARM initiative achieved the creation of an atlas that maps out the world's transboundary aquifers.¹⁴ Crucially, the initiative concluded that the legal frameworks governing groundwater in neighbouring countries are often disparate and limited to the exchange of data, and thus, given the differences in legal approaches, frequently fail to develop their full potential for effective transboundary aquifer management.¹⁵ In essence, the initiative highlighted the need for greater political commitment to facilitate legal harmonisation between neighbouring Aquifer States.

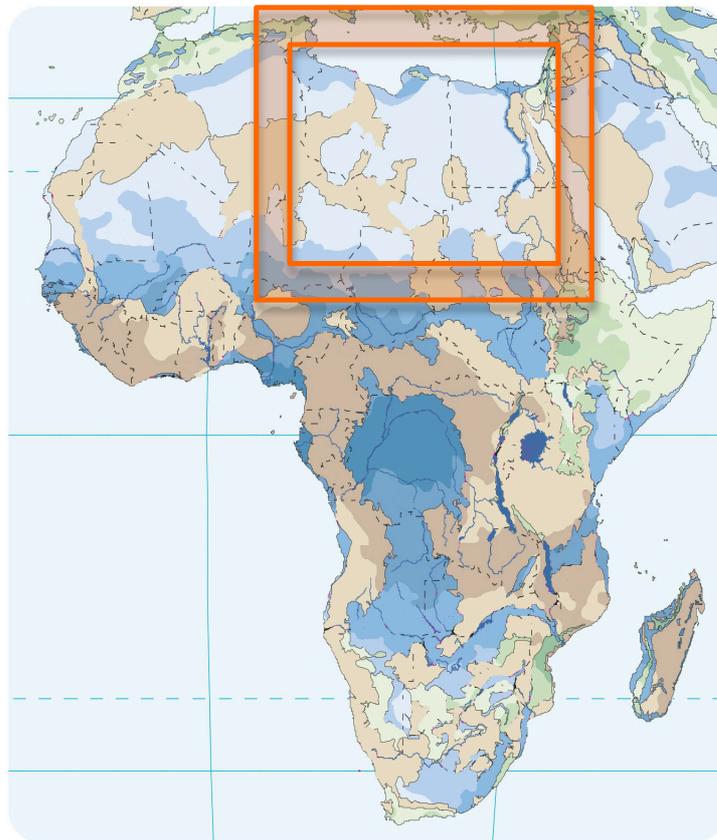


Figure 1: Map of the Nubian Sandstone Aquifer System and other African aquifers (Light blue for non-replenishing areas)

¹⁴ See Puri, S. and Aureli, A. (2009) Atlas of Transboundary Aquifers. Global maps, regional cooperation and local inventories (Paris: UNESCO).

¹⁵ *Ibid.*

Generally, the management of different sources of water is governed by individual bilateral and multilateral agreements – according to Naff and Dellapenna there are more than 286 of them worldwide.¹⁶ Of these, there are numerous agreements governing the use of rivers, but only two are specifically concerned with a transboundary aquifer.¹⁷ This is indicative of the current state of international law with regards to confined transboundary aquifers, for which ‘a consistent body of state practice has yet to emerge’.¹⁸ Most international agreements currently dealing with transboundary water resources either incorrectly define or do not adequately address transboundary groundwaters.¹⁹ There is thus a considerable gap in international law.

The Nubian Sandstone Aquifer System

Although they might be rare, confined fossil aquifers are incredibly important as they not only tend to be large, but also represent a vital source of fresh water to societies with often few adequate alternatives. Among the largest confined fossil aquifers is the Nubian Sandstone Aquifer System. It is situated in the north-eastern part of Africa, underneath the territories of Egypt, Libya, Sudan and Chad.²⁰ It is the world’s largest confined aquifer system with estimated water reserves of 457,550 km³ and constitutes a major potential

¹⁶ Naff, T. and Dellapenna, J. (2002) ‘Can there be confluence? A comparative consideration of Western and Islamic fresh water law’, *Water Policy*, 4(6), p. 485.

¹⁷ 1977 Arrangement on the Protection, Utilization, and Recharge of the Franco-Swiss Genevese Aquifer; 2010 Agreement on the Guarani Aquifer.

¹⁸ Naff and Dellapenna, *supra*, n. 16, p. 472.

¹⁹ Jarvis, T. et al (2005) ‘International Borders, Ground Water Flow, and Hydroschizophrenia’, *Ground Water*, 43(5), pp. 764-770.

²⁰ Heintz, M. and Brinkmann, P. J. (1989) ‘A groundwater model of the Nubian aquifer system’, *Hydrological Sciences Journal*, Vol. 34(4), p. 427.

source of fresh water for the four States under which it is situated.²¹ This is consistent with the rest of the world, where an estimated 40% of the population depend on such transboundary water resources.²² The Aquifer System underlies an area of roughly 2.2 million km², of which c. 37% belongs to Egypt, 35% is covered by Libya, 17% is found underneath North Sudan and roughly 11% underlies territory belonging to Chad. Since the 1960s, the four States sharing the aquifer system (the ‘four Aquifer States’) have each made separate attempts to utilise the Nubian Sandstone Aquifer System to develop the overlying arid lands.

Libya – Ahead in the Game

Of the four Aquifer States, Libya has advanced the most in developing the groundwater resource of the Aquifer System underlying its territory. The country occupies a total land area of roughly 1.76 million km² and is one of two Aquifer States that shares borders with all its three peers (the other being Sudan). It is bordered in the north by the Mediterranean Sea, in the east by Egypt and Sudan, in the south by Chad and Niger, and in the west by Algeria and Tunisia. Like all of its fellow Aquifer States, Libya is predominantly desert land and consequently very arid, with less than 60 millimetres of average rainfall per year, most of which falls in the winter months.²³ In the United Kingdom, by contrast, the average annual rainfall is almost thirty times as high and more evenly distributed throughout the

²¹ Bakhbaki, M. (2006) ‘Nubian Sandstone Aquifer System’ in: Foster, S. and Loucks, D. P. (eds.): *Non-renewable Groundwater Resources: A Guidebook on Socially Sustainable Management for Water-Policy Makers*. UNECE Series on Groundwater, No. 10 (Paris: Intl. Hydrological Programme), pp. 75-81.

²² Scheumann, W. and Schiffler, M. (1998) ‘Introduction’, in Scheumann, W. and Schiffler, M. (eds.): *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation* (Berlin: Springer), p. 1.

²³

seasons.²⁴ There are no major rivers or lakes on Libyan territory, which makes groundwater Libya's main source (roughly 95%) of fresh water for all purposes – domestic, agricultural and industrial. Specifically, groundwater constitutes 98.72% of water used in irrigated Libyan agriculture. After the Fatah Revolution in 1969,²⁵ ensuing industrialisation increased the strain on scarce water supplies and demand has continued to grow. Oil exports, heavy and light industry in addition to agriculture produce roughly 54% of national GDP. Libya's predominantly arid nature provides that irrigated farming systems have always been fundamental in providing for the country's food needs. Almost 50% of Libya's cereal production and 90% of the fruit and vegetable production originates from irrigated agriculture. Consequently, all these branches of the national economy are very dependent on a constant water supply whilst they also provide many of the employment opportunities in the country. The Food and Agriculture Organization of the United Nations (FAO) estimates that Libya's total annual groundwater withdrawal thus already stood at almost 4.3 billion m³ in 2006, of which the Nubian Sandstone Aquifer System to the southeast of the country supplied a substantial share, bottlenecked only by on-going water pipeline construction.²⁶ Use of the Aquifer System's resources is therefore set to grow, though that grow may well have slowed since conflict broke out in the country in 2011.

Although there have been several attempts at desalinating seawater from the Mediterranean Sea, the actual proportion of desalinated seawater in the national water economy is negligible due to the high costs for what is quite an inefficient and

²⁴ See MetOffice (2015) 'How much does it rain in the UK?', available online at <http://www.metoffice.gov.uk/learning/rain/how-much-does-it-rain-in-the-uk> (accessed 1 June 2016).

²⁵ The al-Fatah Revolution, launched by a group of Libyan army officers (chief among whom was Col. Muammar Gaddafi) in 1969, toppled Libya's King Idris I and sought self-determination of the Libyan people; see Vandewalle, D. (2006) *A History of Modern Libya* (Cambridge: Cambridge University Press), p. 86; for the political struggles that preceded the al-Fatah Revolution, see Khadduri, M. (1963) *Modern Libya. A Study in Political Development* (Baltimore: Johns Hopkins Press).

²⁶ FAO (2006) 'Aquastat: Libya', available online at http://www.fao.org/nr/water/aquastat/countries_regions/libya/index.stm (last accessed 2 May 2012).

environmentally unfriendly process.²⁷ Libya's only viable source for fresh water is therefore groundwater abstraction. Although there are a few aquifers along the Libyan coast that are recharged by rainfall, they are very limited in size and can therefore only play minor roles in the national water economy. Moreover, groundwater development from these aquifers historically has not been controlled and water extraction now exceeds annual replenishment. This has caused a significant drop in water levels and subsequent seawater encroachment, which makes water from these coastal aquifers almost unusable without desalination.²⁸ Future fresh water supply in Libya is thus increasingly dependent on groundwater from the Nubian Sandstone Aquifer System, which does not benefit from substantial recharge and as a confined aquifer is non-renewable.

These factors resulted in the implementation and continuation of the Great Man-Made River Project (hereinafter GMMRP), a giant pipeline and man-made reservoir construction programme for groundwater abstraction from the Nubian Sandstone Aquifer System. This megaproject was one of the world's largest construction undertakings in the 1980s, essentially constructing clusters of wells and connecting them via gigantic pipelines to storage reservoirs.²⁹

²⁷ Ashour, M. M. and Ghurbal, S. M. (2004) 'Economics of seawater desalination in Libya', *Desalination*, 164, pp. 215-18.

²⁸ FAO (2009) *Groundwater Management in Libya – Draft Synthesis Report* (Rome: FAO), p. 2.

²⁹ The Editors of Encyclopedia Britannica (n. d.) 'Great Man-Made River (GMR): Underground Pipeline Network, Libya', available online at <https://www.britannica.com/topic/Great-Man-Made-River> (accessed 18 November 2011).



Figure 2: GMMRP pipe modules (4 metres in diameter) being transported to an installation site (Image: Galen Frysinger)

In the period of 1975 – 2000, the total annual water abstraction of 4.2 billion m³ was roughly 8 times the available annual renewable groundwater in Libya and has forced the country to depend heavily on, and invest heavily in, the abstraction of groundwater from the Nubian Sandstone Aquifer System.³⁰ The project's aim is to provide the water supply necessary for Libyan agricultural self-sufficiency, which otherwise would be impossible due to limited rainfall and the lack of significant natural lakes or rivers. The GMMRP is designed to ultimately abstract and transport several billion m³/year of fossil water from the Nubian Sandstone Aquifer System in the Libyan South to the Mediterranean coast where the water is urgently needed for agricultural, municipal and industrial use.³¹ Construction of the Project consists of five phases but to date has not been completed. For Phase I, wells in the Al Kufrah Basin have been designed to convey 730 million m³ of

³⁰ FAO, *supra*, n. 26.

³¹ Reliable sources for the project's precise design capacity are unavailable; FAO pegs it at 5-6 million m³/day, see FAO (2016) 'Aquastat: Libya', available online at http://www.fao.org/nr/water/aquastat/countries_regions/lby/index.stm (accessed 15 January 2016).

water per year to the coastal areas extending from Benghazi to Sirte since 1991. Phase II consists of several well fields in the Jebel Hasawna area, designed to produce some 910 million m³/year for the Jifarah plain around Tripoli starting in 1997. Phase III facilitates the transfer of an additional 613 million m³/year from Al Sarir to Tobruk whilst Phases IV and V will extend and join the different distribution networks.³² Libya's motivation to develop the Nubian Sandstone Aquifer System is therefore of economic nature, namely to supply the water needs of its agricultural sector. Whilst it is unclear to what extent agricultural activity will be affected by the protracted political turmoil that has unfolded since the overthrow of the government in 2011, a food security snapshot by FAO suggests that agricultural production has remained flat between 2011 and 2015.³³ According to the snapshot, an important limiting factor is lack of irrigation, with only 51% of land developed for irrigation receiving adequate water supply. This in turn suggests that the GMMRP has stalled in its development and thus highlights the centrality of the Project to Libya's agricultural economy.

Chad – Fresh water access frequently a challenge

Although no other aquifer state has committed to the development of its groundwater resources from the Nubian Sandstone Aquifer System as much as Libya, that does not mean they have less of a need for it. Of the four States, Chad is especially agriculturally underdeveloped because of water scarcity and suffers from regular food shortages. It is a landlocked state located in the heart of Africa with a territory of roughly 1.2 million km². Groundwater levels in Chad have decreased considerably due to insufficient precipitation,

³² FAO, *ibid*; the Libyan civil war put a hold to any construction work in 2011, with NATO reportedly having destroyed some of the GMMRP's infrastructure.

³³ FAO (2016) 'GIEWS Country Briefs – Libya', available at <http://www.fao.org/giews/countrybrief/country.jsp?code=LBY> (accessed 23 March 2016).

which is the total amount of aqueous particles drawn to earth by gravity and not just mere rainfall,³⁴ and increased evaporation at the same time.³⁵ Overall, only about 23% of Chad's population has permanent access to safe drinking water.³⁶ The rate of drinking water supply for the entire urban area is only 40%, while in rural areas only 32% of the population have access to improved drinking water sources. Sanitary conditions are very underdeveloped in both cities and rural areas. Additionally, Chad's health infrastructure is inadequate and of poor quality. As a result, the national authorities adopted a national water resources strategy to investigate the potential for abstracting water from the Nubian Sandstone Aquifer System³⁷, possibly with similar technology to that employed in Libya's Great Man-Made River Project, although almost certainly not on the same scale. Nevertheless, current Chadian groundwater extraction from the Nubian Sandstone Aquifer System appears to be to such negligible extent, that they are not even indicated by the Centre for Environment and Development for the Arab Region and Europe (CEDARE).³⁸

However, investment in private and village community irrigation is expanding in Chad. Although the national government is not in a position to disperse the heavy investments necessary for large-scale projects such as the GMMRP, it is nonetheless urging donors to focus more on this agricultural subsector. Only the expansion of irrigation can guarantee stable production in cases of poor rainfall and consequent food security.³⁹ More than 70%

³⁴ American Metrological Society (2009) *Precipitation*, available online at <http://amsglossary.allenpress.com/glossary/search?id=precipitation1> (accessed 29 April 2015).

³⁵ World Bank and UNDP (2000) 'Support for the detailed technical design and feasibility of demonstration projects and co-implementation arrangements for a full GEF project', available online at http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/International%20Waters/CHAD%20-%20Lake%20Chad%20Basin/PDF%20C.pdf (accessed 12 November 2012).

³⁶ UNDP (2003) *Integrated Plan for Chad's Water Development and Management*; available at http://www.un.org/esa/sustdev/publications/sdea/english/pdf/04_Introduction.pdf.

³⁷ *Ibid.*

³⁸ Bakhbakhi, *supra*, n. 21, p. 79.

³⁹ FAO (2006) 'Aquastat: Chad', available online at http://www.fao.org/nr/water/aquastat/countries_regions/chad/indexfra.stm (accessed 2 May 2012).

of the 2003 economically active population in Chad was employed in agriculture including the rearing of livestock. Agriculture accounted for 38% of Chad's GDP in 2003.⁴⁰

Chad's surface water resources depend entirely on replenishment through rainfall, which occurs very irregularly. As a result, agricultural output has declined since 2014.⁴¹ The largest lake is Lake Chad. In the 1960s, its surface measured 19,000 km². The lake has four riparian countries: Chad, Niger, Nigeria, and Cameroon. The lake dried up completely in 1985, so the surface water varies between 0 (1985, 1987, 1988) and 7,000 km² (1979, 1989 and 2000). Lakes Fitri, Lere, Iro and Toupouris are smaller.⁴² Wetlands are located in the extreme south and in the plains of the two main rivers, Chari and Batha. The Lake Chad area, with variations of water levels, can also be considered wetland. Generally, they are poorly preserved and are subject to significant degradation. The Batha river is ephemeral, flowing only for about three months during the year and delivering no more than 1-2 km³ of water.⁴³ Chad therefore also displays the same potential to benefit from stable water supply from the Nubian Sandstone Aquifer as Libya.

Sudan – Plagued by frequent draughts

Sudan, meanwhile, is the largest country in Africa by geographical area. It covers an area of around 2.5 million km².⁴⁴ It shares borders with the three other stakeholder States: Egypt in the north, Chad and Libya in the west. The area of North Sudan covering the Nubian Sandstone Aquifer System is predominantly desert and extremely arid, with a

⁴⁰ *Ibid.*

⁴¹ FAO (2016) 'GIEWS Country Briefs – Chad', available at <http://www.fao.org/giews/countrybrief/country.jsp?code=LBY> (accessed 23 March 2016).

⁴² FAO, *supra*, n. 39.

⁴³ *Ibid.*

⁴⁴ FAO (2006) 'Aquastat: Sudan', available online at www.fao.org/nr/water/aquastat/countries_regions/sudan/index.stm (accessed 2 May 2012).

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maximum rainfall of 0-50 millimetres per acre. This is problematic as the country's dominant economic sector is that of agriculture. In 2002, farming contributed to Sudan's GDP with over 39% and in 2004 it employed 57% of the economically active population. It contributed about 90% of Sudan's non-oil related income.⁴⁵ Nevertheless, rainfall agriculture comprises the majority of agriculture in Sudan and the total area cultivated (and subsequent production) varies considerably from year to year according to rainfall in that year. The major crops grown in Sudanese rain-fed agriculture include sorghum and millet. The main export crops are water intensive crops such as cotton as well as fruits and vegetables. Livestock also constitutes significant output destined for export. There are very few agricultural firms with land holdings of more than 1,000 hectares and smaller farms carry out most farming.⁴⁶

Drought episodes of 2-3 years are common. Recently, there has been a switch from sorghum to wheat as a staple food with the result that ever more expansive stretches of land in the Nubian Sandstone Aquifer System region are used to grow the crop. This puts greater pressure on the limited water resources. Sudan has a population of roughly 34.3 million (2004) with an annual growth rate of around 2.2%. The majority (60%) of the country's population is rural. Even the most favourable estimates state that over 50% of Sudan's population live on less than \$1 per day: less favourable estimates suggest that 66% of Sudan's population subsists on this amount. Consequently, the Sudanese government launched a Poverty Reduction Programme in 2001, which included the improvement of drinking water supply to the rural population in particular.⁴⁷ Various other government initiatives have also been announced to improve agricultural productivity and sanitation in

⁴⁵ FAO (2006) *Aquastat: Sudan*; available online at www.fao.org/nr/water/aquastat/countries_regions/sudan/index.stm (accessed 2 May 2012).

⁴⁶ *Ibid.*

⁴⁷ IMF (2012) *Sudan – Interim Poverty Reduction Strategy Paper* (Washington: IMF), pp. 44-47, available at <https://www.imf.org/external/pubs/ft/scr/2013/cr13318.pdf> (accessed 11 February 2013).

Sudan since 1992. The Sudan Comprehensive National Strategy for the Agricultural Sector (1992-2002) prioritised food security, sustained agricultural development and efficient resource utilization. However, the initiative has had little impact on broader Sudanese society.⁴⁸ Focus, for instance, was put on improved supplementary irrigation for crops and fodder to boost productivity, which, unfortunately has stagnated at very low levels.⁴⁹

Despite these limitations, Sudan nominally has the second largest irrigated area in Africa (after Egypt). Although the country's irrigated area constitutes only 11% of its total cultivated land, it contributes more than half to the total volume of agricultural production. Consequently, Sudan also displays a concrete need for the water resources of the Nubian Sandstone Aquifer.

Egypt – Still focussed on the Nile, but for how long?

Egypt, on the other hand, does not display the same urgency when it comes to the development of the Nubian Sandstone Aquifer. The country's territory covers about 1 million km². In the north, it is delineated by the Mediterranean Sea, in the east by the Gaza Strip, Israel and the Red Sea, in the south by Sudan and in the west by Libya. Egypt's most important source of fresh water is the Nile and up to 1975 the country's focus for fresh water supply has been this river. Even in the new millennium, the country only meets about 7% of its water demand through the extraction of groundwater. 82% of this groundwater predominantly is seepage water extracted from the Nile basin. Less than 2%

⁴⁸ FAO, *supra*, n. 44.

⁴⁹ *Ibid.*

of the overall Egyptian groundwater extraction is derived from the Nubian Sandstone Aquifer System.⁵⁰

However, with an ever-expanding population and a corresponding increase in demand for fresh water in new settlements outside the reach of the Nile, it has become apparent that the river alone would be insufficient as a main source of fresh water for the country. Whilst total abstracted groundwater volumes in Egypt are nowhere near the same level as the use of the Nile, groundwater is the only viable source of water besides the Nile. Under mounting pressure to develop alternative water resources, the Egyptian government prioritised groundwater in recent national water policies.⁵¹ Egypt regards the Nubian Sandstone Aquifer System as a strategic water reserve and a crucial part of national development, which causes significant changes in traditional ways of life. Whereas previously the groundwater extracted from the Nubian Sandstone Aquifer System was predominantly used for agriculture by private farms scattered around oases⁵², much larger, industrially scaled irrigation projects have been planned. In 2003, 4,200 hectares (i.e. roughly the equivalent of 4,200 rugby fields) were already under irrigation.⁵³ The Egyptian Ministry of Water Resources and Irrigation has identified as among the main issues related to the development of Egypt: (i) a high regional concentration of all Egyptian land use (less than 10% of the whole country), (ii) a resulting unbalanced population distribution, (iii) a decreasing per capita share in water and agricultural land and (iv) a lack of reliable water supply and sanitation in rural and desert regions.⁵⁴ This suggests that Egypt's dependency

⁵⁰ FAO (2006) *Aquastat: Egypt* – available online at http://www.fao.org/nr/water/aquastat/countries_regions/egypt/index.stm (accessed 2 May 2012).

⁵¹ El Bedawy, R. (2014) 'Water Resources Management: Alarming Crisis for Egypt', *Journal of Management and Sustainability*, 4(3), p. 109.

⁵² Bakbakhi, *supra*, n. 21, p. 78.

⁵³ Salem, O. and Pallas, P. (2004) 'The Nubian Sandstone Aquifer System', in: Appelgren, B. (ed.): *Managing Shared Aquifer Resources in Africa*. UNECE Series on Groundwater, No. 8 (Paris: Intl. Hydrological Programme), p. 22.

⁵⁴ Application for GEF funding: Chad, Egypt, Libya and Sudan, April 2005.

on the water contained in the Nubian Sandstone Aquifer System is going to increase in the future.

All four Aquifer States therefore depend on scarce water resources for their economies and the livelihood of their citizens, which puts the Nubian Sandstone Aquifer System at the centre of present water supply and its future potential. The development of the Nubian Sandstone Aquifer System is characterized by very high intensity use especially in Libya and Egypt where the Great Man-made River and the Western Desert Irrigation projects are examples of a use race. Most of the water extracted from the aquifer system is used for agriculture, either in intensive farming projects in Libya or for private farms in Egypt. This had already led to declining groundwater levels in Egypt and Libya in 2000, when the groundwater level was reported to have declined by sixty metres at several Egyptian oases, which led to all free-flowing wells and springs being replaced by deep wells.⁵⁵

The Long Road Towards a Common Framework of Governance

The nature of the Nubian Sandstone Aquifer System is unlikely to allow for all four Aquifer States to extract as much water as they wish all at the same time without risking its geological integrity. As the Aquifer System is made of porous sandstone and is by and large underexplored, over-drilling could lead to a rapid decline in extractable water from a particular drilling site in one or more of the Aquifer States. This is a common problem in the hydrocarbon sphere, too, where the production of crude oil needs to be carefully managed to avoid excessive loss of reservoir pressure that helps keep it in place. The

⁵⁵ CEDARE/IFAD (2001) *Regional Strategy for the Utilization of the Nubian sandstone Aquifer System*. Volume II: Hydrogeology.

problems such consequences could create are similar. Both crude oil and water are precious resources and their sudden drop in availability would be disastrous for a stakeholder state. Agricultural development is fundamental to all four stakeholder States as all four are not only experiencing a rapid expansion in their population, but because agriculture, even for oil-rich Libya, Egypt and Sudan, is the main source of employment for the majority of their populations. Water scarcity can thus not be underestimated as a constraint to development in the region.⁵⁶

Whilst the Aquifer States have expressed their will for cooperation since the 1970s, it was only in 1997 that they agreed to seek international assistance to establish a regional project to develop a strategy to utilise the Aquifer System. Subsequently, CEDARE as well as the International Fund for Agricultural Development (IFAD) and the Islamic Development Bank (IDB) agreed to establish a programme for the formulation of such a regional development strategy.⁵⁷ The four States under which territory the Nubian Sandstone Aquifer System lies also formed the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer System (hereinafter referred to as the Joint Authority), which concluded a geological assessment of the span of the Nubian Sandstone Aquifer in 2008. The ultimate objective of the Joint Authority was to achieve a political solution to ensure equitable utilisation through cooperation as a result of the geological assessment programme, however, a strategy, or indeed consistent cooperation, failed to materialise at the time. The Joint Authority picked up the thread again by agreeing to a Strategic Action Programme in September 2013, which provides a basis for the continued exploration of cooperative action schemes but, as discussed later, does not include concrete provisions for water management and only highlights the most basic requirements for any

⁵⁶ Abu Zeid, K. and Abdel-Meguid, A. (2008) *Pioneering Action in Managing the Transboundary Nubian Sandstone Groundwater Aquifer* (Cairo: CEDARE), p. 1.

⁵⁷ *Ibid.*

effective cooperation in the future.⁵⁸ The targets set by the 2013 Strategic Action Programme indicate that it aims to ‘revive’ the negotiations that ended abruptly in 2008,⁵⁹ and to ‘explore’, ‘understand’ and ‘develop’ future means of cooperation,⁶⁰ instead of establishing concrete rules of aquifer management. The limited progress made in the development of international law in promoting and facilitating the cooperative management of transboundary confined groundwater resources over the recent decades contributed to the current lack of such a uniform and universally accepted framework. Ultimately, it is this lack of framework and the generally underdeveloped nature of groundwater law that is responsible for the slow progress of the negotiations between the four Aquifer States.⁶¹

The Middle East and North Africa (MENA) region, meanwhile, has a long and rich legal tradition in managing available water, which, as it is home to approximately 300 million Muslims,⁶² stems primarily from Islamic teachings. Over centuries, Islamic scholars have created an elaborate system of legal customs regulating the use and ownership of water resources.⁶³ This has been the logical development through history in a region plagued by water scarcity and the importance of the precious liquid to the survival of nomadic societies inhabiting the land between the western tip of Africa and the Arabian Gulf. Forces of culture and religion thus have a profound impact on how societies manage their natural resources, including water. Unfortunately, these aspects of human

⁵⁸ GEF (2013) *Regional Strategic Action Programme for the Nubian Aquifer System* (Vienna: GEF), pp. 23-35.

⁵⁹ Action 1a.2.ii; the signatories envision this to take up to 5 years (i.e. until 2018).

⁶⁰ See *Targets* 1a.1, 1e.4, 2q.1-7, 3a.1, 3b.1, 3b.2 and *Actions* 1a.1.ii, 1a.6.iii, 1b.5.i, 1e.4.i, 2a.1.i, 2a.5.ii, 3a.6.1, 3a.10.i.

⁶¹ GEF (2004) *Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer* (Bethesda: GEF), p. 17.

⁶² Lugo, L. et al (2009) *Mapping the Global Muslim Population* (Washington: Pew Research Centre), available online at <http://www.pewforum.org/2009/10/07/mapping-the-global-muslim-population/> (accessed 1 November 2011).

⁶³ Norvelle, M. E. (1980) *Water Use and Ownership According to the Text of Hanbali Fiqh*, M.A. Thesis, Montreal: Institute of Islamic Studies, McGill University.

development have hitherto tended to be neglected in the interest of ‘objectivity’ based on the belief that the world is proceeding towards ‘some kind of common, material-based culture’.⁶⁴ With the introduction of the *2008 Draft Articles on the Law of Transboundary Aquifers* (hereinafter the *2008 Draft Articles*), the International Law Commission (ILC) attempted to advance the development of international fresh water law in precisely this manner by introducing a set of articles offering a comprehensive solution to questions pertaining to the management of confined transboundary aquifers, including the rights and obligations of Aquifer States relating to the use of their transboundary resources. The ILC modelled the *2008 Draft Articles* closely on the *1997 Watercourse Convention* and does not refer to any specific Islamic principles governing the use of shared fresh water resources to produce a globally applicable set of articles. Whilst it is of course necessary to draft an international legal instrument as objectively as possible to ensure their lasting applicability, failing to consider cultural and religious factors – if not in the instrument itself then perhaps in guiding commentary or a thesis such as this – but instead insisting they have no place in its application at all merely foregoes an opportunity to achieve a more profound understanding and appreciation of its specific goals. Accordingly, the four Aquifer States, which have in common strong roots in Islamic tradition and law, are still in search of a common framework of governance for the Nubian Sandstone Aquifer System despite the availability of aquifer management case studies from Europe, the United States and South America since the 1970s. There is, therefore, a pressing need for an adequate framework that would entice these four States to come to such an agreement and underscores that water scarcity in the MENA region will force policy makers to use every tool available to

⁶⁴ Faruqui, N. I. (2001) ‘Introduction’, in Faruqui, N. I., Biswas, A. K. and Bino, M. J. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), p. xii; see also Amery, H. A. (2001) ‘Islamic Water Management’, *Water International*, 26(4), p. 481.

adequately address the issues arising from competing interest vying for the same water within the region.⁶⁵

This thesis will approach its theme in a holistic manner. In other words, it will refrain from adopting an overly rigid or dogmatic methodology but instead seek out the principles contained in different corpora of international law to advance our understanding of the unique set of problems involved in the utilisation of the Aquifer System. As will be discussed in detail below, the four Aquifer States have tried for an extensive period of time to arrive at a comprehensive utilisation framework for their transboundary groundwater, but to no avail. This circumstance will inform this thesis' methodology in several ways.

First, all four Aquifer States have committed to finding a mutually acceptable framework within the context existing international law. However, as will be demonstrated in the following chapters, development of existing international water law has hitherto focussed on surface waters and their related groundwaters, i.e. those volumes of water connected to the hydraulic cycle. For reasons that shall be explored below, comparatively little attention has been paid to transboundary groundwater not connected to the hydraulic cycle. Current international law thus considers implication for water replenishment and environmental management only in relation to the first kind – hydraulically connected groundwater – but not the latter. As a result, there is no established international legal framework that the four Aquifer States could simply adopt.

Second, and flowing from point one, the name of the *2008 Draft Articles* underscores the current stage of their development. Almost nine years after their inception they remain a proposal. Indeed, as will be seen later, their future status is highly uncertain and the

⁶⁵*Ibid*, p. xvi.

Introduction

international community is struggling to advance the *Draft Articles* to any final form. It therefore cannot be surprising that the four Aquifer States have equally struggled to devise their framework agreement. Nevertheless, as shall be explored in the following chapters, the international community has certainly taken notice of the *Draft Articles* despite their legal shortcomings. Indeed, they have already been used as the basis of utilisation framework of the Guarani Aquifer located beneath the surface of Argentina, Brazil, Paraguay and Uruguay as they contain a roster of sensible and practical principles aimed at the utilisation of transboundary groundwater.

Third, three of the four Aquifer States expressly cite Islamic norms as the central source of domestic law in their respective constitutions. The fourth, Chad, is constitutionally committed to cooperate with its neighbours, accepting their jurisprudential positions from the outset. Islamic law is therefore central to the Aquifer States' framework finding mission. Although there is no evidence to support the notion that they have hitherto struggled to arrive at a framework solution because of the lack of reference to Islamic law in prevailing international water law, it is nonetheless submitted that any conflict between new instruments of international water law and Islamic law would certainly make it very difficult for the majority of Aquifer States – Libya, Egypt and Chad – to adopt and ratify such a framework.

Yet, instead of regarding Islam as a limiting factor, this thesis will approach its subject by drawing on the religion as a codex of binding norms, which through the almost universal acceptance in its fundamental form throughout the Muslim world can introduce a vital element of impartial adjudication and common ground among the four Aquifer States. At this point, it is stressed that the author is neither a Muslim nor an Islamic theologian, and that this thesis does not purport to represent the intricate differences of the different schools of Islamic jurisprudential thought. Given the somewhat limited availability of

English language sources of specific Islamic jurisprudential teachings, the Hanbali School of Islamic jurisprudence was primarily consulted. Nevertheless, this School has been recognised as the most widely accepted in the MENA region and water quality is not a domain of substantial divergence in Islamic jurists' opinions because of its importance to Islamic rituals.

Nevertheless, since the basis of a legal system's normative effect is rooted in its principles, it can therefore only be appropriate to draw on legal principles from both general international and Islamic law. In other words, this thesis will look to Islam as a potential bridge where general international law has not yet become authoritative enough.

This thesis will therefore investigate to what extent the *2008 Draft Articles* are compatible with general principles of Islamic water law in light of the specific set of circumstances surrounding the Nubian Sandstone Aquifer System. Given the importance of Islam to all four Aquifer States, this thesis will argue that the principal clauses provided by the *2008 Draft Articles* are compatible with Islamic law and could therefore provide a stepping-stone for the four Aquifer States to adopt a framework agreement modelled on the *2008 Draft Articles*.

Although the Aquifer System is among the largest of its kind in the world, it is not the only one and many of its counterparts exist in countries where either Islam forms part of the foundation of the constitution or at least an important part of society through religion and culture.⁶⁶ This study of principles of international environmental law in general and transboundary groundwater law in particular as espoused in the *2008 Draft Articles* and their

⁶⁶ See *Figure 1* above.

compatibility with the relevant principles of Islamic law therefore hopes to impact the emerging law of transboundary fossil aquifers.

As such, this thesis will draw on a plethora of sources, both primary and secondary, to investigate the extent of congruence between principles contained in general international law and international environmental law, and Islamic jurisprudence in relation to the use of fresh water. Special attention will be paid to the *2008 Draft Articles* and Islamic jurisprudence contained in the Qur'an and special Islamic teachings related to water. Due consideration will also be given to the historical context of legal developments to highlight the degree of congruence between important legal viewpoints.

Chapter I will assess the legally relevant geological intricacies of groundwater as well as the different specific types of aquifers. It will then progress with a discussion on the potential for conflict where transboundary resources are only insufficiently, or not at all, covered by international legal frameworks. Building on those findings, an assessment will be made on what the four Aquifer States have achieved to date in establishing a legal framework for the utilisation of the Aquifer System. This will be followed by asking to what extent existing legal frameworks of the utilisation of transboundary hydrocarbons and international human rights can inform the emerging international law of transboundary groundwater resources. Chapter II will examine relevant provisions of international resource and environmental law, focussing specifically on equity and principles of sustainable development. Building on this assessment, Chapter III will introduce and discuss in detail the *2008 Draft Articles on the Law of Transboundary Aquifers*. It will demonstrate how the *Draft Articles* build on the provisions of international environmental law highlighted in Chapter II as well as various existing legal instruments. Special attention will be given to the *Draft Articles'* relationship with the *1997 Convention on the Law of the Non-navigational Uses of International Watercourses*. Having established the relationships between the

nature of transboundary aquifers, existing provisions of petroleum and environmental law, as well as the significance of the *2008 Draft Articles* in relation to the *1997 Convention*, Chapter IV will turn to general principles of Islamic law. In this chapter, the focus will be on introducing the reader to the drivers of Islamic jurisprudential thought as well as the foundations of Islamic water law and the Islamic conception of the environment. Chapter V will subsequently demonstrate the significance of Islamic law as a factor in modern international law to show its existence should not be ignored. It will then compare and contrast specific provisions of Islamic water law with those of the 2008 Draft Articles by building on the preceding chapters. Chapter V will be followed by the conclusion.

Chapter I – INTERNATIONAL LAW NEEDS FOSSIL AQUIFER-SPECIFIC ENHANCEMENTS

This chapter will examine an array of important issues in relation to the legal demands of utilising the Nubian Sandstone Aquifer System. Before delving into the intricacies of international law in relation to transboundary aquifers, it is important to understand the nature of groundwater, the extent to which its comparable to the development of crude oil resources, how it is impacted by international human rights and the potential consequences of not addressing the prevailing gap in international transboundary aquifer law. This chapter will demonstrate that provisions of hydrocarbon law and international human rights may well inform the conception of an aquifer-specific framework, and in the case of human rights even provide the cue to advance the development of such a framework, but that ultimately the geological characteristics of a transboundary confined fossil aquifer are too specific for any existing legal regime alone to provide a comprehensive cover.

Water knows no political, economic or social boundaries but provides a crucial link within ecosystems. The centrality of water to the welfare of nations and their economies thus increases risk of conflict between stakeholder States. Comprehensive water management therefore needs to address the principal challenge of unlocking the benefits

water in a sustainable and equitable way and stakeholder participation is a fundamental prerequisite for adaptive and integrated water resource management.⁶⁷ As will be explored below, the nature of the Nubian Sandstone Aquifer System is highly unlikely to allow all four Aquifer States to simultaneously extract as much water as they wish without risking the geological integrity of the aquifer. The porous sandstone the Nubian Sandstone Aquifer System is made of imparts the risk that over-drilling could lead to a rapid decline in extractable water from a particular drilling site in one or more of the Aquifer States. Unfettered groundwater extraction has already been implicated in a 60-metre drop of groundwater levels in certain Egyptian and Libyan oases.⁶⁸ Notably, this is a common problem in the extraction of crude oil, too, where the development of hydrocarbon deposits needs to be carefully managed to avoid excessive loss of reservoir pressure that helps keeping them in place. The problems such consequences could create are thus similar as well: both crude oil and water are precious resources and a sudden drop in their availability would be disastrous for an aquifer state. Agricultural development is fundamental to all four Aquifer States as all four are not only experiencing a rapid expansion in their population, but also because agriculture, even for oil-rich Libya, Egypt and Sudan, is the main area of employment for most the population. Water scarcity can thus hardly be underestimated as a constraint to regional development.⁶⁹

⁶⁷ Pahl-Wostl, C. (2008) 'Requirements for adaptive water management', in Pahl-Wostl, C., Kabat, P. and Moltgen, J. (eds) *Adaptive and Integrated Water Management* (Berlin: Springer), p. 4.

⁶⁸ Mirghani, M (2012) Groundwater Need Assessment: Nubian Sandstone Basin (EUGRIS- IWRM-Net), p. 6.

⁶⁹ *Supra*, n. 56.

The Nature of Groundwater and Aquifers

Although there have been attempts to produce sources of international law to guide parties in utilising their shared groundwater resources dating back to the 1960s⁷⁰, these focus on the rights and responsibilities of States and do not marry legal and hydrological intricacies in relation to the different types of groundwater reservoirs.

The term groundwater denotes all subsurface water below the water table,⁷¹ which saturates or fills porous geologic formations.⁷² Although groundwater comprises only a fraction of the world's available water resources, it provides more than 90% of accessible drinking water.⁷³ In most cases, groundwater is rarely stagnant and tends to flow towards its natural discharge point, which can be a lake, a river, the sea or other surface water concentration. Groundwater does not flow in underground rivers or 'veins' but rather seeps from one area to another as if through a sponge.⁷⁴ Groundwater velocity can thus be very slow – no more than one meter per year in some cases.⁷⁵ The flow is governed by its hydraulic potential, mainly a combination of gravity, gradient and soil permeability (but ambient air pressure and temperature can also have an impact), and it follows that groundwater flows from elevated to lower ground.⁷⁶ As a result, groundwater flow can be counterintuitive where, for instance, a stream is flowing in one geographical direction following gravity and slope and groundwater flows in entirely different direction. The water

⁷⁰ See 1966 Helsinki Rules on the Uses of the Waters of International Rivers; 1997 Convention on the Non-Navigational Uses of International Watercourses; 1986 Seoul Rules on International Groundwaters.

⁷¹ United States Geological Survey (2015) 'Aquifers' (Online content), available at <http://water.usgs.gov/edu/earthgwaquifer.html>.

⁷² Price, M. (1996) *Introducing Groundwater* (London: Chapman & Hall), p. 7; see also Heath, R. C. (1987) 'Basic Ground-Water Hydrology', *U.S. Geological Survey Water-Supply Paper 2220*, pp. 1-4; available online at <http://pubs.usgs.gov/wsp/2220/report.pdf> (accessed 1 May 2012).

⁷³ Bouwer, H. (1978) *Groundwater Hydrology* (New York: McGraw-Hill), pp. 2-3.

⁷⁴ Barberis, J. A. (1986) 'International Ground Water Resources Law', *Food and Agricultural Organization Legislative Study*, Vol. 36, p. 2.

⁷⁵ Hamblin, K. and Christiansen, E. H. (2001) *Earth's Dynamic Systems: A Textbook in Physical Geology* (Upper Saddle River, NJ: Prentice Hall), p. 325.

⁷⁶ Heath, R. C. (1983) *Basic Ground-Water Hydrology* (Reston: USGS), pp. 20-25.

is usually abstracted through pumps lowered into a well, which usually creates water flow to the immediate vicinity of the well.⁷⁷

Unlike the possible perception of an underground lake or bubble of pure water, the term ‘aquifer’ describes a concentration of groundwater within a relatively permeable and porous geologic formation.⁷⁸ Based on the nature of groundwater flow, aquifers can therefore also be described as groundwater basins because the groundwater tends to concentrate in the subterranean soil of lower geographical areas. To fulfil the definition, such a concentration of groundwater must also have sufficient capacity to allow water extraction via springs or wells.⁷⁹ In other words, a water-bearing section of subterranean soil incapable of transmitting significant quantities of water (e.g. a layer of clay) does not constitute an aquifer. To create the reservoir, the water saturates the permeable matter through seepage to create the ‘zone of saturation’, which is sealed off by an impermeable base layer to the bottom. Generally, aquifers can thus be regarded as natural underground storage reservoirs that are replenished by rainfall and influent streams and where water leaves the ground through springs or effluent streams.⁸⁰

However, not all aquifers are created equal. The geological nature of the Nubian Sandstone Aquifer needs to be distinguished from other kinds of aquifers. Indeed, there exist three general types – unconfined, confined and ‘fossil’ – of which the Nubian Sandstone Aquifer is the latter. Whilst the introduction to groundwater and the general concept of aquifers described above can be wholly applied to all three types of aquifers,

⁷⁷ *Ibid*, p. 30.

⁷⁸ Bouwer, *supra* n. 73, p. 4.

⁷⁹ Price, *supra* n. 72, p. 9.

⁸⁰ Bear, J. (1972) *Dynamics of Fluids in Porous Media* (New York: American Elsevier Pub. Co.), p. 5.

they differ in the way they are sealed off to the top, which determines their different characteristics.

Although being sealed by an impermeable base layer of rock or sediments to the bottom, unconfined aquifers are ‘open’ at the top, i.e. their ceilings are permeable.⁸¹ Their upper bounds are merely kept in place by the water table through atmospheric pressure, which usually is revealed by the water level in a well penetrating the aquifer.⁸² Importantly, these aquifers benefit from replenishing rain or surface water seepage from rivers or lakes and equally discharge naturally through springs or seepage. They are often directly connected to bodies of surface water and form an intricate part of the hydraulic cycle (i.e. the continuous evaporation, condensation and precipitation of water).

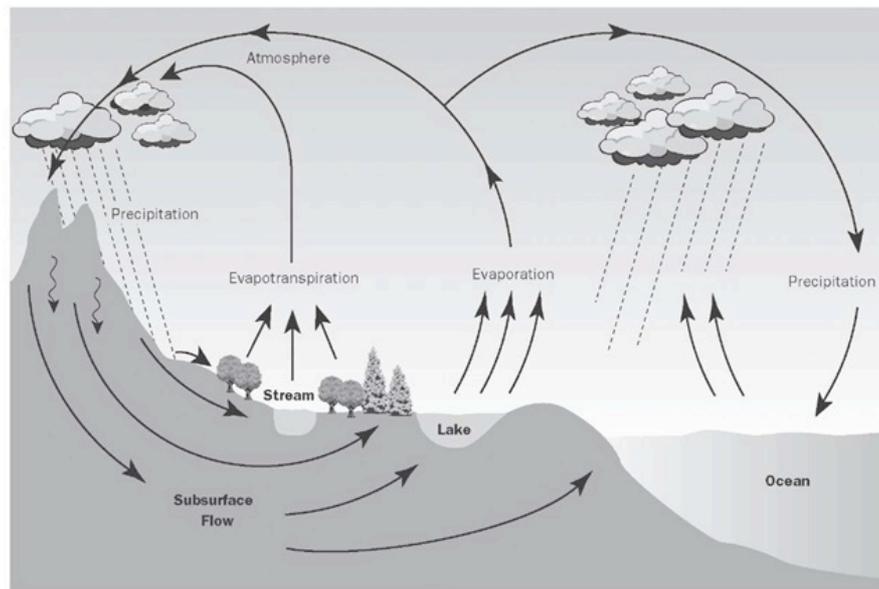


Figure 3: The Hydraulic Cycle (Image source: What-when-how.com)

Consequently, their resource base can be regarded as being renewable and their natural cycle of replenishment and discharge also provides for the removal of contaminants over

⁸¹ Price, *supra*, n. 79.

⁸² Bear, *supra*, n. 80, p. 2.

time. As a result, this is immensely beneficial for both the quantity and quality of water available for use over time.

In comparison, a confined aquifer is a variation of the unconfined type by being wedged between two impermeable layers (e.g. sandstone), one forming the reservoir's base and the other its ceiling. The two layers make the water subject to greater pressure than mere atmospheric pressure, which is why a successful well drilled into a confined aquifer will result in water being propelled out without the need for pumps.⁸³ However, simply because an aquifer is of the confined type does not mean that it cannot dis- and recharge naturally. Lateral flow from higher regions such as distant mountains frequently provides a regular replenishment of its resource base. Equally, a confined aquifer can in principle be capable of natural discharge into lower elevations if these exist.⁸⁴

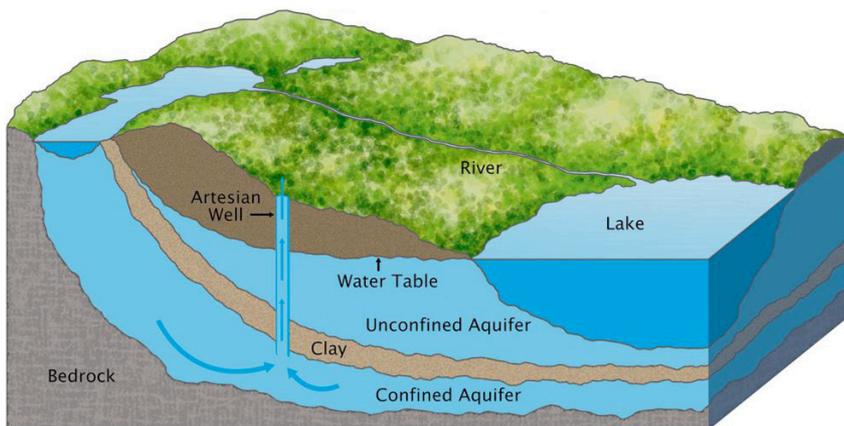


Figure 4: Schematic of confined and unconfined aquifers (Image source: Open Geography Education)

At this point it is important to highlight that the scope of the *1997 Watercourse Convention* in relation to groundwater is limited to these kinds of aquifers. Although Special Rapporteur McCaffrey emphasised in his detailed preliminary study of the subject the quantity of groundwater and its importance to humanity, his work focussed on the more

⁸³ Price, *supra*, n. 72, pp. 10-11.

⁸⁴ Bouwer, *supra*, n. 73, pp. 5-6.

common type of groundwater that is connected to the hydraulic cycle, and which is part of a watercourse ‘system’.⁸⁵ McCaffrey made clear that he thought it vital that States appreciate the interconnectedness between surface water with common groundwater, as the International Law Commission had to decide whether to include the novel concept of the ‘relative international character’ of a watercourse in their deliberations.⁸⁶ It appears that the Special Rapporteur was (rightly) more concerned with preventing that novel concept from creeping into and weakening the scope of the eventual *1997 Watercourse Convention* than to include every aspect of surface and groundwater in the *Watercourse Convention’s* draft articles at the time. One consequence of this strategy was that any aquifer not part of the hydraulic cycle (i.e. being ‘confined’ and ‘disconnected’) did not fall under the scope of Article 2(a):

*“Watercourse” means a system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.*⁸⁷

Instead, many members of the International Law Commission disagreed with the opinion of Robert Rosenstock – who succeeded Stephen McCaffrey as Special Rapporteur – that fossil groundwater should be included in the *1997 Watercourse Convention’s* draft articles.⁸⁸ They believed the topic to be too remote for consideration at that point.⁸⁹ The Commission thus decided not to consider confined and disconnected groundwater as part of the *1997 Watercourse Convention’s* draft articles. In this regard, it is noteworthy that neither

⁸⁵ McCaffrey, S. (1991) ‘The Law of the Non-Navigational Uses of International Watercourses’, *Yearbook of the International Law Commission*, Vol. II (Pt. 1), UN Doc. A/CN.4/SER.A/1991/Add.1 (Part 1), pp. 50-60.

⁸⁶ *Ibid*, p. 62.

⁸⁷ 1997 Convention on the Law of the Non-navigational Uses of International Watercourses.

⁸⁸ Rosenstock, R. (1993) ‘Summary Records’ (2309th meeting), *Yearbook of the International Law Commission*, Vol. I, p. 85.

⁸⁹ Rosenstock, R. (1993) ‘Summary Records’ (2309th, 2311th – 2316th and 2322nd meetings), *Yearbook of the International Law Commission*, Vol. I; Rosenstock, R. (1994) ‘Summary Records’ (2334th – 2339th, and 2353rd – 2356th meetings), *Yearbook of the International Law Commission*, Vol. I.

Libya, Egypt nor Chad were members of the Commission, but that Sudan, which was a member, expressed its opposition to Rosenstock's opinion with the view that confined and disconnected groundwater deserves 'a different set of rules'.⁹⁰

This type of groundwater is contained in so-called 'fossil' aquifers. They do not recharge (or only recharge on a truly negligible scale through minor seepage, for instance) and do not discharge naturally. Although the utilisation of the word 'fossil' as a blanket term perhaps too general to satisfy a geologist,⁹¹ it commonly occurs in legal literature to identify their resource base as finite.⁹² With regards to the Nubian Sandstone Aquifer System, the term 'fossil' is correct both as a geological classification identifying the great age of the contained water and as a legal term of art to signify its finite resource base.⁹³ Studies by Ebraheem et al⁹⁴ and Heinel and Brinkmann⁹⁵ based on a simulation on water extraction in southwest Egypt and Libya to assess the viability of the Aquifer System suggest that there is a real danger of ground water depletion without adequate management of present and future utilisation. Crucially, they are disconnected from any natural water flows – especially the earth's hydraulic cycle – so that the water they contain is stagnant and typically ancient as it was trapped at the same time their surrounding geological structures formed.⁹⁶ As a result, the definitive size of a fossil aquifer is determined by the amount of water it managed to trap during its formation. Subsequent natural change is highly unlikely and would have to evolve along the lines of two fossil aquifers merging through geological

⁹⁰ Rosenstock, R. (1993) 'Summary Records' (2311th meeting), *Yearbook of the International Law Commission*, Vol. I, p. 95.

⁹¹ There are other types of non-renewable aquifers that are not 'fossil' but 'connate', i.e. the water they contain was trapped at a different time the geological structures formed.

⁹² Fetter, C. W. (1994) *Applied Hydrogeology* (New Jersey: Prentice Hall), p. 288.

⁹³ Fetter, *ibid*, pp. 288, 364.

⁹⁴ Ebraheem, A. et al (2002) 'Simulation of impact of present and future groundwater extraction from the non-replenished Nubian Sandstone Aquifer in southwest Egypt', *Environmental Geology*, Vol. 43(1-2), pp. 188-96.

⁹⁵ Heinel and Brinkmann, *supra*, n. 20, pp. 439-441.

⁹⁶ Barberis, *supra*, n. 74, pp. 4-6; Bouwer, *supra*, n. 73, p. 7.

shifts without establishing a connection to other sources of water in the process. As its name suggests, the Nubian Sandstone Aquifer System comprises a web of smaller aquifers that can be divided into two major parts situated in two different geological spheres within the earth's crust: the much older and more extended Nubian Sandstone Aquifer underlies the smaller Post-Nubian Aquifer.⁹⁷ Whilst low permeability layers separate the two aquifers, they are nonetheless hydraulically connected in the form of upward leakage and are thus still considered a single entity, but one that remains disconnected from surface water.⁹⁸ Consistent with the general characteristics of a fossil aquifer, then, the Nubian Sandstone Aquifer System is also unconnected to any other aquifer or aquifer system in the region.⁹⁹

The Difference between ‘Shared’ and ‘Transboundary’ Resources

One of the most important issues for the successful development of an utilisation framework for the Aquifer System will be an appropriate understanding of its nature as a ‘transboundary’ resource, which legal significance goes beyond the general characteristics of groundwater and the different types of aquifers already discussed above. There is no exhaustive list of different types of resources that can be subsumed under the term ‘transboundary natural resource’ but the term implies two inherent geographical characteristics, whereby two or more States have access to the same resource and activities

⁹⁷ Salem and Pallas, *supra*, n. 53, p. 19.

⁹⁸ Pallas, P. and Margat, J. (2004) *Transboundary Aquifers: Scientific-hydrogeological Aspects*, in: Appelgren, B. (ed.): *Managing Shared Aquifer Resources in Africa*. UNECE Series on Groundwater, No. 8 (Paris: Intl. Hydrological Programme), p. 41; notably, the ILC concurs that a system of aquifers of the same geological categorisation ought to be treated as a unitary whole, see Report of the International Law Commission – Sixtieth Session, 5 May-6 June and 7 July-8 August 2008, UN Doc. A/63/10, p. 32, para. 1.

⁹⁹ Fetter, *supra*, n. 93.

by one state have an impact on the capability of the other to use the resource.¹⁰⁰ Resources may be classified as transboundary either when their deposit is divided by a state boundary or when they move from one side of the border to the other, such as straddling fish stocks and other migratory species.¹⁰¹ It is clear, therefore, that transboundary natural resources can encompass living as well as non-living natural resources. As this thesis will not focus on living resources, they do not require more precise categorisation here. On the other hand, non-living resources comprise those that are mobile and those that are static. Mobile transboundary resources can be described as ‘a natural resource which is not only transected by a national frontier, but which is capable of traversing that frontier by virtue of its state of flux’.¹⁰² In other words, the process of self-equilibration either keeps these types of resources in constant movement (e.g. in case of a river) or provides the potential for such motion, especially when the resource in question suffers from an alteration to its geological environment (e.g. through the drilling of wells). In contrast, static resources are immobile and include coal, timber and types of rock. These resources have no potential for self-equilibration. This distinction is important because their different physical characteristics require different methods and processes for successful utilisation or exploitation.

Whereas the question of apportionment of mobile transboundary resources can be difficult, when it comes to their static counterparts a resolution may simply be found, at

¹⁰⁰ UNEP (1975) Co-operation in the field of the environment concerning natural resources shared by two or more States. Report of the Executive Director (UNEP/GC/44 (1975), para. 86; UNEP (1978) Report of the Intergovernmental Working Group of Experts on Natural Resources Shared by Two or More States on the Work of its Fifth Session (UNEP/IG.12/2), para. 16; Adede, A. O. (1978) ‘United Nations Efforts toward the Development of an Environmental Code of Conduct for States Concerning Harmonious Utilization of Shared Natural Resources’, Albany Law Review, 43, pp. 488-512.

¹⁰¹ Matz-Lück, N. (2009) ‘The Benefits of Positivism: The ILC’s Contribution to the Peaceful Sharing of Transboundary Groundwater’, in: Nolte, G. (ed.) *Peace through International Law* (Dordrecht: Springer), p. 130.

¹⁰² Haile, Z. B. and Wadley, I. L. G. (2004) Common goods and the common good: Transboundary natural resources, principled cooperation, and the Nile Basin Initiative (Berkeley: Center for African Studies), p. 3.

least in principle, on the basis of existing boundaries agreed by the state parties concerned or, where these are absent, by way of geographic and geological surveys. In Africa, the *1964 Organization of African Unity Resolution on Border Disputes* determined the post-colonial boundaries of African States' as legally binding (although not historically legitimate), thereby removing the prospect of many on-going border disputes.¹⁰³ When these recognised international boundaries are viewed through the perspective of permanent sovereignty over natural resources,¹⁰⁴ it is possible to ascertain with relative ease the rights held by each claimant over the contested static transboundary resources.¹⁰⁵ This is not possible for mobile transboundary resources due to their nature being in flux, and whilst individual States have entered into agreements that treat certain hydrocarbon deposits as if they were static transboundary resources, this is not the norm.

Whilst rivers, lakes and the oceans have been at the centre of attentions of modern international law for several decades, aquifers have been much neglected both in a national and transboundary context. The emergence of terms of art such as 'the hidden resources' or 'hydroschizophrenia' point towards the elusiveness of groundwater in the international legal sphere.¹⁰⁶ As a result of the neglect of the legal requirements of transboundary aquifers, there is limited global experience in their practical governance. Such governance must, of course, be rooted in law as this transboundary resource definitely leaves the private sphere and affects matters of state.

¹⁰³ *1964 Organization of African Unity Resolution on Border Disputes*, July 21, 1964, AHG/Res. 16(1), stating that 'The assembly of Heads of State and Government meeting in its First Ordinary Session in Cairo, UAR, from 17 to 21 July 1964 [...] solemnly declares that all Member States pledge themselves to respect the borders existing on their achievement of national independence.'

¹⁰⁴ See Art. 2, 1974 United Nations Charter on the Economic Rights and Duties of States, UNGA Resolution 3281(XXIX).

¹⁰⁵ Haile and Wadley, *supra*, n. 102.

¹⁰⁶ Jarvis, *supra*, n. 19.

To this extent, the transboundary nature of the Nubian Sandstone Aquifer System seems rather obvious: water-bearing geological strata straddle the national borders of Libya, Egypt, Sudan and Chad. However, the term ‘transboundary’ has frequently been used to describe the natural resource in question – most prominently hydrocarbons or, indeed, groundwater – as ‘common’ or ‘shared’ between States, in particular by the International Law Commission in its work towards the codification of the law of transboundary aquifers and hydrocarbon resources.¹⁰⁷ Nevertheless, the term ‘transboundary’ describes the physical state of the resource in its geological, geographical and legal dimensions whereas the term ‘shared’ relates more to the actions and attitudes of parties with respect to the resource in question (i.e. ‘sharing’). Accordingly, Szekely argued that

*‘even accepting the inevitable natural unity of a given deposit of resources, the sovereignty of a State over its territory and natural wealth cannot be fragmented, much less shared’.*¹⁰⁸

In other words, where a resource is considered as ‘shared’ between States, each state has accepted a certain set of obligations towards its neighbours and the resource itself and thereby acquiesced to subsume its territorial sovereignty under an agreed set of rules. Consequently, whilst cooperation between neighbouring States in the exploration and exploitation of a transboundary resource can give the appearance of the resource as being ‘shared’ in its physical dimension, there is lack of legal consensus on the view that this marks the resource as something more profound than merely being ‘transboundary’. This, for example, is demonstrated by the uneasiness several States have had towards the use of the term ‘shared’ by the International Law Commission’s mandate for Special Rapporteur

¹⁰⁷ Official Records of the General Assembly, 57th Session, Supplement No. 10 (A/57/10 and Corr.1), paras. 518-519; *Reports by Special Rapporteur Yamada on ‘Shared Natural Resources: Transboundary Groundwaters’* (2003-2007), International Law Commission, 55th- 59th Sessions, UN Docs A/CN.4/533, 539, 551 & 580.

¹⁰⁸ Szekely, A. (1986) ‘International Law of Submarine Transboundary Hydrocarbon Resources: Legal Limits to Behavior and Experiences for the Gulf of Mexico’, *Natural Resources Journal*, Vol. 26(4), p. 735.

Yamada.¹⁰⁹ Whilst there were no outright objections to the use of the term, there was ‘concern’ about considering transboundary resources in general as ‘shared’. Incidentally, the concerned States also did not believe that the study of the international law pertaining to transboundary groundwater was worth the effort – claiming that it did not produce any issues in inter-state relations because ‘practical accommodations’ were always found – whilst perhaps forgetting that the neighbouring States of the Nubian Sandstone Aquifer System by that time had not managed to find such an accommodation for more than a decade.¹¹⁰

The problem with insistence on strict territorial sovereignty, of course, is the risk for the Nubian Sandstone Aquifer System to fall victim to the ‘tragedy of the commons’,¹¹¹ whereby individual States in pursuit of their own self-interest develop and exploit the part of the Aquifer System situated in their territory independently and thereby deplete it prematurely through their collective action. This would not result in equitable utilisation of the Aquifer, but instead allow the state with the best ability to extract – if not all of the water – at least its lion’s share. The risk of prematurely depleting the aquifer, for instance, might become less significant if by virtue of a head start a state can expect to overall extract more water than its allotted share under a multilateral agreement.

What is required to prevent this outcome, therefore, is international cooperation based on a framework of equitable utilisation that is rooted in international environmental law. However, as the following section shall explain, the crux of the matter is that States are in principle self-interested and vie to protect their territorial sovereignty. Although the

¹⁰⁹ Yamada, C. (2003) *Shared Natural Resources: First Report on Outlines*, International Law Commission, 55th Session, UN Doc. A/CN.4/533, p. 3.

¹¹⁰ *Ibid*, pp. 3-4; unless indicated otherwise, this thesis will interpret the term ‘shared’ in its practical sense, i.e. denoting its transboundary meaning.

¹¹¹ Lloyd, W. F. (1833) *Two Lectures on the Checks to Population*. (Oxford: S. Collingwood); see also Hardin, G. (1968) ‘The Tragedy of the Commons’, *Science*, 162(3859), pp. 1243-8.

derogation of territorial sovereignty to serve a greater goal is in itself an act of national sovereignty – one cannot renounce something without having right to it first – even when multilateral action can be expected to deliver the best outcome for all concerned, it is not always the case that individual States adopt that approach.

Potential for Conflict Over Transboundary Water Resources

– “War does not determine who is right, but who is left” –

British WW II veteran, Bournemouth, 1997

Notwithstanding the fact that more than half the world’s population lack sufficient access to safe drinking and sanitation water, it is difficult to establish multilateral management and utilisation regimes for groundwater.¹¹² Unfortunately, access is often at risk because of inadequate or absent water policies and programmes.¹¹³ Consequently, beyond direct humanitarian implications, there is significant potential for conflict because international institutions are often ill equipped to resolve tensions between stakeholder States through their own means.¹¹⁴ Apart from the availability of fresh water for human consumption and even agriculture, States’ water requirements also extend to other areas of their economies, but on which international institutions traditionally engaged in water management have less influence over.

¹¹² Duda, A. et al. (2012) *Contributing to Global Security. GEF Action on Water, Environment and Sustainable Livelihoods* (Washington: GEF Secretariat), p. 3.

¹¹³ *Ibid*, p. 51.

¹¹⁴ Klare, M. T. (2001) *Resource Wars. The New Landscape of Global Conflict* (New York: Metropolitan Books); Wolf, A. T. (1998): ‘Conflict and cooperation along international waterways’, *Water Policy*, Vol. 1(2), pp. 256-60.

States are unlikely prompted to commit to the equitable utilisation of transboundary water resources out of inherent benevolence. The mere fact that international law primarily relies upon nation States' acquiescence for momentum underscores that most fundamental of premises of political realism: States are ultimately self-interested. One should expect States to work in self-interested ways to secure an advantage over their peers, especially with regards to scarce natural resources. Although there are examples of States dividing their common natural resources between them in a proactive manner, to date these have been overshadowed by examples of the opposite.

States have been embroiled in international conflicts for various reasons since times immemorial, chief among which is at least access – if not control – over strategic natural resources. The United States Joint Army and Navy Munitions Board made perhaps the first attempt by a state organ to define strategic resources for the modern age following World War I in 1922. The Board arrived at two broad classifications for natural resources to emphasise their national importance: there were those of strategic nature (i.e. essential to maintain military capabilities) and those that were critical to national welfare in general.¹¹⁵ The interest the US military paid to the topic highlights the centrality of natural resources to national welfare in the broadest sense of the word. Accordingly, control over natural resources has been one of the key determinants of wars in the past. The rise of industrialism during the Victorian era, for example, has intensified the struggle for raw materials. An early study of the causes of wars by Bakeless suggests that 14 of 20 major wars during 1878-1918 were related to conflicts over natural resources, including Chile's war with Bolivia and Peru over control of the nitrate trade (War of the Pacific, 1879-

¹¹⁵ Kessel, K. A. (1990) *Strategic Minerals: U.S. Alternatives* (Washington, DC: National Defence University Press), pp. 13-14.

1884).¹¹⁶ Even as recent as the 1990 Gulf War, the United States justified intervention with reference to the Carter Doctrine.¹¹⁷

Yet, when the discussion turns away from the generality of natural resources and to the specifics of water, academic discourse over the last 25 years has concluded that conflict over it is a myth because it would be counterproductive.¹¹⁸ According to McCaffrey, international water agreements have ancient roots, some of which date back several thousand years.¹¹⁹ He argues that the earliest recorded water sharing agreement known today was one concluded between the Mesopotamian upper riparian state of Umma and the lower riparian state of Lagash to settle – at least temporarily – a conflict over the diversion of waters from the river Euphrates in approximately 3100 BC.¹²⁰ Indeed, the end of the Early Dynastic period of southern Mesopotamia (today's Iraq) was marked by an expansion of centralised urban polities, which resulted in ever growing pressure on shared water resources,¹²¹ a development that would resonate with today's inhabitants of water scarce regions ranging from Las Vegas to Mumbai to Beijing. Whilst on the surface the dispute between the two States was about entitlement to tracts of field and pasture along their 28-mile common border, the fundamental issue was access to fresh water without which the land would have been barren. In this context, McCaffrey and others suggest that humanity, and therefore States, have for millennia possessed the basic will to come

¹¹⁶ Bakeless, J. (2021) *The Economic Causes of Modern War. A Study of the Period 1878-1918* (London: Forgotten Books, reprint 2013), pp. 58-9; see also Acemoglu, D. et al. (2012) 'A Dynamic Theory of Resource Wars', *The Quarterly Journal of Economics*, 127(1), pp. 283-331.

¹¹⁷ The Carter Doctrine was a policy proclaimed by the US President in his State of the Union Address on 23rd January 1980, which stated that the United States was prepared to use military force to defend its national interests in the region of the Persian Gulf, namely 'exportable oil'.

¹¹⁸ Wolf, *supra*, n. 114, p. 259.

¹¹⁹ McCaffrey, S. (2007) *The Law of International Watercourses* (Oxford: Oxford University Press), p. 59.

¹²⁰ *Ibid*, p. 60.

¹²¹ Adams, R. McC. (1981) *Heartland of Cities. Surveys of Ancient Settlement and Land Use on the Central Floodplain of the Euphrates* (Chicago: University of Chicago Press), p. 134.

together and regulate their water distribution to overcome adversity imposed by their habitat.¹²²

Whilst it is true that the actual agreement between Lagash and Umma, preserved on the Victory Stele of Eannatum, King of Lagash (better known as the ‘Stele of the Vultures’), is one of the earliest documentations of inter-state relations,¹²³ it allows for a decidedly different interpretation. The Stele is a limestone slab celebrating Lagash’s victory over Umma and the killing of its king in battle, and is named after the vultures that adorn one of the engraved scenes. It uses both inscriptions and pictures to convey its bleak message. The key passage pertaining to the two States’ water arrangement in the translation of the (badly damaged) Stele reads:

*The ruler of Umma to Eannatum does swear: “By the life of Enlil, king of heaven and earth, the fields of Ningirsu [the Sumero-Babylonian god of rain, irrigation, and fertility] I shall exploit as an interest-bearing loan. I shall operate the levees up to the spring, and forever and ever over the boundary territory of Ningirsu I shall not cross. To its levees and irrigation ditches I shall not make changes.”*¹²⁴

Although this does amount to an arrangement between the two States, it does not represent a cooperative relationship or an early example of modern principles of transboundary water management based on equitable distribution. Instead, Lagash, the more powerful of the two treaty parties even before their war,¹²⁵ imposes its demands on defeated Umma – including the payment of tribute and the assurance that the flow of water will remain unaltered in Lagash’s favour – but without accepting obligations of its own. It

¹²² McCaffrey, *supra*, n. 119, p. 61; Dinar, A. et al (2013) *Bridges over Water* (Singapore: World Scientific Publishing), pp. 68-9; see also Shelton, D. (2008) ‘International cooperation on shared natural resources’, in Hart, S. (ed.) *Shared Resources: Issues of Governance* (Gland/Bonn: IUCN), pp. 1-14; Wolf, *supra*, n. 114, p. 251.

¹²³ Nussbaum, A. (1954) *A Concise History of the Law of Nations* (New York: Macmillan), p. 2.

¹²⁴ Starr, J. J. (n. d.) *Translations of the Vulture Stele and the Eannatum Boulder*, online content (available at <http://sumerianshakespeare.com/38801.html>) (accessed 10 May 2015).

¹²⁵ Adams, *supra*, n. 121, p. 157.

is clearly an example of the victor squeezing the vanquished. The new King of Umma, who is not even named, is made to swear the same oath to seven different deities to prevent him from recanting whilst the Stele was erected on the Lagash-Umma border for everyone to see. To this end, the Stele fulfilled an important political purpose: it was an ‘agent’ for Lagash’s territorial claim over the disputed land and its integral water resources by eliciting support for its particular perspective on events and thereby preserving a moral and contractual bind for posterity.¹²⁶ The Stele only represents the view of Lagash, the views and motivations of defeated Umma are given no space. It literally inscribes the terms of the arrangement in stone as if to extinguish any prospect of renegotiation whatever the circumstances.

This ancient example of a water ‘agreement’ concerning non-navigational uses of a shared watercourse demonstrates that humanity did not always amicably agree on sharing water available to them. In contrast to the suggestion offered by McCaffrey’s observation, States have been in conflict with one another over scarce water resources through the ages. More recently, during the Fashoda crisis in September 1898, a French expeditionary force attempted to capture the headwaters of the White Nile in today’s South Sudan to deny the British access to water and force them out of Sudan.¹²⁷ In 1965, Brazil occupied the Guaira Falls on the Paraná River to achieve an advantage over Paraguay in negotiations over the use of the river.¹²⁸ Incidentally, there is no indication that Umma would have behaved any different to Lagash if the tables had been turned. Unsurprisingly, the Lagash-Umma war and the Stele did not end the water conflict and a later Lagash king ordered the

¹²⁶ Winter, I. J. (1985) ‘After the Battle is Over: The Stele of the Vultures and the Beginning of Historical Narrative in the Art of the Ancient Near East’, *On Art in the Ancient Near East, Vol. II* (Leiden: Brill), pp. 30-31.

¹²⁷ Bell, P. M. H. (2014) *France and Britain, 1900-1940: Entente and Estrangement* (London: Routledge), p. 3.

¹²⁸ Grover, V. I. (2007) *Water: A Source of Conflict or Cooperation?* (Enfield: Science Publishers), p. 327.

construction of a new canal to channel water from the Tigris to Lagash, which still exists as the Shatt-al-Hai Canal in Iraq.¹²⁹

It is therefore important to stress that equitable water agreements do not materialise without continuously striving to create and maintain them. Until the inception of the United Nations, even modern international water law (as part of modern general international law), was more occupied with navigational uses and sovereignty than the equitable distribution of water resources.¹³⁰ A study by Westcoat shows that between 1648 and 1792 treaties were dominated by concerns over the laws of nature and of state and that between 1804 and 1868 they addressed watercourses only in the context of conflict and commerce.¹³¹ Accordingly, the development of international water law was at first almost completely concerned with the rights of free navigation; the legal navigational regime of international rivers was first considered in the 1815 Congress of Vienna, during which the principle of free navigation on Europe's international rivers was proclaimed.¹³²

Water is undoubtedly incredibly important to the four Aquifer States because of their agricultural economies and general scarcity of the resource within the prevailing arid conditions of the region. Scholars such as Homer-Dixon have concluded that struggle over access to resources has been an important cause of lacking cooperation, tension and conflict.¹³³ The core thesis of these writers is that resource scarcity may not result in the

¹²⁹ Lloyd, S. H. F. (1961) *Twin Rivers: A Brief History of Iraq from the Earliest Times to the Present Day* (Oxford: OUP).

¹³⁰ FAO (1978) *Systematic Index of International Water Resource Treaties, Declarations, Acts and Cases by Basin* (Rome: Food and Agricultural Organization of the United Nations), pp. 1-4.

¹³¹ Westcoat, J. L., Jr. (1996) 'Main Currents in Early Multilateral Water Treaties: A Historical-Geographical Perspective, 1648-1948', *Colorado Journal of International Law and Policy*, 7, pp. 39-74.

¹³² Yamada, *supra*, n. 109.

¹³³ Percival and Homer-Dixon (2001) 'The Case of South Africa', in Diehl, P. F. and Gleditsch, N. P.: *Environmental Conflict* (Boulder: Westview Press); Gleick (1993) *Water in Crisis. A Guide to the World's Fresh Water Resources* (Oxford: OUP); Brock, L. (1991) 'Peace through Parks: The Environment on the Peace Research Agenda', *Journal of Peace Research* 28(4), p. 407-423; World Commission on Environment and Development (1987) *Our Common Future: Report of the World Commission on Environment and Development*, UN Doc. A/42/427; Galtung, J. (1982) *Environment, Development and Military Activity. Towards Alternative Security*

affected States coming together for coordinated, reasonable resource management but instead push individual agendas to further their own interests. Access to fresh water in particular is essential to achieve that goal: including the protection of a healthy population, agricultural production and industrial development. In essence, water underpins the national economy and thereby facilitates the socioeconomic basis for state development. Water's crucial significance thus ensures that when States perceive their access to it to be threatened, the risk for international conflicts as diverse as war, terrorism or diplomatic disputes increases.¹³⁴

Environmental stress is one of the most important factors that can contribute to that risk where States regard it as a threat to their national security.¹³⁵ Since the end of the Cold War, the view of what constitutes a threat to security as well as what constitutes conflict has evolved to include environmental pressures as part of an array of security sub-categories on which the general physical, social and economic well-being of a nation are founded. Notably, Richard Ullman, a distinguished historian and scholar of diplomacy and foreign policy, proposed to define 'a threat to national security' as

*'an action or sequence of events that (1) threatens drastically and over a relatively brief span of time to degrade the quality of life for the inhabitants of a state, or (2) threatens significantly to narrow the range of policy choices available to the government of a state or to private, nongovernmental entities (persons, groups, corporations) within the state.'*¹³⁶

Doctrines (Oslo: Norwegian University Press); Choucri, N. and North, R. C. (1975) *Nations in Conflict* (San Francisco: Freeman).

¹³⁴ Hamilton, A. (2003) 'Resource Wars and the Politics of Abundance and Scarcity', *Dialogue*, 1(3), pp. 27-38.

¹³⁵ Homer-Dixon, T. F. (1999) *Environment, Scarcity and Violence* (Princeton: Princeton University Press), p. 3.

¹³⁶ Ullman, R. (1983) 'Redefining Security', *International Security*, 8(1), p. 133.

According to this definition, environmental degradation and the ungoverned exhaustion of natural resources in the context of population growth are threats to security because they are ‘bound to degrade the quality of life, and diminish the range of options available’.¹³⁷ Although Ullman offered his definition of ‘security’ from the perspective of a rich state threatened by the population growth in the developing world, and while his definition is very broad, it raises the issue of how environmental stress can potentially affect national policies. As such, environmental stress could take up a plethora of causal roles and in some cases even act as a direct cause of conflict whilst in others it is only a minor factor in a wider tale consisting of international politics, the drive for economic growth and social pressures.¹³⁸ What remains, however, is the increased risk of conflict between the States concerned.

The term ‘conflict’, however, is a rather malleable term and could describe the clash of opposing interests in a violent as well as a non-violent manner. Intuitively, the notion of violent conflict appears the more tractable of the two. Scholars adherent to the realist school of international relations assert that environmental stress is capable of shifting the balance of power to the detriment of the state most affected, thereby producing both regional and global power instabilities that could even cause war.¹³⁹ Another scenario proposed by the realist camp is that global environmental damage widens the gap between industrialised and developing States, increasing the risk that poorer nations might militarily confront the rich for a fairer share of the planet’s wealth.¹⁴⁰ Based on these scenarios, it could even be asserted that the rich-poor divide does not necessarily have to be the

¹³⁷ *Ibid*, p. 143.

¹³⁸ Homer-Dixon, *supra*, n. 135.

¹³⁹ Gilpin, R. (1981) *War and Change in World Politics* (Cambridge: Cambridge University Press), pp. 94, 191.

¹⁴⁰ Heilbroner, R. (1980) *An Inquiry into the Human Prospect* (New York: W. W. Norton), p. 39; Ophuls, W. (1977) *Ecology and the Politics of Scarcity: A Prologue to a Political Theory of the Steady State* (San Francisco: Freeman), pp. 214-17.

prominent driver. Campaigns to secure a larger share of earth's resources by States need not be confined to the struggle – real or perceived – between industrialised and developing nations. The mere fact that a resource is finite and scarce could compel States to claim as much of it as they possibly can. Resource scarcity alone could potentially be enough to prompt a state to launch a campaign involving the military to secure access to those scarce resources. Russia, for example, formally requested the Commission on the Limits of the Continental Shelf to declare almost 1.2 million km² of Arctic Ocean seabed north of the Arctic Circle, including the North Pole, as part of its continental shelf in 2015.¹⁴¹ Previously, the area north of the Arctic Circle had been estimated by the US Geological Survey to contain roughly 43% of the world's undiscovered hydrocarbon resources, mostly offshore and at rather accessible water depths of less than 500 metres.¹⁴² In concert with its diplomatic efforts, the Russian Ministry of Defence (a co-author of the request put to the Commission) also reopened military bases and tasked a new Arctic Strategic Command, centred on the Northern Fleet, to presumably protect the country's interests in the region against other Arctic States.¹⁴³ Many of Russia's neighbouring Arctic States – Canada, Denmark, Norway and the United States – have equally stepped up their military activities in Arctic waters, whilst Denmark, Canada and Norway have also lobbied the Commission in respect of the extent of their continental shelves in the Arctic.¹⁴⁴

¹⁴¹ Ministry of Natural Resources and Environment of the Russian Federation et al (2015) Partial Revised Submission of the Russian Federation to the Commission on the Limits of the Continental Shelf in Respect of the Continental Shelf of the Russian Federation in the Arctic Ocean – Executive Summary (Moscow: Ministry of Natural Resources and Environment of the Russian Federation).

¹⁴² Gautier, D. L. et al (2009) 'Assessment of Undiscovered Oil and Gas in the Arctic', *Science* 324(5931), pp. 1175-79.

¹⁴³ Jones, B. (2014) 'Russia activates new Arctic Joint Strategic Command', *IHS Jane's Defence Weekly* (Online content), available at <http://www.janes.com/article/46577/russia-activates-new-arctic-joint-strategic-command> (accessed 28 July 2015).

¹⁴⁴ Select Committee on the Arctic (2015) *Responding to a changing Arctic: Report of Session 2014–15*, Ch. 3 (London: The Stationary Office Ltd), p. 31 ff.

Far from being confined to the new resource frontier of the Arctic, there is evidence of resource jostling among the four Aquifer States, too. In this context, a comparison of the different attitudes by the two successive Egyptian governments towards the Nile since 2012 reveals that there remains considerable risk of conflict over precious water resources in the region. Article 19 of the *2012 Constitution of the Arab Republic of Egypt* stipulated rather reservedly that

'The Nile River and water resources are a national wealth. The State is committed to maintaining and developing them, and preventing abuse. The use of such resources shall be regulated by law.'

In contrast, Article 44 of the new constitution of 2014 is considerably more aggressive in tone:

'The state commits to protecting the Nile River, maintaining Egypt's historic rights thereto, rationalize and maximize its use, and refrain from wasting or polluting its water. The state shall also protect its groundwater; adopt necessary means for ensuring water security; and support scientific research in that regard. Every citizen is guaranteed the right to enjoy the River Nile. It is prohibited to trespass the riverbank reserve or harm the riverine environment. The State shall guarantee eliminating any trespass against the River Nile as regulated by Law.'

Notably, it contains the notion that Egypt possesses historic rights to the Nile, which it will be defending against any trespasser, presumably both individuals and States. Article 44 also extends to groundwater and therefore implies the risk of conflict arising over the utilisation of the Nubian Sandstone Aquifer System. In particular, Article 44 introduces considerable uncertainty into Egypt's future relationship with the other Aquifer States. To what extent will it be willing to cooperate? Will it consider Libya's Great Man-Made River Project as trespass onto its groundwater at some point in the future? What actions will it consider and eventually take to protect its water resources when it regards them to be

under threat?

It is highlighted at this point that Buotros Buotros-Ghali, former UN Secretary General and an Egyptian, once warned that ‘the next war in our region will be over the waters of the Nile’.¹⁴⁵ His comment is in line with Egypt’s repeated statements that it is willing to use military force to ensure its continued access to the waters of the Nile.¹⁴⁶ Egypt briefly occupied disputed territory amidst pending negotiations over the Nile waters with Sudan in 1958.

Wolf, on the other hand, criticises writers such as Westing¹⁴⁷ and Remans¹⁴⁸ for being imprecise when alleging that certain previous conflicts have occurred over water. He argues that there are 261 international watersheds, of which only some appear to be situated in geographical areas where an invasion or occupation scenario by a lower riparian state would be thinkable. In his view, armed conflict over water is ‘neither strategically rational, hydrographically effective, nor economically viable’.¹⁴⁹ It might even be conceivable that the water flow does inspire feelings of connectivity in addition to practical considerations, which could bring parties to the negotiating table. Wolf points out that India and Pakistan, for example, have been engaged in three full-scale wars since 1947 in addition to numerous skirmishes and serious threats of war. Yet their water infrastructure has not been the target

¹⁴⁵ Okbazghi, Y. (2008) *Water Resources and Inter-Riparian Relations in the Nile Basin: The Search for an Integrative Discourse*. Albany: State University of New York Press, p. 6.

¹⁴⁶ Tvedt, T. (2009) ‘About the Importance of Studying the Modern History of the Countries of the Nile Basin in a Nile Perspective’, in Tvedt, T. (ed.) *The River Nile in the Post-Colonial Age: Conflict and Cooperation among the Nile Basin Countries*. London: I. B. Tauris, p. 7.

¹⁴⁷ Westing, A. H. (ed.) (1986) *Global Resources and International Conflict: Environmental Factors in Strategic Policy and Action* (New York: OUP).

¹⁴⁸ Remans, W. (1995) ‘Water and War’, *Humantäres Völkerrecht* Vol. 8(1).

¹⁴⁹ Wolf, *supra*, n. 114, p. 259.

of their mutual aggressions and the protection of dams is codified in Protocol I of the Geneva Convention's Laws of War¹⁵⁰.

However, Wolf, and incidentally those warning of 'water wars', focus on rivers. Confined fossil aquifers such as the Nubian Sandstone Aquifer System, are of course different by nature. There is no stable flow at risk that mutually benefits all four Aquifer States. There is also no danger of a dam breaking and flooding the lower riparian state as a consequence of violent conflict, which might otherwise prove as a deterrent of attack. From a strategic perspective, there is little difference between the well field of an aquifer and the well field of an oil prospect. Both are geographic areas with fixed infrastructure, which can be captured and held militarily without giving the defending state a chance to choke off water flow in retaliation as might be possible when dealing with a river. Evidently, the ILC thought along the same lines and provided Draft Article 18 – Protection in Time of Armed Conflict – as part of the *2008 Draft Articles* further discussed below. Concurrently, Draft Article 19 – Data and Information Vital to National Defence or Security – provides scope for States to withhold information vital to their national defence. These two Draft Articles, therefore, demonstrate that ILC is certainly aware of transboundary aquifer's potential to become a target during an international conflict.

Even if this kind of reasoning appears hyperbolic, and whilst Wolf's argument that the common interest in good water flow and quality are powerful factors in preventing conflict over shared water resources has its merits,¹⁵¹ the contention that cooperation is therefore the predominant modus operandi whenever water rivalry between States could occur is too

¹⁵⁰ Art. 56, 1977 Protocol additional to the Geneva Convention of 12 August 1949, and Relating to the Protection of Victims of International Armed Conflicts (Protocol I).

¹⁵¹ Wolf, *supra*, n. 149, pp. 257-8.

idealistic.¹⁵² Notably, the quantitative research by Wolf et al also suggests that cooperation between riparian States often remains relatively shallow and rarely leads to established regimens of joint water management.¹⁵³ Crucially, there is a dearth of comparative examples for the utilisation of transboundary ‘fossil’ aquifers, especially in an arid region such as North Africa. Galtung’s theory of ‘negative peace’, whereby a stalemate or deadlock between disputing States over their shared waters results merely in the absence of violence without further constructive collaboration, therefore offers a more convincing scenario.¹⁵⁴ Consequently, notional cooperation, i.e. what the study by Wolf et al identified as ‘mild interactions’,¹⁵⁵ does not automatically lead to conscientious development of the shared water resource. Notwithstanding the Aquifer States’ on-going search for a framework for equitable utilisation of the Aquifer System for almost 30 years, the development of the transboundary groundwater has continued unchecked.

Given that the water contained in the Nubian Sandstone Aquifer System is a finite resource, a lack of cooperation and coordination between the Aquifer States could put the aquifer under unnecessary stress and degrade its quality. As discussed above, this would likely increase environmental stress, which in turn would increase the risk of conflict between the stakeholder States.

Nation States vie for water for different uses, but the intricacy of man-made boundaries make the issue of international water disputes a formidable and volatile one. The inherent conflict between constrained utilisation in the interest of conserving this precious resource and water’s centrality to economic development means that progress in legal development

¹⁵² Wolf, A. T., Yoffe, S. B. and Giordano, M. (2003) ‘International waters: identifying basins at risk’, *Water Policy*, 5(1), p. 39.

¹⁵³ *Ibid.*

¹⁵⁴ Galtung, J. (1996) *Peace by Peaceful Means: Peace and Conflict, Development and Civilisation* (Oslo: Peace Research Institute), p. 14.

¹⁵⁵ Wolf, Yoffe and Giordano, *supra*, n. 152.

has been slow and whatever development was achieved has been diluted by compromise. This is not to say, of course, that compromise is inherently undesirable. It sometimes can be a helpful tool to help along the agenda by smoothing out minor creases but too often it weakens the agreed plan of action as it forces the contractual parties to make concessions they may well regard as a loss to their position. The concept of compromise starts with the notion of two opposing positions that eventually ‘meet somewhere in the middle’ but have had to make sacrifices along the way. It is not even guaranteed that the opposing sides have made equal sacrifices or acted in good faith, especially when the compromise was achieved based on considerations unrelated to the issue at hand. Consequently, the risk of a self-perceived ‘loser’ wanting to make good on that ‘loss’ increases, which in turn reduces the security of the agreement. Instead of mere compromise, the search for common principles should prevail and a solution should be built on that foundation. Unlike compromises, the search for common principles between contracting parties significantly reduces ambiguity and eliminates the notions of ‘winners’ and ‘losers’. As a result, searching for a solution based on shared principles instead of mere compromise improves the prospects of good faith.

What have the Four Aquifer States achieved to date?

The geological intricacies of transboundary groundwater as well as the unique nature of transboundary confined fossil aquifers make stakeholder engagement over aquifer utilisation key. However, there is no treaty between any of the Nubian Sandstone Aquifer System’s stakeholder States that would effectively regulate the equitable utilisation of the Aquifer.¹⁵⁶ Although all four stakeholder States depend on scarce water resources for their

¹⁵⁶ Pallas and Margat, *supra*, n. 98, p. 45.

economies and the livelihood of their citizens, they have struggled to arrive at a mutually agreeable framework for more than two decades. Prior to 2005, the four States had only concluded three agreements in relation to the study of the Nubian Sandstone Aquifer System, all three of which fell short of constituting viable frameworks in relation to its use. With support from the Global Environment Facility (GEF) since 2005, the four States have yet again been engaged in formulating a comprehensive framework but the published schedule suggests a completion horizon well beyond 2020. Provided that this loose schedule is kept, the Aquifer States will have been engaged in a solution-finding process for the utilisation of the Nubian Sandstone Aquifer System for almost 30 years. This circumstance emphasises the complexity of the issues involved and highlights the gap in international law in relation to transboundary confined fossil aquifers that has protracted the solution-finding efforts.

The first of the pre-2005 agreements created the Joint Authority through the drafting of a ‘Constitution’ in 1992. Although the 2008 Draft Articles would not be written for another 16 years, the formation of the Joint Authority is firmly in line with Article 14 (‘Management’) of the Draft Articles, which marks the formation of the Joint Authority as an important component of the four Aquifer States’ efforts to arrive at a framework solution for the equitable utilisation of the Nubian Sandstone Aquifer System. The Authority was established as a bilateral organisation between Libya and Egypt at a time when both States were engaged in uncoordinated large groundwater abstraction from the Aquifer System. The two countries recognised the need for a joint study of the Nubian Aquifer basin to avoid losing access to the resource, which otherwise would have

devastating effects on the welfare of their populaces and economies. The remaining two Aquifer States – Sudan and Chad – later joined in 1996 and 1999, respectively.¹⁵⁷

In response to the problem of unfettered extraction of transboundary groundwater, the Authority's Constitution advocates it was intended to serve as a joint institution/commission for the management of the Nubian Sandstone Aquifer System. Accordingly, the drafters cast a wide net to capture the Joint Authority's managerial responsibilities, allowing it to conduct studies on the Aquifer System, draft programmes and plans for its utilisation and propose common water policies.¹⁵⁸ Art. 3(6) of the Constitution even provides for the Authority to 'undertake to ration the consumption of Nubian Sandstone Aquifer Waters in member countries'.¹⁵⁹ However, this is not reflected in the powers bestowed upon the Authority's Board of Directors and its Executive General Director, which are focussed on the internal administration of the Authority and do not extend to the ability to direct member States in their national water consumption.¹⁶⁰ Instead, the respective ministries of at least two Aquifer States retain full control over their domestic share of the Nubian Aquifer System, which practically renders any ambition by the Authority to impose Art. 3(6) futile.¹⁶¹ Notwithstanding, there is no evidence of the Authority ever having sought to exercise its powers under Art. 3(6). This highlights the first flaw of the current arrangement between the four Aquifer States: whereas on paper the

¹⁵⁷ Joint Authority for the Study and Development of the Nubian Sandstone Aquifer System (2015) 'The common definition of the Authority for the Study and Development of the Nubian Sandstone Reservoir' (translated from Arabic), online content, available at http://www.nsasja.org/about_ar.php.

¹⁵⁸ Art. 3, 1992 Constitution of the Joint Authority for the Study and Development of the Nubian Sandstone Aquifer Waters (English Translation), in GEF (2004) Project Proposal – 'Regional Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer' (Washington: GEF), Annex 7.

¹⁵⁹ Art. 3(6), *ibid.*

¹⁶⁰ Arts. 8, 10 and 13, *supra*, n. 158.

¹⁶¹ See for example Sudan Ministry of Water Resources (2016) 'General Administration of Groundwater and Valleys' (translated from Arabic), available at <http://goo.gl/gmvCtC> (accessed 4 June 2016); Arts. 18-36, Part IV (Groundwater), Resolution 14717, *1984 Irrigation and Drainage Law*, Egypt; the websites of the Water Ministries of Libya and Chad could not be reached.

Joint Authority was established as a competent management body with sweeping powers, this ambition is not reflected in the intricacies of the Constitution.

At the centre of this flaw lies the Constitution's lack of inclusion or reference to any water management principle. Even the Joint Authority's own website describes the organisation as having only a limited mandate to the extent that it implements joint studies to strengthen member countries' capacity for future joint management of the Aquifer System, but without including clearly defined management functions vis-à-vis the Aquifer System's groundwater resources, such as a methodology for the allocation of water to member States.¹⁶² There are no other accessible sources on the establishment of the Joint Authority apart from a description of its institutional structure on its webpage, but without reference to any articles of association, governance systems or other indicators of oversight by respective parliaments or national assemblies. In other words, even if Libya and Egypt as the two drafting countries of the Authority's Constitution (Chad and Sudan simply adopted it when they joined) had formed the Constitution to include a potential for the Joint Authority to exercise powers to allocate water to different member States at some point in the future, the Authority's role to date has been confined to the maintenance of diplomatic channels and to act as a 'switch board' between the relevant ministries of the four Aquifer States, various United Nations organisations and other NGOs. Indeed, the Joint Authority's description of the duties of a member of the Board of Directors broadly falls into two camps: administering the organisations budget and personnel, and to 'build bridges of cooperation between international and regional institutions and bodies'.¹⁶³ The

¹⁶² Joint Authority for the Study and Development of the Nubian Sandstone Aquifer System (2015) 'Objectives of the Commission', (translated from Arabic), online content, available at http://www.nsasja.org/objects_ar.php.

¹⁶³ Joint Authority for the Study and Development of the Nubian Sandstone Aquifer System (2015) 'Board of Directors', (translated from Arabic), online content, available at http://www.nsasja.org/council_ar.php.

Constitution thus appears to be rather an institutional arrangement or an executive regulation for the Joint Authority instead of a comprehensive groundwater management tool.

The other two agreements came to fruition with support from the International Fund for Agriculture and Development (IFAD), the Islamic Development Bank (IDB) and the United Nations Development Programme's Global Environment Facility (UNDP-GEF). Building on that support between 1998 and 2002, the Joint Authority launched several initiatives to implement a joint survey of various socio-economic development policies and plans, including the establishment of a Nubian Sandstone Aquifer Regional Information System (NARIS) database. NARIS became instrumental in the preparation of data for a regional model to simulate groundwater flow under different scenarios based on different socio-economic development strategies related to the groundwater resources in the four Aquifer States.¹⁶⁴ The Joint Authority subsequently identified the need for the expansion of aquifer monitoring and the establishment of a network of observation wells. In response, the Aquifer States launched a Regional Cooperation Programme for the Development of the Nubian Sandstone Aquifer System.¹⁶⁵ Two basin-wide agreements between the four Aquifer States marking the first tangible regional collaboration were then signed in 2000.¹⁶⁶ The so-called Agreements No. 1 and 2 led to the production and development of regional thematic maps, a mathematical model, and a regional information system. However, the project was not successful in formulating a comprehensive development strategy, and the envisioned development activities did not exceed the planning stage by the end of the

¹⁶⁴ IAEA (2010) *Regional Shared Aquifer Diagnostic Analysis For the Nubian Sandstone Aquifer System – Second Draft Report* (Vienna: IAEA), p. 1.

¹⁶⁵ Burchi, S. Mechlem, K. (2005) *Groundwater in International Law. Compilation of Treaties and other Legal Instruments* (Rome: FAO/UNESCO), p. 4.

¹⁶⁶ FAO (n.d) *FAO Corporate Repository – Groundwater Agreements*, online content, available at <http://www.fao.org/docrep/008/y5739e/y5739e05.htm#bm05>.

project in 2002.¹⁶⁷ These three agreements represented the only steps towards an utilisation framework of the Aquifer System until 2005. Although NARIS, detailed maps, flow models and an information system are important components of a basin-wide groundwater development strategy, on their own they fall short of providing an adequate framework for water management.

These general shortcomings have been recognised by the four Aquifer States and the GEF. To address them, the GEF agreed to finance a ‘Medium Sized Project’ in 2005, which comprises five ‘Components’ that are to build on each other to arrive at a groundwater management framework. Component 1 re-visited previous efforts to scientifically assess the Aquifer System through a ‘Shared Aquifer Diagnostic Analysis’ (SADA) to prepare the ground for subsequent Components and was concluded in 2008. Component 2 constitutes a Strategic Action Programme (SAP), which was – after a five-year delay – launched as the *Regional Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer* in 2013.¹⁶⁸ This Action Programme aims to arrive at ‘rational and equitable management of the NSAS towards sustainable socio-economic development and the protection of biodiversity and land resources’.¹⁶⁹ Its purpose is to prepare the ground for Component 3, which seeks to establish a ‘framework for developing an agreed legal and institutional mechanism towards a NSAS convention’. Components 4 and 5 represent various project management and evaluation activities, essentially aimed at sustaining the eventual framework.¹⁷⁰ The timeline for Component 2

¹⁶⁷ Mirghani, *supra*, n. 68, p. 2.

¹⁶⁸ GEF (2004) Project Proposal – ‘Regional Formulation of an Action Programme for the Integrated Management of the Shared Nubian Aquifer’ (Washington: GEF), pp. 13-23.

¹⁶⁹ *Ibid.*, p. 12.

¹⁷⁰ GEF, *supra*, n. 168, pp. 17-23.

suggests it will not be completed for another two years.¹⁷¹ This in turn implies a completion horizon of the whole GEF project well beyond 2018.

As the SAP is intended to prepare the ground for the development of a ‘Nubian Sandstone Aquifer Framework’, the overall strengthening of the Joint Authority in view of enhancing and developing cooperation is its focus. Subsumed under this overarching goal is the establishment of a cooperation framework on data exchange, which represents the most basic level of cooperation with regards to transboundary water resources.¹⁷² Although the Action Programme does not refer to it, this is congruent with Article 8 (‘Regular exchange of data and information’) of the 2008 Draft Articles. The same applies to the targeted establishment of regional legal and institutional mechanisms to protect the ecosystems and biodiversity of the Nubian Aquifer System, and extend the competence of the Joint Authority in this field.¹⁷³

Furthermore, the SAP reaffirms the ambition that the Joint Authority should exercise active control over the degree of utilisation of the Nubian Sandstone Aquifer water.¹⁷⁴ The GEF considers this reaffirmation to indicate that ultimately the Joint Authority would allocate extracted water from the Aquifer.¹⁷⁵ However, as noted above, the Joint Authority is presently lacking the legal capacity to do so, which presumably is to be remedied as part of Component 3. This goal ties in with another theme of the Strategic Action Programme, namely to develop a strategy to prevent, control and manage human migration in the Nubian basin.¹⁷⁶ The Action Programme thus indicates that the Aquifer States have identified the uncontrolled expansions of human settlements within the region as an

¹⁷¹ GEF (2013) Regional Strategic Action Programme for the Nubian Aquifer System (Vienna: GEF), pp. 42-43.

¹⁷² Targets 1a.1-2.

¹⁷³ Target 2a.1.

¹⁷⁴ Target 1b.1.

¹⁷⁵ GEF, *supra*, n. 171, p. 37.

¹⁷⁶ Target 3b.1.

important factor in the rising pressure on water abstraction from the Aquifer System. Although the Action Programme leaves it open to interpretation, this issue could prove to be the motivation behind the consistent inclusion of the aspiration for the Joint Authority to control water supply.

In light of these core objectives as part of the renewed GEF-funded efforts, the emphasis on finance throughout the Constitution is noteworthy. The individual Actions/Targets as well as reports by the IAEA emphasise the need for funding, and the Action Programme emphasises funding not only for certain projects, but also for the Joint Authority itself.¹⁷⁷ Arguably this underscores the need to improve the institutional strength of the Joint Authority, as consistent funding seems far from secure at this stage (which would help to explain the significant time gap between the conclusion of the Shared Aquifer Diagnostic Analysis in 2008 and the Action Programme in 2013). This does not mean the Action Programme cannot represent a good basis for regional cooperation. However, it is clear Component 2 needs to be followed up with concrete principles of international law to strengthen the role of the Joint Authority and to make Component 3 a success. In this context, it is noteworthy that the Aquifer States have not simply skipped Component 2 and moved to swiftly complete Component 3 by adopting the Draft Articles as their future framework sometime after 2008. This in turn suggests

¹⁷⁷ Targets, 1a.8, 1b.5, 1e.6, 2a.6, 3a.9 and 3b.5.

Would drawing parallels to hydrocarbon deposits be helpful?

The geological characteristics at the core of the nature of the Nubian Sandstone Aquifer System suggest that they can be transposed to that of a hydrocarbon deposit such as an oil field. There are striking similarities between a confined fossil aquifer and an oil field. Firstly, just like the water contained in fossil aquifers, hydrocarbons (i.e. oil and natural gas) are disconnected from a continuous resource cycle, which makes their quantity equally finite. Secondly, hydrocarbons originate from source rock, which are sedimentary rocks comprised of tiny mineral fragments within which the remains of organic material has been ‘cooked’ over millions of years due to vast pressure from overlying hard rock strata and temperatures in excess of 120 °C.¹⁷⁸ Just as the water contained in a fossil aquifer was trapped during the formation of its geological surrounding, the organic matter that sank to the source rock floors of quiet water bodies (e.g. swamps, marine bays or in deep marine areas) became trapped by an increasing build-up of sediment layers. Thirdly, the eventual hydrocarbons produced are sealed off at the top through hard, compressed rock strata with the original source rock forming the bottom seal (see Figure 5). And fourthly, hydrocarbons are kept in place by a similar regime of different pressures as is the water contained in confined fossil aquifers. Indeed, fossil aquifer water is sometimes an intricate part of an oil field where the water underlies the oil deposit and thus provides upward pressure.¹⁷⁹

¹⁷⁸ Broadhead, R. (2002) ‘The origin of oil and gas’, in Brister, B. S. and Price, L. G. (eds.) *New Mexico’s Energy: Present and Future* (Socorro: New Mexico Bureau of Geology & Mineral Resources), pp. 41-43.

¹⁷⁹ Ely, N. (1938) ‘The Conservation of Oil’, *Harvard Law Review*, 51(7), pp. 1209, 1219; see also Williams, H. R. et al (1992) *Cases and Materials on the Law of Oil and Gas* (Mineola: The Foundation Press), pp. 1-12.

Blue Gold – The Utilisation of the Nubian Sandstone Aquifer System

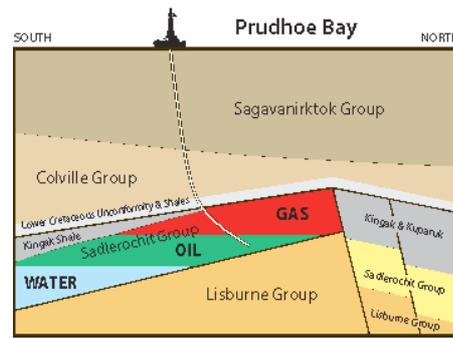


Figure 5: Schematic of fossil aquifer water and hydrocarbon deposits in Prudhoe Bay, Alaska (Image Source: Office of the Federal Coordinator for Alaska Natural Gas Transportation Projects)

This does not mean that this specific type of aquifer water is necessarily fit for human consumption but it highlights the comparable geological structures that host both confined fossil aquifers and oil fields.

The discussion at the beginning of this chapter introduced transboundary fossil aquifer water as a resource that, although characterised by its inertia if left alone, transforms into a substance in flux as soon as large-scale extraction has begun. This behaviour is equally attributable to hydrocarbon deposits, which are subject to the same laws of physics as fossil aquifer water. The instinctive reaction might therefore be to assume that existing international law governing the multilateral utilisation of transboundary hydrocarbon deposits will tackle the same issues pertinent to the utilisation of transboundary groundwater. Given that the supreme authority over particular deposits of mineral resources squarely falls within the scope of territorial sovereignty and integrity whilst at the same time being subject to the limitations imposed by their fluid nature,¹⁸⁰ it seems logical that practices common to the hydrocarbon industry should equally be applicable to transboundary aquifers such as the Nubian Sandstone Aquifer System. This in turn begs the question whether the two realms of international law are indeed compatible and

¹⁸⁰ Lagoni, R. (1979) 'Oil and Gas Deposits Across National Frontiers', *The American Journal of International Law*, 73(2), p. 215.

whether the world needs yet another instrument of international law when all that is seemingly required is the adaptation of existing hydrocarbon development regimes.

But would that result in a sufficiently thorough approach towards the vital fresh water resources contained in fossil aquifers? The most prominent issue is that of apportioning the resource to the satisfaction of all stakeholder States. Based on their fluid nature, a fundamental problem of the utilisation of transboundary hydrocarbon resources is that these, unlike transboundary hard mineral deposits such as coal or iron ore, cannot be divided by a border into stable and recognisable independent units. Consequently, a transboundary hydrocarbon deposit can be exploited – wholly or in part – from either side of the border,¹⁸¹ as can a transboundary fossil aquifer. The International Court of Justice (ICJ) described the problem in its judgement in the *North Sea Continental Shelf* cases:

*[...] it frequently occurs that the same deposit lies on both sides of the line dividing a continental shelf between States, and since it is possible to exploit such deposit from either side, a problem immediately arises on account of the risk of prejudicial or wasteful exploitation by one or the other of the States concerned.*¹⁸²

What the Court identified is the fundamental problem arising from a state's general inability to determine the precise amount of hydrocarbons accruing to it without the help of its neighbours who equally exert authority over parts of the resource.¹⁸³ Moreover, there is the difficulty of making reliable predictions about the exact perimeter and contents of an underground deposit of either hydrocarbon or fossil water, and therefore when exactly the extraction reached the point when a neighbouring state's resources are impinged. In response to this problem, previous state practice and academic discourse have resulted in

¹⁸¹ *Ibid.*

¹⁸² *North Sea Continental Shelf Cases* (Federal Republic of Germany vs Denmark, Netherlands) [1969] ICJ Rep. 51, para. 97.

¹⁸³ Lagoni, *supra*, n. 180, p. 217.

several distinct approaches to the rights and duties in the apportionment of transboundary oil and gas resources.¹⁸⁴ The first, and perhaps the most drastic, is the ‘rule of prior appropriation’, which stipulates that the first state to undertake extraction has the right to exploit the whole deposit. According to Morris, the rule allows

*‘one who has the right to drill for and produce oil and gas from a particular tract of land [to] produce such hydrocarbons even though the oil or gas so produced is drained from beneath the land of another.’*¹⁸⁵

The application of that rule, also known as the ‘rule of capture’ in the United States (where mineral rights typically reside with the landowner and not the state),¹⁸⁶ is likely to result in competitive drilling, and as a result encourage unfettered consumption of resources by foregoing options to stretch out their availability to the maximum possible. As the ‘rule of prior appropriation’ implies the absence of a multilateral agreement or understanding on cooperation or production sharing of transboundary resource deposits between nations, the general sovereignty of a state over its subsoil would take effect.¹⁸⁷ The result of both the ‘rule of capture’ and the ‘rule of prior appropriation’, even though they respectively refer to the domains of either public or private law, would effectively constitute a similar set of affairs. States or individuals who are not engaged, for whatever reason, in the rapid exploitation of a transboundary hydrocarbon or fossil water deposit would risk losing at least some of the deposit’s natural production potential to a fast-moving neighbour or competitor. As a result, both rules are likely to result in competitive

¹⁸⁴ International Law Commission (2010) *Report of International Law Commission. Sixty-second session*. UN Doc. A/65/10, paras. 376-84.

¹⁸⁵ Morris, J. W. (1968) ‘The North Sea Continental Shelf: Oil and Gas Legal Problems’, *The International Lawyer* 2(2), p. 206; see also Thalmann, H. (1951) *Grundprinzipien des Modernen Zwischenstaatlichen Nachbarrechts* (Zurich: Polygraphischer Verlag), p. 121.

¹⁸⁶ Williams, H. R. et al (1992) *Cases and Materials on the Law of Oil and Gas* (Mineola: The Foundation Press), p. 57.

¹⁸⁷ Lagoni, *supra*, n. 180, p. 220.

drilling. This outcome was demonstrated by the ‘silent war’ between two concessionaires at the boundary between Saudi Arabia and the Neutral Zone it had established with Kuwait.¹⁸⁸ Indeed, it has been highlighted above that Libya is engaged in the development of the Nubian Sandstone Aquifer System since 1975 whereas the earliest systematic hydrological studies of this specific resources date back to only 1984.¹⁸⁹

It is in mind with the risk of escalation that the domestic laws of most States provide for cooperative or unitised exploitation of common petroleum deposits and therefore it would be difficult to regard the ‘rule of prior appropriation’ as a general principle of law recognised by civilised nations.¹⁹⁰ Indeed, the law of some federal States of the United States prescribes compulsory pooling of drilling permits in circumstances where hydrocarbon deposits encroach neighbouring property but landowners are unwilling (or unable) to invest.¹⁹¹ It is thus not surprising that other approaches were developed.

An interesting solution proposed by Onorato is the assumption of joint property rights and a resulting vested interest in transboundary hydrocarbon deposits.¹⁹² According to his approach, States are prohibited from unilaterally engaging in the exploitation of a transboundary hydrocarbon deposit to protect those property rights, and the utilisation of these deposits is only legal under the umbrella of a joint agreement.¹⁹³ In other words, Onorato proposes a regime of customary international law that draws neighbouring States into cooperating with each other to avoid conflict. However, there is little evidence of state

¹⁸⁸ Toriguian, S. (1972) *Legal Aspects of Oil Concessions in the Middle East* (Beirut: Hamaskaine Press), p. 271.

¹⁸⁹ Abufila, T. M. (1984) *A three-dimensional model to evaluate the water resources of the Kufra and Sarir Basins, Libya*. Thesis (M.Sc.) - Ohio Univ., Athens (USA). Coll. of Arts and Sciences, cited in Heintz and Brinkmann, *supra*, n. 20, p. 441.

¹⁹⁰ Onorato, W. T. (1968) ‘Apportionment of an International Common Petroleum Deposit’, *International and Comparative Law Quarterly*, 26(2), p. 89; Utton, A. E. (1968) ‘Institutional Arrangements for Developing North Sea Oil and Gas’, *Virginia Journal of International Law* 9(1), p. 74.

¹⁹¹ E.g. 1994 *Michigan Natural Resources and Environmental Protection Act*, Section 324.61513 (4); see also Williams, H. R. et al (1992) *Cases and Materials on the Law of Oil and Gas* (Mineola: The Foundation Press), p. 686.

¹⁹² Onorato, *supra*, n. 190, p. 328.

¹⁹³ *Ibid*, p. 329.

practice that recognises such joint property rights under international law. Indeed, it would be difficult to imagine a state making itself subject to what could effectively amount to a moratorium on exploration and development of either hydrocarbon or fossil water deposits where one of its neighbours chose to withhold consent. To illustrate, in the case of the Nubian Sandstone Aquifer System, Egypt can rely on the water supply of the Nile whilst Libya does not have similar alternative fresh water supply. Under Onorato's proposal, Egypt's bargaining power would by far exceed that of Libya as it could deny the exploration and development of the transboundary aquifer without compromising its own fresh water supply.

Instead, the exploration for, and development of, transboundary hydrocarbon deposits over the last five decades has resulted in extensive cooperative state practice without giving up territorial rights, which suggests that inter-state cooperation in the development of their transboundary resources has joined the corpus of customary international law. Indeed, there are powerful incentives for States to cooperate. One of the most fundamental duties of States is to protect their territorial sovereignty and integrity whilst not losing sight of their economic and legal interests on the international parquet. So, in cases where all States concerned are going to exploit a transboundary hydrocarbon deposit at the same time, cooperation can potentially create opportunities to cut exploration and production costs. Even if one state is not planning to exploit the deposit, there remains the strong legal incentive of preserving territorial sovereignty and integrity by cooperating with those that want to do so. In essence, as outlined at the beginning of this section, it is extremely difficult to determine the precise amount of hydrocarbons accruing to a state without the help and cooperation of its neighbours. Hydrocarbons, just like the water contained in confined fossil aquifers, reach a state of flux as soon as artificial extraction has begun, i.e. a well creates 'pulling power' through different pressures in the atmosphere and the geological structure in question. A state avoiding or refusing involvement in the exploration

and development process therefore risks suffering from prejudicial use of the border-straddling hydrocarbons by its neighbours. By avoiding cooperation, e.g. through the avoidance of geological data exchange, a state would effectively prevent the quantification of its claim to the hydrocarbons in question. It is thus not surprising that ‘the principle of co-operation applies to the stage of exploration as well as that of exploitation’.¹⁹⁴ Accordingly, if a state remains inactive after another has requested that it cooperate in determining the geography and geology of the deposit in question, it does not necessarily relinquish its sovereign rights to the minerals in place and the active state also does not acquire the right to exploit the whole deposit for its own benefit.¹⁹⁵ However, the inactive state’s lack of contribution may well serve as a defence for the exploiting state against later claims of indemnification by the inactive neighbour. For example, where extraction resulted in an unknown quantity of hydrocarbons to have moved into the active state’s part or where the conditions of the inactive state’s part of the deposit deteriorated due to the on-going drilling activities across the border, the active state may well have a defence on the grounds of estoppel.¹⁹⁶ Cooperation is therefore necessary for the state parties to preserve their territorial sovereignty and integrity and since the 1960s they have sought to enshrine it in their multilateral agreements. The first example of this type state agreement in modern international law can be seen in Article 4 of an agreement between Great Britain and Norway in 1965, which reads:

If any single geological petroleum structure or petroleum field, or any single geological structure or field of any other mineral deposit, including sand or gravel, extends across the dividing line and the part of such structure or field which is situated on one side of the dividing line is exploitable, wholly or in part, from the other side of the dividing line, the Contracting Parties shall, in

¹⁹⁴ *North Sea Continental Shelf Cases*, *supra*, n. 182, Separate Opinion of Judge Jessup.

¹⁹⁵ Lagoni, *supra*, n. 180, p. 238.

¹⁹⁶ *Ibid.*

*consultation with the licensees, if any, seek to reach agreement as to the manner in which the structure or field shall be most effectively exploited and the manner in which the proceeds deriving therefrom shall be apportioned.*¹⁹⁷

According to Lagoni, Article 4 started today's extensive state practice to include a mineral deposit clause in multilateral delimitation agreements, which have been identified to be 'striking for their uniformity'.¹⁹⁸

Whilst the state community has thus addressed the question of cooperation, beyond cooperative agreements the essential question remains how to apportion the proceeds from the exploitation of transboundary hydrocarbons or fossil water, which of course are mobile transboundary resources. In this regard, state practice varies considerably. The most straightforward way is to allocate the benefits proportionally to the size of the deposit's shares located on opposite boundary sides. In essence, the parties agree to the fiction that the hydrocarbon resource is a static one. The agreement between Czechoslovakia and Austria on the exploitation of a transboundary natural gas field in the Vysoka-Zwerndorf frontier area, for example, provides for apportionment on the basis that (1) neither party enjoys full jurisdiction over the whole gas field and that (2) each party exploits its proportionate share in accordance with annual calculations.¹⁹⁹ Naturally, this requires the parties to periodically exchange data about production rates and the condition of their share of the field. Consequently, this geological cooperation imparts self-imposed limitation of each party's production by means of data exchange and consultation to maintain the field's gas supply for as long as possible. Whilst this arrangement clearly provides for

¹⁹⁷ 1965 Agreement Between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Kingdom of Norway Relating to the Delimitation of the Continental Shelf Between the Two Countries, London 10 March 1965, 551 UNTS 214.

¹⁹⁸ Lagoni, *supra*, n. 196, p. 229

¹⁹⁹ Agreement Between the Government of the Czechoslovak Republic and the Austrian Federal Government Concerning the Working of Common Deposits of Natural Gas and Petroleum, Prague, 23 January 1960, UNTS, Vol. 495, p. 125.

continuous cooperation between the two States, it constitutes one of the few examples where States have agreed to treat the mobile transboundary resource of natural gas as if it were a static one. A variation of the Vysoka-Zwerndorf type of agreement can be found in the 1962 Supplementary Agreement to the Ems-Dollart Treaty between the Netherlands and the Federal Republic of Germany.²⁰⁰ It encourages joint operations by the concessionaires of both parties by entitling both the Netherlands and Germany to an equal share of the hydrocarbons underlying the territory in question irrespective of the actual size of the deposits on either side of the boundary. The rationale behind this rather simplistic approach was to encourage cooperation between the two respective concessionaires appointed by the Netherlands and Germany, Nederlandse Aardolie Maatschappij BV (N.A.M.) and BEB Erdgas und Erdöl GmbH, on the calculation of reserves, revenue sharing and risk bonuses.²⁰¹ Notably, the United Kingdom and Norway have a similar agreement in place concerning the Frigg field.²⁰² However, it is questionable whether the approach of the Dutch-German agreement was successful, as it did not prevent N.A.M. and BEB Erdgas und Erdöl GmbH from entering into a formal dispute over the apportionment of hydrocarbons.²⁰³ This suggests that a simplistic division of mobile transboundary resources is inadequate to fulfil its purpose, namely smoothing relations

²⁰⁰ Supplementary Agreement to the Treaty Concerning Arrangements for the Co-Operation in the Ems Estuary Signed Between the Kingdom of the Netherlands and the Federal Republic of Germany, Bennekom, 14 May 1962, UNTS, Vol. 509, p. 140.

²⁰¹ Nederlandse Aardolie Maatschappij BV (N.A.M.) geg. BEB Erdgas und Erdöl GmbH, Schweizerisches Bundesgericht (I. Zivilabteilung), 4P.212/1999.

²⁰² See, e.g., Agreement between the Government of the United Kingdom of Great Britain and Northern Ireland and the Government of the Kingdom of Norway relating to the exploitation of the Frigg Field Reservoir and the transmission of gas therefrom to the United Kingdom. London, 10 May 1976. UNTS, Vol. 1098.

²⁰³ Sammlung der Entscheidungen des Schweizerischen Bundesgerichts, *supra*, n. 201.

between contracting parties, be it the States themselves or concessionaires as their proxies,²⁰⁴ and the prevention of disputes over the hydrocarbon deposit in question.

Another practice entails unitising a certain hydrocarbon field in cases where its delimitation is well-defined and established.²⁰⁵ This type of arrangement calls for a single operating entity to be established to manage the common deposit on behalf of all parties.²⁰⁶ It is an established practice in the domestic mining legislation of several States.²⁰⁷ On the one hand, like the examples above, the practice of unitisation serves economic purposes by reducing exploration and extraction costs. On the other hand, it is aimed at allowing the peaceful utilisation of a transboundary resource. Even the fourth type of agreement, where parties exercise joint power over all the mineral resources in a Joint Development Zone, is essentially a variation of those described above. Generally, Joint Development Zones are found in the hydrocarbon-rich region of the Persian Gulf where they serve to minimise risk of conflict over transboundary hydrocarbon resources. They either provide for 'equal and undivided' sovereign authority over the parties' respective shares of a geographical area, as in the Zone established by Saudi Arabia and Kuwait,²⁰⁸ or establish equal sovereign rights to a particular field, such as the al-Bunduq field shared by Qatar and Abu Dhabi. The basis for this concept is thus again the preservation of a state's territorial sovereignty or exclusive

²⁰⁴ Buxbaum, R. M. (1988) 'International Mining Projects as a Research Paradigm of Transnational Economic Law', in: Jaenicke, G., Kirchner, C. et al (eds) *Studies in Transnational Law of Natural Resources, Vol. 11 – International Mining Investment: Legal and Economic Perspectives* (Frankfurt am Main: Alfred Metzner Verlag), p. 104.

²⁰⁵ Lagoni, *supra*, n. 180, p. 224

²⁰⁶ Horigan, J. E. (1974) 'Unitization of Petroleum Reservoirs Extending Across Sub-Sea Boundary Lines of Bordering States in the North Sea', *Natural Resources Lawyer*, 7(1), p. 73.

²⁰⁷ See Onorato, *supra*, n. 190.

²⁰⁸ Hosni, S. M. (1966) 'The Partition of the Neutral Zone', *The American Journal of International Law*, 60(4), pp. 739-41; El-Erian, A. A. (1952) *Condominium and Related Situations in International Law* (Cairo: Fouad I University Press), p. 97.

sovereign rights. Accordingly, Article IV of the *Saudi-Kuwaiti Joint Development Zone Agreement*²⁰⁹ stipulates that:

Each of the Contracting Parties shall respect the rights of the Other Party to the shared natural resources either existing at present or which shall exist in the future in that part of the divided zone which is annexed to his territory’.

According to Hosni, a former legal adviser to the Kuwaiti Ministry of Foreign Affairs, the division of rights under the Agreement is an expression of the Islamic legal principle of *Ifraz*, according to which an undivided share in a certain property is transformed by agreement into an exclusive title over a certain part of such property to the extent of the original share.

What can be deduced from these practices, then, is that States have learned that cooperation is a fundamental in the development of their transboundary hydrocarbon deposits. Undoubtedly such cooperation is motivated by a will to adhere to international law, but there is equal motivation to facilitate the timely extraction these transboundary hydrocarbons by creating the right environments that entice concessionaires to invest. In reviewing the practices that have been outlined above, it becomes clear that a fundamental aspect of such an investment environment is a legal framework that reassures a concessionaire that its host state has the right to grant the concession in the first place through its territorial sovereignty and the according mineral rights. This is the primary purpose for these legal frameworks. The importance of such a reassurance to concessionaires is demonstrated by the uncertain future of the Greater Sunrise gas field complex, which is currently situated in Australian waters but is also claimed at least in part by Timor-Leste. In April 2013, the Timor-Leste Government referred a dispute with the

²⁰⁹ 1965 Agreement Between the State of Kuwait and the Kingdom of Saudi Arabia Relating to the Partition of the Neutral Zone, in: *International Legal Materials*, 4(6), pp. 1134-38.

Australian Government relating to the *Treaty on Certain Maritime Arrangements in the Timor Sea* (CMATS), to international arbitration in accordance with the dispute resolution procedure in that treaty. Timor-Leste's claim against Australia rests on the assertion that CMATS was not negotiated in good faith by Australia and therefore needed to be set aside.²¹⁰ Since then, all activities of the Sunrise Joint Venture participants in relation to the development of the gas fields remain on hold until 'the Timor-Leste and Australian Governments [...] agree the legal, regulatory and fiscal regime applicable to Sunrise'.²¹¹ As a result, development of the Sunrise project has effectively been put on hold until further notice due to the uncertainties surrounding the legality of Australia's concession, which underscores the cementation of a state's rights to a certain share of transboundary hydrocarbons as the prime goal of the model frameworks outlined above.

Although existing precedents of hydrocarbon law have prioritised solutions for apportioning hydrocarbons in a manner agreeable to all parties through bilateral agreements, Joint Development Zones, concessions and production sharing agreements, they ultimately drive at timely commercialisation of the resource. For decades, the production of transboundary hydrocarbons has been governed by a medley of unsatisfactory status quos and industry-specific agreements on state/state and state/company level to conform to special constitutional requirements of various producing nations (e.g. through joint operating agreements and so-called 'service contracts' or operational service agreements).²¹² It is therefore submitted that for the purpose of arriving at an adequate framework for confined transboundary fossil aquifers such as the

²¹⁰ See Permanent Court of Arbitration (2013) 'Arbitration under the Timor Sea Treaty (Timor-Leste v. Australia)'.

²¹¹ Woodside Petroleum (2014) 'Sunrise LNG' (Online content, accessed 20 August 2015), available at <http://www.woodside.com.au/Our-Business/Developing/Pages/Sunrise.aspx#.VeYIE84-ATl>.

²¹² See, for instance, Article 81, Constitution of the Islamic Republic of Iran; Articles 2 & 3, Mining Investment Law of Saudi Arabia – Royal Decree No. M/47.

Nubian Sandstone Aquifer system the existing law relating to transboundary hydrocarbons is incomplete.

The utilisation of transboundary fossil aquifers certainly requires an established regime of territorial rights between the neighbouring States concerned – and to this extent the international hydrocarbons law discussed above is informative – but crucially it does not offer a solution for the protection of the aquifer under general environmental law. Of course, there are several instruments of environmental law that deal with the different risks associated with hydrocarbon production. Nevertheless, these are usually enshrined within national law and do not bind neighbouring States. Although offshore hydrocarbon exploration and production in particular is associated with stark environmental impacts, especially on a local level,²¹³ it has still not received enough attention by the international community and suffers from significant gaps related to scope. Attempts to subject offshore hydrocarbon installations to international regulations have repeatedly been unsuccessful. In 1976, for example, the *Convention on Civil Liability for Oil Pollution Damage Resulting from Exploration and Exploitation of Sea Bed Mineral Resources* was adopted but never came into force. Other attempts made by various UN institutions, including the Commission for Sustainable Development and the International Maritime Organization, have also not yielded the desired results.²¹⁴ Whereas prior to the 1990s marine pollution through the search for and production of hydrocarbons attracted relatively little specific attention – even by *UNCLOS*²¹⁵ – partly due to a lack in prevalence of that type of production, the international community still struggles to arrive at a comprehensive and binding

²¹³ Among the most recent incidents is the widely reported Macondo disaster in the US Gulf of Mexico in 2010.

²¹⁴ See IMO (1995) Eighteenth Consultative Meeting of Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter, where opposition scuppered a Dutch proposal to include offshore hydrocarbon exploration and production within the remit of the convention.

²¹⁵ Art. 82 deals with commercial aspects of offshore hydrocarbon production such as taxes and royalties.

framework.²¹⁶ The significant regulatory gap on an international level results in national legislation, as well as its level of enforcement, to vary greatly.²¹⁷ Concurrently, the drive towards a unifying legal instrument had stalled as of 2011.²¹⁸ Even the most recent attempt to develop an international agreement within the G20 framework did not progress beyond early discussions.²¹⁹

Even the current debate over water quality in relation to hydraulic fracturing of hydrocarbon bearing rock ('fracking') indicates that hydrocarbons law to date has not adequately addressed the risk of polluting groundwater resources. This in turn leads to another crucial point: Environmental law relating to hydrocarbons will ultimately be concerned with protecting the environment of the hydrocarbon deposit (e.g. from a spill) but not the other way around. This is critical as pollution of hydrocarbons can be much easier remedied than pollution of fresh water.²²⁰ Even if, say, a chemical used during the production process contaminated a crude oil deposit and would thus render it polluted, that 'degradation' of the resource will routinely be chemically remedied through the refining process. The same is simply impossible for a fresh water resource such as a confined aquifer where pollution (e.g. through a chemical) could render the whole aquifer unfit for human consumption and even agricultural use. To illustrate, roughly one litre of crude oil is capable of rendering 1 million litres of drinking water unusable (i.e. the

²¹⁶ Vinogradov, S. V. and Wagner, J. P. (1998) 'International Legal Regime for the Protection of the Marine Environment Against Operational Pollution from Offshore Petroleum Activities', in Gao, Z. (ed.) *Environmental Regulation of Oil and Gas* (London: Kluwer Law International), p. 93 ff.

²¹⁷ Rochette, J. and Wright, G. (2015) 'Strengthening the international regulation of offshore oil and gas activities', in *Briefs for Global Sustainability Report 2015* (Paris: Institut du Développement Durable et des Relations Internationales), p. 1.

²¹⁸ Chabason, L. (2011) 'Offshore oil exploitation – a new frontier for international environmental law' (Working Paper), *Institut du Développement Durable et des Relations Internationales*, Sciences Po (Paris).

²¹⁹ Rochette, J. et al (2014) 'Seeing beyond the horizon for deepwater oil and gas: strengthening the international regulation of offshore exploration and exploitation', Study N°01/14, *Institut du Développement Durable et des Relations Internationales*, Sciences Po (Paris).

²²⁰ Hydrocarbons in their natural state are usually heavily polluted from a refining perspective, e.g. by sulphur or poisonous gasses such as hydrogen sulphide.

equivalent of one Olympic swimming pool) but the same is not true in reverse. Consequently, the central question of equity based on the premise that fresh water is indispensable for survival is thus also not covered by the law relating to transboundary hydrocarbons. It may well be possible for specific contractual arrangements common to the petroleum industry to offer insights how best to manage specific processes of production, storage and distribution of the aquifer water at a later stage, but it is unsuitable for the establishment of a broader framework for transboundary groundwater resources.

International Human Rights and the 2008 Draft Articles on the Law of Transboundary Aquifers

Whilst the fact that fresh water is central to our very survival does not need any introduction, the fundamental question of how the existence of international human rights might impact the utilisation of the Nubian Sandstone Aquifer System does warrant a closer look. At this point, it should be noted that the scope of this thesis will not allow an in-depth analysis of all aspects of international human rights in relation to water; it is no exaggeration that the subject of international human rights is a vast field due to the moral and political complexities it tackles, thus lending itself as a potential thesis topic in its own right. The following discussion will therefore have to content itself by focussing on the extent international human rights as a body of principles are able to inform the search for an utilisation framework for the Nubian Sandstone Aquifer System.

The UN General Assembly has recognised the important relationship between development and the enjoyment of human rights, which calls for the creation of the

conditions whereby everyone may enjoy those rights.²²¹ However, a crucial problem is the inadequacy of human rights in their present form to tackle the management of the Nubian Sandstone Aquifer System by themselves. Notwithstanding the Human Rights Council's claim to the contrary, it is not clear whether there exists a distinct human right to water. Although it may make common sense to associate access to clean water with the effective implementation of key human rights such as the right to life or the right to health, the international community did not include a self-contained provision on the right to water when it had the opportunity to do so. Instead, it chose to connect access to water with other rights, thereby ultimately pegging access to the priority attributed to other rights or the degree to which they are implemented.

The question is: do the *2008 Draft Articles* still deserve to be examined in greater detail given that international human rights have already ascended to a status of omnipresence in international relations with their claim of 'universality' that purportedly covers all fundamental aspects of human life? In other words, might human rights not bestow the same rights to individuals living in the four Nubian Sandstone Aquifer nations vis-à-vis the state as the *2008 Draft Articles* aim to do?

The main thrust of international human rights norms arguably is aimed at obtaining a status of jus cogens, chief among which are those contained in the Universal Declaration of Human Rights. The Declaration states that the

²²¹ Conroy, H. W. (1993) On the Relation between Development and the Enjoyment of all Human Rights, recognizing the Importance of Creating the Conditions whereby Everyone may enjoy these Rights, UN Doc. A/CONF.157/PC/60/Add.2, para. 9.

*Member States [of the United Nations] have pledged themselves to achieve, in cooperation with the United Nations, the promotion of universal respect of Human Rights’.*²²²

Whilst the Universal Declaration does not legally bind States in its own right, the principles contained therein have been invoked in diverse cases.²²³ Although many of the sovereign States in existence today did not exist in 1948 and therefore could only have given their assent obliquely by joining the United Nations, the fundamental principles of international human rights have been reaffirmed by the UN General Assembly’s endorsement of the *1993 Vienna Declaration and Programme of Action*, which States that:

*‘The World Conference on Human Rights reaffirms the solemn commitment of all States to fulfil their obligations to promote universal respect for, and observance and protection of, all human rights [which] universal nature of these rights and freedoms is beyond question’.*²²⁴

The General Assembly adopted the *Vienna Declaration and Programme of Action* by consensus and thus bestowed what Donnelly termed ‘international normative universality’ to the two documents.²²⁵ As the extensive research by Sohn highlights, such expression of consensus by States to accept – or at least approve of – a set of norms is a strong indication that they indeed form part of *jus cogens*.²²⁶ Such state action of express acceptance of mutual obligations is also consistent with Article 34 of the *Vienna Convention*

²²² Preamble, Universal Declaration of Human Rights, para. 6; Muslim States have also adopted the Universal Islamic Declaration of Human Rights in 1981.

²²³ See, for example, ICJ (2004) *Legal Consequences of the Construction of a Wall in the Occupied Palestinian Territory*, p. 178, para. 105; (1980) *Case Concerning United States Diplomatic and Consular Staff in Tehran*, p. 42, para. 91; (1971) *Legal Consequences for States of the Continued Presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970)*, p. 57, para. 131; see also Schwebel, S. M. (1998) ‘The Seminal Contributions of the World Court to the Law of Human Rights’, Address to the International Bioethics Committee of UNESCO, Proceedings: 5th Session (Vol. I), pp. 69-72.

²²⁴ 1993 *Vienna Declaration and Programme of Action*, para. 1; UNGA Res. 48/121, UN Doc. A/RES/48/121 (1993).

²²⁵ Donnelly, J. (1989) *Universal Human Rights in Theory and Practice* (Ithaca: Cromwell University Press), p. 2.

²²⁶ Sohn, L. B. (1986) ‘“Generally Accepted” International Rules’, *Washington Law Review*, Vol. 61(3), p. 1078.

on the Law of Treaties, whereby a treaty can only ‘create obligations or rights for a third state [with] its consent’.²²⁷ It is this body of rights that has been declared to be driving the objectives of the United Nations.²²⁸ In 1999, the UN Secretary General reiterated in his statement to the 55th Session of the Commission on Human Rights that human rights are

*‘at the heart of every aspect of our work and every article of our Charter’.*²²⁹

This is significant as international human rights would thus be binding on the four Aquifer States, including to the extent that they contain norms on the distribution of shared freshwater resources.

In preparation of the *1993 World Conference* in Vienna, Conroy highlighted the important relationship between international human rights and development to facilitate the flourishing of humanity.²³⁰ This concept dates back to the *1977 UN Water Conference* held in Mar del Plata, Argentina, which produced the first international recognition that human beings possess a right to water. Encouragingly, its report declares that:

*‘All peoples, whatever their stage of development and social and economic conditions, have the right to access drinking water in quantities and of a quality equal to their basic needs [because] It is universally recognized that the availability to man of that resource is essential both for life and his full development’*²³¹

This view was reaffirmed by a study commissioned by the Human Rights Council to explore the scope and content of the human rights obligations related to the Right to

²²⁷ 1969 *Vienna Convention on the Law of Treaties*, UN Recueil des Traités, Vol. 1155, p. 341.

²²⁸ Article 1, UN Charter (1945) 1 UNTS, *On the Purpose and Principles of the UN*, p. xvi.

²²⁹ UN Doc. SG/SM/99/91 (7th April 1999), para. 3.

²³⁰ Conroy, *supra*, n. 221.

²³¹ United Nations (1977) *Report of the United National Water Conference*, Mar del Plata. E/CONF.70/29, Res. II(a), pp. 66-7.

Water.²³² The study gave rise to the assertion by the then High Commissioner for Human Rights, Louise Arbour, that

'The United Nations High Commissioner for Human Rights believes that it is now time to consider access to safe drinking water and sanitation as a human right'.²³³

Aside from the Universal Declaration of Human Rights,²³⁴ a considerable number of other sources of international law also suggest that the High Commissioner only reiterated what had already become a prominent aspect of the continuous development of international human rights.²³⁵ Clearly, the international community has already spent considerable efforts to conceptualise a human right to fresh water. As a result, could this not mean that States have thereby accepted that there is a universal right to fresh water, and that by implication, as current international human rights instruments in relation to fresh water require States to 'take all appropriate measures' to 'ensure full implementation' of access to fresh water, international human rights eclipse the *2008 Draft Articles*? Do we need yet another instrument of international law, this time addressing only a highly specific set of circumstances?

²³² Human Rights Council (2006) *Human Rights and Access to Water*, Decision 2/104 (27 November 2006).

²³³ UNGA (2007) Report of the United Nations High Commissioner for Human Rights on the scope and content of the relevant human rights obligations related to equitable access to safe drinking water and sanitation under international human rights instruments, A/HRC/6/3 (16th August 2007), para. 66.

²³⁴ Arts. 3 & 25.

²³⁵ See, for example, Art. 24(2)(c), Convention on the Rights of the Child (CRC), incl. Committee on the Rights of the Child General Comment No. 7 (2006) on Implementing Child Rights in Early Childhood, para. 27; Art. 14(2)(h), Convention on the Elimination of All Forms of Discrimination against Women (CEDAW); Art. 28(2)(a), Convention on the Rights of Persons with Disabilities; Art. 5(b), 1985 ILO Convention No. 161 on Occupational Health Services; Art. 14(1), (2)(c), African Charter on the Rights and Welfare of the Child; Art. 15(a), Protocol on the Rights of Women in Africa, African Charter on Human and Peoples' Rights.

The answer must be a resounding yes. Kühnhardt expressed it well by stating that human rights law is but a mediator between the ideal and the real world.²³⁶ Where the ideal is Eden on earth, the real world consists of general international law driven by state interests; to be able to play that mediatory role, international human rights must thus be underpinned by provisions of general international law or risk losing their significance.

This becomes first apparent when examining a right to water in the light of international human rights' moral claim to 'universality', which proceeds on the idea of an international culture common to all humanity that includes everyone, everywhere for everything. A key foundation for that claim stems from attempts to trace human rights into the depths of history, starting with ancient Egyptian texts from 1,300 B.C. or the Cyrus Scroll from 539 B.C.²³⁷ However, even if trace elements of modern human rights can be detected in ancient texts and decrees, these elements should be understood in their own historical context and not as precursors to the *1948 Universal Declaration*. What may appear as the raw ingredients for modern human rights today, originally served as the basis for other doctrines and 'universalisms',²³⁸ thus putting any causal link between millennia-old sources and the *Universal Declaration* into question.

Notwithstanding these limitations to the concept of universality, it has even been argued that the need to address conceptual differences between legal traditions when considering human rights has altogether disappeared, whereas the new focus should lie on

²³⁶ Kühnhardt, L. (1987) *Die Universalität der Menschenrechte* (Bonn: Bundeszentrale für Politische Bildung), pp. 371-81.

²³⁷ See Hersch, J. (ed.) (1969) *Birthright of Man* (Paris: UNESCO), pp. 22-29; United for Human Rights (2016) 'A Brief History of Human Rights' (online content), available at <http://www.humanrights.com/what-are-human-rights/brief-history/cyrus-cylinder.html>, accessed 3 May 2015; Griffin, J. (2008) *On Human Rights* (Oxford: Oxford University Press), p. 9; see also Tierney, B. (1997) *The Idea of Natural Rights* (Cambridge: William B. Erdman Publishing).

²³⁸ Pollock, S. (2006) *The Languages of the Gods in the World of Men: Sanskrit, Culture, and Power in Premodern India* (Berkeley: University of California Press), p. 280.

guaranteeing their application and preventing their violation.²³⁹ This view underlines once more the assumption of a universal internationalism of common values, which enthrone humanity as a whole and therefore meet universal acceptance (except for isolated incidents of bad governance). Yet, the belief that one's own values are not just one's own but are the values that are good for everyone, everywhere and always is probably the default position of any moral assertion and certainly echoes in the claim to universalism made by the *1948 Declaration*, the *1968 Proclamation of Tehran* and the *1993 Vienna Declaration*.²⁴⁰ This assertion, however, ignores that cultural differences can have practical implications for the observance of human rights. Although not writing explicitly in the context of human rights, Naser Faruqi of the UN-recognised International Water Resources Association has submitted that forces of culture and religion have a profound impact on how societies manage their natural resources, whilst the aspects of culture and religion have hitherto been neglected in the interest of 'objectivity' based on the belief that the world is proceeding towards 'some kind of common, material-based culture'.²⁴¹ Even the drafters of the *Universal Declaration of Human Rights* intended the *Declaration* to foster a 'common understanding' of the rights and freedoms it contained rather than advancing it as a document enforcing a certain set of rules on the international community.²⁴² It is therefore not enough to merely insist that international human rights take universal effect; by their very nature they prescribe a basic state of affairs but are constrained by international relations and the fundamental principle of state sovereignty, which ultimately leaves it to States to implement them how they see fit. In other words, whilst the signatories to the

²³⁹ Bobbio, N. (1996) *The Age of Rights* (Cambridge: Polity Press), pp. 12-13.

²⁴⁰ 1968 Proclamation of Tehran (1st World Conference of Human Rights), UN Doc. A/CONF.32/41 and the 1993 Vienna Declaration (2nd World Conference of Human Rights), UN Doc. A/CONF.157/23.

²⁴¹ Faruqi, *supra*, n. 64, p. xiii; see also Amery, H. A. (2001) 'Islamic Water Management', *Water International*, 26(4), p. 481.

²⁴² Preamble, Universal Declaration of Human Rights, para. 7.

1993 Declaration could agree that there should be a right to fresh water, they have not agreed on *how* to facilitate that right.²⁴³

Adherence to a universal human right to water alone is unlikely to result in constructive collaborative state practice towards the shared utilisation of the Nubian Sandstone Aquifer System by the Aquifer States. Generally, international human rights law in relation to health – and thereby, by extension, to water – supports collaborative state practice only in times of crisis when one state is unable to provide sufficient disaster relief.²⁴⁴ Even where the United Nations Committee on Economic, Social and Cultural Rights (UNCESCR) recognises such an obligation in order to give effect to the rights of the *International Covenant on Economic, Social and Cultural Rights* (CESCR), such collaborative practice is primarily related to financial assistance.²⁴⁵ Moreover, the human rights provisions outlined above aim to alleviate some of the most pressing basic needs of citizens through their respective state, which in turn bestows a positive duty on a state to ensure a supply of water. Yet, the example of Libya's Great Man Made River Project demonstrates how expensive the development of the Nubian Sandstone Aquifer System would likely be for another aquifer state. Although the Libyan government has never published accounts for the project, the author estimates eventual capital expenditure will exceed \$30 billion, not accounting for inflation since the 1990s. In comparison, Chad's GDP amounted to just \$10.8 billion in 2015.²⁴⁶ In essence, a human right to water by its citizens would therefore not compel any of the other three Aquifer States to engage over the shared utilisation of the Nubian

²⁴³ See also Steiner, H. J. and Alston, P. (2000) *International Human Rights in Context, Law, Politics and Morals* (Oxford: OUP), p. 326.

²⁴⁴ CESCR (2000) General Comment 14: The Right to the Highest Attainable Standard of Health (Art. 12), 22nd Session, Doc. E/C.12/2000/4, para. 40.

²⁴⁵ See CESCR (1990) General Comment 3: The Nature of States Parties Obligations (Art. 2), 5th Session, Doc. E/1991/23; Article III, 1978 Alma-Ata Declaration.

²⁴⁶ World Bank (2016) *World Bank Open Data: Chad*, online content, available at <http://data.worldbank.org/country/chad>.

Sandstone Aquifer System before not having explored other, cheaper options first. For example, Sudan would likely opt to engage with Egypt over the utilisation of the Nile's water first before asserting any entitlement to the water of the Nubian Sandstone Aquifer under a human right to water. Conversely, Chad would probably have to resign itself to the status quo as it does not have the means to compete with Libya in terms of water infrastructure. Libya itself is currently engaged in providing a stable supply of fresh water for its citizens, an activity currently protected from non-interference under international human rights law.²⁴⁷ Instead, the UNCESCR recommends that

*'[States] should consider the development of further legal instruments.'*²⁴⁸

The CESCR thus provide an important cue for further development of the international law of transboundary fossil aquifer, providing yet another demonstration for the need for a separate and specific legal instrument.

Summary

This section drew on an array of important issues relevant to the legal demands of the Nubian Sandstone Aquifer System and has covered significant ground in the search for an existing legal framework that could benefit the Aquifer System. It has demonstrated that provisions of hydrocarbon law and international human rights may well inform the conception of an aquifer-specific framework, and in the case of human rights even provide the cue to advance the development of such a framework, but that ultimately the geological

²⁴⁷ See CESCR, *supra*, n. 244, para. 39.

²⁴⁸ *Ibid*; see also see also Art. 23, *International Covenant on Economic, Social and Cultural Rights*, (Adopted and opened for signature, ratification and accession by UNGA Res. 2200A (XXI), entry into force on 3rd January 1976).

characteristics of a transboundary confined fossil aquifer are too specific for any existing legal regime to provide a comprehensive cover.

Although transboundary groundwater knows no political, economic or social boundaries, the nature of the Nubian Sandstone Aquifer System is such that stakeholder States cannot simply extract as much water as they wish all at the same time without running the risk of damaging the Aquifer as a reliable freshwater source. It transpired that one of the most important factors in the nature of the Nubian Sandstone Aquifer Systems is its status as a confined ‘fossil’ aquifer. This means that it is not recharged (or only recharged on a truly negligible scale through minor seepage, for instance) via the hydraulic cycle and does not discharge naturally. As a result, the water it contains is both of a finite quantity and would be almost impossible to clean if polluted.

Another important aspect is the transboundary nature of the Nubian Sandstone Aquifer. The groundwater development activities of one state thus have an impact on the capability of the other to use the resource due to the process of self-equilibration, especially when the groundwater concerned suffers from an alteration to its geological environment (e.g. through the drilling of wells). In contrast, static resources such as coal and timber have no potential for self-equilibration and can therefore more readily be divided by neighbouring States.

In this context, the geological characteristics at the core of the nature of the Nubian Sandstone Aquifer System might suggest that they can be transposed to that of a hydrocarbon deposit such as an oil field. At first glance the exploration and development of transboundary hydrocarbon deposits over the last five decades has resulted in extensive cooperative state practice, as there are powerful incentives for States to cooperate. A state avoiding or refusing involvement in the exploration and development process therefore risks suffering from prejudicial use of the border-straddling hydrocarbons by its

neighbours. The same rationale could also be applied to the transboundary waters of the Nubian Sandstone Aquifer System.

However, for the purpose of arriving at an adequate framework for confined transboundary fossil aquifers such as the Nubian Sandstone Aquifer system the existing law relating to transboundary hydrocarbons is incomplete. The production of transboundary hydrocarbons has primarily been governed by a medley of unsatisfactory status quos and industry-specific agreements on state/state and state/company level to conform to special constitutional requirements of various producing nations. The law has thus developed to conform more to notions of territorial integrity than the equitable utilisation of transboundary groundwater resources. Moreover, existing precedent of hydrocarbon law has prioritised solutions for apportioning hydrocarbons in a manner agreeable to all parties through bilateral agreements, Joint Development Zones, concessions and production sharing agreements. Although these agreements contain elements of environmental law that deal with the different risks associated with hydrocarbon production, they are usually enshrined within national law and do not bind neighbouring States. There is thus a significant regulatory gap on an international level and the level of enforcement of the customary practices that do exist varies greatly.

Apart from the legal technicalities, the most important factor underscoring the need for a separate framework for transboundary confined ‘fossil’ aquifers despite the existence of hydrocarbon law is that the environmental law relating to hydrocarbons will ultimately be concerned with protecting the environment from the hydrocarbon deposit (e.g. from a spill) but not the other way around. Whereas pollution of hydrocarbons can be remedied through the refining process, the same would be impossible for the Nubian Sandstone Aquifer. Consequently, the central question of equity based on the premise that fresh water is indispensable for survival is thus also not covered by the law relating to transboundary

hydrocarbons. It may well be possible for specific contractual arrangements common to the petroleum industry to offer insights how best to manage specific processes of production, storage and distribution of the aquifer water at a later stage, but it is unsuitable for the establishment of a broader framework for transboundary groundwater resources.

However, a crucial problem is the inadequacy of human rights to tackle the management of the Nubian Sandstone Aquifer System by themselves. Notwithstanding the Human Rights Council's claim, it is not clear whether there exists a distinct human right to water. Although it may make common sense to associate access to clean water with the effective implementation of key human rights such as the right to life or the right to health, the international community did not include a self-contained provision on the right to water when it had the opportunity to do so. Instead, it chose to connect access to water with other rights, thereby pegging the access to the degree of implementation, or the priority given, of rights specifically provided for in the relevant treaties.

Nation States vie for water for different uses, but the intricacy of man-made boundaries make the issue of international water disputes a formidable and volatile one. The inherent conflict between constrained utilisation in the interest of conserving this precious resource and water's centrality to economic development means that progress in legal development has been slow and whatever development was achieved has been diluted by compromise. This is not to say, of course, that compromise is inherently undesirable. It sometimes can be a helpful tool to help along the agenda by smoothing out minor creases but too often it weakens the agreed plan of action as it forces the contractual parties to make concessions they may well regard as a loss to their position. The concept of compromise starts with the notion of two opposing positions that eventually 'meet somewhere in the middle' but have had to make sacrifices along the way. It is not even guaranteed that the opposing sides have made equal sacrifices or acted in good faith, especially when the compromise was achieved

based on considerations unrelated to the issue at hand. Consequently, the risk of a self-perceived ‘loser’ wanting to make good on that ‘loss’ increases, which in turn reduces the security of the agreement. Instead of mere compromise, the search for common principles should prevail and a solution should be built on that foundation. Unlike compromises, the search for common principles between contracting parties significantly reduces ambiguity and eliminates the notions of ‘winners’ and ‘losers’. As a result, searching for a solution based on shared principles instead of mere compromise improves the prospects of good faith. The following chapter will therefore be engaged with highlighting the key principles of international environmental law relevant to the utilisation of the NSAS.

CHAPTER II – PERTINENT ISSUES OF RESOURCE & ENVIRONMENTAL LAW

It has been argued in the preceding chapter that the NSAS due to its unique nature is just as much threatened as through over-abstraction of water, which warrants the creation of an international legal instrument. This chapter will therefore explore what essential international environmental law principles such an instrument would have to focus on to be effective. Particular attention will therefore be paid to the concept of sustainable development. Although this concept at first seems incompatible with a finite resource such as the Nubian Sandstone Aquifer System, its components such as intergenerational equity, the prevention of transboundary harm and the precautionary principle are highly relevant to an international legal instrument focussing on transboundary ‘fossil’ aquifers.

Whilst Schneider correctly suggests that over-emphasising the role of general international law in environmental law can be problematic as ‘the traditional legal order of the environment is essentially a *laissez-faire* system oriented towards the unfettered freedom

of States’ with limitations to that freedom formed in ‘an ad hoc fashion and [...] formulated from perspectives other than the specifically environmental’,²⁴⁹ the role of natural resources law as a fundamental source to both general principles of international law and environmental law highlights an intrinsic link between the two. Assessing international environmental law is therefore as much a matter of perspective as it is of categorising legal principles. Much of contemporary international environmental law deals with sustainable use of fresh water, fisheries, forests, biological diversity or endangered species. As such, these areas of law could be described as resources law as well as environmental law. What is important is that the resolution of international environmental problems requires the integration and application of many different aspects of international law.²⁵⁰

International Law and ‘Environment’

States should cooperate in the management of transboundary natural resources, treating the natural system as a single ecological unit. Whereas various treaties have long existed on specific living transboundary resources, such as migratory species,²⁵¹ the only general instruments on transboundary water resources are the *1997 Watercourse Convention* and the United Nations Environment Programme’s (UNEP) non-binding text of the *1978 Draft*

²⁴⁹ Schneider, J. (1979) *World Public Order of the Environment: Towards an Ecological Law and Organization* (Toronto: University of Toronto Press), p. 30.

²⁵⁰ See Dupuy, P-M. (1997) ‘Où en est le droit international de l’environnement à la fin du XXe siècle?’, *Revue Générale de Droit International Public*, 101(4), pp. 873-903.

²⁵¹ *1992 Convention on Biological Diversity*, 5 June 1992, UNTS Vol. 1760, pp. 79 ff.; *1979 Convention on Migratory Species of Wild Animals*, 23 June 1979, UNTS Vol. 1651, pp. 333 ff.; *1979 Berne Convention the Conservation of European Wildlife and Natural Habitats*, 19 September 1979, IEL-MT Vol. 979, pp. 70 ff.; *1979 EC Council Directive on the Conservation of Wild Birds*, 2 April 1979, Directive 79/409/EEC; *1973 Agreement on Conservation of Polar Bears*, 15 November 1973, ILM Vol. 13, pp 13 ff; *1950 International Convention for the Protection of Birds*, 19 October 1950.

Principles of Conduct in the Field of the Environment for the Guidance of States in the Conservation and Harmonious Utilization of Natural Resources Shared by Two or More States.

The nature of groundwater as a transboundary natural resource has already been outlined above, albeit more from a practical perspective to illustrate the key dynamics international law needs to address and not with regards to specific legal instruments. Despite groundwater constituting 30% of the world's supply of fresh water,²⁵² the corpus of international law has historically not addressed this resource. The legal status of natural resources, and of transboundary freshwater resources in particular, depends fundamentally on whether they are under the sole sovereignty of one state, shared by a number of States or held in common for the benefit of all.²⁵³

It might be simple to think that in addition to the principle of a state's territorial sovereignty over its subsoil combined with a general obligation not to cause material damage to another state, an obligation to exchange information and consult on matters concerning the shared aquifer would sufficiently address the legal questions arising out of its shared utilisation.²⁵⁴ However, as will be discussed below, despite the status of territorial sovereignty and integrity as integral parts of international law, they are not without serious drawbacks of their own in relation to the responsible development of a transboundary fossil aquifer. Dependence on these principles alone is unlikely to achieve desirable results. Concurrently, notwithstanding the circumstances outlined above where it may well be in a state's interest to cooperate, it is unclear whether a specific obligation to inform and consult about the development of transboundary ground deposits of natural resources

²⁵² United Nations Environment Programme (2007) *Global Environment Outlook 4* (Nairobi, UNEP), p. 118.

²⁵³ Birnie, P., Boyle, A. and Redgwell, C. (2009) *International Law and the Environment* (Oxford University Press, New York), p. 190.

²⁵⁴ Barberis, J. A. (1975) 'Los recursos naturales compartidos entre estados y el derecho internacional', *Derecho de la Integración* 8(18-19), p. 55.

already exists in international law. Although the UN General Assembly has passed a number of resolutions during its twenty-seventh and twenty-eighth sessions that suggest a tendency for States to recognise such an obligation,²⁵⁵ and while there are legal instruments that urge States to cooperate to prevent, *inter alia*, environmental harm²⁵⁶ and to notify and exchange information on the basis of good faith and neighbourliness,²⁵⁷ there is little evidence of a general obligation of States inform and consult before developing natural resources, especially non-living resources such as water contained in fossil aquifers or hydrocarbons, that straddle their borders.²⁵⁸ Instead, as it has been shown, States have resorted to specific agreements on the exploration and development of transboundary hydrocarbon deposits.

Arguably a key issue in this regard is the indecisiveness of international law in committing to a single definition of what constitutes ‘the environment’. As a result of the complexity of environmental issues, the picture that frequently offers itself is that of a fragmented international law of the environment, with a scattered body of sources and frequently vague definitions. Significantly, unlike the Islamic law discussed later, there are no coherent sources of Western international law that unequivocally capture the concept of ‘the environment’.²⁵⁹ Whilst many may have an instinctive grasp of the environment, defining it in an abstract way for the purpose of international law has clearly been a struggle. For example, the *1972 Declaration of the Stockholm Conference on the Human Environment* in its Preamble arrives only at the premise that for

²⁵⁵ Resolutions 2995 (XXVII), 2996 (XXVII), and 3129 (XXVIII).

²⁵⁶ See Principle 24, *1972 Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration)*, 5-16 June 1972, UN Doc. A/CONF.48/14/Rev.1.

²⁵⁷ See Principle 7, *1978 UNEP Draft Principles of Conduct (Environmental Law Guidelines and Principles on Shared Natural Resources)*, 3rd Session, UNEP/IG.7/3.

²⁵⁸ UNCLOS Article 123(a) does impose a duty ‘to coordinate the management, conservation, exploration and exploitation of the living resources of the sea’ but is constrained by its scope extending to live offshore resources.

²⁵⁹ Birnie and Redgwell, *supra*, n. 253, p. 4.

*'man's environment [...] the natural and the man-made [are] essential for his well-being and enjoyment of basic human rights.'*²⁶⁰

On the other hand, the World Commission on Environment and Development merely notes that *'the environment is where we all live'*²⁶¹. A yet more comprehensive definition is offered by the European Commission, which defined the environment as

*'the combination of elements whose complex inter-relationships make up the settings, the surroundings and the conditions of life of the individual and of society as they are and as they are felt.'*²⁶²

Undoubtedly, the spirit of these definitions is to capture the environment as a universal, all-encompassing concept that embraces the interconnectedness of organisms and their habitat. The concept of 'environment' has evolved under the influence of a plethora of inputs, ranging from philosophy, religion, science and economics.²⁶³ Accordingly, treaties such as the *1992 Convention on the Protection of Transboundary Watercourses and Lakes* and others²⁶⁴ typically outline the scope of environmental impacts and harm with reference to flora, fauna, soil, water, air, landscape, cultural heritage and, perhaps in acknowledgement of the European Commission's definition, any interactions between these factors.

Before the Commission's definition, the *1980 Convention on Conservation of Antarctic Marine Living Resources* focussed on the interrelationship of different marine ecosystems²⁶⁵ and the *1988 Convention on the Regulation of Antarctic Mineral Resource Activities* – although it remains

²⁶⁰ Ch. I, Para. 1, *1972 Stockholm Declaration*.

²⁶¹ World Commission on Environment and Development (1987) *Our Common Future*, UN Doc. A/42/427 (Annex), at III.

²⁶² Cited in Birnie and Redgwell, *supra*, n. 253, p. 5.

²⁶³ See Godden, L. and Peel, J. (2010) *Environmental Law: Scientific, Policy and Regulatory Dimensions* (Oxford: Oxford University Press), Ch. 2.

²⁶⁴ Art. 1(2), *1992 Convention on the Protection of Transboundary Watercourses and Lakes*, 17 March 1992, UNTS Vol. 1936, pp. 269 ff.; see also Art. 1(c), *1992 Convention on the Transboundary Effects of Industrial Accidents*, 17 March 1992, UNTS Vol. 2105, pp. 457 ff.; and Art. 2(7), *1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment*, 21 June 1993, ETS No. 150.

²⁶⁵ Art. 1(2, 3), *1980 Convention on Conservation of Antarctic Marine Living Resources*, 7-20 May 1980, UNTS Vol. 1329, pp. 48 ff.

unratified by any state – defined impacts on the regional environment as ‘any impact on the living or non-living components of that environment’²⁶⁶. An even broader interpretation can be found in the *1992 Framework Convention on Climate Change*²⁶⁷. Art. 1(1) includes

‘the composition, resilience and productivity of natural and managed ecosystems’, ‘the operation of natural [and] managed ecosystems’, and ‘socio-economic systems or human health or welfare.’

The *1991 Protocol on Environmental Protection to the Antarctic Treaty*²⁶⁸ includes ‘wilderness’ and ‘aesthetic values’ in general and thereby expands the possible scope of interpretation of ‘environment’ even further.

Such a wide range of definitions of what constitutes the environment can be problematic, however. Laws adopted to protect the environment can impose potentially significant economic costs,²⁶⁹ even if these only extend to limitations on economic opportunities. A typical scenario might be where States are concerned about economic competitiveness as neighbouring countries in particular fail to adhere to the same environmental standards.²⁷⁰ Part of the reason for States’ caution may be that environmental treaties at first rarely provided for financial compensation for the loss in economic competitiveness or even the cost of maintaining higher environmental standards. For instance, the *1973 Convention on the International Trade in Endangered Species of Wild Fauna and Flora* did not account for the loss in revenue for African States resulting from the 1989 ban on international trade in ivory. Although since the *1987 Montreal Protocol* States’ agreement increasingly provide for compensatory measures to incentivise compliance

²⁶⁶ Art. 1(15), *1988 Convention on the Regulation of Antarctic Mineral Resource Activities*, 1 June 1988, ILM Vol. 27, pp. 868 ff.

²⁶⁷ *1992 United Nations Framework Convention on Climate Change*, 9 May 1992, UNTS Vol. 1771, pp. 107 ff.

²⁶⁸ Art. 3, *1991 Protocol on Environmental Protection to the Antarctic Treaty*, 4 October 1991, 30 ILM 1455.

²⁶⁹ Sands, P., Peel, J. et al (2012) *Principles of International Environmental Law*. (Cambridge: Cambridge University Press), p. 7.

²⁷⁰ See Esty, D. (1996) ‘Revitalizing Environmental Federalism’, *Michigan Law Review*, 95, p. 570.

(compliance is further incentivised through specialised funding arrangements by development banks),²⁷¹ the *2008 Draft Articles* do not envision such compensation measures but merely refer to ‘the costs of measures’ to ensure equitable utilisation of the groundwater in question.

Territorial Sovereignty

Consequently, it should not be surprising that the attitude of States towards this subject has broadly been analogous to state sovereignty over hydrocarbons embedded in a nation’s territory. States, with their tendency to prioritise their own interests, generally insisted that their territorial sovereignty also extends over groundwater within their jurisdiction. As Hinsley conveyed it fittingly, sovereignty is

*‘the idea [of] final and absolute authority [...] and no final and absolute authority exists elsewhere.’*²⁷²

This has already been demonstrated above in the specific context of transboundary groundwater, where the laws of Egypt and Sudan prescribe absolute sovereignty by the two States over their respective groundwater resources.²⁷³ This application of the principle of territorial sovereignty is consistent the fundamental premise of international law that sovereign States have sovereignty over their land and the natural resources associated with

²⁷¹ Art. 10(1), *1987 Montreal Protocol on Substances that Deplete the Ozone Layer*, 16 September 1987, UNTS Vol. 1522, p. 3; see also Art. 4(3), *1992 United Nations Framework Convention on Climate Change*, 9 May 1992, UNTS Vol. 1771, pp. 107 ff.; Art. 20(2), *1992 Convention on Biological Diversity*, 5 June 1992, UNTS Vol. 1760, pp. 79 ff. and Art. 13(2), *2001 Stockholm Convention on Persistent Organic Pollutants*, 22 May 2001, UNTS Vol. 2256, pp. 119 ff.; for an example of the World Bank’s project selection criteria, see Bekhechi, M. A. (2012) ‘The Chad-Cameroon Pipeline Project: Some Thoughts about the Legal Challenges and Lessons Learned from a World Bank-financed Large Infrastructure Project’ in Roggenkamp, M. M. et al (eds) *Energy Networks and the Law* (Oxford, Oxford University Press), pp. 78-101.

²⁷² Hinsley, F. H. (1966) *Sovereignty* (New York: Oxford University Press), p. 26.

²⁷³ See preceding chapter, n. 161.

that land.²⁷⁴ It follows that the core premise of this approach entitles all States to the sovereign right of managing and utilising their domestic natural resources pursuant to their own environmental and developmental policies and plans. The doctrine of permanent sovereignty over natural resources has been fundamental in the shaping of the geo-political environment known today. The notion that a state can exert control over its natural resources in modern international law emerged in the 1950s as a fundamental aspect of decolonisation and the self-determination of peoples – after all emerging nations require resources to prosper.²⁷⁵ A fundamental issue in both the extraction of hydrocarbons and fresh water is the state's absolute sovereignty over its natural resources, which is often enshrined in the constitution. Iran's constitution, for example, is particularly explicit on this subject, providing:

*The granting of concessions to foreigners for the formation of companies or institutions dealing with commerce, industry, service or mineral extraction, is absolutely forbidden.*²⁷⁶

Notably, the four Nubian Sandstone Aquifer States have adopted, or in the case of Libya plan to adopt, similar constitutional provisions.²⁷⁷

To this extent, the principle even suggests that States are under an obligation to manage the natural resources within their own territory or jurisdiction in a way that benefits the development of their peoples. In 1962, the adoption of the UN General Assembly's

²⁷⁴ On the other end of the scale, there exists the doctrine of absolute territorial integrity, which grants upstream States water utilisation rights only to the extent that the flow of water to lower riparian States remains unaffected. It resembles the English natural flow doctrine; see Hanks, E. M. (1968) 'The Law of Water in New Jersey', *Rutgers Law Review*, 22(4), pp. 621-715.

²⁷⁵ See Cristescu, A. (1981) *The Right to Self-Determination: Historical and Current Development on the Basis of United Nations Instruments*, UN Doc. E/CN.4/Sub.2/404/Rev.1, para. 279.

²⁷⁶ Art. 81, *1979 Constitution of the Islamic Republic of Iran*, adopted 24 October 1979.

²⁷⁷ Art. 32, *2014 Constitution of the Arab Republic of Egypt*, 15 January 2014, State Information Service; Art. 11(3), *2005 Interim National Constitution of the Republic of the Sudan*, adopted 6 July 2005 (see also Art. 9, *1998 Constitution of the Republic of Sudan*); Art. 57, *1998 Constitution of the Republic of Chad (amended 2005)*, Constitutional Act 08/PR/2005, 15 July 2005.; Chapter 1 – Art. 1, 'Title on Natural Resources', *2014 Libyan Initial Draft Constitution*, unofficial translation by UN Mission for Libya.

*Resolution 1803 on Permanent Sovereignty over Natural Resources*²⁷⁸ allowed the principle of permanent sovereignty over natural resources to rise in prominence in international law.

The resolution declares that:

*'The right of peoples and nations to permanent sovereignty over the natural wealth and resources must be exercised in the interest of their national development and of the well-being of the people of the State concerned.'*²⁷⁹

A number of States, notably Libya, regarded Resolution 1803 as stating existing international law because it was in their interest at the time.²⁸⁰ This was also the view of the arbitrator in *Texaco Overseas Petroleum Company v. The Government of the Libyan Arab Republic*, who stated that:

*'[...] the right of a State to nationalize is unquestionable today. It results from international customary law, established as the result of general practices considered by the international community as being the law.'*²⁸¹

Under the grand theme of independence from 'colonial and alien domination', the *1974 Declaration of a New International Economic Order*²⁸² reaffirmed the principle of national sovereignty over natural resources and States' right to nationalise them. Article 4(e) reads:

'The new international economic order should be founded on full respect for the following principles: [...] Full permanent sovereignty of every State over its natural resources and all economic activities. In order to safeguard these resources, each State is entitled to exercise effective control over them and their

²⁷⁸ 1962 UNGA Resolution 1803 (XVII) 'Permanent Sovereignty over Natural Resources', adopted on 14 December 1962, UN Doc. A/RES/1862(XVII).; see also 1960 UNGA Resolution 1515 (XV) 'Concerted Action for Economic Development of Economically Less Developed Countries', adopted 15 December 1960, Fifteenth Session, 948th Plenary Meeting, UN Doc. A/RES/1515(XV).

²⁷⁹ Art. 1, Resolution 1803 (XVII), *ibid*.

²⁸⁰ See *Texaco Overseas Petroleum Company v. The Government of the Libyan Arab Republic*, 53 ILR 389 (1979), p. 183; *BP Exploration Co. (Libya) Ltd. v. Government of the Libyan Arab Republic*, 53 ILR 297 (1974).

²⁸¹ *Ibid*, *Texaco Overseas Petroleum Company v. The Government of the Libyan Arab Republic* (1977).

²⁸² 1974 UNGA Resolution 3201 (S-VI) 'Declaration on the Establishment of a New International Economic Order', adopted 1 May 1974, Sixth Special Session, UN Doc. A/RES/S-6/3201.

*exploitation with means suitable to its own situation, including the right to nationalization or transfer of ownership to its nationals, this right being an expression of the full permanent sovereignty of the State. No State may be subjected to economic, political or any other type of coercion to prevent the free and full exercise of this inalienable right.*²⁸³

The 1974 *Charter of Economic Rights and Duties of States* followed suit and provided for an implementation framework for States to nationalise their respective resource industries.²⁸⁴

Whilst the *Charter* was adopted by the General Assembly, major Western States, including the United States, objected to or abstained from it. Perhaps the vested interests of Western resource conglomerates undermined the necessary political will to support the charter. Notably, prior to the oil crisis of 1973, the members of the ‘Seven Sisters’ cartel controlled around 85% of global hydrocarbon reserves, including those of Iran.²⁸⁵ This historical context thus suggests that the general thrusts of both the 1974 *Declaration* and the 1974 *Charter* were squarely aimed at signatories’ domestic hydrocarbon and metals industries, which were then dominated by foreign corporations.²⁸⁶ Hence, the prohibition of foreign oil ownership by the current Iranian constitution highlighted above. Yet, whilst the provisions of the *Declaration* and the *Charter* may have been necessary at a time when former colonial States declared their independence, they can have grave implications for natural resources not generally considered at the time – especially for transboundary fossil aquifers such as the Nubian Sandstone Aquifer System. Whereas the development of

²⁸³ *Ibid*, Art. 4(e).

²⁸⁴ Art. 2, 1974 UNGA Resolution 3281 (XXIX) ‘*Charter of Economic Rights and Duties of States*’, adopted 12 December 1974, Twenty-ninth session, UN Doc. A/RES/29/3281.

²⁸⁵ The group comprised the Anglo-Persian Oil Company (now BP), Gulf Oil, Standard Oil of California and Texaco (now Chevron), Royal Dutch Shell, and Standard Oil of New Jersey and Standard Oil Company of New York (now ExxonMobil); see generally Yergin, D. (1991) *The Prize* (New York: Simon & Schuster), p. 563 ff.

²⁸⁶ Nowadays, the reverse is the case. National oil companies such as Saudi Aramco, NIOC, Rosneft, CNPC, Statoil and Petrobras control almost 90% of the world’s hydrocarbon reserves and 75% of annual production; see further Tordo, S. et al (2011) ‘National Oil Companies and Value Creation’, *World Bank Working Paper Series*, No. 218, p. xi.

mineral resources is squarely aimed at their commoditisation, the same cannot be said about the baseline supply of fresh water resources.²⁸⁷ Premature depletion of a hydrocarbon deposit, for example, can be balanced either with alternative supply of the same from a different source or with a substitute. The same is generally not the case for fresh water earmarked for human consumption or agriculture.

Prima facie, the principle of resource sovereignty therefore allows for the unfettered development and exploitation of natural resources as a national prerogative within States' territories. In the context of water resources, absolute territorial sovereignty means that upper riparian States could command the flow of water and use it as they pleased without the need to take the needs of downstream users into account. The theory of absolute territorial sovereignty is exemplified by the (in)famous Harmon Doctrine,²⁸⁸ which stems from an opinion prepared by the United States Attorney General, Judson Harmon, in response to a request by the Department of State for advice concerning a dispute with Mexico over the use of waters of the Rio Grande in 1895. The dispute arose after farmers in Colorado and New Mexico diverted water from the Rio Grande, which reduced the water flowing into Mexico. Harmon's legal advice to the Department refuted Mexico's assertion that its people had been using the waters of the Rio Grande long before the farmers and ranchers of Colorado and New Mexico began to do the same. Based on the concept of national sovereignty, Harmon rejected any limitations in international law on the use of the water:

²⁸⁷ Bottled water only represents marginal supply. Although water supply does represent a household cost, municipal water supply offers a poor rate of return for private investors, see for example Pangare, V., Kulkarni, N. and Pangare, G. (2004) 'An assessment of water sector reforms in the Indian context: The case of the state of Maharashtra', *Project on 'Commercialization, Privatization and Universal Access to Water'*, (Geneva: UNRISD), pp. 14-15; Hadipuro, W. (2010) 'Indonesia's water supply regulatory framework: Between commercialisation and public service?', *Water Alternatives* 3(3), p. 488.

²⁸⁸ For a more detailed discussion, see chapter 'Existing International Framework Attempts – The Question of Aquifer Sovereignty', pp. 125 ff.

*'The fundamental principle of international law is the absolute sovereignty of every nation, as against all others, within its own territory [...] All exceptions [...] to the full and complete power of a nation within its own territories must be traced up to the consent of the nation itself. They can flow from no other legitimate source.'*²⁸⁹

The principle of an absolute claim to the natural resources of one's land was also espoused in relation to groundwater in nineteenth century England and the United States. Accordingly, the owner of the land above the aquifer, or the party with the right to use the land, has an unfettered right to the water beneath the land. In the English case of *Acton v. Blundell*²⁹⁰, the court held that the ancient rights of a landowner extend to the sky above and the earth beneath, which include water. This Common Law position was also recognised in the United States, where, for instance, Missouri affirmed that a landowner had absolute ownership of the water beneath his land.²⁹¹ The effect of landowners rights to the natural resources beneath their land can also be observed in the light tight oil and gas boom the United States have experienced since 2008, where landowners in North Dakota, Texas lease out the mineral rights to the hydrocarbons trapped in the rock several kilometres beneath the ground for a royalty fee. Importantly, absolute territorial sovereignty does not support the concept of reasonable use as it grants the state unfettered utilisation of its water resources.

The principle of territorial sovereignty has been invoked in several water disputes of the twentieth century. In a dispute over the water share of the Indus river between Pakistan and India in the first half of the twentieth century, India at first refused to acknowledge Pakistan's claim to the waters of the Indus basin on the basis that a sovereign state has full

²⁸⁹ McCaffrey, S. (2007) *The Law of International Watercourses* (Oxford: Oxford University Press), p. 114 (citing 21 *Op Atty. Gen.* (1898), pp. 281-83).

²⁹⁰ (1983), 152 Eng. Rep. 1223.

²⁹¹ *Springfield Water Works Co. v. Jenkins*, 62 Mo. App. 74 (Mo. Ct. App. 1895); *Drinkwine v. State*, 300 A. 2d 616 (Vt. 1973).

and exclusive jurisdiction over the water resources in its territory.²⁹² Similarly, in the dispute between Turkey and its riparian States of Syria and Iraq on the waters of the Tigris and the Euphrates, Turkey, unlike Syria and Iraq, refused to become party to the *1997 Watercourse Convention* because it regarded the Tigris and the Euphrates as ‘cross-border rivers’ instead of ‘international rivers’, a definition that provided for more freedom in utilising the rivers’ water as Turkey asserted that the term ‘cross-border’ did not fall under the auspices of the *1997 Watercourse Convention* and therefore could not imply the same shared responsibilities as the term ‘international’.²⁹³ Same as India, Turkey initially argued that as the upper riparian territorial sovereignty gave it exclusive rights to the water of the two rivers (it has since shifted its position towards ‘equitable utilisation’).²⁹⁴ Finally, China objected to the *1997 Watercourse Convention* because the *Convention* does not grant a state absolute sovereignty over watercourses flowing within its territory.²⁹⁵ These examples of state practice demonstrate to what extent States are compelled to prioritise their own immediate interests. Unfortunately, if left unaddressed, such behaviour is likely to lead to ever-intensifying competition between States, which in turn would risk unfettered exploitation of earth’s resources. If such conditions were to prevail among the four Aquifer States, the future of the Nubian Sandstone Aquifer System would come under severe threat.

However, despite the desire of some States to reserve absolute jurisdiction even over shared natural resources such as water, and the lack of an endorsed definition, UNEP’s

²⁹² 1960 *Indus Water Treaty*, 19 September 1960, UNTS Vol. 419, pp. 126 ff.

²⁹³ Dellapenna, J. W. (1984) ‘Treaties as Instruments for Managing Internationally-Shared Water Resources: Restricted Sovereignty vs. Community of Property’, *Case Western Journal of International Law*, Vol. 26, p. 35; Naff, T. and Matson, C. R. (1984) *Water in the Middle East: Conflict of Cooperation?* (Boulder, CO: Westview Press), p. 165.

²⁹⁴ See Elver, H. (2002) *Peaceful Uses of International Rivers: The Euphrates and Tigris Rivers Dispute* (New York, Transnational Publishers), pp. 343-441; Lien, A. (1998) ‘Still Thirsting for a Multilateral Treaty on the Euphrates and Tigris Rivers Following the Adoption of the United Nations Convention on International Watercourses’, *Boston University International Law Journal*, 16, pp. 293 ff.

²⁹⁵ Per Chinese envoy Gao Feng, General Assembly Press Release, ‘General Assembly adopts Convention on Law of the Non-Navigational Uses of International Watercourses’, UN doc. GA/9248.

1978 *Draft Principles* reflect that shared resources are subject to obligations of transboundary cooperation, equitable utilisation and the prevention and control transboundary pollution.²⁹⁶ Nevertheless, the provisions contained in these instruments do not always provide the desired clarity for such an important aspect of international relations. Notably, UNEP's 1978 *Draft Principles* as well as various UN resolutions²⁹⁷ do not even offer a definition of 'shared natural resources'. At its Fifth Session in Nairobi in 1978, UNEP's *Working Group of Experts* considered, but for want of time did not further debate, the following definition for 'shared natural resources':

*'[...] an element of the natural environment used by man which constitutes a biogeophysical unity and is located in the territory of two or more States.'*²⁹⁸

Nevertheless, it only describes a resource's transboundary aspect but leaves considerable room for interpretation in relation to States' rights and responsibilities. One might wish to infer these from the term 'biogeophysical unity', but the question remains why they were not explicitly included. Whilst on the one hand States may well have shown opposition to a more elaborate and clearly defined definition, on the other it remains puzzling why the *Working Group* chose to tackle such a fundamental definition at the end of the Session.

Although on some occasions international courts have referred to international environmental law as if it were such a distinct and confined body of law²⁹⁹, it constitutes but a section of the entire corpus of international law and is not a distinct body of law in its

²⁹⁶ Principles 1, 3 & 4.

²⁹⁷ See for example 1973 UNGA Resolution 3129 (XXVIII) on *Co-operation between States in the Field of the Environment concerning Natural Resources Shared by Two or More States*, adopted on 13 December 1973, 28th Session, 2199th Plenary Meeting.

²⁹⁸ 1978 UNEP *Draft Principles of Conduct (Environmental Law Guidelines and Principles on Shared Natural Resources)*, 3rd Session, UNEP/IG.7/3, p. 17.

²⁹⁹ See for example *Case concerning the Gabčíkovo-Nagymaros Project between Hungary and Slovakia*, ICJ Reports, 1997, pp. 7, paras 92, 104 & 141; see also *Iron Rhine Arbitration*, PCA, 2005, paras 58, 222-3.

own right because there exists considerable interplay and overlaps between other disciplines and principles of general international law, environmental law and in particular the international law relating to sustainable development.³⁰⁰

Sustainable Development

Given that the offered definitions and descriptions of what constitutes the environment vary so much, one might ask whether existing international law adequately protects the environment. One way of approaching environmental protection is to deny the use of earth's resources to prevent their exhaustion. Whilst from a fundamentalist point of view, that is all that is required, it would still be an unsatisfactory solution for States and their development goals. As development goals tend to raise resource consumption, however, it become imperative to ensure resource availability into the future to prevent competition for resource to escalate into conflict. What is required, therefore, is a way of consuming earth's resources without degrading their future availability.

In essence, sustainable development is grounded in the concepts of sustainability and equity, aiming to strike a balance between resource exploitation and preservation, economic development and attribution of appropriate shares. It therefore allows for the departure from an 'either/or' approach to natural resources (i.e. either development or protection).³⁰¹ Although the concept of sustainable development only acquired the status of an international legal concept in its own right as late as 1972 with the *Stockholm Declaration*, early examples of international legal relations that incorporate the idea of 'sustainability' date back as far as 1893, when the United States asserted a right against Great Britain to

³⁰⁰ Brownlie, I. (2005) *Principles of Public International Law* (6th edn., OUP, Oxford), Ch. XII.

³⁰¹ Jackson, B. (1994) *Poverty and the Planet: A Question of Survival*, (London: Penguin), p. 5.

control and license the hunting of fur seals on the Pribilof islands and in ‘the waters adjacent thereto’ (i.e. part of the Bering Sea territory sold by the Russian Empire in 1867). Although the decision was in favour of Great Britain, in accordance with the arbitration treaty the tribunal prescribed a series of regulations for preserving the seal herds, which were to be binding upon and enforced by both powers.³⁰² Notably, by Acts of Congress already passed between 1868 and 1873, the Alaska Commercial Company was granted a limited license for the hunting of seals on condition that the Company would provide for their general protection.³⁰³ In this regard, the *1972 Declaration* was specified by the seminal *Our Common Future* report by the World Commission on Environment and Development in 1987, which introduced the general principle that sustainable development should take place for the benefit of future generations of mankind.³⁰⁴ The objective, therefore, is not to preserve earth’s resources for their own sake, but to ensure they remain available for human consumption. As we shall see, Islamic law mirrors this important characteristic of sustainable development. Since *Our Common Future*, a plethora of treaties, judicial decisions and other instruments of international law have supported, directly or indirectly, the concept of sustainable development and utilisation of resources.³⁰⁵ Article 33 of the *1989*

³⁰² See Art. 1 ff. *Award Between the United States and the United Kingdom Relating to the Rights of Jurisdiction of United States in the Bering’s Sea and the Preservation of Fur Seals*, Decision of 15 August 1893, Reports of International Arbitral Awards, Vol. XXVIII, pp. 263-276, hereinafter ‘Bering Fur Seals Award’.

³⁰³ See for example Act of 27 July 1868, 15 Stat. 240, c. 273.

³⁰⁴ World Commission on Environment and Development, (1987) *Our Common Future*, p. 43.

³⁰⁵ See e.g. Preamble, *1995 Agreement on Co-operation for the Sustainable Development of the Mekong River Basin*, 5 April 1995, reprinted in ILM Vol. 34, pp. 864 ff.; Art. 1(c), *1996 Declaration on Establishment of the Arctic Council*, 19 September 1996, ILM Vol. 35, pp. 1382; Principles 6, 8, & 10, *1997 Caribbean-United States Partnership for Prosperity and Security in the Caribbean: Bridgetown Declaration of Principles and Plan of Action*, 10 May 1997, ILM Vol. 36, pp. 792 ff; Arts. 1, 2, & 10, *1999 Yaoundé Declaration on the Conservation and Sustainable Management of Forests*, 17 March 1999, ILM Vol. 38, pp. 783 ff; Art. 2, *2000 Revised Protocol on Shared Watercourses in the Southern African Development Community*, 7 August 2000, ILM Vol. 40, pp. 317 ff; OECD Guidelines for Multinational Enterprises, Part V, *International Legal Materials (2001)*, 40, p. 237; Art. 2, *2001 Southeast Atlantic Fisheries Convention*, 20 April 2001, UNTS 2221, pp. 189 ff.; Art. VII, *2002 Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific (Antigua)*, 18 February 2002, 2002 IELMT 14; *2003 Convention on the Sustainable Development of Lake Tanganyika*, 12 June 2003, UNTS Vol. 2338, pp. 45 ff.; *2005 Treaty on the Conservation and Sustainable Management of Forest Ecosystems in Central Africa*, 5 February 2005, reproduced in *2006 Law, Environment and Development Journal* 2(1), pp. 145 ff; Art. 2, *22006 Southern Indian Ocean Fisheries Agreement*, 18 July 2006, OJ

Lomé Convention is a good example how the different elements of sustainable development can be brought together:

In the framework of this convention, the protection and the enhancement of the environment and natural resources, the halting of the deterioration of land and forests, the restoration of the ecological balances the preservation of natural resources and their rational exploitation are basic objectives that ACP States concerned shall strive to achieve with Community support with a view to bringing an immediate improvement in the living conditions of their populations and to safeguarding those of future generations.'

A similar approach can also be observed in Article 32 of the *2000 Cotonou Agreement*, whereby environmental protection and sustainable utilisation of resources must be integrated by

'mainstreaming environmental sustainability into all aspects of development cooperation and support programmes and projects implemented by the various actors.'

According to McGoldrick, '[t]he critical importance of sustainable development is that it is an integrationist principle'.³⁰⁶ The potential impact of the concept stems from the rules imposed by international environmental law, which constitutes an underpinning component in the legal interpretation of sustainable development.³⁰⁷ The two aspects of environmental law and the concept of sustainable development appear to be two sides of the same coin because is sustainable development of the earth's resources not an important

L196/15; Art. 1(i), 2006 *International Tropical Timber Agreement*, 27 January 2006, ITTO Doc. TD/TIMBER.3/ 12; Art. 2, 2009 *Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing*, 22 November 2009, 2010 ATNIF 41; Art. III, 2009 *Agreement on the Central Asian and Caucasus Regional Fisheries and Aquaculture Commission*, 2 October 2009, FAO 137th Session Res. No. 1/137.

³⁰⁶ McGoldrick, D. (1996) 'Sustainable Development and Human Rights: An Integrated Approach', *British Institute of International and Comparative Law*, 45, p. 818.

³⁰⁷ French, D. (2010) 'Sustainable development', in Fitzmaurice, M., Ong, D. M. and Merkouris, P. (eds.) *Research Handbook on International Environmental Law* (Cheltenham: Edgar Elgar), p. 55.

objective of environmental protection and therefore international environmental law? Only through the sustainability of development methods can it be ensured that damaging side effects are kept to a bare minimum as sustainability demands prolonged availability of the resource. Any excess stress on resources will ultimately lead to the expedited decline of their availability and therefore it should be in the interest of those exploiting natural resources to do so as sustainably as possible. The foresting and fishing industries especially have a clear interest to preserve forests and fish stocks they harvest through reforestation and fish stock control unless they wish to see their industries enter terminal decline. It can be said, therefore, that sustainable development is firmly based on the idea of environmental protection.³⁰⁸

However, it is not immediately obvious that the concept of sustainability has acquired the status of a rule of international law within the remit of Art. 38(1) of the ICJ's statute – in other words whether it has been 'expressly recognised' by States to have normative effect, either in international treaties, as a rule of customary international law or a general principle of law 'recognised by civilised nations'. A major theme of the 1972 *Stockholm Conference* was to highlight the need – especially for developed economies – to curb their development (and consumption) of natural resources to allow for a more sustainable use of the earth's resources.³⁰⁹ However, as will be discussed below, the *Rio Declaration* two decades later equally recognises States' 'sovereign right to exploit their own resources'.³¹⁰ Consequently, it would be useful to examine the legal status of sustainable development in the light of a 'right to development'.

³⁰⁸ Fuentes, X. (2004) 'International Law Making in the Field of Sustainable Development: The Unequal Competition between Development and the Environment', in Schrijver, N. and Weiss, F. (eds.) *International Law and Sustainable Development: Principles and Practice* (Leiden: Brill Academic Publishers), pp. 7-8.

³⁰⁹ See Statement by Prime Minister Olof Palme in the Plenary Meeting, 6th June 1972.

³¹⁰ Principle 2, 1992 *Rio Declaration*.

A Right to Development at the Expense of the Environment?

If there is such a thing as a right to development, it can most likely be found in the 1992 *Rio Declaration on Environment and Development* (and perhaps the Earth Charter³¹¹, which stems from it). Its diplomatic history is truly impressive – more than 3,000 diplomats, including 103 heads of state, attended the 1992 *Earth Summit* in Rio de Janeiro.³¹² Although part of the corpus of international soft law and therefore not legally binding on States, it constitutes the most significant universally recognised statement of their general rights and obligations towards the environment. As such, it has been referred to directly by the ILC in support of its codification of the law relating to transboundary harm³¹³, by the ICJ in its *Nuclear Weapons Advisory Opinion*³¹⁴ and by the Permanent Court in its *Iron Rhine Arbitration*³¹⁵. The *Rio Declaration* makes clear it intends to build on the 1972 *Stockholm Declaration* by not only reaffirming the older document in its entirety³¹⁶, but also by spelling out in Principle 2 that:

*‘States have [...] the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies.’*³¹⁷

The *Rio Declaration* introduced a nuance into its text because the 1972 *Stockholm Declaration* does not specifically refer to ‘developmental policies’ in relation to the

³¹¹ See Strong, M. F. (1992) ‘Statement to the Plenary on 14 June 1992’, *Environmental Policy and Law*, 22, p. 243; *The Earth Charter*, available at <http://www.earthcharterinaction.org/content/pages/Read-the-Charter.html> (accessed 10 June 2012).

³¹² See Sand, P. H. (1993) ‘International Environmental Law After Rio’, *European Journal of International Law*, 4, pp. 377-389.

³¹³ International Law Commission (2001) *Report of the Commission to the General Assembly on the Work of its Fifty-third Session*, UN Doc. A/56/10 (Supp. No. 10); (2006) *Report of the Commission to the General Assembly on the Work of its Fifty-eighth Session*, 61st Session, Supp. No. 10 (UN Doc. A/61/10), paras 51-67.

³¹⁴ ICJ Reports (1996) 226, paras 29-30; see also dissenting opinions of Judge Weeramantry and Palmer in the *Request for an Examination of the Situation*, ICJ Reports (1995) 288.

³¹⁵ PCA (2005) para. 59.

³¹⁶ Preamble, 1992 *Rio Declaration*.

³¹⁷ Principle 2, 1992 *Rio Declaration*.

exploitation of resources in its Principle 21 but only to ‘environmental policies’. Arguably, this is significant because with the de-facto amendment of the *Stockholm* Principle 21 in the *Rio* Principle 2, ‘developmental policies’ are elevated to equal prominence to ‘environmental policies’ when it comes to resource exploitation. Consequently, the *Rio Declaration* allows States a loophole when weighing up ‘developmental policies’ with ‘environmental policies’ – they might, it seems, be permitted by the *Rio Declaration* to prioritise one over the other. Scholars such as Sand take the view that in practice this nuance in the wording of *Rio*’s Principle 2 and *Stockholm*’s Principle 21 is inconsequential because the utilisation of resources is always inherently developmental.³¹⁸ Whilst that may be true, one must ask why, then, delegations and heads of state have found the need to include both ‘environmental policies’ and ‘developmental policies’ in the same sentence describing a right to resource exploitation? In the author’s view, the 1972 *Stockholm* Principles prioritise ‘environmental policies’ over the exploitation of resources and describe ‘development’ in a very generic context of economic and social progress as part of its instrumentalist approach.³¹⁹ Notably, the 1992 *Rio Declaration* endorsed sustainable development as a concept that manifests a utilitarian approach, which assumes a distinctly anthropocentric position towards the environment by positing

*Human beings [...] at the centre of concerns for sustainable development.*³²⁰

Yet, the *Rio Declaration* moves beyond the *Stockholm Declaration* by being phrased more authoritatively – and potentially norm creating – in obligatory terms (i.e. ‘States shall’

³¹⁸ Sand, *supra*, n. 312; see also Sohn, L. B. (1973) ‘The Stockholm Declaration on the Human Environment’, *Harvard International Law Journal*, 14(3), 423-515.

³¹⁹ See, for example, Principles 4, 8, 11 and 13; see also Handl, G. (2012) *Declaration Of The United Nations Conference On The Human Environment (Stockholm Declaration), 1972 and The Rio Declaration On Environment And Development, 1992* (United Nations Audiovisual Library of International Law), available at http://untreaty.un.org/cod/avl/pdf/ha/dunche/dunche_e.pdf (accessed 3 February 2015).

³²⁰ Principle 1, 1992 *Rio Declaration*; see also Handl, G. (1991) ‘Environmental Security and Global Challenge’, *Yearbook of International Environmental Law* 1(3), p. 24.

instead of ‘States should’).³²¹ Accordingly, the UN General Assembly was ‘convinced’ that the *Rio Declaration* contained ‘fundamental principles for the achievement of sustainable development’³²² and called on the Commission on Sustainable Development and the UN Secretary General to promote the implementation of its principles. Crucially, the UNGA also believed the *Declaration* was based on equitable partnership that was negotiated, in similar vein to UNCLOS, as a ‘package deal’ by consensus and must thus be considered as a whole.³²³ By reading the *Rio Declaration*, it becomes clear that its main concern was to integrate measures of environmental protection and economic growth. Despite some reservations by the United States with regards to Principles 3, 7, 12 and 23 (but which do not contravene the general thrust of the *Rio Declaration*)³²⁴, the arrangement of these principles and rules by consensus constitutes a shift away from developed countries dictating international norms and priorities.³²⁵ The *Rio Declaration*, therefore, cannot be dismissed as a work by an elite section of the international community, an allegation that has been obliquely levied against the developed countries attending the 1972 Stockholm Conference.³²⁶

In essence, the *Rio Declaration* is a compromise between two sets of demands: on the one hand the demands by developed countries for citizens’ participation and access to information³²⁷ (i.e. transparency), a precautionary approach to prevent the worst effects of

³²¹ See Nordquist, M. H. et al (eds.) (1993) *UNCLOS 1982: A Commentary, Vol. II* (The Hague: M. Nijhoff), pp. xlv-xlvi.

³²² 1993 UNGA Resolution 48/190 ‘Dissemination of the principles of the Rio Declaration on Environment and Development’, adopted on 21 December 1993, 86th Plenary Meeting, UN Doc. A/RES/48/190.

³²³ Birnie, P. et al (2009) *International Law and the Environment* (Oxford: Oxford University Press), p. 113.

³²⁴ See UNGA (1992) *Report on the United Nations Conference on Environment and Development*, UN Doc. A/CONF 151/26 (Vol II), para. 16.

³²⁵ Porras, I. (1993) ‘The Rio Declaration: A New Basis for International Cooperation’, in Sands, P. (ed.) *Greening International Law* (London: Earthscan), p. 20.

³²⁶ See Statement by Prime Minister Olof Palme in the Plenary Meeting, 6th June 1972, pp. 5-6.

³²⁷ 1992 *Rio Declaration*, Principle 10.

environmental damage by any development or utilisation of resources³²⁸ and for the principle of ‘the polluter pays’³²⁹, and on the other the demands by developing countries for a ‘right to development’³³⁰ (essentially to alleviate poverty³³¹) and the recognition that developed and developing countries have ‘common but differentiated responsibilities’ based on their societies’ respective impacts on the environment³³². *Rio* can therefore also be seen to have taken an important step towards healing a rift between those advocating that new technology, resource substitution and policy adaptation will suffice in ‘making earth’s resources stretch’ and those insisting that more drastic measures will be necessary, either by curbing resource consumption or population growth.³³³

It is probably because of these two conflicting demands that the *Rio Declaration* contains no explicit reference to a ‘right to development’ in any of its principles. However, Principle 3 does refer to a concept very close to what can be seen as a right to sustainable development:

‘The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.’

Principle 3 can be interpreted to contain both the element of ‘development’ and the requirement to develop resources in ways that enable present and future generations to meet their needs with these resources, where ‘developmental needs’ stands for the needed resources and ‘environmental needs’ stands for the protection of the conditions which allow utilisation of said resources for generations to come. It can be reasonably inferred that this is the reason why Principle 3 contains both the terms ‘developmental needs’ and

³²⁸ *Ibid*, Principle 15.

³²⁹ *Ibid*, Principle 16.

³³⁰ *Ibid*, Principle 3.

³³¹ *Ibid*, Principle 5.

³³² *Ibid*, Principle 7.

³³³ See generally Mensah, A. M. and Castro L. C. (2004) *Sustainable Resource Use & Sustainable Development: A Contradiction* (Bonn: Zentrum für Entwicklungsforschung).

‘environmental needs’. The inclusion of the word ‘equitable’ in Principle 3 further points to towards the balancing of competing factors without prioritising one over the other. This may explain why the United States regard development not as a right but only as a ‘goal’.³³⁴ This reading of Principle 3 is also consistent with Principle 2, which affirms States’ sovereign right to develop and exploit their own resources as they see fit but also confers the responsibility to

[...] ensure that activities within their jurisdiction or control do not cause damage to the environment of other States of areas beyond the limits of national jurisdiction.’

Principle 2 therefore ensures that sustainable development is made possible by reciprocal rights and responsibilities between States. It does not absolutely prohibit environmental damage so long as other States are not affected by it, but because of that limitation, also does not grant a state absolute freedom to exploit its resources regardless of environmental consequences. Principle 3 would be of little use if one state’s developmental and environmental policies would ensure its own resources are developed in a way that they are able to fulfil the needs of future generations of that state’s citizens but which would mean that toxic waste resulting from such development, for example, is merely pumped into a river downstream close to the boarder of a neighbouring state. This view can also be observed in the *Pulp Mills* case:

Whereas the present case highlights the importance of the need to ensure environmental protection of shared natural resources while allowing for sustainable economic development; whereas it is in particular necessary to bear in mind the reliance of the Parties on the quality of the water of the River Uruguay for their livelihood and economic development; whereas from this point

³³⁴ UNGA, *supra*, n. 324.

*of view account must be taken of the need to safeguard the continued conservation of the river environment and the rights of economic development of the riparian States; [...]*³³⁵

Principle 4 reiterates this relationship between rights and responsibilities expressly:

In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.'

Principle 4 thus 'creates the possibility of moving environmental considerations and objectives from the periphery of international relations to the economic core'³³⁶ whilst the Permanent Court of Arbitration regarded it as a 'principle of general international law', which 'applies not only in autonomous activities but also in activities undertaken in implementation of specific treaties between the Parties'³³⁷. The interplay of Principles 2, 3 and 4 demonstrates that no absolute 'right to development' can be found in the *1992 Rio Declaration*. Instead States' development of their resources should conform to the principles of *sustainable* development, which means that the interests of resource exploitation and environmental protection should be reconciled.³³⁸ Relatively recently, the *2002 Johannesburg Plan* (re)affirmed that the

³³⁵ *Case Concerning Pulp Mills on the River Uruguay (Request for the Indication of Provisional Measures)* (Argentina v. Uruguay), ICJ Reports 2006, p. 133, para. 80.

³³⁶ Sands, P. (1994) 'International Law in the Field of Sustainable Development', *British Yearbook of International Law*, 65, p. 303 ff.

³³⁷ *Award of the Arbitral Tribunal in Arbitration Regarding the Iron Rhine ("Ijzeren Rijn") Railway between The Kingdom of Belgium and the Kingdom of the Netherlands*, PCA (2005), pp. 28-29, para. 59.

³³⁸ *Gabčíkovo-Nagymaros Case*, *supra*, n. 299, p. 78, para. 140; see also Dernbach, J. (2003) 'Achieving Sustainable Development: The Centrality and Multiple Facets of Integrated Decisionmaking', *Indiana Journal of Global Legal Studies*, 10, p. 248.

*‘integration of the three components of sustainable development – economic development, social development and environmental protection – [are] interdependent and mutually reinforcing pillars [of sustainable development].’*³³⁹

Apart from sustainable development, this three-pronged approach therefore also advocates sustainable resource utilisation, which, although not new to international law,³⁴⁰ has only recently made its way into the concept of sustainable development. Whereas the *Stockholm Declaration* and the *Rio Declaration* did not specifically address sustainable utilisation, the International Law Association’s *2002 New Delhi Declaration* recognises States’ duty

*‘to ensure sustainable use of natural resources [within their own territory].’*³⁴¹

The *New Delhi Declaration* thus expands the scope of its *Rio* predecessor by recognising a duty of States to not just ensure their neighbours’ environments – and, by extension, their natural resources – remain uncompromised through their actions,³⁴² but also to depart from their traditional ‘sovereign right to exploit’.³⁴³

However, notwithstanding Handl’s observation that ‘[sustainability] is a notion around which legally significant expectations regarding environmental conduct have begun to crystallize’³⁴⁴, the non-binding natures of the *Rio Declaration*, the *Johannesburg Plan* or the *New Delhi Declaration* still allow negotiating States considerable discretion in the effect they wish

³³⁹ *2002 Plan of Implementation of the World Summit on Sustainable Development*, UN Doc. A/CONF. 199/20, p. 8; see also Gehring, M. W. and Newcombe, A. (2011) ‘An Introduction to Sustainable Development in World Investment Law’, in Cordonier Segger, M.-C., Gehring, M. W. and Newcombe, A. (eds.) *Sustainable Development in World Investment Law* (Alphen aan den Rijn: Kluwer Law Int.), p. 4.

³⁴⁰ See ‘*Bering Fur Seals Award*’, *supra*, n. 302.

³⁴¹ Principle 1 (1.1, 1.2), *New Delhi Declaration of Principles of International Law relating to Sustainable Development*, 70th Conference of the International Law Association, New Delhi, India, 2–6 April 2002.

³⁴² Principle 2, 1992 Rio Declaration.

³⁴³ Schrijver, N. (1997) *Sovereignty over Natural Resources – Balancing Rights and Duties* (Cambridge: Cambridge University Press), p. 392.

³⁴⁴ Handl, G. (1990) ‘Environmental Security and Global Change: The Challenges to International Law’, *Yearbook of International Environmental Law*, Vol. 1, p. 25.

to afford sustainable development as a normative factor in their agreements.³⁴⁵ Accordingly, whilst Principle 27 of the *1992 Rio Declaration* calls for ‘further development of international law in the field of sustainable development’, thereby suggesting that international environmental law is subservient to the concept of sustainable development, the wording had already been softened with the *1997 Nairobi Declaration of the United Nations Environment Programme* to ‘international environmental law aiming at sustainable development’³⁴⁶. Nevertheless, what remains is States’ readiness to recognise the interrelationship of concepts such as economic development and sustainability but without having to commit to limit to their development policies.³⁴⁷ It follows that sustainability still requires separate treaties to have effect.

Sustainability gains particular prominence when considering the utilisation of the Nubian Sandstone Aquifer System. Crucially, the aims of environmental protection and sustainable development (i.e. the utilisation of a resource) in practice can be different. What is beneficial in the interest of sustained availability (at least for as long as possible) of a resource might not be in the interest of environmental protection and vice versa. Forestry activities, however sustainable if carried out responsibly, might disturb precious wildlife and therefore be against environmental protection. In such cases, environmental protection might override any consideration for sustainable development. Furthermore, sustainable development only makes sense when dealing with a resource that can replenish itself.

³⁴⁵ Birnie, P. and Boyle A. (2002) *International Law and the Environment* (Oxford: Oxford University Press), p. 89.

³⁴⁶ Art. 3(a), *1997 Nairobi Declaration on the Role and Mandate of the UN Environment Programme*, 27 January -7 February 1997, UNEP/HLC/5/3 & Corr.1.

³⁴⁷ See for example Preamble to the *2000 Cartagena Protocol on Biosafety*, 29 January 2000, UNTS Vol. 2226, pp. 208 ff.: ‘Recognizing that trade and environment agreements should be mutually supportive with a view to achieving sustainable development’.

The World Commission on Environment and Development, originally established in 1987, issued a report entitled *Our Common Future*³⁴⁸ (also known as the '*Brundtland Report*'), which argued that 'sustainability' should be used as a perspective to negotiate the relationship between development and the environment and tackle the differences in economic muscle between States. The *Report* highlights the environmental cost of development; how intensified agricultural production threatens to turn 'productive dryland [...] into worthless desert' through a pull of raw material that forces States to accept the 'ecological interdependence among nations'.³⁴⁹ The *Report* defined sustainable development as meeting 'the needs of the present without compromising the ability of future generations to meet their own needs'³⁵⁰. Potentially, therefore, the *Brundtland Report's* definition identifies sustainable development as a concept to potentially preserve a resource for an unlimited number of future generations.

Clearly, that definition was formed in view of regenerative resources such as fish stocks or forests, and even most aquifers. It makes absolute sense to manage and, where necessary, to restrict the amount of fishing or foresting to allow fish stocks to bounce back and trees to regrow. Aquifers must not be polluted and their contributing water sources must not be cut off so that future generations can use their waters safely as these groundwater structures are replenished. Fish stocks, forests and most aquifers can recover from their exploitation, provided their numbers or quantities are not depleted to a level where that is no longer possible.

However, as already discussed above, confined aquifers such as the Nubian Sandstone Aquifer System, are a different matter. They are not recharged and therefore the water

³⁴⁸ World Commission on Environment and Development (1987) *Our Common Future*, UN Doc. A/42/427 (Annex).

³⁴⁹ *Ibid*, paras. 5-15.

³⁵⁰ At I.3.27.

quantities they contain are on a path of depletion the instant any type of development (i.e. use) takes place. One either leaves them alone completely or accepts that no amount of sustainable development will preserve them for future generations indefinitely. All that sustainable development could achieve for the utilisation of confined aquifers, therefore, is to prolong the availability of the resource.

Intergenerational Equity

Nevertheless, that poses a crucial question: For how long (i.e. how many future generations) is the availability of a resource to be ensured? Less use will increase the number of future generations able to enjoy a fossil aquifer's water, the opposite is true where exploitation of a confined aquifer's water is intensified. Although the Nubian Sandstone Aquifer System is vast both in geographical dimensions and in the quantities of water it is estimated to contain, ultimately the amount of water extracted per generation will determine how many future generations are able to enjoy the water, too.

The concept of intergenerational equity, first developed by Professor Brown Weiss, is firmly rooted in international relations and law, including the *Charter of the United Nations*, the *Universal Declaration of Human Rights* and the *International Covenant on Civil and Political Rights*.³⁵¹ The *Brundtland Commission's* definition of sustainable development equally has at its core the theory of intergenerational equity. Intergenerational equity is somewhat controversial because it requires each generation to utilise its resources in such a manner that it can be passed on to the next in no worse condition than it was received.³⁵² In

³⁵¹ Brown Weiss, E. (1989) *In Fairness to Future Generations* (Irvington-on-Hudson: Transnational Publishers), pp. 25-6.

³⁵² Brown Weiss, E. (1992) 'In Fairness to Future Generations and Sustainable Development', *American University International Law Review*, 8(1), pp. 19-26; Brown Weiss, E. (1989) *In Fairness to Future Generations* (Dobbs Ferry, New York).

essence, the current generation is regarded as a trustee of the earth's resources for the next generation.³⁵³ The concept thus requires each generation to use and develop its heritage consisting of natural resources (and culture) in a way that allows future generations to benefit from them the same way the present one does.³⁵⁴

Echoing the different schools of sustainability thought discussed above, Brown Weiss sees two different approaches for defining intergenerational equity in the context of the relationship among generations and the natural resources they require.³⁵⁵ On one end of the scale is the 'preservationist model', which is somewhat unrealistic because it requires the present generation does not destroy or deplete resources or significantly alter its environment. Instead, the present generation saves earth's resources for future generations and preserves the same level of quality in all aspects of the environment. This preservationist approach is rooted in old English water law and its natural-flow theory, in which riparian States could use stream water so long as their use did not impair in any way the quantity or quality of water for those further downstream. The biggest benefactor of such an approach would be the last riparian before the stream enters the ocean or disappears, because there is no other riparian to whom an obligation is owed. This preservationist model would promote the status quo because the idea behind the term 'preservation' is to preserve nature for its own sake and not to ensure it remains useful for later human needs.³⁵⁶ As such, it is only consistent with a subsistence economy, not with the industrialised – and industrialising – world of today. In essence, therefore, future generations would benefit at the expense of earlier generations. Naturally, this would incur

³⁵³ Brown Weiss, E. (1992) 'In Fairness to Future Generations and Sustainable Development', *American University International Law Review*, 8(1), p. 20.

³⁵⁴ Brown Weiss, *supra*, n. 351, p. 21.

³⁵⁵ Brown Weiss, E. (1992) 'Intergenerational equity: a legal framework for global environmental change', in Brown Weiss, E. (ed.) *Environmental Change and International Law: New Challenges and Dimensions* (Tokyo: United Nations University Press), Ch. 12.

³⁵⁶ See Passmore, J. (1974) *Man's Responsibility to Nature* (London: Duckworth).

the problem of convincing the present generation of forbearing the use what nature has to offer today and thus remains without an incentive and therefore is a difficult outcome to achieve.

At the other end of the scale sits Brown Weiss' 'opulence model'.³⁵⁷ The term encapsulates what it is about, namely that the present generation consumes all that it wants in its lifetime with the view of generating as much wealth as possible for future generations (or because it believes there will be no future generation).³⁵⁸ This model ignores the possibility of long-term degradations of the environment as a result of its implication, such as the irreversible losses of otherwise renewable resources such as forests and fish and costly environmental pollution. The opulence model is sometimes excused by the promise of technological advancement that would enable infinite resource substitution.³⁵⁹ However, it does not provide an answer to what those technological advancements would cost, both in monetary terms and lifestyle. Under the opulence model, very little, if anything is likely to be left for the benefit of future generations as there is thus no guarantee that technology will be able to adequately replace the resources lost.³⁶⁰

Both extremes are not amenable to sustainable development, which aims to extend a stable standard of living from one generation to the next. As a result, Brown Weiss advocates the middle ground, the 'equality model', whereby 'partnership between generations is the corollary to equality'.³⁶¹ In essence, this partnership demands that each generation passes the planet on in no worse condition than it received it in and to provide equitable access to its resources and benefits. Each generation is thus both a trustee for the

³⁵⁷ Brown Weiss, *supra*, n. 355.

³⁵⁸ See Barnett, H. and Morse, C. (1963) *Scarcity and Growth* (Washington: RFF Press), pp. 11-12.

³⁵⁹ See Simon, J. (1981) *The Ultimate Resource* (Princeton: Princeton University Press).

³⁶⁰ This cost debate is already in full swing in the sphere of hydrocarbon consumption and has highlighted that either consumers will have to pay more per energy unit or curb consumption, with the result of slower economic growth.

³⁶¹ Fitzmaurice, M. (ed.) *Contemporary Issues in International Environmental Law* (Cheltenham: E. Elgar), p. 123.

planet and a beneficiary with rights to its resources, but in turn indebted to care for it. Crucially, the concept is less about safeguarding the needs of the present generation – or even several generations into the future – but more about ensuring the sustainable apportionment of earth’s natural resources throughout the future of mankind. Brown Weiss makes this point clear in light of a key problem of her theory. If one generation were to fail to conserve the planet in the condition it had received it in, succeeding generations would have an obligation to repair this damage in favour of the following generation – unless, of course, the generation inflicting the harm has passed on sufficient wealth to its immediate successor generation to allow it to manage the deterioration effectively, but which is unlikely since they would have consumed it all already. Whilst this seems inherently unfair, Brown Weiss suggests that the generation in question can apportion the cost across several of its successors – for example by means of revenue bonds and other financial measures – so that the benefits and costs of remediation are shared among them. Of course, the generation responsible for the environmental degradation in the first place would benefit at the expense of immediate future generations, but intergenerational equity prizes the protection of distant future generations’ access to earth’s resources above all else.³⁶² This intergenerational approach can also be observed in Principles 1 and 2 of the *1972 Stockholm Declaration* and the concept is explicitly referred to in Principle 3 of the *Rio Declaration*. Many other sources of international law contain similar concepts to intergenerational equity, such as the *1995 Agreement on the Conservation of Straddling and Highly Migratory Fish Stocks*³⁶³.

³⁶² Brown Weiss, *supra*, n. 355.

³⁶³ Art. 5(a), (e), (f), (h), *Agreement for the Implementation of the Provisions of the United Nations Convention On The Law Of The Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, A/CONF.164/37, 8 September 1995.

However, D'Amato in particular criticised the concept of intergenerational equity and its element of intergenerational wealth transfer because its argument for an obligatory relationship between generations is grounded in the notion that humanity is somehow the most significant subject of international law since future generations have a moral right 'to inherit an environment no worse than we enjoy'.³⁶⁴ D'Amato's critique hinges on the assertion that human rights are 'species chauvinistic', as thus espoused by Posner:

*'Animals count, but only insofar as they enhance wealth. The optimal population of sheep is determined not by speculation on their capacity for contentment relative to people, but by the intersection of the marginal product and marginal cost of keeping sheep.'*³⁶⁵

Posner's conclusion derives from his principle of wealth maximisation, which, according to him, forms the bedrock of moral justification of all law:

*'Wealth maximization provides a foundation not only for a theory of rights and of remedies but for the concept of law itself.'*³⁶⁶

According to D'Amato's analysis, if the notion of environmental protection and sustainable development is rooted in an obligation 'in fairness to future generations', then the theory of maximising wealth would grant the last generation a moral license to squander earth's resources. This would be hypocritical and points towards the inherent weakness of the theory. Yet, whilst D'Amato's argument is logical, it is footed on the premise that international human rights are 'species chauvinistic'. He therefore ignores the role of human rights as tools for good governance, which, if implemented correctly, will ultimately benefit other species, too. Alternative scenarios without human rights or other

³⁶⁴ D'Amato, A. (1990) 'Do We Owe A Duty To Future Generations To Preserve The Global Environment?', *American Journal of International Law*, 84, p. 195.

³⁶⁵ Posner, R. A. (1981) *The Economics of Justice* (Harvard: Harvard University Press), p. 76.

³⁶⁶ *Ibid*, p. 74.

tools of governance are likely to retreat to unfettered consumption under notion of absolute territorial sovereignty.

A more profound criticism invokes Parfit's generational paradox³⁶⁷, whereby future individuals are unable to possess rights because they do not yet exist and therefore cannot have identifiable interests.³⁶⁸ In his argument, Parfit envisions specific environmental interventions, even minor environmental acts of conservation, which would alter the way the environment takes shape in the future. Even if the environment would only differ in the slightest from the way it would have been, the resulting impact, Parfit and D'Amato argue, would be significant enough to produce people different from those who would have been born if the environmental intervention had not occurred. In the words of D'Amato:

*'Our attempted environmental altruism will prevent the birth of the precise beneficiaries of our altruism.'*³⁶⁹

As a result, the argument goes, if these beneficiaries are inevitably different individuals from those originally intended to benefit, how can they be owed a duty by the present generation? Further, if due to the environmental intervention these individuals are different, how can intergenerational equity claim to improve the wellbeing of yet unborn individuals when it had inevitably prevented their birth? D'Amato concedes that Parfit's theorem may at first appear counterintuitive and a fallacy because it appears unlikely that a slight environmental change echoes through generations and disrupts natural causation. However, he asserts that this assumption is 'scientifically accurate' by referring to Lorenz's

³⁶⁷ Parfit, D. (1976) 'On Doing the Best for Our Children', in Bayles, M. (ed.) *Ethics and Population* (Cambridge, Mass.: Schenkman), p. 100 ff.; Parfit, D. (1976) *Overpopulation: Part One*, referred to in Parfit, D. (1982) 'Future Generations, Further Problems', *Philosophy and Public Affairs*, 11, pp. 113-72.

³⁶⁸ D'Amato, *supra*, n. 364, pp. 190-97.

³⁶⁹ *Ibid*, p. 191.

chaos theory also known as the ‘Butterfly Effect’³⁷⁰. Lorenz’s theory is based on his observations as meteorologist at the Massachusetts Institute of Technology, whereby the slightest data shift about weather conditions fed into his computer model resulted in drastic differences in simulated weather conditions after a number of iterations, doubling in scale every four days.³⁷¹

Notably, though, Parfit’s paradox and D’Amato’s critique are based on individuals’ rights whereas Brown Weiss’ concept of intergenerational equity is based on generational rights, which are *group* rights.³⁷² Importantly, Brown Weiss’s concept is compatible with Islamic principles of justice, which treat fundamental rights essential to human wellbeing not as individual rights but as ‘rights of the community of believers as a whole’³⁷³. These group rights could then be evaluated by objective criteria from one generation to the next, which does not require knowledge of the precise number of future right-holders. At any rate, these generational rights could not be enforced by future right-holders, people who are not yet born cannot be individuals, and therefore are better regarded as constraints on the current generation in relation to a moral choice it must take: whether to curtail resource consumption and waste in the interests of its children or not.³⁷⁴ In fact, this interpretation of intergenerational equity is congruent with D’Amato’s critique, where he concludes that

*[...] we should cultivate our natural sense of obligation not to act wastefully or wantonly even when we cannot calculate how such acts would make any present or future persons worse off [and respond] to a deep and inarticulate sense that human beings are not in confrontation with, but rather belong to, their natural environment.*³⁷⁵

³⁷⁰ See Gleick, J. (1987) *CHAOS: Making a New Science*. New York: Penguin Books.

³⁷¹ D’Amato, *supra*, n. 364, p. 192.

³⁷² Brown Weiss, *supra*, n. 352, p. 24.

³⁷³ Khadduri, M. (1984) *The Islamic Conception of Justice* (Johns Hopkins University Press, Baltimore), p. 233.

³⁷⁴ Brown Weiss, *supra*, n. 372 p. 24.

³⁷⁵ D’Amato, *supra*, n. 364, p. 197.

Unfortunately, the concept of group rights for future generations has the inherent obstacle of inadequate standing. Decisions by international tribunals such as the ICJ that address generational responsibilities all involve the present generation suing with respects to misdeeds of the past.³⁷⁶ Crucially, no international tribunal has expressly recognised the rights of future generations, although the ICJ has, on occasion, considered the concept of intergenerational rights and some judges have acknowledged that it is too important to merely disregard because there is lack of precedent.³⁷⁷ Again, it is important to consider the alternative: in the absence of any moral consideration towards progressive resource consumption and environmental degradation alongside it, the risk increases of States inadvertently harming their neighbours through their unfettered development programmes.

The Duty Not to Cause ‘Harm’

Unfortunately, when it comes to the protection of the natural environment, including policies aimed at intergenerational equity, both the 1972 *Stockholm Declaration* and the 1992 *Rio Declaration* in their pertinent Principles 21 (*Stockholm*) and 2 (*Rio*) do not express a definition of the qualifying level of harm for an action for breach of obligation. Perhaps this was because of the need to balance interests from developed and developing countries. However, after analysing ‘more than sixty international instruments’³⁷⁸, the ILC adopted the view expressed in the *Trail Smelter Arbitration* that the threshold for when harm to the environment becomes a breach of obligation is ‘significant harm’ (previously, the ILC had

³⁷⁶ See, inter alia, *Case Concerning Certain Phosphates Lands in Nauru (Nauru vs Australia)*, Order of 13 September 1993, ICJ Reports (1993), p. 322; *Advisory Opinion on Nuclear Weapons*, Advisory Opinion of 8 July 1996, ICJ Reports (1996), p. 266.

³⁷⁷ See Dissenting Opinion of Judge Weeramantry, in Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in *The Nuclear Tests (New Zealand V. France)* Case, ICJ Reports (1995), pp. 341-2.

³⁷⁸ 1992 Yearbook of the International Law Commission, Vol. II, p. 93.

preferred the term ‘appreciable’³⁷⁹). Notably, ‘significant harm’ is the standard applied both in the ILC’s *1997 Convention on the Law of the Non-navigational Uses of International Watercourses*³⁸⁰ and the *2001 Draft Articles on Prevention of Transboundary Harm*³⁸¹. The *Draft Articles* are based on Principle 21 of the *1972 Stockholm Declaration*, adopting a libertarian approach to resource utilisation as long as neighbouring States remain unaffected, particularly through pollution. Nevertheless, neither the *1997 Convention* nor the *2001 Draft Articles* are able to provide a precise definition of ‘pollution’.

Following the *1972 Stockholm Declaration*, treaties describe ‘pollution’ as a detrimental change in quality of a resource such as water.³⁸² Art. 1(4) of the *1982 United Nations Convention on the Law of the Sea* considers interests of environmental protection to be a vital element in the determination of ‘pollution’, too. Tomczak argues rightly that the element of environmental protection makes the assessment of what constitutes pollution independent from its effects on humans and the intended utilisation of a resource; the fact that an ecosystem is adversely affected is sufficient.³⁸³ Yet, when considering the meaning of pollution, merely thinking in terms of effects is not enough. For pollution to be considered ‘legally significant’, it needs to be somehow quantifiable, i.e. to be measured against a threshold.³⁸⁴ However, this threshold would ultimately be determined by subjective judgement and a more scientific approach put forward in Principle 6 of the *1972 Stockholm Declaration*, which refers to the discharge of substances ‘in such quantities or concentrations

³⁷⁹ See commentary in *Report of the International Law Commission on the work of its Thirty-second session*, 5 May - 25 July 1980, Official Records of the General Assembly, Thirty-fifth session, Supplement No. 10, (A/35/10), pp. 59-98.

³⁸⁰ Art. 7, in *Official Records of the General Assembly*, Fifty-first Session, Supplement No. 49 (A/51/49).

³⁸¹ Arts. 3 and 4, in *Official Records of the General Assembly*, Fifty-sixth Session, Supplement No. 10 (A/56/10).

³⁸² Art. 1, 1974 Paris Convention on Prevention of Marine Pollution from Land-based Sources.

³⁸³ Tomczak, M. (1984) ‘Defining Marine Pollution: A Comparison of Definitions Used by International Conventions’, *Marine Policy*, 8, pp. 319-21.

³⁸⁴ Ong, D. M. (2002) ‘The Relationship between Environmental Damage and Pollution: Marine Oil Pollution Laws in Malaysia and Singapore’, in Bowman, M. and Boyle, A.: *Environmental Damage in International and Comparative Law. Problems of Definition and Valuation* (Oxford University Press, Oxford, 2002), p. 196.

as to exceed the capacity of the environment to render them harmless' (i.e. when they have become irreversible), has not been widely adopted.³⁸⁵ Nevertheless, the scope of transboundary pollution and harm clearly extends beyond injury to persons or property. Although the *Trail Smelter Arbitration*³⁸⁶ is a prominent early example where a narrow judicial view prevailed by which damage to persons (i.e. physical 'injury') or property was recognised but environmental interests such as wildlife and the general health of ecosystems were not, this was because the proceedings were bound by United States tort law of the time.³⁸⁷ Treaties such as the *1992 Convention on Civil Liability for Oil Pollution Damage*³⁸⁸, which entered into force on 30 May 2006, have since changed the legal landscape so that environmental damage is confined within the scope of pollution and environmental harm prevention by States.

There is therefore a recognised need for the avoidance of pollution and its harmful effects to the environment and the ability of neighbouring States to utilise their resources in international law, both enshrined in the *1972 Stockholm Declaration*³⁸⁹ and the *1992 Rio Declaration*³⁹⁰. This requirement can be divided into two aspects of international law: One the one hand the duty to prevent, reduce and control transboundary pollution and its harmful effects stemming from activities within a state's jurisdiction or control,³⁹¹ and on the other the duty to mitigate transboundary environmental risks.³⁹²

³⁸⁵ See McLoughlin, J. and Bellinger, E. G. (1993) *Environmental Pollution Control: An Introduction to Principles and Practice of Administration* (The Hague, Kluwer Law International, 1993), p. 2.

³⁸⁶ *Trail Smelter Arbitration* (United States vs. Canada), Reports of International Arbitral Awards Vol. III, 16 April 1938 and 11 March 1941, pp. 1905-1982.

³⁸⁷ *Trail Smelter Arbitration*, *ibid*, p. 1920.

³⁸⁸ 29 November 1969, 9 ILM 4.

³⁸⁹ Principle 21.

³⁹⁰ Principle 2.

³⁹¹ Principles 2-4, 8, 11, 24, *1992 Rio Declaration*.

³⁹² Principles 9-12, 14, 15, 17-19, *1992 Rio Declaration*.

This approach is reflected in the ICJ's *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons*, where the Court recognises that the

*'environment is under daily threat [and that the] existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.'*³⁹³

In *New Zealand v. France* (1995)³⁹⁴, Judge *ad hoc* Palmer and Judges Weeramantry and Koroma accepted in their dissenting opinions that international law requires States not to cause or allow serious environmental harm to happen (mainly through the precautionary principle for reasons further discussed below).³⁹⁵ The International Law Commission, in its report on the *Fifty-third Session*, has subsequently assessed the meaning of 'jurisdiction' and 'control' respectively as activities in the territory of a state within which, under international law, a state is authorised to exercise authority or where it exerts physical control.³⁹⁶ The judges in the *Nuclear Weapons* advisory as well as the International Law Commission therefore suggest that a duty to prevent transboundary environmental harm is rooted in the respect for another state's sovereignty and territorial integrity. This element is also reflected in the ILC's *2001 Draft Articles on the Prevention of Transboundary Harm*³⁹⁷, where on the one hand risk triggers responsibility even in instances where there is a '*low probability of causing disastrous harm*' and '*a high probability of causing significant harm*'³⁹⁸ but on the other the resulting

³⁹³ ICJ Reports (1996), p. 226, para. 29.

³⁹⁴ *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in The Nuclear Tests* (New Zealand v. France) Case, ICJ Reports, 22 September 1995.

³⁹⁵ For Judge Weeramantry, see *Dissenting Opinion*, p. 342; for Judge Koroma, see *Dissenting Opinion*, pp. 369-71; for Judge *ad hoc* Palmer, see *Dissenting Opinion*, p. 412.

³⁹⁶ International Law Commission (2001) *Report of the Commission to the General Assembly on the Work of its Fifty-third Session*, UN Doc. A/56/10 (Supp. No. 10), pp. 384-5; see also *Legal Consequences for States of the Continued Presence of South Africa in Namibia (South West Africa) notwithstanding Security Council Resolution 276 (1970)*, ICJ Reports (1971), p. 16, para. 118.

³⁹⁷ *2001 Draft Articles on Prevention of Transboundary Harm from Hazardous Activities*, 2 July-10 August 2001, ILC Report 53rd Session, UN Doc. A/56/10.

³⁹⁸ International Law Commission (2001) *Report of the Commission to the General Assembly on the Work of its Fifty-third Session*, UN Doc. A/56/10 (Supp. No. 10), p. 387, paras. (2)-(3).

two-step objective test for probability and magnitude of harm is intended to prevent the imposition of a duty ‘in respect of virtually any activity’.³⁹⁹ Consequently, whilst the duty can have the effect of environmental protection, this is not its recognised objective *per se*. Prioritising state sovereignty might therefore result only in the prevention and mitigation of the most prominent risks to the environment due to the inherent conflict between development needs and environmental protection. Hence, unlike the duty to avoid transboundary harm, the prevention of risks to the environment as a principle *per se* has mostly been confined to European instruments and the adoption by EU member States, and not entered customary international law.⁴⁰⁰ In the *MOX Plant* case,⁴⁰¹ for example, the United Kingdom replied to Ireland’s ‘Request for Provisional Measures’ by describing the extent of its compliance with international law related to the two duties described above and thereby demonstrating acceptance that they apply.⁴⁰²

The Precautionary Principle – *In Dubio Pro Natura?*

Although with the right actions certain environmental damage can be remedied, in its very nature remedies come too late – the damage has already been done. Apart from the aspect of sovereignty, the preceding discussion also highlighted that prevention operates on

³⁹⁹ *Ibid*, para. (3).

⁴⁰⁰ Cameron, J., Wade-Gery, W. and Abouchar, J. (1998) ‘Precautionary Principle and Future Generations’ in Agius, E. et al (eds.) *Future Generations and International Law* (London: Earthscan), p. 101; Handl, G. (1991) ‘Environmental Security and Global Change: The Challenge to International Law’ in Lang W. et al (eds.), *Environmental Protection and International Law* (London: Graham & Trotman), p. 75.

⁴⁰¹ *Dispute Concerning the MOX Plant, International Movements of Radioactive Materials, and the Protection of the Marine Environment of the Irish Sea* (Ireland v. United Kingdom), 9 November 2001, ITLOS No. 10.

⁴⁰² *MOX Plant Dispute, ibid*, Written Response of the United Kingdom, pp. 15 ff; see also *Case concerning Land Reclamation by Singapore in and around the Straits of Johor* (Malaysia v. Singapore), Provisional Measures, 4 September 2003, ITLOS No. 12; Response of the Republic of Singapore, p. 50.

the premise that the decision-maker has certain knowledge of a specific risk being present so that appropriate preventative measures can be adopted.⁴⁰³ As such, prevention requires sound knowledge of the relevant scientific facts on which the decision is based. This may work well with the more tangible natural resources such as forests, watercourses and even fish stocks, for which international law has managed to create specific frameworks.⁴⁰⁴ However, where the relationship between cause and effect of environmental damage may prove to be more difficult to establish, the principle of prevention becomes very limited. In cases where the resource in question is renewable, and thus self-reinvigorating, that limitation can be overcome with time as more scientific research allows for a learning curve and subsequent application of the right preventative measures. The non-renewable nature of fossil aquifers such as the Nubian Sandstone Aquifer System, however, does not allow for such a learning curve to build ‘cumulative experience’⁴⁰⁵. In other words, environmental harm caused by human activity to the Nubian Sandstone Aquifer System would most likely be irreversible, as it is a finite and sealed-off resource. There is no access to the Aquifer System other than through man-made wells, but which work to take water out of the aquifer but not to replace it. There would be very limited scope indeed for ‘getting it right’ a second time through preventive measures by building on past experience.

The precautionary principle, therefore, needs to adopt a more proactive and holistic approach.⁴⁰⁶ Unlike the prevention, it addresses a case-specific inability to establish the likelihood or foreseeability of harm needed to determine the obligation of diligent

⁴⁰³ De Sadeleer, N. (2002) *Environmental Principles: From Political Slogans to Legal Rules* (Oxford: Oxford University Press), pp. 74-75.

⁴⁰⁴ For example, Art. 2, 1991 Salzburg Convention on the Protection of the Alps; 1997 Watercourse Convention; Arts. 194(1, 2), 195, 192, 196, 204, 207-212, UNCLOS.

⁴⁰⁵ De Sadeleer, *supra*, n. 403.

⁴⁰⁶ Trouwborst, A. (2009) ‘Prevention, precaution, logic and law. The relationship between the precautionary principle and the preventative principle in international law and associated questions’, *Erasmus Law Review*, 2(2), p. 107.

prevention and control of risks.⁴⁰⁷ Its purpose is the adequate protection of the environment, as espoused by Principle 15 of the 1992 *Rio Declaration*,⁴⁰⁸ which can also be interpreted as prioritising the environment *per se* in situations where accurate science is lacking, i.e. *in dubio pro natura*.⁴⁰⁹ The precautionary principle therefore is a key component of sustainable development because it enhances the ability to at least prolong the availability of a particular resource.

It entered the international stage at a regional conference for the protection of the North Sea in 1987.⁴¹⁰ By the time of the *Rio Conference* in 1992, it had already been almost universally accepted as a central principle of international environmental law and found its way into more than sixty multilateral treaties, declarations and action programmes covering myriad environmental issues.⁴¹¹ Inter alia, the principle has also become a prominent tenet of European Union law and policy.⁴¹² It is therefore not surprising that Judge *ad hoc* Vinuesa in his dissenting opinion in the *Pulp Mills* case identified the precautionary principle as

*'not an abstraction or an academic component of desirable soft law, but a rule of law within general international law as it stands today.'*⁴¹³

Apart from international legal instruments, States have also repeatedly invoked the precautionary principle in international judicial proceedings, including three times before

⁴⁰⁷ See Article 15, 1992 *Rio Declaration*.

⁴⁰⁸ Principle 15 prescribes the precautionary principle's wide application 'to protect the environment'.

⁴⁰⁹ Ahteensuu, M. (2008) 'In Dubio Pro Natura? A Philosophical Analysis of the Precautionary Principle in Environmental and Health Risk Governance', *Reports from the Department of Philosophy, University of Turku*, 20, p. 1.

⁴¹⁰ 1987 *Declaration of the Second International Conference on the Protection of the North Sea*, 24-25 November 1987, ILM Vol. 27(3), pp. 835-48, para. XVI.

⁴¹¹ See Trouwborst, *ibid*, p. 108.

⁴¹² See generally Art. 191, 2007 *Treaty on the Functioning of the European Union*; see further Regulation (EC) N 1907/EC (Framework for chemicals); Regulation (EC) N 178/2002 (Food security).

⁴¹³ *Pulp Mills Case*, *supra*, n. 335, Dissenting Opinion of Judge *ad hoc* Vinuesa, appended to the ICJ Order on Provisional Measures of 13 July 2006, p. 43.

the International Tribunal for the Law of the Sea (ITLOS) in Hamburg⁴¹⁴ and four times before the ICJ⁴¹⁵. Whilst States have thus invoked the precautionary principle as ‘a very widely accepted [norm] in contemporary international law’,⁴¹⁶ notable decisions by the Supreme Courts of India and Canada concerning environmental pollution have also applied the principle.⁴¹⁷

Still, both the preventative and the precautionary principle share the same result: the protection of the environment. Consequently, States have not always made a clear distinction between the two principles.⁴¹⁸ The *1991 Bamako Convention*, for instance, makes specific reference to the ‘precautionary principle’ as well as ‘the preventive, precautionary approach’.⁴¹⁹ Moreover, a resolution by UNEP’s governing council in 1989 urged the international community to adopt the precautionary principle as the basis of its preventive policy towards marine pollution.⁴²⁰ The interchangeable use of prevention and precaution therefore hints at an inherent conceptual overlap, which stems from the ‘apparently unsteady distinction’ between risk and uncertainty.⁴²¹ Whereas prevention aims to limit risk and precaution tackles uncertainty, the very notion of risk comprises uncertainty. Moreover, even a perfectly implemented preventive measure contains some risk that an important aspect was overlooked or wrongly understood, hence risk mitigation in itself can

⁴¹⁴ *Southern Bluefin Tuna Cases* (New Zealand v. Japan; Australia v. Japan), Order of 27 August 1999, ITLOS Case Nos. 3 & 4, paras. 31-32; *The MOX Plant Dispute*, *supra*, n. 401, (Request for Provisional Measures), p. 414; *Land Reclamation* (Request for Provisional Measures) (Malaysia v. Singapore), ITLOS Case No. 12, 8 October 2003, para. 74.

⁴¹⁵ *New Zealand v. France*, *supra*, n. 394, paras. 5, 34-5; *Gabčíkovo-Nagymaros Case*, *supra*, n. 299; *Pulp Mills Case*, *supra*, n. 413; *Aerial Herbicide Spraying* (Ecuador v. Colombia), Application Instituting Proceedings, 31 March 2008, paras. 30, 37.

⁴¹⁶ *New Zealand v. France*, *supra*, n. 415, para. 5.

⁴¹⁷ *Vellore Citizens’ Welfare Forum v. Union of India* [1996] 5 SCC 647, AIR (SC) 2715; *Spray-Tech v. Hudson* [1993] 19 MPLR (2d) 224.

⁴¹⁸ Gray, K. R. (2000) ‘International Environmental Impact Assessment: Potential for a Multilateral Environmental Agreement’, *Colorado Journal of International Environmental Law and Policy*, 11, p. 99.

⁴¹⁹ Art. 3, 1991 Convention on the Ban of Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa.

⁴²⁰ UNEP Governing Council Decision 15/27 on the Precautionary Approach to Marine Pollution, Including Waste-dumping at Sea, 25 May 1989, UNGAOR, 44, Supp. 25, p. 152, para. 1.

⁴²¹ Cameron, Wade-Gery, and Abouchar, *supra*, n. 400.

be understood to be precautionary as much as preventative.⁴²² By that logic it follows that ultimately any risk reduction is captured by the precautionary principle. However, as discussed above, it is the degree of uncertainty that serves as a distinction between prevention and precaution. Consequently, although high risk does not necessarily entail high levels of uncertainty, where the probability and magnitude of harm cannot be charted due to unclear causal relationships, for instance, the adopted measure would fall under the precautionary principle.⁴²³

The question therefore arises how States regard such level of uncertainty, which is a prerequisite for the precautionary principle. In early cases of modern international law, even though the term ‘precautionary principle’ was unheard of, its equivalent was not given much room. In the *Corfu Channel Case*⁴²⁴, for instance, the ICJ noted that responsibility is only triggered where the risk has become known:

*[...] if Albania had been informed of the operation before the incidents of October 22nd, and in time to warn the British vessels and shipping in general of the existence of mines in the Corfu Channel, her responsibility would be involved....’*⁴²⁵

The *Trail Smelter Arbitration* similarly suggests that responsibility for transboundary environmental harm only arises where actual and serious harm has or is likely to occur (i.e. a high standard of proof) and thereby sets a high threshold only beyond which responsibility would arise.⁴²⁶ This conservative approach still persists today – a party

⁴²² *Ibid.*

⁴²³ Hohmann, H. (1994) *Precautionary Legal Duties and Principles of Modern International Environmental Law* (Dordrecht: Kluwer Law International 1994), p. 334.

⁴²⁴ *The Corfu Channel Case*, Judgement of 9th April, ICJ Reports (1949), pp. 18-22.

⁴²⁵ As per Counsel for Albania, cited in Judgement of April 9th, ICJ Reports (1949), p. 22.

⁴²⁶ *Trail Smelter Arbitration*, *supra*, n. 386, p. 1959.

alleging a risk of environmental harm must establish that at least a *prima facie* risk really exists – which is generally not the party that undertakes potentially harmful activities – thus placing the burden of proof squarely on the potential claimant. In both the *Dispute Concerning the MOX Plant* and the *Pulp Mills* case the PCA and ICJ, respectively, denied provisional measures for the claimants.⁴²⁷ In the *Southern Bluefin Tuna Cases*, however, the ITLOS panel saw it evidenced that indeed such risk existed.⁴²⁸ To this extent, the outcomes of the *MOX Plant* and the *Pulp Mills* proceedings thus sit at odds with *Southern Bluefin Tuna* and the *Rio Declaration*, which made very clear that ‘lack of full scientific certainty shall not be used as a reason for postponing’ preventative measures’,⁴²⁹ whilst the *New Delhi Declaration*⁴³⁰ and the International Law Association’s 2004 *Berlin Rules on Water Resources*⁴³¹ take a very similar approach. It is beyond the scope of this thesis to conduct an analysis on the differing attitudes of international judicial bodies towards the precautionary principle. Nevertheless, the analysis above suggests that the courts err on the side of caution by prioritising the preventive approach and its element of territorial sovereignty over the precautionary principle despite the various inclusions of the precautionary principle in international legal instruments. Effectively, then, the judicial outcomes still regard States as prioritising their territorial sovereignty over environmental protection *per se*, thus making the various inclusions of the precautionary principle in international legal instruments seem more of a statement of good intentions than an actual commitment.

Summary

⁴²⁷ *MOX Plant Dispute*, *supra*, n. 401, (Jurisdictional and Procedural Measures), paras. 53-5; *Pulp Mills Case*, *supra*, n. 335, paras. 73-7.

⁴²⁸ *Southern Bluefin Tuna Cases* (New Zealand v. Japan; Australia v. Japan), Provisional Measures, para. 79.

⁴²⁹ Principle 15.

⁴³⁰ Para. 4.1.

⁴³¹ Article 23(2).

This chapter explored what essential principles a new instrument of international environmental law in relation to a non-renewable resource such as the NSAS would have to focus on to be effective. Particular attention was therefore be paid to the concept of sustainable development and its components and the integration and application of many different aspects of international law to international environmental law.

Despite the status of territorial sovereignty and integrity as integral parts of international law, they are not without serious drawbacks of their own in relation to the responsible development and utilisation of a transboundary fossil aquifer; dependence on these principles alone is unlikely to achieve desirable results. Concurrently, notwithstanding the circumstances outlined above where it may well be in a state's interest to cooperate, it is unclear whether a specific obligation to inform and consult about the development of transboundary ground deposits of natural resources already exists in international law.

A key issue in this regard is the indecisiveness of international law in committing to a single definition of what constitutes 'the environment'. As a result of the complexity of environmental issues, the picture that frequently offers itself is that of a fragmented international law of the environment, with a scattered body of sources and frequently vague definitions. Significantly, there are no coherent sources of Western international law that unequivocally capture the concept of 'the environment'. Such a wide range of definitions can be problematic. Laws adopted to protect the environment can impose potentially significant economic costs, even if these only extend to limitations on economic opportunities. Consequently, it should not be surprising that the attitude of States towards this subject has broadly been analogous to state sovereignty over hydrocarbons embedded in a nation's territory. States, with their tendency to prioritise their own interests, generally insist that their territorial sovereignty also extends over groundwater within their jurisdiction.

However, sustainable development is at its core an integrationist principle. Earlier steps towards the development of the principle, such as the 1972 Stockholm Declaration attempted to gradually tighten environmental controls around national development and natural resources policies whilst also maintaining States' right to consume their natural resources for the purpose of development. The *1992 Rio Declaration* in particular tries to sit on two chairs at once by fully endorsing its 1972 predecessor on the one hand, and on the other tightening said controls. The New Delhi Declaration later even expanded the scope of its Rio predecessor by recognising a duty of States to not just ensure that their neighbours' environments – and, by extension, their natural resources – remain uncompromised through their actions, but also to depart from their traditional 'sovereign right to exploit'. Inter alia, it might therefore not come as a surprise that the New Delhi Declaration has so far not morphed into binding international law. States therefore retain considerable discretion in the effect they wish to afford sustainable development as a normative factor in their agreements

Concurrently, even though the ICJ's *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons* finds for a general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment, a duty to prevent transboundary environmental harm is rooted more in the respect for another state's sovereignty and territorial integrity rather than environmental protection *per se*. Although in contrast the precautionary principle adopts a more holistic approach and aims to protect environment *per se*, judicial bodies have by and large taken a conservative approach by prioritising territorial sovereignty over the principle of precautionary environmental protection.

Prima facie this represents a shortcoming in international law because it does not serve

the prolonged utilisation of the Nubian Sandstone Aquifer System (if not sustainable development) and intergenerational equity, which requires a consistent environmental approach towards its water. In turn this would leave a significant gap in international environmental law were it not for the conceptual overlap between the preventive approach and the precautionary principle. Whereas prevention aims to limit risk and precaution tackles uncertainty, the very notion of risk comprises uncertainty. It is therefore possible to see the preventive approach as serving both territorial sovereignty and environmental protection. Whilst this could potentially compromise sustainable development and intergenerational equity, it currently seems to be as far as international courts are willing to go at the moment. With this analysis in mind, it is therefore time to turn to the 2008 Draft Articles to assess to what extent they comply with the above-discussed key elements of international environmental law and sustainable development.

CHAPTER III – EXISTING INTERNATIONAL FRAMEWORK ATTEMPTS

The preceding chapter explored what essential principles a new instrument of international environmental law in relation to a non-renewable resource such as the Nubian Sandstone Aquifer System would have to incorporate to be effective, in particular the various components of sustainable development to the extent that they can be applied to a finite resource as well as intergenerational equity and questions of state sovereignty over natural resources. This chapter will therefore examine the current progress of international water law with particular emphasis on the *2008 Draft Articles on the Law of Transboundary Aquifers*, which were originally conceived to address the particular legal requirements of ‘fossil’ aquifers such as the NSAS and its finite water resource base, and their congruence with the specific elements of international environmental law discussed already.

The Slow Advance of International Water Law

A few European powers, notably Great Britain and France, concluded several colonial treaties in Africa, which tangentially addressed groundwater issues in the nineteenth century. These very early references to groundwater in international agreements were

concerned with the use of wells and springs in new frontier areas such as Somalia. What is interesting are their attempts to incorporate regimes that incorporate elements of equity. In 1888, France and Great Britain expressly ‘agreed that the use of the wells of Hadou, through which the boundary passes, shall be common to both parties’.⁴³² In 1925, in a border agreement between Italy and Egypt, Italy conceded the Ramla Well to Egypt under the condition that the Egyptians would reserve sufficient water from the well to satisfy the needs of the local population, to be determined by a joint commission created for that purpose.⁴³³

However, although these specific agreements were concerned with the allocation of groundwater in a manner that incorporated the needs of those who depended on it, they were, unfortunately, exceptions. For most of the nineteenth and twentieth centuries States ignored the regulation of groundwater. It was only from 1879 onwards that international non-governmental organisations began to focus on hydrological issues, inducing the slow pace at which States were move towards codification and incremental advances in international water law. Apart from the occasional inclusion of groundwater in their scope, such as brief references to its use and allocation,⁴³⁴ almost no international agreements dealt with groundwater comprehensively until the *Arrangement Relating to the Protection and Utilization and Recharging of the Franco-Swiss Genevese Aquifer* in 1977.⁴³⁵

In the first decade of the twenty-first century, there were four new agreements focussing specifically on groundwater in North Africa. As already discussed above, Libya,

⁴³² *Agreement between the Governments of Great Britain and France with regard to the Somali Coast*, 2-9 February 1888, prov. 1, British and Foreign State Papers, Vol. LXXXIII, pp. 674-5.

⁴³³ *Agreement between Egypt and Italy concerning the establishment of frontiers between Cyrenaica and Egypt*, 6 December 1925, cited in *Yearbook of the International Law Commission*, 1974, Vol. II, Pt. 2, p. 70.

⁴³⁴ E.g. *1994 Danube River Protection Convention*, 29 June 1994, International Commission for the Protection of the Danube River.

⁴³⁵ Burchi, S. and Mechlem, K. (2005) *Groundwater in International Law: Compilation of Treaties and Other Legal Instruments*. FAO Legislative Study, No. 86 (Rome: FAO and UNESCO), pp. 1-8.

Egypt, Sudan and Chad, as part of their joint *Programme for the Development of a Regional Strategy for the Utilisation of the Nubian Sandstone Aquifer System*, signed Agreements 1 and 2 comprising *Terms of Reference for the Monitoring and Exchange of Ground Water Information of the Nubian Sandstone Aquifer System* and *Terms of Reference for Monitoring and Data Sharing* in 2000.⁴³⁶ These brief instruments focus on information sharing, covering technical, meteorological, socio-economic, and development-related information,⁴³⁷ as well as the continued monitoring of extraction, water level, and salinity of aquifer water. Nevertheless, these two agreements do not address the legal issues surrounding the development and simultaneous use of the Nubian Sandstone Aquifer System by all four States. Instead, they only constitute the very first step of bringing the different stakeholder States together. Accordingly, the preamble of the *Programme for the Development of a Regional Strategy for the Utilisation of the Nubian Sandstone Aquifer System* reads:

*For sustainable utilisation of the Nubian Sandstone Aquifer System, consolidation of the existing data and information in such a usable accessible manner and the continuous update of knowledge in the Aquifer Systems should be maintained. In order to accomplish this objective and to assure the exchange and flow of information between the four countries sharing the Nubian Sandstone Aquifer System.*⁴³⁸

In another instrument reminiscent of Agreement 1, Libya, Algeria and Tunisia agreed in Rome on the *Establishment of a Consultation Mechanism for the Northwestern Sahara Aquifer System* in 2002.⁴³⁹ The three countries agreed to coordinate, promote and facilitate rational management of the aquifer system through a steering committee, a coordination unit and

⁴³⁶ FAOLEX (FAO legal database online). Reprinted in: Centre for Environment & Development for the Arab Region and Europe (CEDARE), *Regional Strategy for the Utilisation of the Nubian Sandstone Aquifer System*, Volume IV, Appendix II, Cairo, 2001.

⁴³⁷ Agreement 1.

⁴³⁸ FAOLEX, *supra*, n. 436.

⁴³⁹ *Agreement on the Establishment of a Consultation Mechanism for the Northwestern Sahara Aquifer System*, 19-20 December 2002, reproduced in Burchi, S. and Mechlem, K., *supra*, n. 435.

an ad hoc scientific committee. The agreement, comprising the meeting's minutes and the letters of endorsement, stipulates mechanisms for consultation, data processing and verification, research and the publication of information relating to the aquifer and its uses under the administrative roof of the *OSS (Observatoire du Sahara et du Sabel)*.

The other two twenty-first century agreements were concluded in Europe and in South America. In 2007, France and Switzerland signed the *Convention on the Protection, Utilization, Recharge and Monitoring of the Franco-Swiss Genevois Aquifer*⁴⁴⁰, which builds on the preceding *1977 Arrangement*. The agreement established the Genevois Aquifer Management Commission, which is responsible for approving and monitoring the construction of new waterworks, recording water levels to ensure extraction does not exceed the set limit and establishing water quality criteria. In 2010, Argentina, Brazil, Paraguay and Uruguay concluded the *Acuerdo sobre el Acuífero Guaraní (Guarani Aquifer Agreement)*.⁴⁴¹ The *Guarani Aquifer Agreement* emphasises territorial sovereignty over natural resources, but also obliges its parties not to cause significant harm.⁴⁴² To this extent, it is within the bounds of Principle 21 of the *Stockholm Declaration* and Principle 2 of the *Rio* as well as the approach hitherto generally favoured by international courts. Like the agreements on the Nubian Sandstone Aquifer System, the Northwest Sahara Aquifer System (SASS) and the Genevois Aquifer, the *Guarani Aquifer Agreement* established a commission to coordinate the exchange of technical and scientific information on the aquifer's condition.⁴⁴³ Yet, it goes beyond those

⁴⁴⁰ *Convention on the Protection, Utilization, Recharge and Monitoring of the Franco-Swiss Genevois Aquifer*, France-Switzerland, 18 December 2007, reprinted and translated to English at http://www.unece.org/fileadmin/DAM/env/water/meetings/legal_board/2010/annexes_groundwater_paper/2008Franco-Swiss-Aquifer-English.pdf.

⁴⁴¹ *Guarani Aquifer Agreement*, 2 August 2010, unofficial translation available at http://www.internationalwaterlaw.org/documents/regionaldocs/Guarani_Aquifer_Agreement-English.pdf.

⁴⁴² Arts. 3, 6.

⁴⁴³ Article 15.

other agreements by incorporating provisions for equitable utilisation of the aquifer's waters:

*'The Parties shall promote the conservation and environmental protection of the Guarani Aquifer System so as to ensure multiple, reasonable, sustainable, and equitable use of its water resources.'*⁴⁴⁴

The 1997 Watercourse Convention on the Law of the Non-navigational Uses of International Watercourses

Despite these agreements, the corpus of law relating to fresh water has historically been disintegrated. Rules governing the allocation of rights to surface water have traditionally been separate from those regulating the utilisation of groundwater; law aimed at preventing and containing pollution have usually been conceived in isolation from those governing permits of water utilisation.⁴⁴⁵ However, the international body of States and non-governmental law associations have never dropped the issue altogether and continued to work towards a universal framework, albeit very slowly indeed.

A major early driving force in the development of the international law of the non-navigational use of international and transboundary water resources has been the *Institut de Droit International* (Institute of International Law, 'IIL'). It is devoted to the study and development of international law, and its membership comprises widely recognised public international lawyers.⁴⁴⁶ The IIL does not intend to produce binding legal instruments but works towards solutions to pressing issues in the realm of international law. The Institute's

⁴⁴⁴ Article 4.

⁴⁴⁵ Brown Weiss, E. (2013) *International Law for a Water-Scarce World* (Leiden: Koninklijke Brill), p. 51.

⁴⁴⁶ The Institute was awarded the Nobel Peace Prize in 1904.

*Madrid Declaration*⁴⁴⁷ had already captured many of the key principles of sound water management in 1911, but arguably was ahead of its time as two world wars and an economic crisis diverted the attention of the world powers. In essence, the *Madrid Declaration* proposed a framework based on equitable utilisation of transboundary water resources, reflecting especially the no-harm doctrine. Where a body of water traverses the borders two or more States, the *Declaration* sought to prohibit States from altering, polluting or damming surface bodies of water to the detriment of other riparian States whilst promoting multilateral cooperation.⁴⁴⁸ It was not until 50 years later that the IIL's *Salzburg Resolution on Utilization of Non-Maritime International Waters*⁴⁴⁹ took the baton from its *Madrid Declaration* of 1911 and embellished the articles of that older document with provisions of equity, good faith and guidelines on negotiation procedures.⁴⁵⁰ In 1979, the IIL concluded the *Athens Resolution on the Pollution of Rivers and Lakes and International Law*⁴⁵¹, which fleshed out the reference to the no-harm doctrine given in the *Madrid Declaration*. Accordingly, Article I provides a definition for pollution, namely

'any physical, chemical or biological alteration in the composition or quality of waters which results directly or indirectly from human action and affects the legitimate uses of such waters, thereby causing injury.'

Article II of the *Athens Resolution* reads in its English translation by FAO:

'In the exercise of their sovereign right to exploit their own resources pursuant to their own environmental policies, and without prejudice to their contractual obligations, States shall be under a duty to ensure that their activities or those

⁴⁴⁷ IIL (1911) 'Réglementation internationale de l'usage des cours d'eau internationaux en dehors de l'exercice du droit de navigation' (Madrid Session 1911)', in *Annuaire de l'Institut de Droit International*, Vol. 24, p. 365.

⁴⁴⁸ *Ibid.*

⁴⁴⁹ IIL (1961), 'Utilisation des eaux internationales non maritimes (en dehors de la navigation) (Salzburg Session 1961)', in *Annuaire de l'Institut de Droit International*, Vol. 49(II), p. 381.

⁴⁵⁰ *Ibid.*, Arts. 3, 6, 7 and 8.

⁴⁵¹ IIL (1980) 'Resolution on the Pollution of Rivers and Lakes and International Law', in *Annuaire de l'Institut de droit international*, Vol. 58, pp. 197 ff.

conducted within their jurisdiction or under their control cause no pollution in the waters of international rivers and lakes beyond their boundaries.'

Another contemporary of the IIL, the International Law Association (ILA), has been equally active in the development of the international law on the non-navigational use of shared water resources. Its 1958 *Resolution on the Use of the Waters of International Rivers* introduced the important notion that a 'system of rivers and lakes in a drainage basin should be treated as an integrated whole (and not piecemeal)'. In 1966, the International Law Association adopted the *Helsinki Rules on the Uses of the Waters of International Rivers*⁴⁵², which was the most ambitious to date, covering not only non-navigational uses but also navigation, timber floating and procedures for the prevention and settlement of disputes. Despite its status as an unofficial, non-binding draft, the *Helsinki Rules* have been very influential on the development on the law relating to the utilisation of fresh water.

Meanwhile, the United Nations had moved slowly towards conceiving its own draft of law for the non-navigational use of international waters. Member States decided to include in the organisation's Charter a provision that requires the General Assembly to

*'initiate studies and make recommendations for the purpose of [...] encouraging the progressive development of international law and its codification.'*⁴⁵³

The United Nations Secretariat's declared aim was to support 'the 'codification movement' [to] remove the uncertainties of customary international law, as well as [to give] precision to abstract general principles whose practical application is not settled'⁴⁵⁴ by establishing the

⁴⁵² ILA (1966) *Report of the Fifty-Second Conference, Helsinki, 1966*, p. 484.

⁴⁵³ Article 13(1)(a), UN Charter.

⁴⁵⁴ United Nations (2012) *The Work of the International Law Commission, Vol. I* (New York: UN), p. 1.

International Law Commission (ILC) as a subsidiary body of the General Assembly.⁴⁵⁵ Accordingly, the General Assembly requested the UN Secretary General to test the waters with Member States on whether problems relating to the utilisation of international rivers was an appropriate subject for codification in 1959.⁴⁵⁶

In 1970, the General Assembly recommended in its resolution *Progressive Development and Codification of the Rules of International Law Relating to International Water Courses*⁴⁵⁷ that the ILC begin with the assessment of the law of non-navigational uses of international watercourses with a view to its progressive development and codification. In this context, it is useful to note that the catalyst for the General Assembly's 1970 resolution was a request by the Government of Finland. The Finnish delegation pushed for the inclusion of an item entitled '*Progressive development and codification of the rules of international law relating to international watercourses*' in the agenda of the twenty-fifth General Assembly session, upon which it was referred to the Sixth (Legal) Committee for consideration.⁴⁵⁸ In the Sixth Committee, Judge E. J. Manner, member of the Finnish delegation and former chair of the International Law Association committee responsible for the 1966 *Helsinki Rules*, then proposed in his capacity as a government delegate that the ILC be tasked with the codification of the law of international watercourses modelled on the *Helsinki Rules*.⁴⁵⁹ Although the views of Sixth Committee delegates differed whether the IIL's *Salzburg Resolution* or ILA's *Helsinki Rules*

⁴⁵⁵ Article 1(1), *UNGA Resolution 174(II)* 'Establishment of an International Law Commission', 21 November 1947.

⁴⁵⁶ Preamble, *UNGA Resolution 1401(XIV)* 'Preliminary Studies on the Legal Problems Relating to the Utilization and use of International Rivers', adopted 21 November 1959, 14th Session, 842nd Plenary Meeting.

⁴⁵⁷ UNGA Resolution 2669(XXV) 'Progressive Development and Codification of the Rules of International Law Relating to International Watercourses', adopted 8 December 1970, 25th Session, UN Doc. A/8202.

⁴⁵⁸ N. Verbal Dated 24 April, 1970 From the Permanent Mission of Finland to the United Nations Addressed to the Secretary-General, UN GAOR, 25th Session, Annexes, agenda item 91, UN Doc. A/7991.

⁴⁵⁹ UN General Assembly Sixth Committee (1970) '1225th Meeting: Progressive development and codification of the rules of international law relating to international watercourses (A/7991)', UN Doc. A/C.6/SR/1225.

should form the basis of the ILC's work – the delegates eventually settled on a compromise by merely referring to the work of '[recent] intergovernmental and non-governmental studies on the subject' in their report⁴⁶⁰ – it seems clear that the *Helsinki Rules* had significant influence on the General Assembly's 1970 resolution and can be seen as the immediate precursor to the ILC's draft articles on the non-navigational uses of international watercourses.

The result of the ILC's work between 1974 and 1994 were a set of draft articles that led to the adoption of the *Convention on the Law of the Non-Navigational Uses of International Watercourses* by the General Assembly on 21 May 1997. Importantly, the negotiations leading to the *Convention* were open to all UN member States as well as States that are members of UN specialised agencies, which thus formed a 'Working Group of the Whole'.⁴⁶¹ This ties in with the General Assembly's clear focus on driving forward with the codification of customary international law by expressing its conviction that

*'successful codification and progressive development of the rules of international law governing the non-navigational uses of international watercourses would assist in promoting and implementing the purposes and principles set forth in Articles 1 and 2 of the [UN] Charter.'*⁴⁶²

McCaffrey observes that only few changes were made to most of the ILC draft articles during the negotiations, which, according to his assertion, strongly suggests that the *1997 Watercourse Convention* enshrines customary international law pertaining to non-navigational uses of international watercourses.⁴⁶³ Notably, the ICJ utilised the *Convention* a mere four

⁴⁶⁰ Resolution 2669(XXV), *supra*, n. 457, para. 7.

⁴⁶¹ UNGA Resolution 49/52 'Draft Articles on the Law of the Non-navigational Uses of International Watercourses', adopted 9th December 1994, 84th Plenary Meeting, UN Doc. A/RES/49/52; see also Annex of the same resolution.

⁴⁶² *Ibid*, 'Preamble'.

⁴⁶³ McCaffrey, S. and Sinjela, M. (1998) 'The 1997 United Nations Convention on International Watercourses', *American Journal of International Law* 92(1), p. 98.

months after its inception in its case work; two out of four cases concerning international watercourses referred to by the ICJ in the past 20 years concern non-navigational uses of these shared watercourses: the *Gabčíkovo-Nagymaros Project* case⁴⁶⁴ and the *Pulp Mills* case⁴⁶⁵.

In *Gabčíkovo-Nagymaros Project*, the ICJ suggested it shared the view that the *Watercourse Convention* encodes customary international law on the topic. The case involved a treaty dispute over the construction and operation of the Gabčíkovo – Nagymaros Dams on the Danube River. The two dams' construction programme was agreed between Hungary and Czechoslovakia in Budapest in 1977 (*'Budapest Agreement'*), but which was subsequently suspended by Hungary for environmental concerns and an alleged threat to the Budapest water supply. Slovakia disagreed and subsequently completed its own damming project (Variant C) on Slovakian territory. Variant C restricted Hungarian access to the Danube water considerably and caused ecological damage to the island of Szigetköz (Little Rye Island). As the resulting dispute was brought before the ICJ (Slovakia had assumed dissolute Czechoslovakia's rights and obligations under the *Budapest Agreement*), the court held that the *Agreement* remained valid and that both parties, Slovakia and Hungary, were in breach of it. The ICJ referred to Hungary's 'basic right to an equitable and reasonable sharing of the resources of an international watercourse' and opined that Slovakia, by unilaterally imposing its own control over the shared resource, had thus deprived Hungary of its equitable share and thus violated the international legal norm of proportionality.⁴⁶⁶ The fact that the Court characterised Hungary's right as 'basic', strongly suggests that it views equity in the utilisation of shared water resources as customary international law. The ICJ also applied to non-navigational uses the concept of 'community

⁴⁶⁴ *Gabčíkovo-Nagymaros Case*, *supra*, n. 299

⁴⁶⁵ *Pulp Mills Case*, *supra*, n. 335.

⁴⁶⁶ *Gabčíkovo-Nagymaros Case*, *supra*, n. 299, pp. 54, 85.

of interest’, which the Permanent Court of International Justice (PCIJ) first articulated in the *River Oder* case.⁴⁶⁷ According to the PCIJ, the

*‘community of interest in a navigable river becomes the basis of a common legal right, [which includes] the perfect equality of all riparian States in the use of the whole course of the river and the exclusion of any preferential privilege of any one riparian State [over another].’*⁴⁶⁸

In *Gabčíkovo-Nagymaros* the ICJ thus recognised that such a right exists in modern international law, whereby at the very least States cannot deny their neighbours the right to use their proportional share of the water resource in question.⁴⁶⁹

The *Pulp Mills*⁴⁷⁰ case was brought by Argentina against Uruguay in relation to two pulp mills that were to be built on Uruguayan territory by the Uruguay River. These facilities convert wood chips or other sources of plant fibre into thick fibreboard for shipment to a paper mill for further processing. Argentine communities located on the Uruguay river feared waste sewage from the pulp processing would pollute the river’s water. Whilst only one of the two mills ended up being built, the ICJ held that Uruguay had failed to adhere to its due diligence obligation and to follow the procedural steps laid out in the *1975 Statute of the River Uruguay*,⁴⁷¹ which binds both Argentina and Uruguay. Importantly, in interpreting the parties’ obligations under the *1975 Statute*, the ICJ considered the principles of equitable utilisation and sustainable development. Article 27 of the *1975 Statute* provides:

⁴⁶⁷ *Territorial Jurisdiction of the International Commission of the River Oder*, Judgment No. 16, 1929, PCIJ, Series A, No. 23.

⁴⁶⁸ *Ibid*, p. 27.

⁴⁶⁹ *Gabčíkovo-Nagymaros Case*, *supra*, n. 299, pp. 54.

⁴⁷⁰ *Pulp Mills Case*, *supra*, n. 335.

⁴⁷¹ *1975 Statute of the River Uruguay*, signed at Salto on 26 February 1975, *UN Treaty Series* (1982), No. 21425, Vol. 1295, pp. 339-47.

'The right of each Party to use the waters of the river, within its jurisdiction, for domestic, sanitary, industrial and agricultural purposes shall be exercised without prejudice to the application of the procedure laid down in articles 7 to 12 when the use is liable to affect the regime of the river or the quality of its waters.'

Although the term 'equitable utilisation' was not incorporated in the *1975 Statute*, just like in the *Gabčíkovo-Nagymaros Project* case, the ICJ drew on the concept of equitable utilisation as a part of the *1997 Watercourse Convention* and thus customary international law. Accordingly, the Court interpreted Article 27 of the *1975 Statute* in its judgement as referring to

*'utilization [that] could not be considered to be equitable and reasonable if the interests of the other riparian State in the shared resource and the environmental protection of the latter were not taken into account. Consequently, [...] Article 27 embodies this interconnectedness between equitable and reasonable utilization of a shared resource and the balance between economic development and environmental protection that is the essence of sustainable development.'*⁴⁷²

Moreover, the ICJ thus highlighted that equitable utilisation of a shared resource must take into account not only the interests of other riparian States, but also environmental protection. This can also be observed in Article 5(1) of the *1997 Watercourse Convention*, according to which equitable utilisation means 'taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse.' Article 5(1) thus embodies the Court's interpretation of what constitutes a core principle of modern environmental law.

⁴⁷² *Pulp Mills Case, supra*, n. 335, p. 53.

It is also important to note that the Court did not deem it justified that Uruguay circumvented the Comisión Administradora del Río Uruguay (Administrative Commission of the River Uruguay), formed by the *1975 Statute*⁴⁷³, when informing Argentina of its permission for the two pulp mills in question to be constructed. Argentina and Uruguay had agreed to Article 7 of the *1975 Statute*, whereby

'If one Party plans to construct new channels, substantially modify or alter existing ones or carry out any other works which are liable to affect navigation, the regime of the river or the quality of its waters, it shall notify the Commission, which shall determine on a preliminary basis and within a maximum period of 30 days whether the plan might cause significant damage to the other Party.'

The Court's judgement reflects its view that joint management mechanisms established by the treaty parties are 'the core and essence' of cooperation and their circumvention, even if the intended outcome was to be the same, would therefore call the treaty 'fundamentally into question'.⁴⁷⁴ The ICJ's repeated references to the *1997 Watercourse Convention* cannot be surprising as it is the most comprehensive treaty concerned with international water resources. It can thus be seen as a framework convention, which, due to its universality, is able to supply guidance to contracting parties irrespective of the many different intricacies of the world's watercourses.

However, whilst the ICJ's consideration of international law relating to shared transboundary bodies of surface water in both the *Gabčíkovo-Nagymaros* and the *Pulp Mills* cases, relatively little has been achieved to regulate the use of subterranean, naturally occurring fossil aquifers. As outlined above, the likes of the Nubian Sandstone Aquifer System are in particular need of an adequate and practical framework in accordance with

⁴⁷³ Arts. 1, 2(e).

⁴⁷⁴ *Pulp Mills Case, supra*, n. 335, p. 52.

their status as arguably the most important source of fresh water in the regions they are occurring. Although the negotiations leading to the *1997 Watercourse Convention* took 22 years, it was only in 1991 that the ILC decided to include groundwater within the scope of the *Convention*. Like the *1966 Helsinki Rules*, the *1997 Watercourse Convention* supports the doctrine of hydrological unity by including groundwater in its definition of what constitutes a watercourse as a

*'system of surface waters and groundwaters constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus.'*⁴⁷⁵

The *1997 Convention*, therefore, does extend to unconfined aquifers because they are connected to the hydraulic cycle, including surface water such as rivers and lakes. Unfortunately, this definition does not extend to groundwater contained in fossil aquifers. As outlined above, fossil aquifers are distinct in their geology by being disconnected from the hydraulic cycle, making them a finite resource and particularly vulnerable to damage, either by over-abstraction or pollution. The efforts by Robert Rosenstock, Special Rapporteur for the ILC at the draft stage of the *1997 Convention*, to broaden the first definition to capture the unique nature of confined groundwaters were unsuccessful despite his opinion that the

*'recent trend in the management of water resources has been to adopt an integrated approach [which makes the] inclusion of 'unrelated' confined groundwater [...] the bare minimum in the overall scheme of the management of all water resources in an integrated manner.'*⁴⁷⁶

⁴⁷⁵ Article 2(a).

⁴⁷⁶ Rosenstock, R. (1994) *Second Report on the Law of the Non-navigational Uses of International Watercourses*, UN Doc. A/CN.4/462, para. 3.

Whilst Rosenstock's view was congruent with the one espoused by the ILA Water Resources Committee,⁴⁷⁷ it has been suggested that the ILC at the time believed that there was insufficient precedent to include groundwater not linked to international watercourses flowing into 'a common terminus' in the *Watercourse Draft Articles*.⁴⁷⁸ When these particular *Draft Articles* were presented to the United Nations, States also declined to expand the definition of what constitutes a watercourse to confined aquifers on the basis that the *Watercourse Draft Articles* may be seen to capture a water basin in its entirety and thereby introduce the concept of neighbouring States having jurisdiction over each other's land areas and thus infringe on national sovereignty.⁴⁷⁹

Subsequently, the *2008 Draft Articles* were first encouraged by the ILC's Robert Rosenstock, who recognised the finite nature of the water resources contained within a fossil aquifer and, under consideration of continuous population growth, foresaw a potential threat to peace in the absence of a set of 'a clear set of guidelines [...] which are followed with regard to shared natural resources'.⁴⁸⁰ In his submission to the ILC, Mr Rosenstock also professed that the set of norms or guidelines (he acknowledged that a decision on the final form of any draft articles would come at a much later stage) should become a general instrument rather than a resource specific set of rules. Interestingly, the ILC's original mandate for drafting the *2008 Draft Articles* also considers the inclusion of 'possible alternative regimes of distribution'.⁴⁸¹ Although the Commission did not continue

⁴⁷⁷ *Ibid*, para. 3, footn. 4.

⁴⁷⁸ McCaffrey, S. (2001) 'The contribution of the UN Convention on the law of the non-navigational uses of international watercourses', *International Journal of Global Environmental Issues*, Vol. 1(3/4), p. 252.

⁴⁷⁹ Solanes, M. (2009) 'The International Law Commission and Legal Principles Related to the Non-navigational Uses of the Waters of International Rivers', *Natural Resources Forum*, Vol. 11(4), p. 359.

⁴⁸⁰ ILC (2000) *Syllabuses on topics recommended for inclusion in the long-term programme of work of the Commission*, p. 3, available online at <http://untreaty.un.org/ilc/reports/2000/english/annex.pdf#page=7> (accessed 2 February 2013).

⁴⁸¹ *Ibid*.

to investigate these possibilities because of their contentious nature, the author takes here his cue to follow the path first suggested by Robert Rosenstock.

At its fifty-fourth session, the ILC decided to include the topic '*Shared Natural Resources of States*' in its long-term work programme, which was acknowledged and accepted by the General Assembly.⁴⁸² Following the appointment of Special Rapporteur Chusei Yamada, who upon studying the matter produced five reports, each advancing and substantiating the original set of draft articles, the ILC adopted the *2008 Draft Articles* at its sixtieth session after having invited Governments to provide information on the topic if they wished to do so.

The 2008 Draft Articles on the Law of Transboundary Aquifers

In his *First Report*, Special Rapporteur (SR) Yamada defined a 'transboundary aquifer' as 'a groundwater body that is intersected by a boundary itself'.⁴⁸³ Transboundary aquifers not linked to the hydraulic cycle are not covered by the *1997 Watercourse Convention*, which therefore fails to capture transboundary fossil aquifers such as the Nubian Sandstone Aquifer. Specifically, it does not include provisions for monitoring or research, and it implicitly assumes that the necessary information to be exchanged between riparian States is readily available. Yet, as SR Yamada observed,

⁴⁸² International Law Commission (2000) *Report of the International Law Commission on the Work of Its Fifty-second Session*, 55th Session, UN Doc. A/RES/55/152.

⁴⁸³ Yamada, C. (2008) *Shared Natural Resources: First Report on Outlines*, UN Doc. A/CN.4/533.

*'human knowledge of undergroundwater [sic] resources is still limited despite their massive volume and their high and pure quality [whilst] management of confined transboundary groundwaters is still in its infancy.'*⁴⁸⁴

Accordingly, the ILC began work on the topic 'Shared Natural Resources' with work initially focussing on transboundary groundwaters in 2003. Clearly, the ILC recognised the gap left by the *1997 Watercourse Convention* when it came to groundwater, which remained to be closed. The Commission consulted extensively with experts so that its work would be based on a 'correct understanding of hydrogeological characteristics'.⁴⁸⁵ Yamada thus met with representatives from the United Nations Educational, Scientific and Cultural Organisation (UNESCO), FAO, and the International Association of Hydrogeologists (IAH), and convened a group of 20 experts in the field of hydrogeology and legal affairs to advise him.⁴⁸⁶

The Scope and Form of the 2008 Draft Articles

To address the gap left by the *1997 Watercourse Convention*, the ILC adopted a separate resolution on confined transboundary groundwater.⁴⁸⁷ The Resolution, which was intended to be treated separately from the *1997 Watercourse Convention*, 'recommends States be guided by [its] principles' in regulating transboundary groundwater. Subsequently, at its sixtieth session in 2008, the ILC composed and adopted a set of 19 *Draft Articles on the Law of*

⁴⁸⁴ *Ibid*, para. 22.

⁴⁸⁵ *Ibid*.

⁴⁸⁶ International Law Commission (2008) *Report of the International Law Commission on the Work of Its Sixtieth Session*, 62nd Session, Supp. No. 10 (UN Doc. A/63/10), p. 18.

⁴⁸⁷ International Law Commission (1997) *Report of the Commission to the General Assembly on the Work of its Forty-sixth Session*, UN Doc. A/CN.4/SER.A/1994/Add. 1 (Pt. 2).

Transboundary Aquifers, which were submitted to the UN General Assembly as a part of the Commission's report on work completed at that session.⁴⁸⁸

Although the *2008 Draft Articles*' title places their scope squarely within a transboundary context, their remit stretches widely. According to Article 2(a), an aquifer is simply defined as

'a permeable water-bearing underground geological formation underlain by a less permeable layer and the water contained in the saturated zone of the formation',

while Article 2(b) describes an 'aquifer system' as two or more hydraulically connected aquifers. It is clear, then, that the *2008 Draft Articles* are intended to focus on aquifers that underlie at least two States or that are at least hydraulically connected to such a transboundary aquifer. The ILC sensibly included such a wide definition to satisfy both legal and geological technicalities to eliminate the potential for confusion at what point a water deposit would count as an aquifer.⁴⁸⁹ Consequently, the *Draft Articles* in their current wording limit the number of States with rights and obligations to those that host part of a transboundary aquifer. Their scope in turn exclude aquifers and aquifer systems of any kind entirely located within one country.

Importantly, Article 2(a) also imparts a discrepancy between the wording used in the *2008 Draft Articles* and the *1994 Resolution on Confined Transboundary Groundwater*⁴⁹⁰. Whilst the *2008 Draft Articles* use the term 'aquifer' to describe their subject, the *1994 Resolution* used the term 'groundwater'. As Quinlan et al make clear in their definition of karst aquifers,

⁴⁸⁸ *Supra*, n. 486.

⁴⁸⁹ *Ibid*, p. 32.

⁴⁹⁰ ILC (1994) *The law of non-navigational uses of international watercourses. Draft articles and commentaries thereto adopted by the Drafting Committee on second reading: articles 1-33*, UN Doc. A/CN.4/L.493 and Add.1 [and Add.1/Corr.1] and 2.

scientifically, an ‘aquifer’ is a separate geological structure and to be defined independently from the groundwater it contains.⁴⁹¹ Arguably, the ILC’s reference to the geological structure of an ‘aquifer’ inclusive of the water it contains in the *2008 Draft Articles* instead of the more general term of ‘groundwater’ is important for the original purpose of the *2008 Draft Articles* to fill the gap in relation to fossil aquifers left by the *1997 Watercourse Convention*. In other words, the question remains why terms like ‘freshwater’ or ‘groundwater’ have not been included in Draft Article 2 as separate items to provide greater consistency of the *2008 Draft Articles* with previous instruments of international law.⁴⁹² As it stands, the ILC’s commentary makes clear that Article 2 is exclusively concerned with the aquifer as a geological structure and the water it contains. The aquifer in question and the water it contains are therefore considered as a single unit. Whilst this approach may be scientifically imprecise, it is nonetheless a practical choice the ILC (as well as this thesis) has clearly taken to frame the subject matter of the *2008 Draft Articles* as concisely as possible. Yet, beyond mere questions of practicability, Article 2(a) also serves as an important distinction from other types of aquifers and is therefore vital to the framing of the *Draft Articles’* scope. As outlined in above,⁴⁹³ ordinarily groundwater is in constant flux, driven by the hydraulic cycle whilst fossil aquifers remain autarkic. Arguably, with the departure from broad terms such as ‘groundwater’, the ILC therefore indicated that the scope of the *2008 Draft Articles* ought to apply only to transboundary ‘fossil’ aquifers and not to other forms of groundwater. Otherwise, the deconstruction of the concept of ‘groundwater’ into an aquifer and the water contained exclusively within it would be

⁴⁹¹ Qinlan et al (n. d.) ‘Recommended Administrative/Regulatory Definition of Karst Aquifer, Principle for Classification of Carbonate Aquifers, Practical Evaluation of Vulnerability of Karst Aquifers, and Determination of Optimum Sampling Frequency at Springs’, available at <http://info.ngwa.org/GWOL/pdf/910156241.pdf> (accessed 1 December 2012).

⁴⁹² See *1986 Seoul Rules on International Groundwaters*, 30 August 1986, 62 ILA 251; see also *1997 Watercourse Convention*, *supra*, n. 10; see further Koskenniemi, M. (2007) ‘The Fate of Public International Law: Between Technique and Politics’, *Modern Law Review* 70(1), pp. 1-30.

⁴⁹³ See chapter ‘International Law Needs Fossil Aquifer-specific Enhancements’, pp. 19-24.

superfluous, merely inviting confusion. The fact that Article 2(a) does not mention ‘fossil’ aquifers by name thus also serves to eliminate potential confusion, as it is scientifically too imprecise.⁴⁹⁴ The wording of Article 2(a) thus seeks to confirm it exclusively refers to the two parts and no other basin water related to the hydraulic cycle. To this extent, at least The *Draft Articles*’ ambition to address the ‘fossil aquifer gap’ left by the *1997 Watercourse Convention* is clear. Still, Article 2(a) cannot dispel all uncertainty. Notwithstanding the ILC’s attempts to avoid confusion in Article 2(a), it does not describe the second important element of a ‘fossil’ aquifer, namely being ‘underlain by a less permeable layer’ as well as being sealed off from the hydraulic cycle at the top. The current wording of Article 2(a), therefore, still lacks the required precision. To compound this residual uncertainty, Draft Article 4(d), which is focussed on equitable utilisation and will be further discussed below, introduces the concept of recharging aquifers by disallowing Aquifer States to ‘utilize a recharging transboundary aquifer or aquifer system at a level that would prevent continuance of its effective functioning.’ The inclusion of aquifers that are by definition connected to the hydraulic cycle and therefore covered by the *1997 Watercourse Convention* does not sit well with the intended relationship of the *2008 Draft Articles* to the *1997 Watercourse Convention* by addressing the latter’s omission of ‘fossil’ aquifers whilst the former will incorporate key principles already in force.

Perhaps unsurprisingly, therefore, some States have regarded the *Draft Articles*’ relationship to the *1997 Watercourse Convention* as problematic. Although the General Assembly allocated the *Draft Articles* to its Sixth Committee at its 2nd plenary meeting on 16th September 2011, and whilst some delegations expressed their readiness to begin with negotiations on the future form of these *Draft Articles* at the Committee’s sixteenth and

⁴⁹⁴ See Fetter, *supra*, n. 92.

twenty-ninth sessions, the United States, India, China and the Russian Federation expressed their scepticism that it was the right time for the *Articles* to be elaborated into a legally binding instrument, noting, without going into detail, that there was still room for improvement. The Sixth Committee thus adopted the draft resolution *The Law of Transboundary Aquifers* by which the General Assembly would ‘continue to examine, inter alia, the question of the final form that might be given to the draft articles [at its sixty-eighth session in September 2013]’.⁴⁹⁵

However, at the sixty-eighth session in September 2013, States could also not agree on such a form. Some delegations, such as Chile and Portugal, expressed their preference for a convention, noting that the timing was right to commence negotiations on the subject.⁴⁹⁶ These delegations advocated a step-by-step approach, which might lead the *2008 Draft Articles* to evolve into an international framework convention. While not ruling out the possibility of a convention in the future, others, including Austria, Colombia and China, were of the view that the elaboration of a legally binding instrument on the basis of the draft articles remained premature.⁴⁹⁷ Their argument was that there is still a need for state practice (through bilateral and regional arrangements) to develop further. They pointed out that the purpose of the *2008 Draft Articles* could equally be achieved through bilateral and regional arrangements, whilst simultaneously asserting again there remained room for improvement of the *Draft Articles*. Whilst some other delegations remained flexible as to the final form of the *2008 Draft Articles*, China specifically opined that the *Articles’* adoption in the form of a non-binding declaration of principles would be more appropriate to serve as

⁴⁹⁵ Para. 3, *Draft Resolution The Law of Transboundary Aquifers*, adopted 3 November 2011, Sixty-sixth Session, UN Doc. A/C.6/66/L.24.

⁴⁹⁶ UN General Assembly (2011) ‘The law of transboundary aquifers – Report of the Secretary-General (incl. comments and observations received from governments)’, 66th Session, UN Doc. A/66/116., para. 91 and Add. 1.

⁴⁹⁷ Draft Resolution, *supra*, n. 495, paras. 8-9, 14, 16.

general guidelines for state practice in general and for the creation of bilateral or regional agreements.⁴⁹⁸ Likewise, the United States affirmed its continued belief in ‘context-specific arrangements’ as opposed to a global framework instrument. The US delegation surmised that if the *Draft Articles* were fashioned into a global convention, it was unlikely that such an instrument would garner sufficient support within the international community. By the terms of the resolution *The Law of Transboundary Aquifers*, the General Assembly will also continue to encourage States concerned to find individual bilateral or regional agreements to ensure appropriate management of their transboundary aquifers in light of the provisions contained in the *Draft Articles*.⁴⁹⁹ Consequently, to date, the *2008 Draft Articles* have not been transformed into a legally binding instrument.

Clearly the present state of the *Draft Articles* contributes to States’ scepticism about their usefulness. As noted above, the *1997 Convention* is built on the general consensus that it embodies customary international law in relation to the non-navigational uses of international watercourses; it was approved by a vote of 103-3 in the General Assembly in 1997. It could have been even higher at 105-3 had Nigeria and Fiji not missed the Assembly session.⁵⁰⁰ As the ILC’s work on the *1997 Convention* revealed the need for a codification of the international law pertaining to transboundary aquifers, it can be of no surprise that a comparison of the *2008 Draft Articles* with the *1997 Convention* shows that the *Draft Articles* draw extensively on the convention, but without becoming a replica.

Nevertheless, it leaves the question of what ILC envisioned the *Draft Articles* would become – supplementary to the *1997 Convention* to remedy its shortcoming in relation to

⁴⁹⁸ UN General Assembly, *supra*, n. 495, paras. 14, 29 (per delegation of the Czech Republic).

⁴⁹⁹ International Law Commission, *supra*, n. 486.

⁵⁰⁰ UN General Assembly (1997) ‘General Assembly Adopts Convention on Law of Non-Navigational Uses of International Watercourses’, *Press Release GA/9248*; see also Salman, S. M. A. (2007) ‘The United Nations Watercourses Convention Ten Years Later: Why Has its Entry into Force Proven Difficult?’, *Water International*, 32(1), p. 4.

fossil aquifers or a convention that exclusively codified customary international law specific to all types of transboundary aquifers? The ILC's commentary suggests that the Commission would find either outcome acceptable but chose to leave the decision to the General Assembly.⁵⁰¹ It seems that instead of proposing a form for States to adopt, the ILC is still waiting for States to consider the options and propose themselves the desired form of the *Draft Articles* – non-binding declaration, protocol or framework convention – to the Commission. In this context, the rather unspecific title of *Law of Transboundary Aquifers* also appears in new light. It remains unclear, then, whether the *Draft Articles* are supposed to supplant the *1997 Convention* in relation to surface-connected aquifers – an outcome likely to lead to more confusion – or to only remedy the *Convention's* specific shortcoming towards fossil aquifers.

The present *Draft Articles* thus sit in between a protocol and a framework convention. Some provisions included in the *1997 Convention*, (e.g. a non-prejudicial clause in favour of existing international water agreements) are not included in the *2008 Draft Articles*, and the text of some of the *Draft Articles* differs considerably from the text of corresponding articles of the *Convention*. Moreover, whilst the ILC would naturally draw on the *1997 Convention* in creating the *Draft Articles*, there remains considerable confusion as to their scope. Significantly, Article 2(g, h) of the *Draft Articles* provides for recharge and discharge zones, but thereby also envisions aquifers' connectivity to surface waters. As already discussed, these do not exist for fossil aquifers whilst the *1997 Convention* already addressed groundwater interconnectivity with surface waters. The reader will recall that the *1997 Watercourse Convention* included within its scope

⁵⁰¹ International Law Commission, *supra*, n. 486, p. 29.

'a system of surface waters and groundwater constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus'.⁵⁰²

The term 'unitary whole' is lacking from the *2008 Draft Articles*, which means the *2008 Draft Articles* lack scope to manage an entire system of hydraulically interconnected waters conjunctively with the *1997 Watercourse Convention*. On the other hand, the *1997 Watercourse Convention* lacks specific provisions taking account of the particular need of fossil aquifers, which, of course, was the prime reason for the International Law Commission to produce the *2008 Draft Articles* in the first place. As a result, groundwater within the scope of the *1997 Watercourse Convention* might receive a lower level of protection than that envisaged by the *2008 Draft Articles*, yet the *2008 Draft Articles* do not come fully equipped to close the gap as an independent framework convention. It therefore follows that the *2008 Draft Articles* would be more appropriately framed as a specific fossil aquifer protocol to the *1997 Convention*. If the *Draft Articles* will evolve into a protocol to the *1997 Convention*, these gaps would be of little consequence as it would only supplement or clarify the latter. Parties to the *1997 Convention* could choose whether to adopt the *Draft Articles* or not.⁵⁰³ However, if the *2008 Draft Articles* were to evolve into an independent convention, or even remain a non-binding international instrument, they would be incomplete. In their current form they do not include provisions on all of the matters covered in the *Convention* and would therefore be unable to provide a fully functioning regime for the regulation and management of transboundary aquifer systems. As a standalone legal instrument, the *Draft Articles* would need to clarify how they relate to the *Watercourse Convention* to facilitate harmonious co-existence of the two instruments. To date, the *2008 Draft Articles* do not

⁵⁰² *1997 Watercourse Convention, supra*, n. 10, Article 2(a).

⁵⁰³ E.g. Denmark, which acceded to the *1997 Watercourse Convention* on 30 April 2012, commented upon the UN Secretary General's circular n. dated 2 January 2009 that it has no transboundary aquifers, *see* UN Doc. A/66/116, p. 7.

refer to the *1997 Watercourse Convention* even in their preamble. Instead, they ‘reaffirm the United Nations Conference on Environment and Development of 1992 in the Rio Declaration on Environment and Agenda 21’ in a similar vein to the *1997 Watercourse Convention*. Yet, notwithstanding their current limbo, the mere inception of the *2008 Draft Articles* was a necessary and welcome step towards a more comprehensive corpus of law in relation to the utilisation of transboundary fossil aquifers such as the Nubian Sandstone Aquifer System. Meanwhile, they are capable of giving guidance to States in the creation of individual agreements as they point into the direction the international law related to transboundary fossil aquifers is evolving. The following assessment of the helpfulness of the *2008 Draft Articles* will be divided into four sections: The first will focus on the Draft Article provisions focussed on aquifer protection, the second on the utilisation of the water contained in it, the third on specific management provisions and the fourth on issues of neighbouring States’ sovereignty over transboundary aquifers.

The Question of Aquifer Sovereignty

Arguably, the ILC chose to phrase Draft Article 2 in the somewhat ambiguous way it did because of Draft Article 3 – Sovereignty of Aquifer States – and its occupation with state sovereignty over aquifers. Draft Article 3 made its first appearance in the *2005 Report of the Working Group on Shared Natural Resources*.⁵⁰⁴ At the time, SR Yamada had already introduced and discussed the issue of sovereignty to the subject of natural resources in his

⁵⁰⁴ Working Group on Shared Natural Resources (2005) *Report of the Working Group*, 6, UN Doc. A/CN.4/L.681.

*Third Report on Shared Natural Resources*⁵⁰⁵ by reference to General Assembly Resolution 1803⁵⁰⁶:

‘The need to have an explicit reference to General Assembly Resolution 1803 (XVII) on permanent sovereignty over natural resources in the preamble to the draft articles was advocated particularly by those delegations that are of the opinion that water resources belong to the States in which they are located and are subject to the exclusive sovereignty of those States. The Special Rapporteur recognizes the sensitivity of the question and is willing to include such a reference in the preamble. However, in accordance with the general practice of the Commission, he prefers to postpone the formulation of the preamble until after the substantive draft articles have been agreed upon and all factors to be incorporated in the preamble are known.’⁵⁰⁷

Draft Article 3, however, does not propose absolute sovereignty over the aquifer in question. Although at first it recognises State sovereignty over domestic resources, it subsequently implements a sweeping limitation in the form of international law and the *2008 Draft Articles* themselves:

‘Each aquifer State has sovereignty over the portion of a transboundary aquifer or aquifer system located within its territory. It shall exercise its sovereignty in accordance with international law and the present draft articles.’

Especially the provision that Aquifer States shall exercise their sovereignty ‘in accordance with international law and the present draft articles’ could be seen to reduce the risk that Aquifer States pursue utilisation activities with disregard of any consequences to their

⁵⁰⁵ Yamada, C. (2005) *Third Report on Shared Natural Resources: Transboundary Groundwaters*, UN Doc. A/CN.4/551.

⁵⁰⁶ UNGA Resolution 1803 (XVII) ‘Permanent Sovereignty over Natural Resources’, adopted on 14 December 1962, UN Doc. A/RES/1862(XVII).

⁵⁰⁷ Yamada, *supra*, n. 505, Part II Preamble, p. 3.

neighbours.⁵⁰⁸ However, in concurrence with Vick⁵⁰⁹, the author submits that the notion of territorial sovereignty over an aquifer alluded to in Draft Article 3 of the *2008 Draft Articles* is too controversial to be mitigated by the second sentence of Draft Article 3. In fact, the second sentence of Draft Article 3, changed slightly to include ‘international law’ in addition to the present draft articles as a limitation to sovereignty over an aquifer, arguably does not do enough to mitigate the first sentence. As Vick submits, the change to the second sentence does not enhance Draft Article 3 and refers to an array of general treaties and instruments dealing with air, biological diversity and fish stocks.⁵¹⁰

To fully grasp the implications of Draft Article 3, it is important to assess the implications of sovereignty. Helpfully, Vick cites Black’s Law Dictionary to provide a definition of sovereignty by describing the independent powers included in the concept of sovereignty:

*‘The supreme, absolute, and uncontrollable power by which any independent state is governed. [...] ‘sovereignty’ in its largest sense [means] supreme, absolute, uncontrollable power, the absolute right to govern.’*⁵¹¹

Conca⁵¹² provides a further helpful explanation of the concept of sovereignty:

‘Sovereignty’ distinguishes a self-governing area, that is recognized by other States, from a territory of another State, a trusteeship or a ‘no-man’s land’. Sovereignty is the recognition that a State is legitimate vis-a-vis other States and private interests.’

⁵⁰⁸ Eckstein, G. E. (2007) ‘Commentary on the UN International Law Commission’s Draft Articles on the Law of Transboundary Aquifers’, *Colorado Journal of International Environmental Law and Policy*, 18, pp. 537-610.

⁵⁰⁹ Vick, M. J. (2008) International Water Law and Sovereignty: A Discussion of the ILC Draft Articles on the Law of Transboundary Aquifers, *Pacific McGeorge Global Business and Development Law Journal*, 21, pp. 191-221.

⁵¹⁰ *Ibid*, p. 207; see also ILC (2008) *2008 Draft Articles on the Law of Transboundary Aquifers with Commentaries*, UN Doc. A/63/10, para. 2, p. 39.

⁵¹¹ Black’s Law Dictionary, 6th ed., 1990, p. 1396.

⁵¹² Conca, K. (2005) *Governing Water: Contentious Transnational Politics and Global Institution Building* (Cambridge, MA: MIT Press), p. 44.

Drawing on both Black's and Conca's definitions of sovereignty actually produces two concepts of sovereignty – one where a territory is recognised as a state within the global community of States and another where the state in question is the highest authority within that territory.⁵¹³ As Brownlie sums up, States' competence within their territory can be described in terms of sovereignty and jurisdiction.⁵¹⁴

The inherent problem with Draft Article 3 lies in the fact that it is unclear where its priorities lie. Since Draft Article 2 includes the aquifer as a geological rock formation as well as the water contained within it, the sovereignty provision in Draft Article 3 could be understood to apply either to the rock formation or the water contained in the aquifer. However, if Draft Article 3 were understood to refer to the water contained within the geological structure of the aquifer, it would be contrary to international law, which rejects the notion of territorial sovereignty to extent to transboundary fresh water resources.⁵¹⁵ The rationale behind this rejection is the fact that water is in constant flux either because of the hydraulic cycle, or, in the case of confined 'fossil' aquifers such as the Nubian Sandstone Aquifer System, because the water flows towards the point from where it is extracted due to a difference in pressure or geological conditions. Water's nature to remain constantly in flux is a concept captured well by Justice Oliver W. Holmes when he considered a case brought by the U.S. state of Missouri on the constitutionality of a United States treaty with Canada on the authority over the regulation of hunting migratory waterfowl (although the pertinent legal issues debated were predominantly about the constitutional power of the U.S. Federal Government to enforce international treaty

⁵¹³ Vick, *supra*, n. 509, p. 208.

⁵¹⁴ Brownlie, I. (2008) *Principles of International Law* (Oxford: OUP), p. 105.

⁵¹⁵ Schwebel, S. M. (1980) *Second Report on the Law of the Non-navigational Uses of International Watercourses*, UN Doc. A/CN.4/332, p. 86.

provisions on union States).⁵¹⁶ In what can be seen as an analogy to the flux of water, Justice Holmes observed that Missouri's claim rested on

*'the presence within their jurisdiction of birds that yesterday had not arrived, tomorrow may be in another State and in a week a thousand miles away. [Adequate management of the waterfowl in question can only be ensured] by national action in concert with that of another power [...] But for the treaty and the [implementing] statute there soon might be no birds for any powers to deal with'*⁵¹⁷

Since judicial decisions on water law in the United States in the early 1900s influenced subsequent international water law,⁵¹⁸ useful analysis can also be found in the American Law Institute's *Restatement of Torts*:

*'Water, like air and light, is a fugitive, wandering thing, flowing over and through land, but seldom remaining for any length of time in one place or within the confines of any one person's possession. One's dominion over it while it is upon his land is temporary, and since it ordinarily flows onto the lands of other persons, it is a thing common to the lands of all through whose possession it passes. Unlike air, it is limited in quantity, and a substantial use of it by one may prevent others from having it...[The] rights and privileges of individual users are subject to greater limitation out of regard for the common interests of all.'*⁵¹⁹

Fittingly, McCaffrey expanded on Justice Holmes' observation and noted that without cooperation between Aquifer States, 'there soon might be no [groundwater] for any powers to deal with'.⁵²⁰ Consequently, territorial sovereignty cannot reasonably be exerted

⁵¹⁶ *Missouri vs Holland*, 252 U.S. 416 (1920).

⁵¹⁷ *Ibid*, pp. 434-35.

⁵¹⁸ Vick, *supra*, n. 509.

⁵¹⁹ Restatement of Torts (1939), Ch. 41, Topic 3 (Analysis), p. 350, cited in McCaffrey, S. (2009) 'The International Law Commission Adopts Draft Articles on Transboundary Aquifers', *American Journal of International Law*, 103, p. 287.

⁵²⁰ McCaffrey, *ibid*.

over a substance that is not static in the same way land and territory is.⁵²¹ The idea that state sovereignty can be extended over fresh water resources stems from the dated ‘Harmon Doctrine’. U.S. Attorney General Judson Harmon formulated his doctrine during a dispute between the upper riparian United States of America and the lower riparian Mexico over the waters of the Rio Grande,⁵²² whereby the United States claimed they were masters of their own territory with the right to use the Rio Grande within their territory without an obligation to pay attention to the needs of any other riparian state. In the particular Rio Grande dispute, the United States diverted the waters of the river to their own use at the detriment of Mexico’s frontier communities to the extent that water shortage threatened their existence.⁵²³

Until the emergence of the *Helsinki Rules* in 1966 and the *1997 Watercourse Convention*, there was little in terms of regulatory framework on how riparian States should assess their individual rights and obligations under international law for the use of a river, which transcended over national territories. Apart from some dated sources⁵²⁴ there was not much that riparian States could draw on. The most recent applications of the doctrine date back to India’s dispute with Pakistan in 1948 and Ethiopia’s Nile dispute with Egypt in 1959.⁵²⁵ It is submitted that this absence of a regulatory framework is why the Harmon Doctrine found use in the first place.

A closer look at the formation of the doctrine shows that its creator himself paid little attention to detail when supporting his reasoning. Harmon only cited sources which specifically dealt with the theory of international servitudes (i.e. where the downstream

⁵²¹ McCaffrey, S. (2007) *The Law of International Watercourses* (Oxford: OUP), Ch. 5.

⁵²² Opinion of Attorney General Judson Harmon, 21 OP. ATTY. GEN. 274, p. 283 (1895).

⁵²³ Letter from Mr Guarneros to Minister Romero (4 October, 1894), quoted in McCaffrey, S. (1996) ‘The Harmon Doctrine One Hundred Years Later: Buried, Not Praised’, *Natural Resources Journal*, 36, p. 553 (hereinafter McCaffrey, The Harmon Doctrine).

⁵²⁴ See for example the *Decree of the Provisional Executive Council of the French Republic* of 16 November, 1792, cited in Pradoer-Fodéré, P. (1985) *Traité De Droit International Public Européen et Américain – Suivant les Progres de la Science et de la Pratique* (Paris: Librairie de la Court d’Appel et de l’Ordre des Avocats), p. 282; Klüber, J. L. (1821) *Europäisches Völkerrecht* (Schaffhausen: Verlag der Hurter’schen Buchhandlung).

⁵²⁵ Godana, B. A. (1985) *Africa’s Shared Water Resources. Legal and Institutional Aspects of the Nile, Niger, and Senegal River Systems* (Geneva: Graduate Institute of International Studies), p. 35.

riparian is the ‘servient’ country and the upstream riparian the ‘dominant’ country) to support his reasoning, which, once read consequentially, suggests absurdly that the downstream riparian should actually welcome a reduction in water flow.⁵²⁶ Furthermore, he rests his doctrine on the allegation that no writers he is aware of conclude that the ‘servient’ country could subjugate the ‘dominant’ riparian to restrictions when disposing of its territory, which McCaffrey proves to be literally short sighted.⁵²⁷ Fedor F. de Martens in 1883 concluded that:

In the domain of international relations, territorial sovereignty is limited by the fact of the coexistence and the society of States. The very nature of their neighbourhood relations does not permit them to dispose of their territory without any restriction. From this are born international natural servitudes, to which all States are subject in consequence of the inevitable conditions of their physical existence, one beside the other.’⁵²⁸

Additionally, Harmon acknowledged at least implicitly an obligation not to cause harm to another riparian state by accepting that ‘[t]he dominant country may not divert the course of the stream so as to throw it upon the territory of the other at a different place’⁵²⁹. In fact, the United States themselves reject the doctrine during a dispute with Canada over the Columbia River in the 1950s⁵³⁰, which culminated in the Columbia River Treaty 1961. In the 1957 Lake Lanoux Arbitration⁵³¹ the doctrine was equally unsuccessful. The tribunal ruled that:

‘according to the rules of good faith, the upstream State is under the obligation to take into consideration the various interests involved, to seek to give them every satisfaction compatible with the pursuit of its own interests, and to show that in this regard it is genuinely concerned to reconcile the interests of the other riparian State with its own’.⁵³²

⁵²⁶ McCaffrey, *supra*, n. 523, p. 564.

⁵²⁷ *Ibid*, pp. 564-5.

⁵²⁸ De Martens, F. F. (1883) *Traité De Droit International Vol. I* (Paris: Librairie Marescq Aîné), p. 479, translated from French and cited by McCaffrey, *supra*, n. 523, p. 565.

⁵²⁹ 21 OP. ATTY. GEN. 274, p. 280 (1895).

⁵³⁰ Godana, *supra*, n. 525, p. 37.

⁵³¹ Lake Lanoux Arbitration (France v Spain), 24 I.L.R. 101 (16 November, 1957).

⁵³² *Ibid*, p. 139.

Interestingly, it has been submitted that upper riparian States ‘have never persisted in the claim of absolute territorial sovereignty when the dispute was truly over water’.⁵³³

Harmon also drew on the concept of self-preservation to support his doctrine. He held it to be ‘one of the first laws of nations [which facilitates] the enjoyment by a nation within its own territory of whatever is necessary to the development of its resources or the comfort of its people’.⁵³⁴ Nevertheless, Oppenheim in 1905 pointed out that self-preservation was not a right but only an excuse:

If every State really had a right of self-preservation, all the States would have the duty to admit, suffer and endure every violation done to one another in self-preservation. But such duty does not exist. On the contrary, although self-preservation is in certain cases an excuse recognized by International Law, no State is obliged patiently to submit to violations done to it by such other States as acts in self-preservation, but can repulse them. It is a fact that in certain cases violations committed in self-preservation are not prohibited by the Law of Nations. But they remain violations and can therefore be repulsed. Self-preservation is consequently an excuse’⁵³⁵

He continues by stating that such a violation ‘in the interest of self-preservation’ would only be excused in cases of ‘necessity’ and where it was carried out during the course of self-defence, ‘because otherwise the acting State would have to suffer or have to continue to suffer a violation against itself’.⁵³⁶ Consequently, Harmon’s doctrine cannot stand on that footing as well.

At this point, it is interesting to consider one of Mexico’s submissions to the dispute. By note of 11th August, Mexico supported its position with an American study by H. P. Farnham.⁵³⁷ The relevant parts of this study held that:

‘A river which flows through the territory of several States or nations is their common property ... It is a great natural highway conferring, besides the

⁵³³ Naff, T. and Matson, C.R. (1984) *Water in the Middle East: Conflict of Cooperation?* (Boulder, CL: Westview Press), p. 165.

⁵³⁴ 21 OP. ATTY. GEN. 274, p. 282 (1895).

⁵³⁵ Oppenheim, L. F. L (1905) *International Law, Vol. I: Peace* (New York: Longmans, Green & Co.), pp. 177-78.

⁵³⁶ *Ibid*, p. 178.

⁵³⁷ McCaffrey, *supra*, n. 523, p. 577.

*facilities of navigation, certain incidental advantages, such as fishery and the right to use the water for power and irrigation. Neither nation can do any act, which will deprive the other of the benefits of those rights and advantages. The inherent right of a nation to protect itself and its territory would justify the one lower down the stream in preventing by force the one further up from turning the river out of its course, or in consuming so much of the water for purposes of its own as to deprive the former of its benefit...*⁵³⁸

It can be seen that Farnham relied on similar reasoning to that of self-preservation but arrived at a completely opposite conclusion to that of Harmon. The fact that both jurists could arrive at opposed conclusions from the same general principle demonstrates the lack of utility of principles of self-determination in this context.⁵³⁹

As a consequence, the ‘Harmon Doctrine’, and with it the sovereignty of Aquifer States over the water contained in geological structures (i.e. the aquifer), does not represent a viable legal concept. It was rejected in the *1997 Watercourse Convention*.⁵⁴⁰ Unsurprisingly, however, countries such as Turkey welcomed Draft Article 3 by commenting:

*‘An explicit reference to the sovereignty of States over the natural resources within their territories is preferred [...] States should be able to exercise full sovereign rights to exploit, develop and manage the water resources located within their land territories according to the present draft articles’.*⁵⁴¹

It is difficult to ascertain why the ILC did not recognise that Draft Article 3 in fact echoed the discredited Harmon Doctrine. Following what has been said above, a distinct problem with Draft Article 3 is that a State may falsely believe that Draft Article 3 has bestowed it with full discretionary powers on how to utilise not only the aquifer’s geological structure, but also the water contained within it. Consequently, instead of community rights, the rights of individual States over others appear to have been given

⁵³⁸ Farnham, H. P. (1904) *The Law of Waters and Water Rights* (Rochester: The Lawyers Co-Operative Publishing Co.), p. 29.

⁵³⁹ McCaffrey, *supra*, n. 537.

⁵⁴⁰ Vick, *supra*, n. 509, p. 220.

⁵⁴¹ UN General Assembly (2008) ‘Shared natural resources: comments and observations by Governments on the draft articles on the law of transboundary aquifers’, *International Law Commission 60th Session*, UN Doc. A/CN.4/595, p. 22.

prominence in Draft Article 3. Furthermore, since each aquifer state could claim under the principle of absolute territorial sovereignty and integrity, several irreconcilable demands for the utilisation of the same water could be made, which would be a state of affair impossible to solve, especially with regards to Draft Articles 4 and 5. As a result, Draft Article 3 has the potential to undermine the whole purpose of the *2008 Draft Articles*. As one of the States commenting on Draft Article 3, Austria, stated, Article 3 ‘emphasiz[es] that sovereignty is the fundamental rule on which the entirety of the draft articles is based so that the latter have to be interpreted accordingly’.⁵⁴²

In fairness, the ILC does make it clear in its commentary to Art. 3 that it did not intend the wording to suggest that States indeed have an unconstrained right to exploit the groundwater situated within or stretching into its territory regardless of the consequences for other Aquifer States.⁵⁴³ Art. 3 thus explicitly demands to be interpreted ‘in accordance with international law and the present draft articles’. However, international law is not entirely clear when it comes to the extent of sovereignty over national resources.

On one hand, as demonstrated by several resource nationalisation arbitrations, it is regarded as customary international law that States have the right to nationalise their resources and thereby take it outside the sphere of influence from outside powers.⁵⁴⁴ The adoption of the *1962 UN General Assembly Resolution 1803 on Permanent Sovereignty over Natural Resources*⁵⁴⁵ allowed the principle of permanent sovereignty over natural resources to gain increased prominence in international law, although the principle itself emerged in

⁵⁴² Comments and Observations by Governments on the Draft Articles on the Law of Transboundary Aquifers, UN Doc. A/CN.4/495, pp. 21-22.

⁵⁴³ ILC, *supra*, n. 486, pp. 38-40.

⁵⁴⁴ See for example *Texaco Overseas Petroleum Company v. The Government of the Libyan Arab Republic*, 53 ILR 389 (1979), p. 183.

⁵⁴⁵ *UNGA Resolution 1803 (XVII)*, *supra*, n. 278; see also *UNGA Resolution 1515 (XV) ‘Concerted Action for Economic Development of Economically Less Developed Countries’*, adopted 15 December 1960, Fifteenth Session, 948th Plenary Meeting, UN Doc. A/RES/1515(XV).

the 1950s as a fundamental aspect of decolonisation and self-determination.⁵⁴⁶ The resolution declares that:

*'The right of peoples and nations to permanent sovereignty over their natural wealth and resources must be exercised in the interest of their national development [...]'*⁵⁴⁷

The *1974 Declaration of a New International Economic Order*⁵⁴⁸ reaffirmed the principle of national sovereignty over natural resources and States' right to nationalise them.⁵⁴⁹ The *1974 Charter of Economic Rights and Duties of States* followed suit.⁵⁵⁰ However, major Western States, including the United States, objected to or abstained from the *1974 Charter*.

On the other hand, pertinent documents such as the *1972 Stockholm Declaration* and the *1992 Rio Declaration of the UN Conference on Environment and Development*⁵⁵¹, which introduce the concept of sustainable development and its associated elements of prohibition on transboundary harm and the precautionary principle, are not legally binding but often referred to as customary international law. With regards to States' behaviour, however, Daniel Bodansky notably concludes that

*'[a]ccording to the orthodox account of customary international law, few principles of international environmental law qualify as customary'*⁵⁵²

Bodansky criticises that customary international law is predominantly asserted by compounding a 'critical mass' not of actual State practice, but of collations of texts 'often

⁵⁴⁶ Cristescu, A. (1981) *The Right to Self-Determination: Historical and Current Development on the Basis of United Nations Instruments*, UN Doc. E/CN.4/Sub.2/404/Rev.1, para. 279.

⁵⁴⁷ Para. 1.

⁵⁴⁸ UNGA Resolution 3201 (S-VI) 'Declaration on the Establishment of a New International Economic Order', adopted 1 May 1974, Sixth Special Session, UN Doc. A/RES/S-6/3201.

⁵⁴⁹ *Ibid*, Art. 4(e).

⁵⁵⁰ Art. 2, UNGA Resolution 3281 (XXIX) 'Charter of Economic Rights and Duties of States', adopted 12 December 1974, Twenty-ninth session, UN Doc. A/RES/29/3281.

⁵⁵¹ Annex I, *1992 Rio Declaration*.

⁵⁵² Bodansky, D. (1995) 'Customary (and Not So Customary) International Environmental Law', *Indiana Journal of Global Legal Studies*, 3, p. 112.

by non-state actors such as courts and arbitral panels, intergovernmental and non-governmental organizations, and legal scholars'.⁵⁵³ Bodansky consequently characterises these norms as 'declarative' rather than customary law.⁵⁵⁴

Equity and Aquifer Utilisation

This uncertainty in relation to aquifer sovereignty also weakens the Draft Articles' provisions for aquifer utilisation as it fundamentally clashes with concepts of restrained development and intergenerational equity in particular. One of the major provisions on the use of an aquifer can be found in the rather complex Draft Article 4 – Equitable and Reasonable Utilisation. It requires Aquifer States to 'utilize transboundary aquifers or aquifer systems according to the principle of equitable and reasonable utilization' through utilisation plans to allow for 'the equitable and reasonable accrual of benefits therefrom to the Aquifer States concerned', namely to satisfy their 'future needs' with regards to alternative sources of water supply. Both Draft Article 4 of the *2008 Draft Articles* and Article 5 of the *1997 Watercourse Convention* are concerned with utilisation in an 'equitable' and 'reasonable' manner. 'Reasonable utilisation' is frequently defined as 'sustainable utilisation' or 'optimum utilisation'.⁵⁵⁵ 'Sustainable' and 'optimum' utilisation refers to the maximum sustainable yield possible whilst maintaining or restoring the level of resources.⁵⁵⁶ The ultimate aim, at least in theory, therefore, is to preserve resources in perpetuity. The

⁵⁵³ Bodansky, *ibid.*, pp. 113-4; see also Norton, P. M. (1991) 'A Law of the Future or a Law of the Past? Modern Tribunals and the International Law of Expropriation', *American Journal of International Law*, 85, p. 497-98.

⁵⁵⁴ Bodansky, *supra*, n. 553; see also Chodosh, H. E. (1991) 'Neither Treaty Nor Custom: The Emergence of Declarative International Law', *Texas International Law Journal*, 26, p. 88.

⁵⁵⁵ Vick, M. J. (2009) 'The Law of International Water: Reasonable Utilization', available at http://works.bepress.com/margaret_vick/1 (accessed 11 August 2013).

⁵⁵⁶ Article 118, *United Nations Convention on the Law of the Sea*, 10 December 1982, UNTS Vol. 1833, pp. 397 ff.; see also ILC, *supra*, n. 486, p. 42.

ILC in its commentary does acknowledge that this is more applicable to recharging aquifers than to non-recharging aquifers such as the Nubian Sandstone Aquifer System. However, the ILC's position can be summed up by its comment that 'it is not necessary to limit the level of utilisation to the level of recharge'.⁵⁵⁷

The ILC's commentary indicates this means that the *2008 Draft Articles* are effectively leaving Aquifer States to determine the nature of the benefits to be protected, enjoyed and over what period. Draft Article 4 does not include a specific limitation or framework on the level of extraction of water even when a level of recharge is to be considered and it does not consider the rates of aquifer discharge into connected bodies of water. As a result, it is very imprecise where, especially in cases of confined aquifers, precision and clear guidelines are fundamental to govern the utilisation of this finite resource. For example, Article 4 and the ILC's commentary do not refer to the significant concept of intergenerational equity, which is at the core of the *Brundtland Commission's* definition of sustainable development. As discussed above, intergenerational equity is a somewhat controversial concept because it requires each generation to utilise its resources in such a manner that it can be passed on to the next in no worse condition than it was received.⁵⁵⁸ In essence, the current generation is regarded as a trustee of the earth's resources for the next generation.⁵⁵⁹ However, this concept tackles the crucial question of how a finite resource is to be managed for future generations. This intergenerational approach can also be observed in Principles 1 and 2 of the *1972 Stockholm Declaration* and the concept is explicitly referred to in Principle 3 of the *Rio Declaration*. Many other sources of international law contain similar concepts to intergenerational equity, such as the *1995*

⁵⁵⁷ ILC, *supra*, n. 486, para. 5, p. 42.

⁵⁵⁸ Brown Weiss, E. (1992) 'In Fairness to Future Generations and Sustainable Development', *American University International Law Review*, 8(1), pp. 19-26; Brown Weiss, E. (1989) *In Fairness to Future Generations* (Dobbs Ferry, New York).

⁵⁵⁹ Brown Weiss, *ibid*, p. 20.

*Agreement on the Conservation of Straddling and Highly Migratory Fish Stocks.*⁵⁶⁰ However, Professor D'Amato in particular criticised the concept by invoking Parfit's generational paradox⁵⁶¹ and Lorenz's 'Butterfly Effect'⁵⁶² and concluded that of future generations are unable to possess rights because they do not yet exist and therefore cannot have identifiable interests.⁵⁶³ Nevertheless, Parfit's paradox and D'Amato's critique are based on individuals' rights whereas Brown Weiss insists intergenerational equity is based on generational rights, which are *group* rights.⁵⁶⁴ It may also prove to be significant for this thesis that Brown Weiss's concept is compatible with Islamic principles of justice, which treat's fundamental rights essential to human wellbeing not as individual rights but as 'rights of the community of believers as a whole'⁵⁶⁵ These group rights could then be evaluated by objective criteria from one generation to the next, which does not require knowledge of the precise number of future right-holders. At any rate, these generational rights could not be enforced by future right-holders, people who are not yet born cannot be individuals, and therefore are better regarded as constrains on the current generation in relation to a choice it must take: whether to curtail consumption of resources and waste in the interests of its children or not.⁵⁶⁶ However, the concept of group rights for future generations has the inherent obstacle of inadequate standing. Decisions by international tribunals such as the ICJ that address generational responsibilities all involve the present

⁵⁶⁰ Art. 5(a), (e), (f), (h), 1995 *Agreement for the Implementation of the Provisions of the United Nations Convention On The Law Of The Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, UN Doc. A/CONF.164/37.

⁵⁶¹ Parfit, D. (1976) 'On Doing the Best for Our Children', in Bayles, M. (ed.) *Ethics and Population* (Schenkman, Cambridge, Mass.), p. 100 ff.; Parfit, D. (1976) *Overpopulation: Part One*, referred to in Parfit, D. (1982) 'Future Generations, Further Problems', *Philosophy and Public Affairs*, 11, pp. 113-72.

⁵⁶² See Gleick, J. (1987) *CHAOS: Making a New Science* (New York: Penguin Books).

⁵⁶³ D'Amato, A. (1990) 'Do We Owe A Duty To Future Generations To Preserve The Global Environment?', *American Journal of International Law*, 84, pp. 190-7.

⁵⁶⁴ Brown Weiss, *supra*, n. 558, p. 24.

⁵⁶⁵ Khadduri, M. (1984) *The Islamic Conception of Justice* (Johns Hopkins University Press, Baltimore), p. 233.

⁵⁶⁶ Brown Weiss, *supra*, n. 564.

generation suing with respects to misdeeds of the past.⁵⁶⁷ Crucially, as highlighted above, no international tribunal has expressly recognised the rights of future generations, although the ICJ has, on occasion, considered the concept of intergenerational rights and acknowledged that it is too important to merely disregard because there is lack of precedent.⁵⁶⁸

None of the Aquifer States of Libya, Egypt, Chad and Sudan have announced that sustainable development is not going to be the motivation behind any plans they have or might have to exploit the confined water of the Nubian Sandstone Aquifer System. However, they have also not committed themselves to the concept of sustainable development of the Nubian Sandstone Aquifer System. All that has taken place were a series of meetings to assess the scale of the aquifer. The proposed political programme of finding a solution on equitable utilisation that was to follow has not materialised. The fact that the main thrust of Draft Article 4 is thus geared towards yield maximisation can also be shown by SR Yamada's analysis. In his *Third Report*, he opined that States should not be strictly limited in their use of the shared water resource, as this would 'in reality deny Aquifer States the right to utilise the valuable water resource, accumulated over the years.'⁵⁶⁹ Nevertheless, this sits at odds with the requirement of equitable utilisation because Draft Article 4 leaves too much room for state abuse and negligence. It also contravenes the potential argument that instead of yield maximisation, water quantities earmarked for agricultural purposes should first be attempted to be harnessed by other methods such as rain capture instead relying exclusively on drinking water from the NSAS.

⁵⁶⁷ See *Case Concerning Certain Phosphates Lands in Nauru (Nauru vs Australia)*, Order of 13 September 1993, ICJ Reports (1993), p. 322; *Advisory Opinion on Nuclear Weapons*, Advisory Opinion of 8 July 1996, ICJ Reports (1996), p. 266.

⁵⁶⁸ See Dissenting Opinion of Judge Weeramantry, in Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's Judgment of 20 December 1974 in *The Nuclear Tests (New Zealand V. France)* Case, ICJ Reports (1995), pp. 341-2.

⁵⁶⁹ Yamada, *supra*, n. 505, p. 9.

This is indeed implied by Draft Article 5(g), which requires Aquifer States to assess ‘the availability of alternatives’ but thus also represent in a contradiction within the Draft Articles.

Another important provision to be read in conjunction with Draft Article 4 is Draft Article 5 – Factors Relevant to Equitable and Reasonable Utilisation –, which is closely modelled on Article 6 of the *1997 Watercourse Convention* (with some provisions rearranged). Draft Article 5, however, has enjoyed two additions when compared to Article 6 of the *1997 Watercourse Convention*:

‘d) The contribution to the formation and recharge of the aquifer or aquifer system;

[...]

The role of the aquifer or aquifer system in the related ecosystem.’

The ILC’s commentary clarifies that subparagraph (d) refers to ‘the comparative size of the aquifer in each Aquifer State and the comparative importance of the recharge process in each State where the recharge zone is located’.⁵⁷⁰ Significantly, paragraph 2 of Draft Article 5 now provides an indication of how the different factors in Draft Article 5 are to be weighed, namely to give priority to ‘vital human needs’.⁵⁷¹ To some extent this provision can prevent an overly narrow interpretation of Draft Article 5 because it is closer to the basic human right to have access to water than what Article 10 of the *1997 Watercourse Convention* was able to provide.⁵⁷² Furthermore, Draft Article 5(1)(b) includes the provision of ‘present and future’ needs to further attempt to delimitate the extent of utilisation. Nevertheless, this is not enough to fill in for the missing concept of intergenerational

⁵⁷⁰ ILC, *supra*, n. 486, para. 4, p. 45.

⁵⁷¹ ILC, *ibid*, para. 5, p. 46.

⁵⁷² McCaffrey, *supra*, n. 519, p. 275.

equity. Considering what has been said about Art. 4 above, where there is no explicit maximum use of water from a confined aquifer, the concept of intergenerational equity would impose restrictions on use to allow for the water to be available to as many generations as possible. In contrast, merely considering ‘present and future’ needs would allow governments to interpret present needs in a way that suits their short-term goals and play down the need of future generations.

Draft Article 6 – Obligation Not to Cause Significant Harm – traces the provisions contained in Article 7 of the *1997 Watercourse Convention* but has been adapted to suit the specific circumstances of aquifers by widening the scope of activities causing harm to the aquifer from those merely relating to the utilisation to any potential threat, especially those posed by other Aquifer States which through their perhaps unrelated activity on the surface of the aquifer (e.g. a chemical plant) may cause harm to a neighbouring state on which territory the aquifer has got its discharge zone:

‘Aquifer States shall, in undertaking activities other than utilization of a transboundary aquifer or aquifer system that have, or are likely to have, an impact on that transboundary aquifer or aquifer system, take all appropriate measures to prevent the causing of significant harm through that aquifer or aquifer system to other Aquifer States or other States in whose territory a discharge zone is located’.

Nevertheless, Draft Article 6 leaves open whether ‘significant harm’ is to be interpreted in the same way it was intended for the *1997 Watercourse Convention*, i.e. ‘harm [which] exceed[s] the parameters of what was usual in the relationship between the States that relied on the use of the waters for their benefit’.⁵⁷³ As Eckstein suggests, while it may be

⁵⁷³ International Law Commission (1995) Report of the Commission to the General Assembly on the Work of its Forty-fifth Session, The Law of the Non-Navigational Uses of International Watercourses, UN Doc. A/CN.4/SER.A/1993/Addendum 1 (Part 2).

difficult to assess the threat emanating from contamination of a river by a nearby toxic waste deposit, this threat assessment becomes exponentially more complex when dealing with an aquifer and the water it contains because it is an underground structure.⁵⁷⁴ SR Yamada, in his *Second Report*, summed it up by stating that ‘significant harm is a flexible and relative concept’.⁵⁷⁵ The fact that Draft Article 6 does not specify the severity of ‘significant harm’, or provides an indication whether the term should be used as in the context of the *1997 Watercourse Convention*, considerably weakens the Draft Article and its applicability to the circumstances of the Nubian Sandstone Aquifer System.

As mentioned in connection to Draft Article 11, Draft Article 7 – General Obligation to Cooperate – is an important provision of the *2008 Draft Articles* because it is an accepted international law principle and generally applicable to international resources.⁵⁷⁶ Without good cooperation between Aquifer States, the adequate management of transboundary water resources is impossible. This was confirmed by the ICJ in the *Gabčíkovo-Nagymaros* dispute between Hungary and Slovakia discussed above.⁵⁷⁷ The case involved a treaty dispute over the construction and operation of the Dams on the Danube River. The treaty in question was the *1977 Budapest Treaty* entered into by Hungary and Czechoslovakia which caused a dam building project to be initiated in 1978, but which was subsequently suspended by Hungary for environmental concerns and an alleged threat to the Budapest water supply.⁵⁷⁸

⁵⁷⁴ Eckstein, *supra*, n. 508, p. 570.

⁵⁷⁵ Yamada, C. (2004) *Second Report on Shared Natural Resources: Transboundary Groundwaters*, UN Doc. A/CN.4/539, para. 25.

⁵⁷⁶ International Law Commission (2006) *Report of the Commission to the General Assembly on the Work of its Fifty-eighth Session*, 61st Session, Supp. No. 10 (UN Doc. A/61/10), p. 212.

⁵⁷⁷ *Gabčíkovo-Nagymaros Case*, *supra*, n. 299.

⁵⁷⁸ *Ibid*, para. 17.

However, a key problem that exists in relation to Draft Article 7 and the nature of the Nubian Sandstone Aquifer System (i.e. a confined ‘fossil’ aquifer) is that the draft article seeks to achieve cooperation ‘on the basis of’ sustainable development. The ILC’s commentary makes it clear that ‘sustainable development’ is the goal of Draft Article 7.⁵⁷⁹ Nevertheless, the Brundtland Commission⁵⁸⁰ defined ‘sustainable development’ as ‘meeting the needs of the present [generation] without compromising the ability of future generations to meet their own needs’.⁵⁸¹

Following the definition advocated by the Brundtland Commission, the aim of ‘sustainable development’ is the preservation of a particular resource to allow future generations to benefit from whilst meeting the needs of the current generation. Notably, this was the understanding of ‘sustainable development’ as implemented in the 1997 *Watercourse Convention*, i.e. that it ‘requires measures to keep resources in perpetuity’.⁵⁸² Clearly, that definition was formed in view of regenerative resources such as fish stocks or forests, and even most (rechargeable) aquifers. It makes absolute sense to manage and, where necessary, to restrict the amount of fishing or foresting to allow fish stocks to bounce back and trees to regrow. Aquifers must not be polluted and their contributing water sources must not be cut off so that future generations can use their waters safely as these groundwater structures are replenished. Fish stocks, forests and most aquifers can recover from their exploitation, provided their numbers or quantities are not depleted to a level where that is no longer possible. Most aquifers are recharged through watercourses or rainwater. However, confined aquifers, such as the Nubian Sandstone Aquifer System, are a different matter. They are not recharged and therefore the water quantities they contain

⁵⁷⁹ ILC, *supra*, n. 486, para. 2, p. 48.

⁵⁸⁰ Formerly known as the World Commission on Environment and Development (WCED), United Nations.

⁵⁸¹ United Nations (1987) *Report of the World Commission on Environment and Development*. General Assembly Resolution 42/187, 11 December 1987.

⁵⁸² ILC, *supra*, n. 486, para. 4, p. 42.

are on a path of depletion the instant any type of development (i.e. use) takes place. One either leaves them alone completely or accepts that no amount of sustainable development will preserve them for future generations indefinitely. All that sustainable development could therefore achieve for the utilisation of confined aquifers is to prolong the availability of the water. Nevertheless, that poses a crucial question: For how many future generations? Less use will increase the number of future generations able to enjoy a confined aquifer's water; the opposite is true where exploitation of a confined aquifer's water is intensified. Although the Nubian Sandstone Aquifer System is vast both in geographical dimensions and in the quantities of water it is estimated to contain, ultimately the amount of water extracted per generation will determine how many future generations are able to enjoy the water, too. Consequently, where a resource is finite, there cannot be 'sustainable development' without the element of intergenerational equity. As a result, an alternative approach to the utilisation of the Nubian Sandstone Aquifer System should envision the inclusion of intergenerational equity instead of stopping short at the term 'sustainable development'.

Nevertheless, Draft Article 7 will be instrumental for the proper implementation of Draft Article 8 – Regular Exchange of Data and Information.⁵⁸³ Draft Article 8 is very important for the management of an aquifer because only with sound data and information can any kind of projection and sensible planning be made possible. Significantly, the draft article requires the exchange of data and information 'of a geological, hydrogeological, hydrological, meteorological and ecological nature and related to the hydrochemistry of the aquifers or aquifer systems, as well as related forecasts' from Aquifer States intending to

⁵⁸³ See Draper, S. E. (1997) 'International Duties and Obligations for Transboundary Water Sharing', *Journal of Water Resources Planning and Management*, 123, pp. 344, 347-48.

use the groundwater and those who do not alike.⁵⁸⁴ Draft Article 8(3) specifies that the requested state must make ‘best efforts to comply with the request’. This could cause controversy among Aquifer States because a State not wishing to use the water stored in a transboundary aquifer for the time being might object to having to engage in monitoring activities because a utilising State needs to know where to best begin drilling activities. Arguably, the expectation for non-utilising States to do so would ignore basic resource competitiveness between nations. Whilst Eckstein suggests that the requested state’s entitlement to be reimbursed for the cost of compliance with Draft Article 8(3) would sufficiently deter Aquifer States ‘from making unreasonable demands for data and information’⁵⁸⁵, GEF documentation shows that funding for a similar information and data gathering project has been put at \$7.9 million, which, measured against national budgets, is a puny amount in circumstances where groundwater is regarded as a strategic resource.⁵⁸⁶

Draft Article 13 – Monitoring – is a precursor to Draft Article 14 – Management.⁵⁸⁷ It essentially requires Aquifer States to conduct this monitoring jointly whenever possible and make gathered data available to other Aquifer States where joint monitoring was not possible. This is a straightforward article, which will prove very useful to any framework regarding the utilisation of the Nubian Sandstone Aquifer System. As suggested by the ILC’s commentary, Draft Article 13 needs to be read in conjunction with Draft Article 14.⁵⁸⁸ Arguably, this is because Draft Article 14 does not specify expressly whether the management of aquifers by Aquifer States should be undertaken jointly or severally.

⁵⁸⁴ ILC, *supra*, n. 486, para. 3, p. 52.

⁵⁸⁵ Eckstein, *supra*, n. 508, p. 581; assuming ‘unreasonable’ is meant to be in circumstances where the requesting state seeks to acquire data for its own sole use with disregard to Draft Article 7.

⁵⁸⁶ United Nations Development Program – Global Environment Facility (GEF) (2005) Medium-Sized Project Proposal – Request for GEF Funding, available at http://www-naweb.iaea.org/napc/ih/documents/Nubian/Nubian_final_MSP_Sandstone.pdf (accessed October 2011).

⁵⁸⁷ ILC, *supra*, n. 486, para. 1, p. 60.

⁵⁸⁸ ILC, *ibid.*

However, bearing in mind that Draft Article 13 calls for the joint monitoring of aquifers by Aquifer States and considering that monitoring arguably is an integral part of sound management, the conclusion has to be that Draft Article 14 intends management to be jointly. The second sentence of that Draft Article provides further guidance by stating that the Aquifer States ‘shall, at the request of any of them, enter into consultations concerning the management of a transboundary aquifer or aquifer system.’ Since transboundary aquifers by nature are a shared resource and contain shared groundwater, any unilateral attempt at sound management is likely to fail and could prove catastrophic for other Aquifer States and for the managing state itself because of lack of information on the whole aquifer or aquifer system.

When looking at the *1997 Watercourse Convention*, it becomes apparent that Draft Article 15 – Planned Activities – is not as comprehensive as the nine articles with detailed provisions on ‘Planned Measures’ where the activities of one riparian state may infringe the rights of another. In its commentaries, the ILC justifies the ‘minimalist approach’ of Draft Article 15 with the scarcity of state practice with respect to aquifers.⁵⁸⁹ This is, however, not an entirely satisfactory justification as the 1947 Statute of the International Law Commission mandates the ILC with ‘the promotion and progressive development of international law and its codification’.⁵⁹⁰ In accordance with its mandate, since the ILC has already recognised the lack of extensive state practice with regards to transboundary aquifers, Draft Article 15 could perhaps have been an opportunity to develop the law more progressively, especially since other legal sources dealing with groundwater, such as the

⁵⁸⁹ ILC, *supra*, n. 486, para. 1, p. 66.

⁵⁹⁰ Article 1(1) *1947 Statute of the International Law Commission*, adopted by UNGA Resolution 174(II), 21 November 1947 (as amended in 2005).

1986 *Seoul Rules*⁵⁹¹ which make the 1966 *Helsinki Rules*⁵⁹² applicable to groundwater, do not cover confined aquifers.

Draft Article 16 – Technical Cooperation with Developing States – requires States to promote scientific, educational, technical, legal and other cooperation with developing States for the protection and management of transboundary aquifers. In its commentary, the ILC made clear that it intended the effect of this article to be ‘a two-sided process to foster sustainable growth’ and by and large have left it to the cooperating States to decide how the cooperation is to take shape and evolve because the list of possible activities in Draft Article 16 is not intended to be exhaustive. Significantly, although international law does not invoke a general obligation for States to provide financial support to other States, the total absence of mechanisms or procedures to ‘mobilise financial resources to support capacity building, knowledge development, research and data generation and equipment procurement’ in Draft Article 16 make the potential success of the 2008 *Draft Articles* for countries short of financial means questionable, despite the possibility to apply for project funding from institutions like the Global Environment Facility Trust Fund.⁵⁹³

Aquifer Protection – Pollution and Precaution

As outlined above, confined aquifers are disconnected from surface water and constitute autonomous bodies of water. As a result, they lack recharge and discharge zones. Recharge zones reduce the danger of water depletion from overuse as they allow fresh water supplies from the hydraulic cycle to feed into the aquifer. Concurrently, constant recharge and discharge permits an aquifer to cleanse itself of pollution over time if left

⁵⁹¹ 1986 *Seoul Rules on International Groundwaters*, 30 August 1986, 62 ILA 251.

⁵⁹² 1966 *Helsinki Rules on the Uses of the Waters of International Rivers*, 20 August 1966, International Law Association, Report of the 52nd Conference (1967), pp. 484 ff.

⁵⁹³ Eckstein, *supra*, n. 508, p. 599.

alone, just like a river. As confined aquifers do not possess such zones and are disconnected from the hydraulic cycle, they are particularly vulnerable to potential overuse and pollution. Accordingly, the *2008 Draft Articles* should include specific provisions aimed to facilitate that protection. Importantly, as will be discussed below, the ILC appears to rely heavily on States' good faith when interpreting the provisions relating to aquifer protection. Whilst on the one hand such an approach is understandable as too strict wordings could risk driving States away from the Draft Articles, on the other all Aquifer States of the Nubian Sandstone Aquifer System are countries currently undergoing significant social, political and economic transitions. The author therefore submits more stringent provisions must be employed to ensure adherence to them by Aquifer States. Nevertheless, the following *Draft Articles* still contain important provisions that warrant closer examination.

At the ILC's second attempt to compose a legal framework, SR Yamada ensured that groundwater experts briefed the Commission extensively.⁵⁹⁴ The Commission was keen to appreciate the science surrounding groundwater before embarking on composing another framework to govern the resource after the *1997 Convention*. The positive impact this has had can be observed in Draft Article 1(b), (c) of the *2008 Draft Articles*, which includes in their scope any activities that could have a detrimental impact on the aquifer's integrity as well as measures for its protection and management. This broad delimitation of the scope identifies the *2008 Draft Articles* as a framework aimed at more than just the mere utilisation of an aquifer, which is vital if the draft articles are to be meaningful.

⁵⁹⁴ Yamada, C. (2003) *Shared Natural Resources: First Report on Outlines*, International Law Commission, 55th Session, UN Doc. A/CN.4/533, para. 1, p. 18.

In that regard, Draft Article 10 – Protection and Preservation of Ecosystems – is perhaps one of the most important provisions because it aims to provide not only for the protection and preservation of the aquifer but also for the connected ecosystems:

‘Aquifer States shall take all appropriate measures to protect and preserve ecosystems within, or dependent upon, their transboundary aquifers or aquifer systems, including measures to ensure that the quality and quantity of water retained in an aquifer or aquifer system, as well as that released through its discharge zones, are sufficient to protect and preserve such ecosystems.’

Although Draft Article 10 does not specifically refer to the environment in general, its language is reminiscent of that found in many environmental law instruments. An ‘ecosystem’ can be defined as a ‘community of organisms interacting with one another and with the chemical and physical factors making up their environment’.⁵⁹⁵ Ecosystems, therefore, include flora and fauna as well as their habitat. Although humans are not specifically mentioned in Article 10, this is consistent with other international treaties, such as Articles XX(b) of the *1986 General Agreement on Tariffs and Trade* or Article 36 (ex Article 30 TEC) of the *2012 Treaty on the Functioning of the European Union*, and it is clear from the Preamble that at the core of the *2008 Draft Articles* lies the protection of interests of those dependent on an aquifer or aquifer system.

Reading Draft Article 10 therefore creates the impression that it intends States to have the obligation to ‘protect’ and preserve the ecology of an aquifer, which goes beyond the mere utilisation of the contained fresh water resource. The application of such broad protection would considerably widen the scope of provisions concerning environmental damage or harm caused by aquifer and non-Aquifer States and thus provides some

⁵⁹⁵ See Miller, G. T. Jr. (1991) *Environmental Science: Sustaining the Earth*. Wadsworth Publishing Co. (Belmont, CA.), p. 7, cited in Corn, M. L. (1993) *Ecosystem, Biomes, and Watersheds: Definitions and Use* (Congressional Research Service, No. 93-655).

guidance on how Article 12 – Prevention, Reduction and Control of Pollution – is to be interpreted. Whilst it might be difficult to apply this broad interpretation, awareness of the possible scope of ‘environment’ is important when examining Articles 10 and 12 as they require Aquifer States to consider factors beyond the mere rate of extraction of water and minimise or control pollution of the aquifer (whilst not providing a definition of ‘pollution’) respectively. Especially in view of confined ‘fossil’ aquifers, Draft Article 10 therefore possesses some scope to require Aquifer States to consider factors beyond the rate of extraction, including contamination and pollution of the aquifer through the use of land above it.

Nevertheless, the ILC’s commentary creates some confusion because the obligation to protect aquifer-connected ecosystems is suddenly limited to ‘relevant’ ecosystems only.⁵⁹⁶ Arguably, this is an unnecessary qualification of Article 10, which already specifies the ecosystems in question as those ‘within, or dependent upon, their transboundary aquifers or aquifer systems’. Unfortunately, neither the *2008 Draft Articles* or the ILC’s commentary specify the term ‘relevant’. Although SR Yamada had already submitted in his *Third Report* in 2005 that Draft Article 10 is not to be understood as a provision aimed at the protection of the environment in general but that the protection of ecosystems matters to the scope of the *2008 Draft Articles* only insofar as it is necessary for the protection of the aquifer,⁵⁹⁷ it leaves open the question why Article 10 was then not specified in this manner? Whilst this could be seen as a way to allow States more flexibility in the implementation of their responsibilities to protect the aquifer, the author submits that instead of adding flexibility in the implementation, it adds flexibility for States to choose whether they should engage in protection at all. Notably, Corn asserts that ecosystems are difficult to be separated because

⁵⁹⁶ ILC, *supra*, n. 486.

⁵⁹⁷ Yamada, *supra*, n. 505, para. 33.

of their interconnectedness, highlighting that attempts to do so would defy reality.⁵⁹⁸ Logically, then, all ecosystems are potentially relevant and should not be excluded from consideration. Hence, it was sensible of the ILC to include ‘dependent’ ecosystems in Article 10. A closer look at several legal instruments on the environment shows that Corn’s assertion of interconnectivity between different ecosystems is widely followed. Treaties, such as the *1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment*⁵⁹⁹, the *1992 Convention on the Transboundary Effects of Industrial Accidents*⁶⁰⁰ and the *1992 Convention on the Protection of Transboundary Watercourses and Lakes*⁶⁰¹, typically outline the scope of environmental impacts and harm with reference to flora, fauna, soil, *water* [emphasis added], air, landscape, cultural heritage and any interactions between these factors. Similarly, the *1980 Convention on Conservation of Antarctic Marine Living Resources* focussed on the interrelationship of different marine ecosystems⁶⁰² and the *1988 Convention on the Regulation of Antarctic Mineral Resource Activities*, although it has remained unratified by any State, defined impact on the regional environment as ‘any impact on the living or non-living components of that environment’.⁶⁰³ An even broader interpretation of environment can be found in the *1992 Framework Convention on Climate Change*⁶⁰⁴. Its Article 1(1) includes ‘the composition, resilience and productivity of natural and managed ecosystems’, ‘the operation of natural [and] managed ecosystems’, and ‘socio-economic systems or human health or welfare’. Bringing together both Corn’s assertion and the approach chosen by

⁵⁹⁸ Corn, *supra*, n. 595.

⁵⁹⁹ Art. 2(7), *1993 Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment*, 21 June 1993, ETS No. 150.

⁶⁰⁰ Art. 1(c), *1992 Convention on the Transboundary Effects of Industrial Accidents*, 17 March 1992, UNTS Vol. 2105, pp. 457 ff.

⁶⁰¹ Art. 1(2), *1992 Convention on the Protection of Transboundary Watercourses and Lakes*, 17 March 1992, UNTS Vol. 1936, pp. 269 ff.

⁶⁰² Art. 1(2, 3), *1980 Convention on Conservation of Antarctic Marine Living Resources*, 7-20 May 1980, UNTS Vol. 1329, pp. 48 ff.

⁶⁰³ Art. 1(15), *1988 Convention on the Regulation of Antarctic Mineral Resource Activities*, 1 June 1988, ILM Vol. 27, pp. 868 ff.

⁶⁰⁴ *1992 United Nations Framework Convention on Climate Change*, 9 May 1992, UNTS Vol. 1771, pp. 107 ff.

these conventions described above, the *2008 Draft Articles*' consideration of only 'relevant' ecosystems introduces uncertainty whilst a literal reading of Article 10 provides a more comprehensive and appropriate approach.

It could, of course, be argued that the term 'relevant' introduces by at least equal measure an important limiting effect, whereby States are only obliged to take appropriate action against foreseeable threats in a preventive manner instead of making wholesale changes to development policies based on speculation or conjecture. Nevertheless, it leaves the door open for Aquifer States not to act in good faith in relation to the protection of the aquifer. States may choose not to believe that environmental damage to one ecosystem has effects on an aquifer until scientifically proven beyond doubt and thus delay action. This harks back to the previous discussion of the preventive approach and the precautionary principle. The movement of groundwater is dependent on several factors such as hydraulic conductivity, the hydraulic gradient and especially the permeability and porosity of the source rock. As a result of the interplay of these different factors, groundwater generally has to move considerably slower than surface water.⁶⁰⁵ A deterioration of the quality of groundwater, for instance through overexploitation in one Aquifer State – which could increase the water's salinity – or pollution, might thus take considerably longer to manifest itself (and generally more so the further away from the epicentre of the deterioration). Consequently, the deterioration of aquifer water quality, especially in a confined 'fossil' aquifer such as the Nubian Sandstone Aquifer System, may well manifest itself too late for any meaningful intervention to protect or restore the water quality. Whereas the reading of Article 10 allows for the assumption that the precautionary principle could be applied, the

⁶⁰⁵ United States Geological Survey (1999) 'General Facts and Concepts About Groundwater', *USGS Sustainability of Ground-Water Resources Circular*, 1186, pp. 6-15.

ILC's commentary suggests the opposite because limiting the scope to 'relevant' ecosystems without elaborating on relevance potentially infringes upon a holistic approach.

Fortunately, the ILC provided at least in principle for the precautionary protection of an aquifer or aquifer system with Draft Article 12 – Prevention, Reduction and Control of Pollution – which is closely modelled on the provisions found in Articles 195 and 196 *UNCLOS* as well as in Article 21 of the *1997 Watercourse Convention*.⁶⁰⁶ However, a comparison of Article 21 and Draft Article 12 shows that the latter is much more imprecise as it lacks the strong-worded definition of pollution contained in Article 21:

'any detrimental alteration in the composition or quality of the waters of an international watercourse which results directly or indirectly from human conduct'.

Article 21 thus conveys very broad obligations on the contracting parties. In contrast, the second sentence of Draft Article 12 reads:

'[...] Aquifer States shall take a precautionary approach in view of uncertainty about the nature and extent of a transboundary aquifer or aquifer system and of its vulnerability to pollution.'

As outlined above, there can be little doubt about the vulnerability of aquifers to pollution. The ILC's clearly recognised the same but opted for the 'precautionary approach' instead of the 'precautionary principle' simply because it is 'less disputed' in international law.⁶⁰⁷ By merely advocating 'approach', Draft Article 12 is less forceful than it could have been had the ILC incorporated specific precautionary measures or the 'precautionary principle'. Whereas 'approach' allows States to pick and choose among different protective measures, 'principle' would have imposed a compatibility test for precautionary

⁶⁰⁶ ILC, *supra*, n. 486, para. 2, p. 58.

⁶⁰⁷ ILC, *supra*, n. 486, para. 5, p. 59.

environmental protection on any development policy. The ILC's wording in Draft Article 12 is therefore inconsistent with its work on the *2001 Draft Articles on the Prevention of Transboundary Harm*⁶⁰⁸, which would trigger responsibility for appropriate measures even in instances of 'low probability of causing disastrous harm'.⁶⁰⁹ There can thus be no doubt that the Commission chose its words very carefully at this point of the *Draft Articles* to avoid alienating States by preventing the imposition of a duty 'in respect of virtually any activity'.⁶¹⁰ Nevertheless, in accordance with Article 26 of the *1969 Vienna Convention on the Law of Treaties*, the ILC consequently relies on States' good faith in interpreting 'prevention' and 'precautionary approach'.⁶¹¹ Only when interpreted in good faith can, as suggested in the previous chapter, the two concepts lead to the same results in practice. Otherwise 'precautionary approach' leaves too much scope to address the danger of pollution to aquifers with less vigour as perhaps required. Whilst the first sentence of Draft Article 12 specifies 'prevention', the ILC's commentaries clarify that this is not meant to refer to a preventive approach in opposition to the precautionary principle but rather a generic term to 'prevent' future damage to the aquifer.⁶¹²

In the context of harm prevention, Draft Article 17 deals with the important aspect of emergencies and how Aquifer States should treat the preceding draft articles in the case of a severe emergency. *The 1997 Watercourse Convention* contains similar provisions in its Article 28. Whilst the ILC's commentary on what might constitute an emergency is somewhat contradictory – on the one hand it purports that emergencies to aquifers might not be as destructive as they are to watercourses but on the other it acknowledges that an earthquake

⁶⁰⁸ *2001 Draft Articles on Prevention of Transboundary Harm from Hazardous Activities*, 2 July-10 August 2001, ILC Report 53rd Session, UN Doc. A/56/10.

⁶⁰⁹ International Law Commission (2001) *Report of the Commission to the General Assembly on the Work of its Fifty-third Session*, UN Doc. A/56/10 (Supp. No. 10), p. 387, paras. (2)-(3).

⁶¹⁰ *Ibid*, para. (3).

⁶¹¹ ILC, *supra*, n. 607.

⁶¹² ILC, *supra*, n. 486, p. 58.

could destroy an aquifer⁶¹³ – it does provide guidance as to what kind of incident might be an emergency under Draft Article 17, i.e. one which seriously damages the aquifer and the water it contains. Furthermore, Paragraph 1 of Draft Article 17 indicates that the emergency must occur suddenly and pose an ‘imminent threat’. However, the term ‘imminent threat’, in conjunction with the ILC’s commentary, which asserts that the element of ‘suddenness’ is crucial for the application of the draft article, does not sit well with the nature of the Nubian Sandstone Aquifer System and the potential threats to its existence. The ILC’s commentary allows the conclusion that the Commission included the element of ‘suddenness’ because it first and foremost thought of emergencies in cases of earthquakes or tsunamis.⁶¹⁴ However, the Nubian Sandstone Aquifer System is not located in a region that is plagued by threats posed by earthquakes or tsunamis. Instead, the author submits, the Nubian Sandstone Aquifer System is far more threatened by potential dangers of environmental pollution. Environmental pollution, however, is unlikely to threaten aquifers ‘suddenly’. It may take years until toxic waste buried above an aquifer dissolves and trickles down into the water.⁶¹⁵

In the context of this discussion, Draft Article 11 – Recharge and Discharge Zones – is a new provision not found in the *1997 Watercourse Convention* and adds an important consideration to any possible framework aimed at the utilisation of transboundary aquifers. It specifically deals with transboundary aquifers’ recharge and discharge zones, i.e. the area of land where an aquifer connects to the surface. Whilst the consideration for recharge and discharge zones does not have primary relevance for the Nubian Sandstone Aquifer System because it is a system of confined ‘fossil’ groundwater, Draft Article 11 represents an

⁶¹³ ILC, *supra*, n. 486, para. 1.

⁶¹⁴ ILC, *supra*, n. 486, paras. 1-2.

⁶¹⁵ For a discussion of the timescale during which environmental pollution takes place see Eckstein, *supra*, n. 508, pp. 602-03.

integral part of the *Draft Articles*' scope for the protection of transboundary aquifers from harmful influences.

Nevertheless, Draft Article 11 is not compulsory enough because it leaves it to the States to identify the recharge and discharge zones and does not provide guidance of how these zones are to be identified, for example in a concerted effort together with other Aquifer States, which then put Draft Article 11 in harmony with the general obligation to cooperate as specified in Draft Article 7. As Draft Article 11 stands, however, Aquifer States not acting in good faith as commanded by Article 26 of the *1969 Vienna Convention on the Law of Treaties* could protract the 'identification process' if other national interests, such as the construction of a petrochemical plant and the employment it brings, takes national priority. Such short-term thinking is a real possibility where politicians might be keen to be seen to provide employment, for example, and the negative effects of polluting the aquifer may take years to transpire.

Significantly, Draft Article 11(2) imposes an obligation upon both Aquifer States and Non-Aquifer States whose activities may have an impact on the aquifer in question to identify that aquifer's recharge and discharge zone. The problem is that unless such a Non-aquifer state was to become a party to a (hypothetical) 'Convention on the Law of Transboundary Aquifers', it cannot be bound by its terms.⁶¹⁶ Admittedly, this is an unsatisfactory state of affairs. Fortunately, however, Draft Article 11(2) is not likely to be relevant to the Nubian Sandstone Aquifer System because it is entirely located on the

⁶¹⁶ Article 34, *1969 Vienna Convention on the Law of Treaties*, 23 May 1969, UNTS Vol. 1155, pp. 331 ff.

territories of Aquifer States – Libya, Egypt, North Sudan and Chad – and is too distant for horizontal drilling by Non-Aquifer States.⁶¹⁷

Summary

For most of the nineteenth and twentieth centuries States ignored the regulation of groundwater. It was only from 1879 onwards that international non-governmental organisations began to focus on hydrological issues, inducing the slow pace at which States were move towards codification and incremental advances in international water law. Apart from the occasional inclusion of groundwater in their scope, such as brief references to its use and allocation, almost no international agreements dealt with groundwater comprehensively until the *Arrangement Relating to the Protection and Utilization and Recharging of the Franco-Swiss Genevise Aquifer* in 1977.

Despite these agreements, the corpus of law relating to fresh water has historically been disintegrated. Rules governing the allocation of rights to surface water have traditionally been separate from those regulating the utilisation of groundwater; law aimed at preventing and containing pollution have usually been conceived in isolation from those governing permits of water utilisation. However, the international body of States and non-governmental law associations have never dropped the issue altogether and continued to work towards a universal framework, albeit very slowly indeed. Although the Institute of International Law drafted the *Madrid Declaration* in 1911, which had already captured many of the key principles of sound water management, it was not until 50 years later that the IIL's *Salzburg Resolution on Utilization of Non-Maritime International Waters* embellished the articles of the older document with provisions of equity, good faith and guidelines on

⁶¹⁷ For the idea of horizontal drilling in relation to Draft Article 11(2) see Eckstein, *supra*, n. 508, p. 588.

negotiation procedures. Concurrently, the United Nations spend twenty years between 1970 and 1994 to produce a set of draft articles that led to the adoption of the *Convention on the Law of the Non-Navigational Uses of International Watercourses* by the General Assembly on 21 May 1997.

Whilst the *1997 Watercourse Convention* found use in the ICJ's considerations of the *Gabčíkovo-Nagymaros* and *Pulp Mills* cases rather quickly and has since entered into force, States by and large received the *2008 Draft Articles* with scepticism. Although they were supposed to address a gap left by the *1997 Watercourse Convention* related to transboundary 'fossil aquifers', their scope at times seems to exceed that original remit, allowing room for confusion. Draft Articles 2(a) and 4(d) in particular incorporate elements pertinent to fossil aquifers but also refer to other types connected to the hydraulic cycle. Notably, the *2008 Draft Articles* currently linger between the status of a Protocol to the *1997 Watercourse Convention* and a framework convention in their own right. Some provisions included in the *1997 Convention*, (e.g. a non-prejudicial clause in favour of existing international water agreements) are not included in the *2008 Draft Articles*, and the text of some of the *Draft Articles* differs considerably from the text of corresponding articles of the *1997 Convention*.

Questions of Aquifer States' sovereignty of their share of a transboundary 'fossil' aquifer as well as the related conflict with intergenerational equity and the precautionary principle – all of which are indispensable elements of sound governance for the utilisation of non-renewable 'fossil' aquifers – resulted in several shortcomings of the *2008 Draft Articles*. Although the *Draft Articles'* general thrust requires States to manage their groundwater resource base in as sustainable a manner as possible and to minimise the risk of environmental harm through the adoption of a precautionary approach, these vital elements are referred to only in a general way. Accordingly, sustainable development is referred to only in passing in Draft Article 7 (General Obligation to Cooperate), while its

implementation is addressed obliquely in Draft Article 4 (Equitable and Reasonable Utilization). The obligation to minimise harm is mentioned only in Draft Article 11 (Recharge and Discharge Zones) and Draft Article 16 (Scientific and Technical Cooperation), both of which are quite superficial. The precautionary approach is mentioned only in passing in Draft Article 12 (Prevention, Reduction and Control of Pollution) despite the centrality of precaution in relation to confined aquifers.

It is evident, therefore, that the *2008 Draft Articles on the Law of Transboundary Aquifers* contain a number of useful principles applicable to transboundary aquifers in general. Nevertheless, they often are limited by conditions specific to the Nubian Sandstone Aquifer System when it comes to the sustainable development or the obligation not to cause significant harm. Notably, in their current form, the *2008 Draft Articles* cannot serve as a closed set of rules of the Law of Transboundary Aquifers. Instead, the *2008 Draft Articles* should currently be seen as a useful proposition of a framework of principles relevant to transboundary aquifers in general, allowing Aquifer States the freedom to enter into their own specific agreements. This leaves sufficient scope to pursue the search for an alternative approach to the utilisation of the Nubian Sandstone Aquifer System, taking into account the numerous useful principles found in the *2008 Draft Articles* but with the freedom to reinterpret them to suit their legal culture.

CHAPTER IV – GENERAL PRINCIPLES OF ISLAMIC LAW

This chapter will delve into the different aspects that are important to the nature of Islamic law in general and the Islamic perception of law and justice in relation to the environment. At this point, the author would like to stress that the approach will not be that of an Islamic theologian because as a non-Muslim and without specific schooling this would not be possible, whilst a theological approach would venture far beyond the scope of this thesis. What this chapter will do, however, is considering basic principles of Islamic law pertaining to water and the environment in light of general international law. As has been shown in the preceding chapters, much of international environmental law is reliant on principles to achieve a normative effect on States (e.g. the precautionary principle).⁶¹⁸ In the words of the umpire, Ralston, in the *Gentini Case*:

[A] rule [...] is essentially practical and, moreover, binding [whereas a principle] expresses a general truth, which guides our action, serves as

⁶¹⁸ Paradell-Trius, L. (2000) 'Principles of International Environmental Law: An Overview', *Review of European Community and International Environmental Law*, 9(2), p. 93.

*theoretical basis for the various acts of our life, and the application of which to reality produces a given consequence’.*⁶¹⁹

As such, the examination of principles, although not legally binding in their own right, can have significant impact by providing much needed inspiration and guidance in the negotiation and interpretation of international goals, rights and obligations. Hence in the different aspects of Islamic jurisprudence that follow below are going to be essential stepping stones in the analysis to what extent the *2008 Draft Articles* are congruent with environmental principles of Islamic law.⁶²⁰

A common critique of Islamic jurisprudence has been that it has lost touch with the changing conditions of contemporary life because it is intrinsically linked to Shari'a and the latter's claim of remaining unchanged since its inception almost 1,500 years ago. The argument goes that because of the perceived backwardness of Shari'a, it is incapable of contributing to modern government processes in the fields of legislation and judicial practice in a constructive manner. On the other hand, a reverse critique is at times levelled at Islamic governments when they fail to incorporate principles of Islamic jurisprudence into legislative practices and standards.⁶²¹

This gap between Islamic law and its sources as practiced in Islamic States can at least partly be attributed to the increasing prevalence of statutory legislation that competes with the Islamic tradition of jurisprudence (*usul al-fiqh*). Jurisprudential thought is one of the most distinctive areas of Islamic learning, a 'mother' discipline in Shari'a as well as a genuine manifestation of Islamic thought and scholarship throughout its long history of

⁶¹⁹ *Gentini Case* (Italy vs Venezuela), MCC, 1903, in Ralston, J. H. and Doyle, W. T. S. (1904) *Venezuelan Arbitrations of 1903*, 58th Congress, 2nd Session, Doc. 316 (Washington: Government Printing Office), p. 725 (trans. from French).

⁶²⁰ See further DFID (2012) *Faith Partnership Principles: Working Effectively with Faith Groups to fight Global Poverty* (London: Department of International Development), pp. 6-7.

⁶²¹ Kamali, M. H. (2013) *Principles of Islamic Jurisprudence* (Cambridge: Islamic Texts Society), p. xxi.

development. However, key doctrines and methods of *usul al-fiqh* such as *Ijtibād* (the application of reason) are conspicuously absent in contemporary judicial decision making processes in Muslim countries. Apart from circumventing the traditional role of the Islamic jurist to marry the demands of Shari'a with the requirements of progressive legislation, a self-contained statutory code and the formal procedures accompanying it have somewhat eroded the possible application of *Ijtibād* as envisioned by Shari'a. Moreover, the wholesale importation of foreign legal concepts and institutions into Islamic countries as well as the uneasy relationship this amalgamation of legal systems and philosophy has produced in legal education and judicial practice are among the general sources of confusion and discontent.⁶²² It is perhaps this tension between two legal conceptions of justice and law that is partly responsible for the contemporary 'Islamic revivalism'⁶²³.

Concurrently, it has been a criticism by renowned Islamic scholars teaching at Western institutions that prominent Islamic jurisprudential doctrines are neglected in the discussion of particular Islamic laws.⁶²⁴ Inevitably, however, the scripture of Islamic jurisprudence available in English will differ slightly from the Arabic original. English translations tend to exhibit a certain difference of style and perspective in comparison to Arabic works on the subject. Islamic jurisprudence and all of the various other branches of the Shari'a bear testimony to the recognition of the divine revelation (*wahy*) as the most authoritative influence and source, over and above that of man-made legislation. Although this aspect of Islamic law is generally acknowledged, the importance of the divine revelation to the detailed formulations of Islamic law is not highlighted in the English

⁶²² See Weeramantry, C. G. (2001) *Islamic Jurisprudence: An International Perspective* (Kuala Lumpur: The Other Press).

⁶²³ Kamali, *supra*, n. 621.

⁶²⁴ *Ibid*, p. xix.

language accounts of Islamic law as perhaps exuberantly as in the Arabic original.⁶²⁵ This is not to say that the Western discourse on Islamic law is less relevant, but especially in relation to contentious and highly emotive topics such as environmental protection and intergenerational equity it is necessary to at least attempt (as a non-Muslim) to capture some of the spirit of Islamic law as well as its concrete provisions. The reader should therefore not be surprised of frequent references to the Qur'an as a source of jurisprudence as well as religion and philosophy.

It is perhaps true to say that Islamic jurisprudence exhibits greater stability and continuity of values, thought and institutions when compared to Western jurisprudence. This can partially be explained by reference to the respective sources of law the two legal systems are based on. Whereas rationality, custom, judicial precedent, morality and religion constitute the basic sources of Western law, with the ambition to grant each an equal weighting, morality and religion acquire greater prominence over other sources in Islamic law. Fluidity and overlap with other disciplines such as philosophy and sociology is perhaps true of both Islamic and Western jurisprudence. But it is the latter that exhibits the greater measure of uncertainty regarding its scope and content. Thus according to one observer, books that bear the title 'jurisprudence' vary widely in subject matter and treatment because 'the nature of the subject is such that no distinction of its scope and content can be clearly determined'⁶²⁶ and in Julius Stone's somewhat dramatic words (but which may ring true with many) jurisprudence is described as 'a chaos of approaches to a chaos of topics, chaotically delimited'.⁶²⁷ Nevertheless, the values to be upheld and defended by Islamic law and societies are not always validated on rationalist grounds alone. Notwithstanding the

⁶²⁵ Kamali, *supra*, n. 621, 'Preface'.

⁶²⁶ Dias, R. W. M. (1985) *Jurisprudence* (London: Butterworths), p. 1.

⁶²⁷ Curzon, L. B. (1988) *Jurisprudence* (London: Pittman), p. 13.

fact that human reason has always played an important role in the development of Islamic law, the Shari'a itself is primarily founded on the divine revelation.

Islam as a Code of Conduct as well as a Religion

Islam, like many other belief systems, encompasses more than the worship and a code of conduct, i.e. what can ordinarily be inferred from the term 'religion'.⁶²⁸ It frequently penetrates aspects of Muslims' daily lives, ranging from contracts to inheritance and, of course, the use of water. Importantly, Islam does not recognise the separation of the concept of 'secularism'. So, while only few Muslim countries base their political, judicial, economic or constitutional systems on Islam alone, it is equally the case that only Turkey can be seen as a truly secular state in the Middle East. In Libya, for example, a State which prior to 2011 called itself the *Great Socialist People's Libyan Arab Jamahiriya* (i.e. the Libyan Arab State of the Masses)⁶²⁹, its then leader Muammar Gaddafi proclaimed the *Jamahiriya* as following the Qur'an for legal guidance, adopting the Shari'a as the country's sole source of law.⁶³⁰ Although the strict adherence to Shari'a was not upheld because it guaranteed private ownership of property, which clashed with the socialist teachings of Muammar Gaddafi's *Green Book*,⁶³¹ the author submits that during the time he spent in the country he had seen numerous contracts quoting the Qur'an in their preambles.

⁶²⁸ Bankowski, Z., Barzelatto, J. and Capron, A. M., eds. (1988) 'Ethics and Human Values in Family Planning': Conference Highlights, Papers and Discussion: 22nd Council for International Organizations of Medical Sciences (CIOMS) Conference, Bangkok, Thailand, 19-24 June, WHO, Special Programme of Research, Development and Research Training in Human Reproduction, Geneva.

⁶²⁹ Blundy, D. and Lycett, A. (1987) *Qaddafi and the Libyan Revolution*. Boston and Toronto: Little Brown & Co., p. 105.

⁶³⁰ Bruce St. John, R. (2012) *Libya: From Colony to Revolution* (Oxford: Oneworld), p. 167.

⁶³¹ Vandewalle, D. (2011) 'From International Reconciliation to Civil War: 2003–2011', in Vandewalle, D. (ed.) *Libya Since 1969: Qaddafi's Revolution Revisited* (Palgrave Macmillan), pp. 215–39.

In the words of Khadduri, ‘justice is essentially a relative concept’⁶³² and therefore conceptions of justice vary considerably from society to society. In Islam, the idea of justice is to be found in the Revelation and Divine Wisdom as communicated by Mohammed to his followers. Muslims believe God transmitted the Revelation in His own words to Mohammad to be enshrined verbatim in the Qur'an. The Divine Wisdom, the Prophet's personal reflections on God's Revelation, was in turn also communicated in his own words and circulated as the Sunnah, which subsequently became known as the Hadith, or the Prophet's Traditions. In that sense, Islamic justice is a form of divine justice. As a Prophet, Mohammad naturally stressed religious values whilst dictating the Qur'an to his followers, but he also was keenly aware of the widespread inequity and oppression in the society in which he had grown up.

Before the advent of Islam, the Bedouin tribes largely traversed in relative proximity to watercourses or other sources such as oases and it is known that water was a constant source of tribal feuds. Islam, however, changed their approach to water utilisation by introducing a new framework based largely on rights and obligations of use.⁶³³ Significantly, in contrast to Western law, which has been formed from a utilitarian perspective in the sense of Bentham, the principal objective of Islamic law is to achieve harmony and balance between the spiritual and the temporal in compliance with God's demands. In his *Introduction to Islamic Law and Legal Theory*, the former Director of the Centre of Islamic and Middle Eastern Law at the School of Oriental and African Studies points out the intrinsic singularity of Islamic law and the Qur'an:

‘Strictly speaking, the whole of the Qur'an is law in the Islamic sense of law as belief and as a set of obligations on the individual as to the ideal conduct

⁶³² Khadduri, M. (1984) *The Islamic Conception of Justice* (Baltimore: Johns Hopkins University Press), p. 1.

⁶³³ Caponera, D. A. (1992) *Principles of Water Law and Administration: National and International* (London: Taylor & Francis), p. 69.

required by God. Little distinction is therefore made between the moral and the legal in the western sense. The Qur'an – the word of God – purports to regulate the whole of a man's life; the word 'Muslim' refers to submission to the religion of Islam and its concomitant obligations'.⁶³⁴

It follows that a fundamental distinction between Islamic law and Western law is that to a large extent Islamic law is not formed by society due to the expectation that human minds can easily be corrupted. As a result, from an Islamic perspective, law controls society and cannot be controlled by the latter as it is the will of God, not public opinion, which determines legality. The doctrine of certitude (*'ilm al-yaqin*) has the effect that what is good and what is evil (and by extension what is right and what is wrong) can only be determined with certainty by God.⁶³⁵ For that reason, the ideal Muslim life is lived in conformity with divine law in order to achieve salvation through the 'right path' (*Shari'a*).⁶³⁶

Substantive justice in Islamic law thus ultimately leads to a declaration of 'permission' (*halal*) or 'prohibition' (*haram*). However, Shari'a does not specify a measure of what is just and what is unjust; it merely states that those subject to Shari'a must fulfil their '*halal*' duties and abstain from anything '*haram*'. Shari'a takes for granted that everything *halal* is automatically just and everything '*haram*' is unjust, simply because it is assumed that the Revelation cannot inflict an injustice on believers.⁶³⁷ Using the notions of *halal* and *haram*, Islamic lawyers traditionally tried to discern the underlying principles determining the distinction between just and unjust. Taken together, these principles would determine the ultimate purpose of the law. Generally, Shari'a's purpose is to guide the followers of Islam

⁶³⁴ Edge, I. (1996) 'Introduction: Material Available on Islamic Legal Theory', in: Edge, I. (ed.) *Islamic Law and Legal Theory* (Aldershot: Dartmouth), pp. 16-17.

⁶³⁵ Fyzee, A. A. A. (1974) *Outlines of Muhammadan Law* (New York: Oxford University Press), p. 15.

⁶³⁶ Coulson, N. J. (1995) *A History of Islamic Law* (Edinburgh: Edinburgh University Press), p. 85.

⁶³⁷ Qur'an, 8:53; see also Khadduri, M. (1984) *The Islamic Conception of Justice* (Baltimore: John Hopkins University Press), p. 137.

and is specifically designed to protect ‘the public good’ (*maslaha*).⁶³⁸ As such, Islam can be seen as a system of values that goes beyond the performance of religious rituals. Instead, it represents an integrated codex, which takes a holistic approach without distinguishing between the sacred and the secular. Consequently, Islam also does not provide for the differentiation between man and nature.⁶³⁹ Shari'a, therefore, provides strong moral legitimacy to its rules and constitutes the essence of divine will. As a result, to be consistent with legitimate discussions of Islam and Islamic law in particular, the following discussion will draw extensively on quotes from both the Qur'an and the Sunnah extensively.⁶⁴⁰

The Sources of Islamic Law

As outlined above, the Qur'an is the primary source for Islamic values and direction. According to Muslim belief, the book displays the exact word of God revealed to the Prophet Muhammad through his Angel Gabriel. Although the Qur'an does contain several specific prescriptions that are identifiable as legal norms, its primary goal is to establish a general set of moral guidelines. It can perhaps be described as a compass to guide Muslims following an Islamic way of life. Accordingly, the Qur'an provides that it ‘is an exposition for the people and a guidance and admonition for those who fear God’.⁶⁴¹ The Sunnah, in turn, conveys what Muhammad said, did, or tacitly approved when in discussion with his disciples. In Islam, following the example of the Prophet is given such importance because

⁶³⁸ Kerr, M. (1966) *Islamic Reform: The Political and Legal Theories of Muhammad 'Abdub and Rashid Rida* (Berkeley: University of California Press), pp. 80-6; Qur'an 48:18-19.

⁶³⁹ Fazlun, K. M. (2002) ‘Islam and the Environment’, in Timmerman, P. (ed.) *Encyclopedia of Global Environmental Change, Vol. 5: Social and Economic Dimensions of Global Environmental Change* (Chichester: John Wiley & Sons) pp. 332-9.

⁶⁴⁰ For consistency, all Qur'anic references stem from a translation by Khan, M. W. (2009) *The Qur'an* (Hicksville: IB Publisher).

⁶⁴¹ Qur'an: 3:138.

the Qur'an explicitly instructs Muslims to follow Muhammad's leadership.⁶⁴² The Qur'an, therefore, appoints the Prophet as the perfect human role model and leader of Muslims. Notably, the high degree of importance Islam attaches to the Prophet's persona might not be paralleled in other religions. As a result, if the Qur'an is a compass for Muslims, the Sunnah is a more detailed map for the specifics of Muslims' journey on this earth.

Some of the Prophet's disciples memorised and recorded in scripture what the Prophet said or did. These documented narrations are called *hadith* and constitute vital building blocks of the Sunnah.⁶⁴³ Importantly, Islamic legal theory regards these as more than hearsay. Once recorded, they were later verified for authenticity based upon such factors as independent confirmation and witness testimony, the general consistency of the chain of narration, the credibility of the specific narrators in the chain, and the confluence with other *hadith* and the Qur'an. In some specific cases, known as *hadith qudsi*, Islamic scholars attribute the Prophet's sayings as revelations of God, merely expressed in the Prophet's own words. Of the many collections of *hadith*, six are considered to be the most accurate and reliable – those of Imam Al-Bukhari, Imam Muslim, Imam Al-Tirmidhi, Imam Malik, Imam Abu-Dawud, and Imam Ibn Majah – and they are those this thesis will refer to.⁶⁴⁴ The Qur'an and the Sunnah are therefore prime sources of Islamic jurisprudence (*usul al-fiqh*).

However, as one might expect, the Qur'an and the Sunnah have not made clear and easily identifiable statements or rulings towards transboundary aquifers. Instead, Islamic

⁶⁴² Qur'an, 4:59: 'Believers, obey God and obey the Messenger [i.e. the Prophet Muhammad] and those who have been entrusted with authority among you. If you are in dispute over any matter, refer it to God and the Messenger, if you truly believe in God and the Last Day: this is best, and best in the end'.

⁶⁴³ Holt, P. M., Lambton, A. K. S. and Lewis, B., eds. (1970) *The Cambridge History of Islam – Vol. 1A: The Central Islamic Lands from Pre-Islamic Times to the First World War* (Cambridge: Cambridge University Press), p. xiv.

⁶⁴⁴ See Kamali, *supra*, n. 621.

scriptures have concentrated on water utilisation in general, including its ethical and equitable principles, but not in an international setting. It will therefore be necessary to rely on and be mindful of the Islamic jurisprudential doctrine of *Ijtihād* when analysing to what extent principles of Islamic law are congruent with the *2008 Draft Articles on Law of Transboundary Aquifers*.

The doctrine of *Ijtihād* serves as Islam's third jurisprudential pillar. It can be used to arrive at judicial conclusions that address new questions related to changing conditions when the Qur'an does not provide the specific solution. *Ijtihād* is often translated as 'inquiry', 'interpretation', and 'innovation' by Muslim scholars and therefore refers to humanity's capacity for logical thinking and independent reasoning. Essentially, it denotes the development of Shari'a whilst utilising – and adhering to – its sources, i.e. the Qur'an and the Sunnah. In broad terms, the effect of the doctrine can be compared to the incremental approach espoused in English tort law, whereby instead of a strict adherence to precedent, a claimant must also introduce policy arguments to impose liability on the defendant.⁶⁴⁵ In other words, human reason in Islamic jurisprudence has the capacity to create new precedents by taking into account changing circumstances of life. In view of the diverse influences and the rapid pace of social change visible in modern society, a measure of uncertainty in identifying the correct balance of values is perhaps inevitable. But the quest to minimise this uncertainty must remain the central concern of jurisprudential discourse, both Western and Islamic. The quest for better solutions and more refined alternatives lies at the very heart of *Ijtihād*. Likewise, Hugo Grotius, the seminal figure in the development of international legal theory, insisted on human reasoning whilst

⁶⁴⁵ See *Caparo Industries Plc v Dickman* [1990] 2 AC 605, per Lord Bridge.

developing his natural law doctrines.⁶⁴⁶ *Ijtihād* is defined as a good faith effort made by a jurist to infer, with a degree of probability, the rules of Shari'a from its main sources – the Qur'an and the Sunnah – and applying these rules to particular issues.⁶⁴⁷ In this context, Islamic legal tradition also portrays a conversation between the Prophet Muhammad and one of his companions (i.e. disciples), Mu'adh bin Jabal, before the latter was to depart to Yemen to fill in as judge. The Prophet is reported to have asked Mu'adh how he would approach his judicial duties, upon which Mu'adh listed, to the pleasure of the Prophet, the Qur'an, the Sunnah and his own reason.⁶⁴⁸ The doctrine thus demands the formulation of an opinion by using one's own judgement,⁶⁴⁹ but at the same time is barred from fundamental issues such as the creation of the universe, the existence of God, the sending of prophets or the prohibition of murder.⁶⁵⁰ Apart from these (not unreasonable) limitations, *Ijtihād* actively encourages the progressive development of solutions to legal issues, regarding a jurist's conclusion obtained through reason as tantamount to a divine command that must be observed.⁶⁵¹

Ijtihād's intended purpose is therefore to prevent Islamic jurisprudence from remaining static and slowly descending into irrelevancy. Importantly, it also represents part

⁶⁴⁶ Divine law differs from natural law to the extent that it does not assume 'right' and 'wrong' to be inherent in nature, see Kerr, *supra*, n. 638, p. 57.

⁶⁴⁷ Qur'an, 10:100: 'No soul can believe except by the will of God. He will place the filth [of doubt] upon those who do not use their reason'; see also Abu Zahrah, M. (1957) *Usul al-fiqh* (Cairo: Dar al-Fikr al-Arabi), p. 301.

⁶⁴⁸ Arifin, M. (1989) 'Usul al-Fiqh: A History of Islamic Legal Thinking', *International Islamic University Law Journal*, Vol. 1(2), p. 89, citing several eminent Islamic scholars.

⁶⁴⁹ Kamali, *supra*, n. 621, p. 469, citing al-Shawkani, Y. b. A., *Irshad al-Fuhul min Tabqiq al-Haqq ila Ilm al-Usul* (Cairo: Dar al-Fikhr, n.d.), p. 250; Zuhayr, M. A. al-N. (1952) *Usul al-Fiqh – IV*, (Cairo: Dar al-Tiba'ah al-Muhammadiyah), pp. 223-5, and Badran, A. al-A. B. (1984) *Usul al-Fiqh al-Islami* (Alexandria: Mu'assasah Shabab al-Jami'ah), p. 471.

⁶⁵⁰ Aghnides, N. P. (1916) *Mohammedan Theories of Finance*. (New York: Columbia University, PhD Thesis), p. 117.

⁶⁵¹ Al-Ghazali, A. H. M. (1937) *Methods of Islamic Jurisprudence*, Vol. II (Cairo: al-Maktabah al-Tijariyyah) p. 121; al-Amidi, S. al-D. A. b. M. (1982) *Al-Ihkam fi Usul al-Abkam*, IV (Beirut: al-Maktab al-Islami) p. 204; Kassab, al-S. A. al-L. (1984) *Adwa Hawl Qadiyyah al-Ijtihad fi al-Shari'a al-Islamiyyah* (Cairo: Dar al-Tawfiq), p. 119.

of Islamic customary law. The above-mentioned *hadith* of Mu'adh ibn Jabal,⁶⁵² for instance, provides a clear authority for *Ijtihād* rooted in Islamic jurisprudential custom and has consistently been relied upon by Muslim jurists.⁶⁵³ Moreover, another hadith explains that

'When a judge exercises Ijtihād and gives a right judgement, he will have two rewards, but if he errs in his judgement, he will still have earned one reward'.⁶⁵⁴

In other words, the hadith suggests that for an adjudicator passing sound judgement through the course of reason bestows both increased wisdom and reputation, whilst even if the judgement later proves to be incorrect, the increased wisdom remains.

Arguably even more important are the numerous references to *Ijtihād* by the Prophet himself, asserting that the quest for knowledge and solutions is congruent with divine will and therefore cannot be sinful.⁶⁵⁵ Indeed, *Ijtihād*, as one of Islam's major instrument for creativity and knowledge, has been a pillar for Muhammad's path towards the unification of the Arabian Peninsula. Islamic folklore is abound with stories on how he adjudicated on legal matters. More specifically, the Qur'an also has several provisions inviting the Prophet and Islam's followers to meditate on the Qur'an's teachings and reflect on the created world. It is no surprise, then, that a *hadith* quotes the Prophet as saying: 'When I do not receive a revelation (*wahy*), I adjudicate among you on the basis of my opinion'.⁶⁵⁶ *Ijtihād* therefore derives its validity from the Divine Revelation and its propriety is measured by its harmony with the Qur'an and the Sunnah as the 'essential unity of the Shari'a lies in the

⁶⁵² Al-Sijistani, A. D. (1984) *Sunan Abu Dawud*, III (Lahore: Ashraf Press, transl. Ahamad Hasan), p. 1019, hadith no. 3585.

⁶⁵³ Al-Ghazali, A. H. M. (1937) *Methods of Islamic Jurisprudence*, Vol. II (Cairo: al-Maktabah al-Tijariyyah), pp. 63-4.

⁶⁵⁴ Al-Sijistani, *supra*, n. 652, p. 101-3, hadith no. 3567.

⁶⁵⁵ Al-Bukhari, M. b. Ismail (1981) *Sahih al-Bukhari*, VI (Istanbul: al-Maktabah al-Islamiyyah), p. 81; see also Al-Ghazali, *supra*, n. 653, p. 103.

⁶⁵⁶ Al-Sijistani, *supra*, n. 652, p. 1017, *hadith* no. 3578.

degree of harmony that is achieved between revelation and reason'.⁶⁵⁷ Accordingly, analogy and considerations of public interest are linked through human reason to the Qur'an and the Sunnah.⁶⁵⁸

In this context, it is crucial to recognise *Ijtihād* as the key to the equivalent of the Western principle of equity in Islamic law. There are several criteria that need to be considered in the application of *Ijtihād*, most important of which, arguably, are those of deductive analogy (*qiyas*) as well as public interest and human welfare (*maslaha*). In other words, the overall objectives of the Shari'a are to be given priority over certain individual provisions taken in isolation, notwithstanding the prohibition of questioning key pillars of the Islamic faith (*bid'ah sayyi'ah*), such as the existence of God. The contemporary Islamic community experiences a growing need for multidisciplinary creative inquiry into new problems and questions arising in an ever-dynamic world.⁶⁵⁹ To that extent, human reason constitutes the main instrument of interpreting the Qur'an and relating it to the changing conditions of life.⁶⁶⁰

Notably there is a minority view that seeks to assert that *Ijtihād* outside the Prophet's presence is unlawful, and therefore that the application of the doctrine in the present day must not be practiced, too.⁶⁶¹ This minority opinion argues that originally Companions sought access to Muhammad in order to obtain the necessary authority, which would then be decisive and final. Consequently, if one wants to obtain a decisive ruling in a judicial matter, *Ijtihād*, which is merely a speculative exercise (as opposed to the positive law

⁶⁵⁷ *Ibid*, p. 468.

⁶⁵⁸ Islahi, A. A. (1979) *Islamic Law, Concept and Codification* (Lahore: Islamic Publications), p. 109.

⁶⁵⁹ Kamali, *supra*, n. 644, pp. 333-4, 375-6, 384-394, 468 ff.

⁶⁶⁰ Kamali, *ibid*, p. 469.

⁶⁶¹ Kamali, *ibid*, p. 486.

contained in the Qur'an and the Sunnah), is unlawful.⁶⁶² In essence, this view would deny the applicability of the principle of equity in Islamic law, which would impart the risk of similar absurd judicial outcomes as in Western legal systems if equity would be denied there.

The assertion that *Ijtihād* is somehow illegitimate in the present day is flawed because it implicitly takes for granted ready access to the Prophet whilst it also ignores the historic imperative that certain decisions frequently had to be made by the Prophet's disciples independently on an urgent basis. Indeed, the evidence provided by Islamic law points into the opposite direction, whereby the disciples practiced *Ijtihād* both in the presence of the Prophet and in his absence. The hadith outlined above, recounting the conversation between Muhammad and his companion Mu'adh ibn Jabal before the latter was sent off to Yemen as judge, clearly suggests that *Ijtihād* was regarded as a universal practice of deduction and academic discourse. Several of Muhammad's other disciples, including Abu Bakr (who would later become the first Caliph), have been recorded to use *Ijtihād* independently.⁶⁶³ The most direct reference to practicing *Ijtihād* independently from the Prophet, however, is provided in a *hadith* whereby Muhammad authorises his disciple Amr ibn al-As to use *Ijtihād* in judicial matters even though he is not present.⁶⁶⁴

However, Islamic jurisprudence is frequently described as a theoretical, rather than empirical, discipline. This is one of its shortcomings, which took a turn for the worse with the domination of *taqlid* around the tenth century AD. The term *taqlid* translates as a desire to imitate. Instead of addressing social issues and attempting to find innovative legal solutions, the Muslim community of jurists occupied themselves primarily with the

⁶⁶² Al-Shawkani, Y. b. A. (n. d.) *Irshad al-Fuhul min Tahqiq al-Haqq ila Ilm al-Usul: Guidance to Islamic Jurisprudence* (Cairo: Dar al-Fikhr, n.d.), p. 257.

⁶⁶³ *Ibid.*

⁶⁶⁴ *Ibid.*

elaboration, annotation, abridgement, summaries and glossaries of the works of their predecessors. While at first *Ijtihād* was merely frowned upon, by the eleventh century AD Muslim jurists and scholars were restricted to the opinions of particular imams on questions of Islamic jurisprudence. Although an examination of the precise mechanisms of power and influence that brought about this change is beyond the scope of this thesis, the intricate links between the House of al-Saud and a small group of influential Islamic clerics of the ultra-conservative Wahhabi section of Islam and their base of power – the *Ikhwan*⁶⁶⁵ – suggest a possible narrative that could provide some hint.⁶⁶⁶ Al-Alwani presents a different theory, whereby the cast of acknowledged Islamic scholars recognised as competent to interpret Shari'a through reason (*mujtahidun*) simply died out in 922 AD. Following the disappearance of these legal specialists, the thinking of the Islamic legal community was marked by apprehension that certain rulers, by means of construing and abusing jurisprudence to further their own ambitions, would harm the societal structures built on the values of Islam. In al-Alwani's view, the Islamic legal community simply 'closed the door' on *Ijtihād* out of fear and the temporary incapacity of Islamic jurisprudential thought to reform itself and provide the necessary safeguards against abuse at the time.⁶⁶⁷ The restriction of Islamic scholars was subsequently extended to the rulings within one of the Islamic schools of legal thought, essentially stifling progressive

⁶⁶⁵ The Ikhwan (Arabic: الإخوان, (The) Brethren) was a Wahhabi religious militia made up of traditionally nomadic tribesmen, who proffered the military force of Abdulaziz al-Saud, the founder of the Kingdom of Saudi Arabia. It is doubtful that without their fighting capacity al-Saud would have been able to complete his campaigns to become ruler of most of the Arabian Peninsula.

⁶⁶⁶ See, for example, Commins, D. (2009) *The Wahhabi Mission and Saudi Arabia*. (London: I. B. Tauris), p. 76: 'The Ikhwan insisted [with the House of al-Saud] that in domestic affairs their religious views should prevail, including the forced conversion of al-Hasa's Shiites [and they] ordered the demolition of several Shiite mosques and took over teaching and preaching duties at the remaining mosques in order to convert the population.'

⁶⁶⁷ Al-Alwani, T. J. (2005) *Issues in Contemporary Islamic Thought* (London: International Institute of Islamic Thought), p. 109.

development of Islamic jurisprudence.⁶⁶⁸ Accordingly, Al-Alwani describes an obscure set of circumstances where Islamic legal theorists were ‘confined to a few specific textbooks, commentaries on those textbooks, commentaries on the commentaries, and annotations on the commentaries on the commentaries’.⁶⁶⁹

The importance of this brief assessment lies in the loss of importance *Ijtihād* has endured historically. Although Islamic jurisprudence has always been oriented towards theory, it was originally conceived to provide structure and orientation to human reason, not to displace it. Kamali, for instance, points towards the renowned early Islamic jurist al-Shafi’i whose jurisprudential discourse ‘was not burdened with technicality and regimentation of the kind that were subsequently webbed into it by the proponents of *taqlid*’.⁶⁷⁰ Another observer, al-Azmeh, commented,

*‘usul al-fiqh was a retrospective construct [...] Indications are that usul al-fiqh was a manner of systematic positive law that had already been arrived at largely as a result of local and other needs without necessary recourse to the sources.’*⁶⁷¹

The proponents of *taqlid* thus rejected empiricism and relied on ‘deduction from the Islamic texts as their main method of acquiring knowledge’ without paying attention to ‘developing systematic rational knowledge pertaining to law and social structure’ whilst other areas of academic activity, such as mathematics, medicine and geography, continued to rely on reason.⁶⁷² The result was that the gulf between practice and legal theory grew continuously until unwarranted references to an alleged consensus on a particular legal

⁶⁶⁸ Al-Alwani, T. J. (1991) ‘The Crisis of *Fiqh* and the Methodology of *Ijtihād*’, *The American Journal of Islamic Social Sciences*, 8(2), p. 332.

⁶⁶⁹ Al-Alwani, *supra*, n. 667.

⁶⁷⁰ Kamali, *supra*, n. 621, p. 502.

⁶⁷¹ Al-Azmeh, A. (1988) ‘Islam Legal Theory and the Appropriation of Reality’, in al-Azmeh, A. (ed.) *Islamic Law: Social and Historical Contexts* (London: Routledge & Kegan Paul), p. 251.

⁶⁷² Abu Sulayman, A. H. (1987) *The Islamic Theory of International Relations: New Directions for Islamic Methodology and Thought* (London: International Institute of Islamic Thought), pp. 77, 83.

question by the *mujtahidun* of the past was used to proliferate often minor and obscure opinions.⁶⁷³ Importantly, in a struggle of power between religious scholars and secular dynasties, the scholars' rejection of *Ijtihād* was also aimed at denying dynastical rulers the legitimacy to legislate. In turn, the rulers strove to deny the religious scholars a say in government. The result was a tussle over legitimacy, which had 'a serious negative influence in changing the sound psychological and rational environment created by the Prophet and which had dominated earlier periods'.⁶⁷⁴ The rulers strove to enhance the authority of reason over pure religious texts to maintain freedom to legislate whereas the community of religious scholars were keen to deny them that very freedom through their assertion that there was no further need for original *Ijtihād*.⁶⁷⁵ If this seems too remote from a legal perspective or too far removed into nebulous history, one should consider this: According to the *taqlid* approach, the *2008 Draft Articles* would not have any relevance among the Aquifer State as it is not a derivative of the Qur'an.

As noted above, it is perhaps because of the more rigid adherence to a relatively narrow set of sources that Islamic legal thought is often criticised for having lost contact with the changing conditions of contemporary life. As the criticism goes, Shari'a has been unable to relate its resources to modern modes of government, legislation and judicial practice by 'closing the door' on reinterpreting Shari'a's norms and making them more directly compatible to modern life.⁶⁷⁶ However, it is one of the cornerstones of Islam that, unlike the Bible, the Qur'an has supposedly weathered the centuries in unaltered form (if read in Arabic).⁶⁷⁷ Many Muslims the author has spoken to over the years expressed their belief that

⁶⁷³ Kamali, *supra*, n. 621, p. 501.

⁶⁷⁴ Al-Alwani, T. J. (1993) *Ijtihad*, *Occasional Paper Series, No. 4* (London: International Institute of Islamic Thought), p. 10.

⁶⁷⁵ Al-Alwani, *ibid*.

⁶⁷⁶ Kamali, *supra*, n. 673, p. xxi.

⁶⁷⁷ See also Qur'an, 10:64.

it is exactly this unaltered nature of the Qur'an which reassures them that indeed they are reading, and living by, the word of God. Moreover, the wholesale importation of Western legal concepts and institutions into Islamic countries during the colonial era, and the uneasy combinations this has brought about in legal education and judicial practice, give the impression of an inherent conflict between these different conceptions of justice but which, upon closer inspection, in general does not appear to be as stark. Ijtihād, and as a result the principle of equity, therefore need to be put to effective use within interpretations of Islamic law – according to al-Alwani, ‘the challenges of the present demand it’.⁶⁷⁸ It is Ijtihād that integrates the Qur'anic tradition of consultation with jurisprudence. Although strict interpretations of *usul al-fiqh* have dominated Islamic legal discourse for centuries, they struggle with their key shortcoming of being detached from the practicalities of sound government.⁶⁷⁹

Islamic Jurisprudence vis-à-vis General International Law

It has already been highlighted that Islam is the predominant religious and cultural orientation in the four Nubian Sandstone Aquifer System States – but what about the legal sphere? It has already been discussed in relation to religion and culture that to Muslims the Qur'an is supremely authoritative, unalterable, comprehensive and the source and touchstone of every Islamic rule. Its chapters cover not only the ordinances of religion such as prayer, fasting, almsgiving and pilgrimage, but also civil and criminal laws. This is a fundamental tenet of Islam as a religion, and since Islamic law is based on the Islamic religion, it proceeds on the same fundamental assumption. According to Gibb:

⁶⁷⁸ Al-Alwani, *supra*, n. 674 p. 2.

⁶⁷⁹ Kamali, *supra*, n. 621, p. 508.

*'The master science of the Muslim world was Law. Law, indeed, might be said to embrace all things, human and divine, and both for its comprehensiveness and for the ardour with which its study was pursued, it would be hard to find a parallel elsewhere, except in Judaism.'*⁶⁸⁰

The law thus revealed in the Qur'an that governs all these matters is known as the Shari'a, which constitutes the 'path' or a way guiding the Muslim through everyday life. However, the Shari'a cannot be seen as an orthodox legal system because it reaches much deeper into thought, life and conduct than other mainstream legal systems aspire to do.⁶⁸¹ It defines the individual in his or her relationship to society, the universe and God. Islam, like many other belief systems, encompasses more than the worship and a code of conduct, i.e. what can be reasonably inferred from the term 'religion'.⁶⁸² According to Schacht, the

*'sacred law of Islam is an all-embracing body of religious duties rather than a legal system proper; it comprises of an equal footing ordinances regarding cult and ritual, as well as political and (in a narrow sense) legal rules.'*⁶⁸³

The Shari'a thus provides the basic moral and legal framework and governs in every detail the lives of several hundred million people. As a result, Islamic law is based on unqualified submission to the will of God, which embraces all aspects of life and the law hence covers all of them, including the utilisation of water.

Many of the more than 3,500 water-related agreements in existence today provide for formal dispute settlement procedures, ranging from negotiation procedures to third-party

⁶⁸⁰ Gibb, (1953) *Mohammedanism: An Historical Survey* (Oxford: OUP), pp. 4-22.

⁶⁸¹ See Rauf, M. A. (1985) 'Shariah and Social Order', *Shariah Law Journal*, November 1985, pp. 23-8.

⁶⁸² Bankowski, Z., Barzelatto, J. and Capron, A. M. (eds.) (1988) *Ethics and Human Values in Family Planning: Conference Highlights, Papers and Discussion: 22nd Council for International Organizations of Medical Sciences (CIOMS) Conference, Bangkok, Thailand, 19-24 June, WHO, Special Programme of Research, Development and Research Training in Human Reproduction, Geneva.*

⁶⁸³ Schacht, J. (1950) *The Origins of Muhammadan Jurisprudence* (Oxford: Clarendon Press), p. V.

involvement, including optional or mandatory arbitration or adjudication.⁶⁸⁴ Traditionally, riparian States have largely preferred to settle their water-related disputes out of court through diplomacy and negotiations,⁶⁸⁵ and the lack of development and legal certainty in relation to water in general and transboundary groundwater in particular may well have played a considerable part. In 1949, Smith observed that

*'reference to a court is obviously little more than a gamble unless there are clear and accepted rules of law which the court can apply to the facts before it, and in this matter of international water rights it is unfortunately true that the law of nations has so far signally failed to keep pace with modern development.'*⁶⁸⁶

Smith's comment points to the importance and prominence ICJ opinions on the utilisation of transboundary confined aquifers could have. Already, the work of the ICJ has supported principles that are fundamental in effective water management, such as the principles of no-harm and reasonable and equitable utilisation, in acquiring the status of customary international law.⁶⁸⁷ Judicial and arbitral decisions play an important role in the development of the international law because they are able to introduce a degree of finality to long-standing disputes where diplomatic efforts had failed. Research by Mitchell and Hensel shows that 28 out of 29 ICJ opinions dealing with, among other issues, the

⁶⁸⁴ Wouters, P. (2003) 'Universal and Regional Approaches to Resolving International Water Disputes: What Lessons from State Practice?', in *International Bureau of the Permanent Court of Arbitration: Resolution of International Water Disputes: Papers Emanating from the Sixth PCA International Law Seminar, November 8, 2002* (Leiden: Kluwer Law Intl.), pp. 126, 153.

⁶⁸⁵ Wouters, P. (2003) 'Universal and Regional Approaches to Resolving International Water Disputes: What Lessons from State Practice?', in *International Bureau of the Permanent Court of Arbitration: Resolution of International Water Disputes: Papers Emanating from the Sixth PCA International Law Seminar, November 8, 2002* (Leiden: Kluwer Law Intl.), p. 111.

⁶⁸⁶ Smith, H. A. (1949) 'The Waters of Jordan: A Problem of International Water Control', *International Affairs*, 25(4), p. 420.

⁶⁸⁷ Caflich, L. (2003) 'Judicial Means for Settling Water Disputes', in *International Bureau of the Permanent Court of Arbitration: Resolution of International Water Disputes: Papers Emanating from the Sixth PCA International Law Seminar, November 8, 2002* (Leiden: Kluwer Law Intl.), p. 243; see also Gabčíkovo-Nagymaros Project (Hungary/Slovakia), Judgement, ICJ Reports 1997, p. 56 at para. 85;

utilisation of water resources, such as rivers, experience full compliance.⁶⁸⁸ As the ICJ is the principal international adjudicator and may well fulfil that role for parties that at some point might ratify the *2008 Draft Articles*, potentially including States founded on Islamic legal principles, assessing the Draft Articles in the light of Islamic jurisprudence also demands consideration of the Court's own apparent attitude towards that body of law.

Although the Islamic system of jurisprudence has undergone centuries of evolution and can be regarded as one of the first systems of international law, it may seem to the casual observer that specific references to Islamic law are prominently absent from general international law. Weeramantry suggests that the study of Western international law frequently proceeds upon the tacit assumption that it was the West that began with the development of international law and that international law the way it is known today was a Western creation.⁶⁸⁹ Although there can be no doubt that much of original Western thought went into the conception of the current principles of international law, Western thought was by no means the only source. Indeed, a number of factors point towards the opposite. Not only was Islamic law a body of international law developed by accomplished Islamic jurists that was laid out, distributed and debated prior to the incarnation of our modern body of international law, the flow of knowledge, language and culture from the Islamic to the Western world from the eleventh century onward has been well documented and its traces can still be observed in Spain and Italy.⁶⁹⁰

⁶⁸⁸ Mitchell, S. McL. and Hensel, P. R. (2007) 'International institutions and compliance with agreements', *American Journal of Political Science*, 51(4), pp. 721–37.

⁶⁸⁹ Weeramantry, C. G. (2001) *Islamic Jurisprudence. An International Perspective* (Kuala Lumpur: The Other Press), p. xv.

⁶⁹⁰ See Weeramantry, C. G. (2001) *Islamic Jurisprudence. An International Perspective* (Kuala Lumpur: The Other Press), pp. 14–26.

The importance of the Islamic legal system was emphasised at the UN Conference on International Organisation (San Francisco Conference) in 1945.⁶⁹¹ The Conference was as a convention of 50 Allied nations delegates, who between 25th April and 26th June reviewed and rewrote the Dumbarton Oaks agreements to create the United Nations Charter, which was opened for signature on 26th June. At the San Francisco Conference, the ‘Delegation of the Moslem States of the Near East’ presented a note relating to Article 9 of the Statute of the Permanent Court of International Justice (the International Court of Justice retained Article 9 in its Statute) at a meeting of the UN Committee of Jurists in 1945. Article 9 reads

‘At every election [of a member of the ICJ], the electors shall bear in mind not only that the persons to be elected should individually possess the qualifications required, but also that in the body as a whole the representation of the main forms of civilization and of the principal legal systems of the world should be assured’.

The Delegation was probably referring to the history of Islamic law, which brought a unifying legal system to a vast diversity of peoples and countries. By the time the British began to assert their power across the globe in the eighteenth century, the Islamic world’s economic and legal systems had already long accomplished what European powers had aspired to. Long-distance trade across continents, a shared body of knowledge communicated through a common language of learning and a common legal system were the linchpins of a network that linked North Africa to Central Asia and the South China Sea. Great Islamic cities such as Cairo, Baghdad and Isfahan were significant examples of early ‘free trade zones’ where goods could be traded for onward shipment without incurring customs duties. Abu Abdallah Ibn Battuta, a renowned Muslim traveller of the

⁶⁹¹ Documents of the United Nations Conference on International Organization, San Francisco, 1945, Volume XIV, pp. 375-9.

fourteenth century, who travelled the length and breadth of this trade network, often finding employment as a judge, attests to the effectiveness of this system.⁶⁹²

Whilst legal scholars of Renaissance Europe laboured on the development of commercial, banking and canon law by drawing on the foundations laid by the classical civilisations of Greece and Rome,⁶⁹³ there were no available classical sources comparable to their private law counterparts. Although important questions such as the binding force of treaties and their interpretation, the duty of combatants and rights of non-combatants or the disposal of enemy property were to a certain extent addressed by thinkers such as Nicolo Machiavelli (1469-1527)⁶⁹⁴ and Grotius (1583-1645)⁶⁹⁵, there was no uniform body of jurisprudence that would have specifically answered those questions.

Based on the pedigree of Islamic jurisprudence, the Delegation's note highlighted the necessity to include Shari'a as 'one of the principal legal systems' mentioned in Article 9 and that 'Moslem civilisation [is] an autonomous legal system boasting of its own sources, structures and conceptions'.⁶⁹⁶ Crucially, the delegates asserted their view that 'Moslem Law' is able to

'conciliate exalted moral principles and the imperious needs of practical legal proceedings [which] will contribute to mitigate the rigor of legal rules [and] serve as a regulator capable of furnishing in the settlement of international conflicts theories extremely flexible and evolutive'.

⁶⁹² See Dunn, R. E. (1986) *The Adventures of Ibn Battuta, a Muslim Traveller of the Fourteenth Century* (Berkeley: University of California Press).

⁶⁹³ See, for instance, Parks, T. (2005) *Medici Money: Banking, Metaphysics and Art in Fifteenth-Century Florence*, (London: Profile Books).

⁶⁹⁴ Machiavelli, N. (c. 1513) *The Prince* (transl. by W. K. Marriott). Project Gutenberg: Chs. VI-VII, XIV.

⁶⁹⁵ Grotius, H. (1625) *De Jure Belli ac Pacis* (transl. by A. C. Campbell), available at <http://www.constitution.org/gro/djbp.htm>.

⁶⁹⁶ Documents of the San Francisco Conference, *supra*, n. 691.

They also reminded their fellow delegates that the Secretary General of the League of Nations had already received letters to this effect in September 1939. However, the proceedings of the San Francisco Conference do not reflect any acknowledgement by other delegations and no further discussion on the subject took place after the Delegation made its submission. Unfortunately, the lack of discussion makes it difficult to ascertain why exactly Islamic jurisprudence was sidelined this way. Perhaps the root cause can be found in the decline of the great empires that had once dominated the Muslim world and played a major role in global trade and diplomacy.⁶⁹⁷ This decline had unfolded over 200 years and began in the second half of the eighteenth-century when one of the most significant Muslim dynasties – the Safavid of Persia, one of three Muslim ‘gunpowder empires’⁶⁹⁸ – began to crumble as Khorasani (i.e. Afghani) tribes fought for independence in the 1720s⁶⁹⁹. It engulfed the Mughals as they were pushed aside by the well-rehearsed interplay of military and economic might of the East India Company of the Victorian British (which by that time had, in fact, evolved from a pure trading conglomerate into a branch of British colonial administration) and culminated in the defeat of the Ottoman Empire at the end of the Great War in 1918 (although its formal dissolution only took place in 1924). In turn, the 1916 *Sykes–Picot Agreement* prevented the formation of a new, independent Arab (i.e. Muslim) state under the Hashemite King Faisal I and assigned the former Ottoman provinces on the Arabian Peninsula to either French, British or Russian control. In other words, as the 1945 Conference was to launch a new era – indeed a ‘new world order’, according to Woodrow Wilson’s vision – in international relations through the establishment of the United Nations, the Muslim States of the ‘Near East’ seemed to have

⁶⁹⁷ See for example Lane, K. (2010) *Colour of Paradise: The Emerald in the Age of Gunpowder Empires* (New Haven & London: Yale University Press).

⁶⁹⁸ Namely the Ottoman, Safavid and Mughal; see Streusand, D. E. (2011) *Islamic Gunpowder Empires: Ottomans, Safavids, and Mughals* (Boulder, CO: Perseus Books).

⁶⁹⁹ Floor, W. M. (1998) *The Afghan Occupation of Safavid Persia, 1721-1729* (Paris: Association pour l’Avancement des Etudes Iraniennes).

lacked the necessary diplomatic clout to effect consideration of Islamic legal principles. Perhaps it is unsurprising, then, that the ICJ as the principal judicial organ of the United Nations – and which as such has prominently contributed effectively to peaceful resolutions of inter-state conflicts – has hitherto given relatively little regard to this already existing body of international law.

Arguably, this is unfortunate because, apart from the Court's clearly defined role as adjudicator between States, there are also important 'out of court effects' brought about by the ICJ's presence and the consequential prospect of possible impartial and peaceful conflict resolution.⁷⁰⁰ Article 38 (1)(c) of the International Court of Justice's Statute stipulates that the Court should consider 'general principles of law recognised by civilised nations' to decide disputes brought to its door. Although the term 'civilised nations' was once thought to relate exclusively to European nations and their legal systems as part of an expired 'hoary' culture,⁷⁰¹ Article 2(1) of the *International Covenant on Civil and Political Rights* recognises the equal rights of

'all individuals [...] without distinction of any kind, such as race, colour, sex, language, religion or other opinion, national or social origin, property, birth or other status'.

The principle of state equality at law is also recognised by Article 2(1) of the *UN Charter* under 'the principle of the sovereign equality of all its Members'. Therefore, Article 38 (1)(c) is the most direct route through which the ICJ can apply Islamic law.

⁷⁰⁰ Bilder, R. B. (1998) 'International dispute settlement and the role of international adjudication', in: Ku, C. and Diehl, P. F. (eds.) *International Law: Classic and Contemporary Readings* (Boulder, CO: Lynne Rienner), pp. 233–56.

⁷⁰¹ Franck, T. M. (1999) 'The Legal Culture and the Culture Culture', *ASIL Proceedings*, 93, p. 271.

However, for as long as the ICJ has existed, the majority of its judges have resisted interpreting Article 38(1)(c) to require the ICJ to consider Islamic law – or indeed any other body of non-Western law – as norms pertinent to the Court’s interpretation of international law.⁷⁰² At the time it was drafted, Article 38(1)(c) was intended to grant the general principles of law only a subservient role among the different sources of international law. In other words, anything that falls under Article 38(1)(c) would merely play the role of a gap filler to be used at times when treaties and state practice did not provide sufficient normative power to resolve a particular case.⁷⁰³ Consequently, if the ICJ would want to consider Islamic law under Article 38(1)(c), it would have to also admit that sometimes ‘mainstream’ sources of international law are unsatisfactory in the guidance they can offer. Yet, the ICJ’s judicial history suggests that it is reluctant to consider the view that existing treaties and state custom sometimes fail to unequivocally answer a legal issue raised in cases brought to the Court.

One can detect the ICJ’s apparent disregard for Article 38(1)(c) in the court’s own handbook.⁷⁰⁴ The text clearly sets out the different articles of the Court’s Statute and lists the different sources applicable to each article. It describes the international instruments that the Court must consider according to Article 38(1)(a), (b) and (d). Following that, the text outlines the different types of custom the Court considers when looking for rules of decision pursuant to 38(2). In between, however, it avoids a discussion of Article 38(1)(c), which obliges the Court to consider as a source of law the ‘general principles of law recognised by civilized nations’, but instead moves on swiftly to discuss the different kinds

⁷⁰² Lombardi, C. B. (2007) ‘Islamic Law in the Jurisprudence of the International Court of Justice: An Analysis’, *Chicago Journal of International Law*, 8, pp. 85-118.

⁷⁰³ Ford, C. A. (1994) ‘Judicial Discretion in International Jurisprudence: Article 38(1)(c) and “General Principles of Law”’, *Duke Journal of Comparative and International Law*, 5(35), pp. 65-66.

⁷⁰⁴ International Court of Justice (2004) *The International Court of Justice* (The Hague: The International Court of Justice).

of ‘judicial decisions’ and writings of ‘qualified publicists’ pursuant to Article 38(1)(d), whose interpretations of international law can guide the ICJ ‘as subsidiary means for the determination of rules of law’.⁷⁰⁵

This demeanour is consistent with the notion that many ICJ judges from Muslim countries, who perhaps would be in a prominent position to introduce elements of Islamic law into their opinions where appropriate, preferred to find norms in the European international legal tradition. Shihata tried to explain this circumstance with the observation that the judges appointed by non-Western nations not only had undergone Western education, but also generally espoused a much more conservative attitude towards the Court’s jurisdiction and the law applied by it.⁷⁰⁶

However, there have been instances where members of the Court have turned to Islamic jurisprudence to support their opinions. While in the *North Sea Continental Shelf Cases* of 1969, an ICJ opinion on the delimitation of the continental shelf of the North Sea between the Federal Republic of Germany, Denmark and the Netherlands, European legal thought was still central to the Court’s opinion, the separate opinion by Judge Fouad Ammoun of Lebanon included direct references to Islamic law and Article 38(1)(c).⁷⁰⁷ At the centre of the *North Sea Continental Shelf Cases* was whether the ICJ should apply the rigid principle of equidistance as stipulated under the *1958 Geneva Convention on the Continental Shelf*. A distinct legal issue was that Germany had not ratified the Convention and the principle of equidistance was not one of customary international law. Consequently, the

⁷⁰⁵ International Court of Justice, *ibid*, pp. 91-94.

⁷⁰⁶ Shihata, I. F. I. (1965) ‘The Attitude of New States Toward the International Court of Justice’, *International Organization*, 19, p. 220.

⁷⁰⁷ See separate opinion by Judge Fouad Ammoun, pp. 120, 131-139.

ICJ opined that the boundaries in question should be drawn according to ‘equitable principles’.⁷⁰⁸

However, the ICJ did not refer to Islamic legal theories of equity when defining ‘equitable principles’; this is where Ammoun saw a shortcoming in the Court’s methodology of analysis.⁷⁰⁹ Although Judge Ammoun concurred with the outcome pronounced by the ICJ in its official judgment, the fact that Islamic legal thought was pushed to the periphery suggests the ICJ failed to seize an opportunity to cement its opinion by referring to Islamic law and its principles of equity and equality. Ammoun argued that equity was a principle especially suited to fill ‘gaps’ in the law and that the Court was at liberty to consider it where deemed appropriate. Nevertheless, when it decides to do so, Article 38(1)(c) demands that the Court applied these principles in a way consistent with the legal philosophies of all the world’s nations:

[...] it cannot be accepted, as the Governments of the Kingdoms of Denmark and of the Netherlands maintain, that the rule in Article 6 of the Geneva Convention concerning the delimitation of the continental shelf has acquired the character of a general rule of international customary law or that of a regional customary rule.

[...]

Contrary to the opinion of the Court, there is a lacuna in international law when delimitation is not provided for either by an applicable general convention (Article 38, paragraph 1 (a)), or by a general or regional custom (Article 38, paragraph 1 (6)). There remains sub-paragraph (c), which appears to be of assistance in filling the gap. The question which arises is therefore as follows:

⁷⁰⁸ *North Sea Continental Shelf Cases*, *supra*, n. 182, p. 53.

⁷⁰⁹ Separate opinion by Judge Fouad Ammoun, p. 152.

Does there exist a general principle of law recognized by the nations, as provided for by Article 38, paragraph (c), of the Statute of the Court, from which would follow a rule to the effect that the continental shelf could, in case of disagreement, be delimited equitably between the Parties?

[...]

Thus it is necessary [...] to have regard to the general principles of law recognized by nations’.

Specifically, Judge Ammoun argued that the Court should have paid special attention to the Islamic legal tradition, which he submitted had earnestly considered the role of equity in the law. That tradition, he argued, citing the Qur'an⁷¹⁰ and the *Majallat al Abkam al Adaliyyab*⁷¹¹,

*[...] is placed on the basis of equity (and more particularly on its equivalent, equality) by the Koran and the teaching of the four great jurisconsults of Islam’.*⁷¹²

Judge Ammoun went on to give examples where Muslim States declared equity as the guiding principle in disputes of border delimitations:

‘The Arab States of Bahrain, Qatar, Abu Dhabi, Kuwait, Dubai, Sharjali, Ras al Khaimah, Umm al Qainain, and Ajman refer for the delimitation of their areas in the Arabian-Persian Gulf, to the principle of equity and of justice. Finally, for the Iranian Empire, “if differences of opinion arise over the limits of the Iranian continental shelf, these differences shall be solved in conformity with the rules of equity”.’

Judge Ammoun’s opinions should not be misconstrued as to purport that using general principles of Islamic law would lead to a departure from established international

⁷¹⁰ Among others, 4:61, 5:42 and 5:46: ‘If thou judge, then judge with fairness and equity’.

⁷¹¹ The Ottoman Courts Manual, Arts. 87, 88.

⁷¹² Separate opinion by Judge Fouad Ammoun, p. 139.

law, or that it would change the way the ICJ approached disputes in general. Equity in particular is an element of natural law that is reflected in both Western legal traditions and Islamic jurisprudence.

Judge Ammoun opined similarly in the 1975 case of the Court's *Advisory Opinion on Western Sahara*. Western Sahara is an area of land at the western edge of the Sahara desert in North Africa approximately the size of France.⁷¹³ The case revolved around the claims by both Morocco and Mauritania over the territory of Western Sahara. Following the abandonment of colonial control by Spain, which had first established control over the region by proclaiming a protectorate over Rio de Oro and Sakiet el Hamra in 1884,⁷¹⁴ the territory itself also insisted on its purported right of self-determination. During Spain's colonisation, Muslim nomads inhabited the region, herded their animals and grew crops 'as and where conditions were favourable'⁷¹⁵. Once the Algerian-backed Polisario Front began its struggle for independence in the region, Spain proclaimed its intention to de-colonise and the United Nations General Assembly sought an advisory opinion from the ICJ in 1974. The letter sent by the General Assembly posed two questions:

*Was Western Sahara (Rio de Oro and Sakiet El Hamra) at the time of colonization by Spain a territory belonging to no one (terra nullius)? If the answer to the first question is in the negative, what were the legal ties between this territory and the Kingdom of Morocco and the Mauritanian entity?*⁷¹⁶

As the ICJ answered the first question in the negative, it had to turn to the second question and assess Morocco's arguments in particular, which were based on Islamic law. Morocco submitted that in determining whether it had sovereignty over the Western

⁷¹³ Damis, J. (1984) *Conflict in Northwest Africa: The Western Sahara Dispute*. Stanford: Hoover Institute Press, p. 1.

⁷¹⁴ *Ibid.*

⁷¹⁵ ICJ (1975) *Western Sahara (Advisory Opinion)*, p. 41.

⁷¹⁶ UNGA 26th Session, Resolution 3292; ICJ (1975) *Western Sahara (Advisory Opinion)*, p. 14.

Sahara in the 19th century, the Court should consider the question from the perspective of the region's inhabitants. Morocco argued that the region had come under its sovereignty due to ties of the region's Muslim inhabitants to the Sherifian State of Morocco and its Sultan, an argument based not on Western ideas of sovereignty but on the Islamic concept of personal and religious allegiance to the Sultan of Morocco.⁷¹⁷ Not only did Morocco's submissions highlight that the region of Western Sahara had come under Islamic control as part of *Dar al-Islam* since the time of Islamic conquest and that its inhabitants had therefore been Muslim since the seventh century AD, it also pointed to the special character of the Sherifian State, which is founded on the Moroccan royal family's direct descent from the Prophet Mohamed. According to this argument, the Moroccan Sultan had direct religious authority over the people of Western Sahara who owed allegiance to him.⁷¹⁸ The ICJ refused to recognise this argument as a basis to establish territorial sovereignty because it did not comply with the established Western international legal principle of territorial sovereignty because it only manifested itself through religious ties and was not 'manifested in acts evidencing acceptance of his political authority'.⁷¹⁹ In a separate opinion, Judge De Castro rejected Morocco's argument outright because it had not been framed according to Western legal theories, i.e. through conquest, secession or occupation:

It was thus for Morocco as the claimant to prove to the satisfaction of the Court when and how the Moroccan Empire had acquired Western Sahara. Was it by conquest? Was there a true debellatio of the tribes of the Sahara'?

⁷¹⁷ ICJ (1975) Western Sahara (Advisory Opinion), p. 42-44.

⁷¹⁸ *Ibid*, p. 44, para. 95, see also Separate Opinion of Judge De Castro, p. 154.

⁷¹⁹ Joffé, E. G. H. (1987) 'The International Court of Justice and the Western Sahara Dispute', in Lawless, R. and Monahan, L. (eds.) *War and Refugees: The Western Sahara Conflict* (New York: Pinter Publishing), p. 27.

*Was it by 'cession? If so, by what treaties? Was it by occupation? Was the Sabara terra nullius?*⁷²⁰

Whilst it is not entirely clear what the basis of the judgment in the *Western Sahara* case actually was, the Western legal principle of self-determination is what drove the court's opinion. Accordingly, Damis argues that the ICJ opined the way it did to endorse an 'unimpeachable right of self-determination'⁷²¹ This would be in line with the UN's position⁷²² whereby self-determination trumps all other historical, cultural or religious claims.⁷²³ Two major policy considerations underpin the doctrine of self-determination: The assumption that any other policy will lead to endless conflicts, especially in former colonial territories, and that even States with unjustly drawn colonial boundaries will nonetheless have 'develop[ed] a cohesive logic of their own that should not be lightly overridden'.⁷²⁴ However, regardless of the moral merit that these policy considerations impart, the interested parties to the *Western Sahara* negotiations, Morocco, Mauritania, Algeria and Spain, by and large disregarded the Court's Advisory Opinion but instead resorted to agree separately to the *1975 Madrid Accords* (with the exception of Algeria, which has no official territorial interest in the disputed area) whereby Spain ceded administration of the disputed territory to Morocco and Mauritania. Evidently, the Court's Advisory Opinion was not satisfactory to any of the interested parties.

However, two judges, Judge Ammoun and Judge Boni, asserted in their separate opinions that Morocco's Islamic arguments should have received more attention. Both wrote separately to criticise the Court's resistance in engaging more deeply with Morocco's

⁷²⁰ Separate Opinion of Judge De Castro, p. 153.

⁷²¹ Damis, *supra*, n. 713, p. 60.

⁷²² See Art. 2, *1966 UN Declaration on the Granting of Independence to Colonial Countries and Peoples*, UN Doc. A/4684.

⁷²³ Franck, T. (1976) 'The Stealing of the Sahara', *The American Journal of International Law*, 70, pp. 697-8.

⁷²⁴ *Ibid*, pp. 698.

Islamic argument and thus, implicitly, suggested that the ICJ should have considered more seriously the premise that a Muslim people's religious ties to the Sultan of Morocco might have been conceptualised by Muslims as a recognition of territorial sovereignty and implied a degree of political control.⁷²⁵ Judge Ammoun pointed out that Ireland, Bangladesh and Pakistan all provided examples of States defined by and built on the strength of religious ties.⁷²⁶ In his view, religion and religious allegiance are in certain circumstances capable determinants of national identity and that authority exercised through religion might be more relevant than the majority of the ICJ panel recognised in the Court's Advisory Opinion.

Religious feeling does not preclude ethnic or national solidarity between Sabrawi and Moroccans. It tends, rather, to consolidate it. That tie has been neglected in the Opinion. Yet there is no doubt that the religious tie is one of the constituent elements in legal ties and in those of nationality, being additional to ethnic, social, cultural and economic ties and national aspirations, and making them more binding; the more so in that the Sultan possessed both temporal and spiritual powers, and appointed the caids [Also spelled qa'id, Arabic for 'commander' or 'leader', a position which can be understood as local governor] who applied Muslim law'.⁷²⁷

In the *Case Concerning United States Diplomatic and Consular Staff in Tehran*, which had at its centre the seizure of the US Embassy in Tehran in 1979, the United States sought censure and reparations from the Iranian government for 'tolerating, encouraging, and failing to prevent and punish' the storming of its embassy compound as well as the hostage taking of its staff.⁷²⁸ The facts of the case are of lesser importance to this discourse than

⁷²⁵ Separate Opinion of Judge of Judge Boni, p. 173.

⁷²⁶ Separate Opinion of Judge of Judge Ammoun, p. 97.

⁷²⁷ *Ibid*, p. 98.

⁷²⁸ *Case Concerning United States Diplomatic and Consular Staff in Tehran*, p. 6.

the Court's attitude towards Islamic law, for this was one of the very few times the Court referred directly to Islamic law in its Opinion:

[...] the principle of the inviolability of the persons of diplomatic agents and the premises of diplomatic missions is one of the very foundations of this long-established régime, to the evolution of which the traditions of Islam made a substantial contribution'.⁷²⁹

Given the nature of the case in that it dealt with the affairs concerning an Islamic Republic and the fact that Iran questioned the legitimacy of the ICJ and consequently the rules that it would apply to resolve the dispute⁷³⁰, the ICJ may have felt it more necessary than usual to demonstrate to the Islamic Republic the legitimacy of the international legal regime of which the Court, and any of its opinions, was a part.

In his separate opinion, Judge Tarazi noted that he was pleased that

'the Judgement took particular account of the traditions of Islam, which contributed along with others to the elaboration of the rules of contemporary public international law on diplomatic and consular inviolability and immunity'.⁷³¹

He further substantiated the Court's brief reference to Islamic law in relation to the inviolability of diplomatic staff in its main decision with additional references. One concerned Ahmed Rechid and a lecture he gave at the Hague Academy of International Law:

In Arabia, the person of the ambassador had always been regarded as sacred. Muhammad consecrated this inviolability. Never were ambassadors to Muhammad or to his successors molested. One day, the envoy of a foreign

⁷²⁹ *Ibid*, p. 40.

⁷³⁰ See *ibid*, p. 5, where the ICJ confirms that 'the Government of Iran was not represented at the hearings', see also Separate Opinion of Judge Tarazi, p. 60.

⁷³¹ Separate Opinion of Judge Tarazi, p. 59.

nation, at an audience granted to him by the Prophet, was so bold as to use insulting language. Muhammad said to him: 'If you were not an envoy I would have you put to death.' The author of the 'Siyer' which relates this incident draws from it the conclusion that there is an obligation to respect the person of ambassadors. The Prophet always treated the envoys of foreign nations with consideration and great affability. He used to shower gifts upon them and recommended his companions to follow his example, saying: 'Do the same as I'.⁷³²

The other source was a publication by the Institute of State and Law of the Academy of Sciences of the USSR entitled *International Law*:

'The Arab States, which played an important part in international relations in the Middle Ages (from the 7th century) had well-developed conceptions regarding the Law of Nations, closely linked with religious precepts. The Arabs recognised the inviolability of Ambassadors and the need for the fulfilment of treaty obligations. They resorted to arbitration to settle international disputes and considered the observance of definite rules of law necessary in time of war ('the blood of women, children and old men shall not besmirch your victory').⁷³³

The discourse above indicates the reserved attitude espoused by the ICJ towards Islamic jurisprudence. The Court's apparent disregard for non-European interpretations of general principles of natural law and the subsequent disregard for Article 38(1)(c) simply represent a shortcoming in its methodology because it does not use the full spectrum of sources afforded to it by its statute. The Court should certainly turn to the rules to which States had agreed to in treaties first and, failing that, to state practice. The Court correctly expects of Islamic States that have recognised its authority to accept sources based on Western interpretations of international law because they had willingly committed

⁷³² Separate Opinion of Judge Tarazi, p. 59.

⁷³³ *Ibid.*

themselves to those through their recognition. However, by submitting themselves to the Court's statute, they can also expect the Court to utilise the whole spectrum of sources at its disposal, including, where a gap in the law became apparent, to Article 38(1)(c) and the general principles of law recognized by nations. This would be especially important with regards to at least three of the four Nubian Sandstone Aquifer System stakeholder States because the Court would then be able to define and apply such a rule in a way consistent with Muslim sensibilities.

The Legal Status of Islam in the Four Aquifer States

Since the ascendancy of the modern era, Islamic law has become increasingly secularised and systemised within the Ottoman Civil Code (*Majalla* or *Mecelle-i Ahkam-i Adliye*), the Reform Edict of 1856 and the Land Laws of 1858. These major thrusts towards a codification of Islamic law under the Ottomans, who pre-1918 ruled over most of the MENA region, resulted in Islamic land and water law being registered in official cadastres.⁷³⁴ European colonialism also had profound impact on the Islamic legal landscape whereby the Shari'a system and the *Majalla* yielded to European legal schools of thought as most MENA countries came either under French or British domination. Whereas countries under French rule (e.g. Algeria, Tunisia, Lebanon, Mauritania) often continued with the Ottoman drive for codification of water law with relatively distinct institutional and regulatory frameworks ultimately modelled on the Napoleonic Codes,⁷³⁵

⁷³⁴ Mallat, C. (1995) 'The Quest for Water Use Principles: Reflections on Shari'a and Custom in the Middle East', in: Allan, J. A. and Mallat, C. et al. (eds.) *Water in the Middle East: Legal, Political and Commercial Implications* (London: Tauris Academic Studies), p. 130.

⁷³⁵ Algeria: Law 17/83 of 16 July 1983; Tunisia: Law 1975/16 of 31 May 1975; Lebanon: Code des Eaux 1926/30, Mauritania: Decree-law 1921/315.

those countries under British rule (e.g. Libya, Egypt, Sudan, Yemen) adopted legislation akin to the Common Law, at least in style.⁷³⁶

Regardless – or perhaps precisely because of – their individual colonial histories in the pre-modern era, Muslim States frequently recognised an obligation to ensure all laws applied by their judiciary were consistent with several core scriptural rules that the establishment of Islamic scholars, known as the *fuqaha*, accepted as unambiguous. They also strived to create laws that did not harm what the *fuqaha* identified as the legitimate interests of Muslim society.⁷³⁷ Accordingly, Brown and Sherif point towards an ‘Islamic political vocabulary’ in the 1861 Tunisian Constitution and the institutionalisation of Islam as the state religion in the 1876 Ottoman Constitution.⁷³⁸ Arguably, they reflect a public admission by the ruler that his legitimacy depended on his acting in a manner at least consistent with Islamic principles (i.e. the *Bey* in Tunisia or the *Sultan* in Istanbul).

In response to prominent Islamic reformers of the first half of the nineteenth century such as Rida and al-Sanhuri, numerous other countries have enacted constitutions containing provisions that declare Islamic norms to be a – or the main – source of legislation. The by now familiar terms these constitutions utilise to describe the Islamic norms that serve as a source of law include ‘*fiqh*’ (i.e. principles of Islamic jurisprudence), ‘Shari’a’ or ‘the principles of Shari’a’. Most of these constitutional clauses describe Islamic

⁷³⁶ Mallat, *supra*, n. 734.

⁷³⁷ Lombardi, C. B. and Brown, N. J. (2006) ‘Do Constitutions Requiring Adherence to Shari’a Threaten Human Rights? How Egypt’s Constitutional Court Reconciles Islamic Law with the Liberal Rule of Law’, *American University International Law Review*, 21(3), p. 26.

⁷³⁸ Brown, N. J. and Sherif, A. O. (2004) ‘Inscribing the Islamic Shari’a in Arab Constitutional Law’, in Haddad, Y. Y. and Stowasser B. F., eds. (2004) *Islamic Law and the Challenges of Modernity*, (Walnut Creek, CA: AltaMira Press) pp. 57–59.

norms either as *a* principal source of legislation (*masdarun raisiun li'l tashri*)⁷³⁹ or as principal source of legislation (*al-masdar al-raisi li'l-tashri*).⁷⁴⁰

Like the traditional *fuqaha*, Rida argued that the state ought to apply law congruent with clear Islamic principles underpinning the public interest.⁷⁴¹ Building on Rida's view, al-Sanhuri, a renowned Egyptian lawyer and code-drafter, argued that there are several general principles of Islamic jurisprudence common to all the competing interpretations of Islamic law. Consequently, a modern Islamic state must act consistently both with those implicit principles and with the public interest to advance social justice without compromising identity (i.e. Islam).⁷⁴² Importantly, Sanhuri concluded that most rules found in modern European legal codes (many of which had been transplanted into the Arab world during the colonial era) were consistent with his 'functionalist selections' of principles of Islamic jurisprudence.⁷⁴³

Sanhuri's views are significant because he was commissioned to draft the new 1949 Civil Code for Egypt by drawing on comparisons of more than 20 modern codes, the jurisprudence of the Egyptian courts, and Shari'a.⁷⁴⁴ Not surprisingly, this code retained a significant number of colonial-era rules.⁷⁴⁵ Although the *fuqaha*' criticised the code as only pseudo-Islamic because Shari'a acted as a supplement to other sources, the code was widely celebrated in the Arab world and beyond as a successful attempt to harmonise

⁷³⁹ See Art. 1, Permanent Constitution of the State of Qatar; see further Art. 3, Constitution of the Syrian Arab Republic, 24 February 2012.

⁷⁴⁰ See Constitution of the Arab Republic of Egypt (2014), Part I – The State, Art. 2.

⁷⁴¹ Enayat, H. (1982) *Modern Islamic Political Thought* (London: Macmillan), pp. 78–81.

⁷⁴² Shalakany, A. (2001) 'Between Identity and Distribution: Sanhuri, Genealogy, and the Will to Islamise', *Islamic Law and Society*, 8(2), p. 204.

⁷⁴³ *Ibid*, p. 228.

⁷⁴⁴ Hill, E. (1988) 'Al-Sanhuri and Islamic Law: The Place and Significance of Islamic Law in the Life and Work of 'Abd al-Razzaq Ahmad al-Sanhuri, Egyptian Jurist and Scholar, 1895–1971' (Pt. II), *Arab Law Quarterly*, 3, p. 182.

⁷⁴⁵ *Ibid*, p. 187.

Islamic with European law.⁷⁴⁶ In short order, many of the Arab States then emerging from colonial domination decided to adopt Sanhuri-inspired codes.⁷⁴⁷ By doing so, they could indigenise national legal systems, as well as ensure that those legal systems remained consistent with essential elements of the transplanted European legal codes under which legal relationships had already been formed.⁷⁴⁸ All of the so-called ‘Sanhuri codes’ resembled the 1949 Egyptian Code (including Libya’s constitution of 1954). Thus, each arguably used Islamic law as a ‘source’ of law in two different ways. First, each code assumed that embedded in the *fiqh* tradition were a limited number of general principles and that, second, each code incorporated some actual rules from the *fiqh* tradition. Notably, the Sanhuri codes recognised that over time certain ‘gaps’ might transpire – meaning that a judge might face legal questions that could not be answered by reference to the rules in the code. In such cases, judges were supposed to fashion new rules using roughly the same method Sanhuri had used to select rules for inclusion in the code.⁷⁴⁹

Egyptian legal advisors assisted in the drafting of many constitutions that made Shari’a norms a chief source of legislation, such as Sudan’s, Qatar’s, Kuwait’s and Syria’s. Ironically, Egypt itself came late to the ranks of countries that adopted a Shari’a source-of-law clause. Egypt’s 1923 Constitution made Islam the religion of the state, but it did not declare Islamic law a ‘source’ of legislation. It was only in 1971 that Egypt’s Anwar Sadat and his government introduced a new constitution that would reach out to a wider spectrum of constituencies in Egypt – including Islamists – and thereby incorporate Shari’a as ‘the chief source of legislation’. Egypt’s current constitution (as amended in 2014) States

⁷⁴⁶ Zaideh, F. J. (1968) *Lawyers, the Rule of Law, and Liberalism in Modern Egypt* (Stanford, CA: Hoover Institution Press), p. 139.

⁷⁴⁷ Hill, *supra*, n. 744, pp. 39-40.

⁷⁴⁸ *Ibid*, p. 40.

⁷⁴⁹ Art. 1, The Civil Code of the Arab Republic of Egypt.

in its *Preamble* that:

'We are drafting a Constitution that affirms that the principles of Islamic Sharia are the principal source of legislation'.⁷⁵⁰

Shari'a is reaffirmed as the principal source of domestic legislation in Art. 2:

'Islam is the religion of the State and Arabic is its official language. The principles of Islamic Sharia are the main source of legislation'.⁷⁵¹

In 1968, a Sudanese constituent assembly with Islamists in leadership positions proposed an Islamic constitution. Art. 113 of the proposed constitution made Shari'a 'the chief source of legislation'. To further emphasise that all law must respect Islamic principles, Art. 114 provided that 'every legislation passed after the adoption of this constitution in contravention with the provisions of *kitab* and Sunnah [i.e. the Qur'an and hadith literature] should be void, provided that such contravention did not in essence previously exist'. Although this draft never came into force due to political turmoil and a military coup, the constitution that made it in 1973 was ambiguous by making both Islamic Shari'a and custom (*urf*) simultaneously 'the two chief sources of legislation'.⁷⁵²

To address this ambiguity, Sudan introduced a new constitution in 1998 that, like the earlier constitution of 1968, declares Islamic law to be one of 'the sources' of legislation (*urf* being the other) and states explicitly that no law could be inconsistent with Shari'a or custom:

⁷⁵⁰ *Constitution of the Arab Republic of Egypt* (2014), Preamble, p. 5.

⁷⁵¹ Egyptian constitution, *ibid*, Part I – The State, Art. 2.

⁷⁵² Art. 9, *The Permanent Constitution of the Sudan* (1971).

*'The Islamic Shari'a and the national consent through voting, the Constitution and custom are the sources of law and no law shall be enacted contrary to these sources.'*⁷⁵³

Notably, owing to political strife with today's South Sudan, the 1998 constitution was superseded by an interim version in 2005 that remains in force. Although the 2005 document toned down the language pertaining to Shari'a, it still regards it as a prime source of legislation:

*'Nationally enacted legislation having effect only in respect of the Northern States of the Sudan shall have as its sources of legislation Islamic Shari'a.'*⁷⁵⁴

Reflecting its diverse heritage, the Libyan legal system is influenced by Islamic law as well the civil legal regimes of Italy and France. As a state which prior to 2011 called itself the *Great Socialist People's Libyan Arab Jamahiriya* (i.e. the Libyan Arab State of the Masses),⁷⁵⁵ its then leader Muammar Gaddafi proclaimed the *Jamahiriya* as following the Qur'an for legal guidance. This was reflected in Art. 6 of Libya's Constitutional Proclamation of 1969:

'The aim of the state is the realization of socialism through the application of social justice which forbids any form of [human] exploitation [...] Its inspiration is its Arabic and Islamic heritage, humanitarian values and the specific conditions of the Libyan society'.

Although strict adherence to Shari'a was not practiced because it guaranteed private ownership of property, which clashed with the socialist teachings of Gaddafi's *Green Book*,⁷⁵⁶ the Shari'a is nonetheless recognised in Libya's Civil Code as an alternative source of

⁷⁵³ Art. 65, *Constitution of the Republic of the Sudan* (July 1998).

⁷⁵⁴ Art. 5(1), *The Interim National Constitution of the Republic of the Sudan* (2005).

⁷⁵⁵ Blundy, D. and Lycett, A. (1987) *Qaddafi and the Libyan Revolution*. Boston and Toronto: Little Brown & Co., p. 105.

⁷⁵⁶ Vandewalle, D.: 'From International Reconciliation to Civil War: 2003–2011', in Vandewalle, D. (ed.) (2011) *Libya Since 1969: Qaddafi's Revolution Revisited*. Palgrave Macmillan, pp. 215–39.

legislation: ‘In the absence of applicable legal provisions, the Judge shall pass judgement in accordance with the principles of Islamic law’.⁷⁵⁷

Libya has never had a formal constitution, but its governing documents have consistently declared Libya an Islamic nation. Accordingly, the National Transitional Council (NTC) issued an interim constitutional declaration that named Shari'a as the source of all legislation in August 2011:

*‘Islam is the Religion of the State and the principal source of legislation is Islamic Jurisprudence (Shari'a)’.*⁷⁵⁸

In contrast to the other stakeholder States of Egypt, the Sudan and Libya, Chad’s constitutions determines it to be a secular state:

*‘Chad is a sovereign Republic, independent, secular, social, one and indivisible, founded on the principles of democracy, the rule of law and of justice. It has affirmed the separation of the religions and of the State’.*⁷⁵⁹

However, this does not mean that an examination of the general compatibility of the 2008 Draft Articles with general principles of Islamic law is no longer relevant because not all stakeholder States declare Shari'a as a source of legislation. As outlined above, the majority of Chad’s population is Muslim and a representative government will have to be mindful of its views. Accordingly, there exists the governmental High Council for Islamic Affairs, which oversees Islamic matters and represents the country at international Islamic meetings.⁷⁶⁰ Equally important, Chad’s constitution sets forth that the state is committed to

⁷⁵⁷ Art. 1(2), The Libyan Civil Code – *Al-Qanun al-Madani* (February 1954).

⁷⁵⁸ Art. 1, *Constitutional Charter for the Transitional Stage* (August 2011).

⁷⁵⁹ Art. 1, *Constitution of the Republic of Chad*, (1996, rev. 2005).

⁷⁶⁰ U.S. Department of State (2015) ‘Chad’, available at <http://www.state.gov/documents/organization/171607.pdf>.

‘the cause of African unity and [the] commitment to do everything possible to realize sub-regional and regional integration’.⁷⁶¹

As a result, there is considerable potential for the four Aquifer States to find a common denominator within their respective constitutions to work on the basis of principles of Islamic jurisprudence. Egypt, Libya and the Sudan espouse the most direct reference to Islamic law in their constitutions and Sanhuri’s influence provides a good foundation for the necessary flexibility in their respective legal systems. Chad, on the other hand, stresses its secular foundations but asserts it is committed to regional cooperation.

Nevertheless, the ICJ’s attitude makes it more difficult to find a potential adjudicator that all four States could agree to. At the very least, the Court’s apparent reserved attitude towards Islamic jurisprudence could prevent Libya from recognising its authority – depending on how its constitution finally evolves. More drastically, the Court’s attitude could also result in the three Aquifer States that firmly root their constitutions in Islamic law – Egypt, Libya and the Sudan – disengaging from mainstream dispensations of justice by resorting to the Islamic International Court of Justice (IICJ). Even if that might not be a path Chad wishes to choose, such a development would result in yet another obstacle to finding a framework solution for the utilisation of the NSAS. Arguably, the aforementioned denial of recognition of the Islamic legal system ultimately led to the establishment of an Islamic ‘United Nations’: the *Organization of Islamic Cooperation* (OIC, formerly Organization of the Islamic Conference). Although the OIC cites the 1969 arson of the Al-Aqsa Mosque in Jerusalem as the reason for its formation,⁷⁶² the very fact that fifty-seven Muslim States felt the need to establish their own international organisation

⁷⁶¹ Chad Constitution, *supra*, n. 759, *Preamble*.

⁷⁶² Organization of Islamic Cooperation (n.d.) *About OIC*, online content (available at http://www.oic-oci.org/oicv2/page/?p_id=52&p_ref=26&lan=en).

modelled on the United Nations is telling. Whilst the OIC requires its members to ‘commit themselves to the purposes and principles of the United Nations Charter’,⁷⁶³ clearly more than a quarter of sovereign States in the world did not regard the United Nations as a forum adequate for addressing international issues related to Islam. The OIC brought to life the IICJ,⁷⁶⁴ because, as al-Midani suggests, ‘to help create a jurisprudence which will benefit the Islamic community and the international community as a whole’.⁷⁶⁵ Notably, the IICJ has been modelled closely on the functions and powers of the ICJ.⁷⁶⁶ Although to date no case has been brought to the IICJ because it is still in the process of being formally established,⁷⁶⁷ there is a risk of Sudan, Egypt or Libya eventually choosing to turn to the IICJ for adjudication on matters related to the equitable utilisation of the Nubian Sandstone Aquifer System instead of the ICJ. As a result, the landscape of international law would become significantly more fragmented, as there would be two international courts with overlapping jurisdictions.

The potential risk of further fragmentation in international law should not be taken lightly, especially not in relation to limited transboundary freshwater resources. Since the end of the cold war, international law has become subject to an increasing degree of fragmentation.⁷⁶⁸ A prominent causal factor of this fragmentation has been the expansion of international regulations, which in turn produced a legal landscape consisting of numerous ‘erratic parts and elements’⁷⁶⁹ and therefore resulted in a substantial degree of

⁷⁶³ Organization of Islamic Cooperation (n. d.) ‘About OIC’, available at http://www.oic-oci.org/oicv2/page/?p_id=52&p_ref=26&lan=en (accessed 1 June 2015).

⁷⁶⁴ Res. 11/3-P, *Third Islamic Summit*, Saudi Arabia – Mecca and Ta’if, 25–29 January 1981.

⁷⁶⁵ Al-Midani, M. A. (2015) *Presentation of The Islamic International Court of Justice: A Muslim Judiciary Court*, online content (http://www.acihl.org/articles.htm?article_id=8).

⁷⁶⁶ See Arts. 21, 23 and 42, Res. 11/3-P, *ibid*, n.765.

⁷⁶⁷ Al-Midani, *supra*, n. 765.

⁷⁶⁸ Hafner, G. (2000) ‘Risks Ensuing from Fragmentation of International Law’, *Yearbook of the International Law Commission*, Vol. II (Pt. 2), UN Doc. A/CN. 4/SER. A/2000/Add. 1 (Part 2)/Rev. 1, p. 143.

⁷⁶⁹ Mooms, R. (1990) ‘Citizens of a wounded earth in a fragmented world’, in: Gangrade, K. D. and Mishra, R. P. (eds.) *Conflict Resolution through Non-Violence* (New Delhi: Concept), Vol. II, p. 22; Camilleri, J. A. (1990)

fragmentation in international law.⁷⁷⁰ This development is not surprising. With the decolonisation process and the independence of several States in the second half of the twentieth century, new issues of international law, including the utilisation of the world's fresh water resources, were pushed to the fore. These issues required specific regulations and agencies to be addressed. For example, as outlined above, water treaties by major European powers at first prioritised the use of rivers as a means of transport over their role as a source of fresh water. Even the IIL's progressive *Madrid Declaration* of 1911,⁷⁷¹ which already advocated the 'no-harm' principle 50 years prior to the 1961 *Salzburg Resolution on Utilization of Non-Maritime International Waters*,⁷⁷² was practically ignored as Europe obsessed over industrialisation and the preservation of empire. It was only in the second half of the twentieth century that newly independent States such as Sudan and Iraq, which were highly dependent on a narrow portfolio of fresh water supply, began to highlight the gap of development and equitable utilisation of fresh water resources in international law. The United Nations is certainly aware of this dynamic. One of the principle mandates of the International Law Commission is the codification and progressive development of international law.⁷⁷³ Through this codification process, the Commission ultimately aims to stabilise international relations by facilitating stepping stones through the proposal of draft articles (e.g. the *2008 Draft Articles on Transboundary Aquifers*).⁷⁷⁴ Since the fragmentation of

'Fragmentation and integration: The future of world politics', in: Gangrade, K. D. and Mishra, R. P. (eds.) *Conflict Resolution through Non-Violence* (New Delhi: Concept), Vol. II, p. 45.

⁷⁷⁰ Reisman, W. M. (1990) 'International law after the cold war', *American Journal of International Law*, 84(4), p. 864.

⁷⁷¹ IIL (1961), 'Utilisation des eaux internationales non maritimes (en dehors de la navigation) (Salzburg Session 1961)', in *Annuaire de l'Institut de Droit International*, Vol. 49(II), p. 381.

⁷⁷² *Ibid*, Articles 3,6,7 and 8.

⁷⁷³ Article 13, Charter of the United Nations.

⁷⁷⁴ See Articles 15, 23(1)(c, d), Statute of the International Law Commission; ILC (1998) *Making Better International Law: The International Law Commission at 50* (New York: United Nations), p. 2.

international law runs counter to the Commission's objectives, it should seek ways and means to overcome the possible detrimental effects of such fragmentation.

Summary

This chapter explored different important aspects that are pertinent to the nature of Islamic law in general and specifically how Islamic perception of law feature in the application of general international law. Although the author is not a Muslim or an Islamic theologian, the consideration of general principles of Islamic water and environmental law is still a valid exercise because much of international environmental law is reliant on principles to achieve a normative effect on States.

Conceptions of justice vary considerably from society to society. In Islam, the idea of justice is to be found in the Revelation and Divine Wisdom as communicated by Mohammed to his followers. Muslims believe God transmitted the Revelation in His own words to Mohammad to be enshrined in the Qur'an word for word. The Divine Wisdom, inspired to the Prophet, was in turn communicated in his own words, too, and circulated as the Sunnah, which subsequently became known as the Hadith, or the Prophet's Traditions. In that sense, Islamic justice is a form of divine justice.

Importantly, Islam, like many other belief systems, encompasses more than the worship and a code of conduct. It frequently penetrates aspects of many Muslims' daily lives, ranging from contracts to inheritance and, of course, the use of water. So, while only few Muslim countries base their political, judicial, economic or constitutional systems entirely on Islam, it is equally the case that only Turkey can be seen as a truly secular state in the Middle East. Consequently, a fundamental distinction between Islamic law and Western law is that to a large extent Islamic law is not formed by society based on the expectation that human minds can easily be corrupted. As a result, from an Islamic perspective, law

controls society and cannot be controlled by the latter as it is the will of God, not public opinion, which determines legality.

However, a common critique of Islamic jurisprudence has been that it has lost touch with the changing conditions of contemporary life because it is intrinsically linked to Shari'a and the latter's claim of remaining unchanged since its inception almost 1,500 years ago. The argument goes that because of the perceived backwardness of Shari'a, it is incapable of contributing to modern government processes in the fields of legislation and judicial practice in a constructive manner. On the other hand, a reverse critique is at times levelled at Islamic governments when they failed to incorporate principles of Islamic jurisprudence into legislative practices and standards.

This gap between Islamic law and its sources as practiced in Islamic States can to considerable extent be attributed to the historic marginalisation of *Ijtihād*. However, this chapter suggested that although Islam prohibits some routes of inquiry, including the questioning of key pillars of the Islamic faith – for example, the existence of God – the contemporary Islamic community experiences a growing need for multidisciplinary creative inquiry into new problems and questions arising in an ever-more dynamic world. The doctrine of *Ijtihād* was conceived to do just that whilst following the guidelines already established by the Qur'an and Sunnah.

Concurrent with this criticism of 'backwardness' comes the chequered attitude of the ICJ towards Islamic law. This represents an unfortunate state of affairs because, apart from the Court's clearly defined role as adjudicator between States, there are also important 'out of court effects' brought about by the ICJ's presence and the consequential prospect of possible impartial and peaceful conflict resolution. Although Article 38 (1)(c) of the ICJ's Statute stipulates that the Court should consider 'general principles of law recognised by civilised nations', for as long as the ICJ has existed, the majority of its judges has resisted

interpreting Article 38(1)(c) to require the ICJ to consider Islamic law – or indeed any other body of non-Western law – as norms pertinent to the Court’s interpretation of international law.

In contrast, Muslim States frequently recognise an obligation to ensure all laws applied by their judiciary are consistent with several core Islamic rules. They also strive to create laws that did not harm what has been accepted as the legitimate interests of Muslim society. As a result, there is considerable potential for the four Aquifer States to find a common denominator within their respective constitutions to work on the basis of principles of Islamic jurisprudence. Egypt, Libya and the Sudan espouse the most direct reference to Islamic law in their constitutions whilst Chad stresses its secular foundations but asserts it is committed to regional cooperation.

Nevertheless, the ICJ’s attitude makes it more difficult to find a potential adjudicator that all four States could potentially agree to. At the very least, depending on how Libya’s constitution finally evolves, the Court’s apparent reserved attitude towards Islamic jurisprudence could prevent the country from recognising the Court’s authority. More drastically, the Court’s attitude could also result in the three Aquifer States that firmly root their constitutions in Islamic law – Egypt, Libya and the Sudan – to disengage from mainstream dispensations of justice by resorting to the Islamic International Court of Justice. Even if that might not be a path Chad wishes to choose, such a development would result in yet another obstacle to finding a framework solution for the utilisation of the NSAS. The potential risk of further fragmentation in international law should not be taken lightly, especially not in relation to limited transboundary freshwater resources. Through this codification process, the Commission ultimately aims to stabilise international relations by facilitating stepping stones through the proposal of draft articles such as the *2008 Draft Articles on Transboundary Aquifers*. Since the fragmentation of international law

runs counter to the Commission's objectives, it should seek ways and means to overcome the possible detrimental effects of such fragmentation.

CHAPTER V – THE CONGRUENCE BETWEEN THE 2008 DRAFT ARTICLES AND ISLAMIC LAW

As outlined above, water resources in the four Nubian Sandstone Aquifer System States of Egypt, Libya, Chad and North Sudan are very scarce. Concurrently, the World Bank identified the MENA (Middle East and North Africa) region as the world's most water-deprived region.⁷⁷⁵ It has been highlighted in the preceding chapter that Islam is fundamentally significant to States that base their legal systems to considerable extent on Islamic law, which itself is built primarily on a single source: The Qur'an.⁷⁷⁶ Part of the discussion so far has tried to shed light on the prevailing attitude towards the Islamic law within general international law. Although numerous modern water experts believe that governments in the MENA region are increasingly willing to extend the scope of Islamic law to more effectively address water management issues arising out of rising demand amid falling supply, these efforts still see Islamic legal traditions and custom competing for influence with western water management concepts. This circumstance has led Caponera

⁷⁷⁵ World Bank (2007) *Making the Most of Scarcity: Accountability for Better Water Management in the Middle East and North Africa*. Washington: The World Bank, xiii.

⁷⁷⁶ Al-Ghunaimi, M. J. (1968) *The Muslim Conception of International Law and the Western Approach* (The Hague: Martinus Nijhoff), p. 106.

conclude that Muslim countries have ‘justifiable mistrust’ towards the Western codification of water law for fear that the result might offend Islamic law.⁷⁷⁷

Whereas the preceding chapter has highlighted key areas of Islamic law, its sources and tools, as well as its status within the prevailing system of general international law and its status within the four Aquifer States, the following will consider the extent to which Islamic water law is congruent with the general thrust of the *2008 Draft Articles*. It will first examine the relationship between Islamic law and the environment in general as well as Western environmental law. This will then be followed with discussions pertaining to water distribution, the ownership and the utilisation of water under Islamic law.

Islam, the Environment and Intergenerational Equity

In the Judeo-Christian tradition, God gave the earth to mankind and its offspring as an everlasting possession, to be cherished and passed on through the generations:

*I will maintain my Covenant between Me and you, and your offspring to come, as an everlasting covenant throughout the ages, to be God to you and to your offspring to come. I give the land you sojourn in to you and to your offspring to come, all the land of Canaan, as an everlasting possession. I will be their God.*⁷⁷⁸

This has been carried forward in both the common law and the civil law traditions. Accordingly, the English philosopher John Locke asserts that regardless of whether one accepts natural reason or believes in God's gift ‘to Adam and, and to Noah, and his sons’, mankind holds the world ‘in common’. Humanity may only appropriate to the extent that it

⁷⁷⁷ Caponera, D. A. (1954) ‘Irrigation and Drainage’, in Caponera, D. A. (ed.) *Water Laws in Moslem Countries* (Rome: FAO), p. 1.

⁷⁷⁸ Genesis, 17:7-8.

leaves ‘enough, and as good’ for others as part of an obligation not to consume more resources than required and thereby deprive someone else of them in the future.⁷⁷⁹ In the sphere of civil law, this recognition of the community interest in natural property appears in Germany in the form of social obligations that are part and parcel of private property ownership.⁷⁸⁰ Dolzer argues that ownership rights can be limited to benefit the public good, without attributing a right for compensation to the owners.⁷⁸¹ For instance, legislatures can ban the disposal of toxic wastes in ecologically sensitive areas and ‘invoke the social obligation inherent in property’ to avoid monetary compensation to the landlord.⁷⁸² In common law jurisdictions such as the United States, the constitution provides for police powers or the public trust doctrine to protect the local population against such misuse of nature.⁷⁸³ Similarly, as will be discussed in more depth below, Islam views the utilisation and sustainable use of earth’s resources as the privilege of all people. Mankind should thus take every precaution to ensure the interests and rights of fellow humans, as they are all equal participants in life on earth. Crucially, Islam regards mankind’s appropriation of resources as joint ownership in which each generation utilised natural resources in good faith and only to the extent to cover its needs, without disrupting or upsetting the interests of future generations.⁷⁸⁴

Arguably, a contemporary hostile attitude towards the environment can be observed as a product of the secular and industrial view that gained popularity in the seventeenth and eighteenth centuries. After the industrial revolution, growing materialism competed not only

⁷⁷⁹ Locke, J. (1690) *Second Treatise of Government, Ch. V (‘Of Property’)*, available from The Project Gutenberg at <https://www.gutenberg.org/files/7370/7370-h/7370-h.htm>.

⁷⁸⁰ Dolzer, R. (1976) *Property and Environment: The Social Obligation Inherent in Ownership – A Study of the German Constitutional Setting* (Morges: International Union for Conservation of Nature and Natural Resources), available at <https://portals.iucn.org/library/efiles/documents/EPLP-012.pdf>.

⁷⁸¹ *Ibid*, p. 23.

⁷⁸² *Ibid*, p. 57.

⁷⁸³ Garton, W. A. (1971) ‘Ecology and the Police Power’, *South Dakota Law Review*, 16, p. 261.

⁷⁸⁴ Khadduri, M. (1984) *The Islamic Conception of Justice*, (Baltimore: Johns Hopkins Press), pp. 137-9, 219-20, 233-9.

with religious spirituality, but also with environmentalism. For many, materialism is part of human nature. Accordingly, Aristotle maintained that rain causes crops to grow, which in turn serve to feed animals, which then exist to serve humans.⁷⁸⁵ John Locke tried to answer the question who or what decides on the relationship between mankind and nature through his Theory of Given Property. In Locke's Christian view, God created and gave all of nature – including 'inferior creatures' – to humanity and to which it is unreservedly entitled.⁷⁸⁶ This hierarchical view was later challenged, however, by Charles Darwin who theorised about the lack of order (i.e. lack of direction) in nature and the progression of evolution by way of 'descent with modifications' through random genetic mutations.⁷⁸⁷ Consequently, according to Darwin's theorem, mankind is an integral part of nature and is not above it. Naturalist John Muir, known as the 'Father of National Parks'⁷⁸⁸ also famously ridiculed the theory of Divine appointment of human matters by questioning that if God created nature solely to serve human interests, then what should be made of parasites specialising on infecting humans or even poisonous forms of life?⁷⁸⁹

Although *prima facie* this appears to be at odds with the Islamic conception of mankind's role within the environment because it removes mankind from the pinnacle of creation, in principle it is not. Whilst the likes of Aristotle and Locke advance the view that mankind is entitled to what nature has to offer under any circumstances by way of Divine gift, thereby absolving them of responsibility for the sustainability of their practices, Darwin and especially Muir defend a much more holistic perspective of humans' role on earth.

⁷⁸⁵ Gruen, L. and Jamieson, D. (1994) *Reflecting on Nature. Readings in Environmental Ethics and Philosophy* (Oxford: OUP), pp. 2-19.

⁷⁸⁶ See Widerquist, K. (2010) 'Lockean Theories of Property: Justifications for Unilateral Appropriation', *Public Reason* 2(1), pp. 3-26.

⁷⁸⁷ Darwin, C. (1859) *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life* (London: John Murray), p. 162.

⁷⁸⁸ President Theodore Roosevelt's decisions to establish Yosemite National Park (the world's first) by congressional action in 1890 is attributed to Muir's work.

⁷⁸⁹ See Muir, J. (1916) *A Thousand-Mile Walk to the Gulf* (Boston: Houghton Mifflin Co.).

Whilst both distance themselves from the Divine gift assertion – which could lead to the conclusion they regard mankind as much less important to God’s ways – they emphasise the individual and collective responsibility humans have towards nature and directly challenge the notion of any human entitlement. In essence, they do not regard humans as the pinnacle of creation but the integral part of a greater system (i.e. the ‘cosmos’). In Muir’s words:

Why should man value himself as more than a small part of the one great unit of creation? And what creature of all that the Lord has taken the pains to make is not essential to the completeness of that unit - the cosmos? The universe would be incomplete without man; but it would also be incomplete without the smallest transmicroscopic creature that dwells beyond our conceitful eyes and knowledge. From the dust of the earth, from the common elementary fund, the Creator has made Homo sapiens. From the same material he has made every other creature, however noxious and insignificant to us. They are earth-born companions and our fellow mortals [...] This star, our own good earth, made many a successful journey around the heavens ere man was made, and whole kingdoms of creatures enjoyed existence and returned to dust ere man appeared to claim them. After human beings have also played their part in Creation's plan, they too may disappear without any general burning or extraordinary commotion whatever.’⁷⁹⁰

Muir, in particular, asserts that the lack of entitlement bestows responsibility on man:

‘Any fool can destroy trees. They cannot run away; and if they could, they would still be destroyed – chased and hunted down as long as fun or a dollar could be got out of their bark hides, branching horns, or magnificent bole backbones. Few that fell trees plant them [...] God has cared for these trees, saved them from drought, disease, avalanches, and a thousand straining,

⁷⁹⁰ *Ibid*, p. 139.

leveling tempests and floods; but he cannot save them from fools – only Uncle Sam can do that.⁷⁹¹

This acceptance of responsibility is of prime importance when searching for a common set of denominators between the Western and Islamic legal conceptions of transboundary groundwater utilisation. To Muslims, God has created the universe in due proportion and measure both quantitatively and qualitatively. Accordingly, the Qur'an declares that God has created everything in due measure and balance.⁷⁹² Islam acknowledges that the universe contains enormous diversity and variety in form and function – and attributes these solely to God – and mankind's welfare is fulfilled through its various elements:

Do you not see that all those who are in the heavens and on earth praise God, as do the birds with wings outstretched? Each knows his own mode of prayer and glorification: God has full knowledge of all they do.⁷⁹³

Islam teaches that God's universe was created to sustain itself by means of these different elements, culminating in the cycle of life:

All things in the universe are created to serve the One Lord Who sustains them all by means of one another, and Who controls the miraculous cycles of life and death.⁷⁹⁴

Another crucial element of the Islamic interpretation of the status of the environment is that the cycle of life is regarded as the path to distinguish good from evil. In essence, the cycle serves as God's tool to assess a Muslim's adherence to his faith.

He created death and life so that He might test you, and find out which of you is best in conduct.⁷⁹⁵

⁷⁹¹ *Ibid.*

⁷⁹² Qur'an, 13:8, 54:49, 44: 38-9.

⁷⁹³ Qur'an, 24:41.

⁷⁹⁴ Qur'an, 6:95.

⁷⁹⁵ Qur'an, 67:2.

This is an important aspect to consider as Islam (and consequently its perspective on the environment) puts particular emphasis on morality. It not only epitomises the circular reference between God, the Qur'an and Islamic law, but also represents a cornerstone of the perspective on the environment the Islamic legal system has to offer. In the Muslim faith, God has tasked mankind to be his stewards on earth. The Qur'an makes clear that all on earth has been subjected to humans and their free will, but that they owe their existence to God alone and are therefore responsible to Him for their treatment of nature and its resources:

'[God] has subjected everything on the earth to you⁷⁹⁶ [...] Do not corrupt the land after it has [thus] been set in order. This is for your own good, if you are true believers.'⁷⁹⁷

Importantly, it must therefore follow that the utilisation of the resources offered by the earth becomes the right and privilege of all people.⁷⁹⁸ In the author's view, the Qur'an's demand not to 'corrupt' what has been created by God also indicates that Islamic law pertaining to water accepts the concept of intergenerational equity. While the attitudes of Islamic law to the environment, the sources of life and the resources of nature are based in part on prohibition of abuse, it is also based on sustainable development. The element of keeping earth's resources uncorrupted can be seen as a counterpart to the Western concept of sustainable utilisation. Interpretations of the Qur'an (*hadith*) clearly identify the integration of resource development and preservation of the natural environment as a commanding concept that Muslims ought to adhere to. In the Hadith, Islam's Prophet Muhammad expressly prohibited the wastage of water, even at times of abundance or where it is used for a holy purpose. The Hadith demonstrates clear examples, for instance, where

⁷⁹⁶ Qur'an, 22:65.

⁷⁹⁷ Qur'an, 7:85.

⁷⁹⁸ See Qur'an, 41:10.

Mohammed performs absolution with expressly referenced two-thirds of a litre of water⁷⁹⁹ or where he takes a bath using 2-3 ½ litres⁸⁰⁰. The approach of Islam toward the use and development of the earth's resources can also be observed through an address by Ali ibn Abi-Talib, the fourth Caliph⁸⁰¹, to a man who had developed and reclaimed abandoned land:

*Partake of [your land] gladly, so long as you are a benefactor, not a despoiler;
a cultivator, not a destroyer.*⁸⁰²

This points towards Islam considering the relationship of mankind with the environment as being a positive and interactive one. Importantly, the Qur'an prescribes humans to live life in a way as to benefit their environment as whole and therefore, for example, puts forward various views on animal protection⁸⁰³ and also includes concepts akin to modern national parks (*hima*)⁸⁰⁴. In essence, Islam regards mankind as part of a holistic system of life created by God that bestows special privileges and duties on humans or it would fall apart. The Qur'an imposes the expectations upon its followers to care for and preserve this system and purports that they might not understand all the intricacies of this system. The notion of human appointment as God's trustee on earth can be deduced from mankind's status as *khalifa* (successor):

*[The] Lord said to the angels, 'I am putting a successor on earth.'*⁸⁰⁵

⁷⁹⁹ Hadith al-Bukhari, 1.200.

⁸⁰⁰ Hadith al-Tirmidhi, 427.

⁸⁰¹ A Caliph being the successor of the Prophet Muhammad and thereby chief Muslim civil and religious authority. The Caliph resided in Baghdad until 1258 and subsequently in Cairo until the Ottoman conquest of 1517. In the following centuries, the title was held by the Ottoman sultans until it was abolished by Atatürk in 1924. Perhaps the most famous was Caliph Harun al-Rashid (i.e. "The Rightly Guided"), whose exploits form part of the basis of the *Thousand and One Nights* series of stories.

⁸⁰² Cited in Bagader et al (1994) *Environmental Protection in Islam* (Cambridge: IUCN), p. 2.

⁸⁰³ See Qur'an, 6:38.

⁸⁰⁴ Hughes, T. P. (1885) *Dictionary of Islam* (London: W. H. Allen & Co.), p. 175.

⁸⁰⁵ Qur'an, 2:30; in other translations of the Qur'an, this verse is translated as 'I will create a trustee on earth'. The appendix to the Qur'an's translation used by the author explains that the difference between the word trustee and successor derives from the meaning of *khalifa* in medieval Arabic.

Islam thus regards mankind as the species endowed with the duty to manage the earth, which goes hand-in-hand with the special skill-set bestowed upon humans by God.⁸⁰⁶ Yet, Islamic environmental philosophy espoused by the Qur'an also suggests that all creatures exist independent of their utility to human beings. Accordingly, the Qur'an asserts that all the different organisms on earth praise God in their own particular way without human beings necessarily being equipped to understand them,

*'The Seven Heavens and the earth and all who dwell therein glorify Him. There is not a single thing but glorifies Him with His praise; but you do not understand their glorification. Truly, He is forbearing and most forgiving.'*⁸⁰⁷

Yet, the word 'environment', i.e. strictly meaning the aggregate of all land, air, water and organisms contained therein, does not appear in the Qur'an. Instead, there is strong emphasis on the different matters (or elements) that constitute the environment. Although nominally Islam treats all of nature's elements equally, in the author's view, water takes a special place. Water is such an important element of life that Islam seeks to protect it on both a legal and an ethical level. Water's value is epitomised by a Qur'anic statement made about dry land, which is subsequently enriched when God pours rain down upon it to sustain mankind:

*'It is He who has laid out the earth for you and traces routes in it and sent down water from the sky. We have brought forth every sort of plant with, so eat and graze your cattle.'*⁸⁰⁸

According to Islam, mankind's role as God's successor (or trustee) on earth is a continuation of God's plan to cause life to flourish in all its forms. As outlined above, by using the gifts and talents given to them by God, human beings are responsible not merely

⁸⁰⁶ See Qur'an, 2:31.

⁸⁰⁷ Qur'an, 17:44.

⁸⁰⁸ Qur'an, 20:53-4.

for improving their own lives but also the lives of other creatures. Accordingly, the Qur'an gives water a central role in the creation of life:

'We have made every living thing out of water'.⁸⁰⁹

Notably, the thirteenth century scholar al-Baydawi asserted that this verse means that all of God's creation is dependent on water.⁸¹⁰ The importance of water within the culture of Islam Water derived from rain, wells, springs, the sea and large rivers is considered clean and suitable for ablution as well as consumption provided that these sources remain in their natural state without contamination or pollution.⁸¹¹ Water, therefore, is Islam's essential agent of purification, hence the need for a ritual wash before the Muslim prayer.

In Islamic law, there are four categories of water, each being subject to a different rule concerning access. Whilst sea water is available to everyone, large rivers and other bodies of surface water are made subject to irrigation rules, namely that they can be freely used by individuals as long as that utilisation does not infringe the water's availability to others. Other shared water resources, which would include confined aquifers such as the Nubian Sandstone Aquifer System, are subject to similar stringent rules when it comes to irrigation. Whereas the use for drinking purposes remains unrestricted, irrigation is only allowed to the extent that others' right (and ability) to use the water is not infringed upon.⁸¹²

The division of water for the purpose of irrigation is significant in the four Nubian Sandstone Aquifer System stakeholder States because agriculture is, of course, absolutely dependent on irrigation. Significantly, the right to water for irrigation (*shirb*) can be held independent of the ownership of land. Resolution of disputes concerning shared water

⁸⁰⁹ Qur'an, 21:30.

⁸¹⁰ See Baydawi, A. (2004) *Anwar al-Tanzil wa-Asrar al-Tawil* [The lights of revelation and the secrets of interpretation] (Beirut: Dar Sader Publishers).

⁸¹¹ Hughes, T. P. (1885) *Dictionary of Islam* (London: W. H. Allen & Co.), p. 665; see also Qur'an, 8:11.

⁸¹² Porritt, J. (1984) *Seeing Green: Politics of Ecology Explained* (London: Wiley-Blackwell), p. 16.

rights will involve consideration of the amount of land which to be irrigated as all parties should receive a fair share. Water for irrigation cannot be dammed or otherwise impeded without the agreement of all concerned. As outlined above, the attention paid by Islam to water, its distribution and its utilisation, is a consequence of its importance as an element of life:

*'Did you not see how God sent down water from the sky with which we bring forth fruit of diverse colours?'*⁸¹³

Arguably, this verse portrays a profound environmental message in that human beings ought to appreciate the value of water they have been given. This is an important aspect because Islam extends the notion of care for the things made available to humanity throughout.⁸¹⁴ Among the Prophetic traditions is a *hadith* that portrays this point distinctively:

*'The Messenger of Allah passed by Saad when he was performing ablution using an excessive amount of water, and he said: 'What is this extravagance?' He [Saad] in turn asked: 'Can there be any extravagance in ablution?' He said: 'Yes, even if you are on the bank of a flowing river.'*⁸¹⁵

Apart from water preservation, Islamic law provides an environmental system, which includes protecting water from misuse and pollution. Accordingly, the Islamic legal system imposes a system of zones that are *haram* or *harim*, whereby the Prophet 'recognised that the ownership of canals, wells and other water sources entailed in the ownership of a certain extent of bordering land or *harim* on which it was forbidden to dig a well [...]'.⁸¹⁶ Although the concept of *harim* is mainly associated with watercourses, but its meaning easily extends

⁸¹³ Qur'an, 35:27.

⁸¹⁴ Dien, M. I. (2000) *The Environmental Dimensions of Islam* (Cambridge: Lutterworth Press), p. 32.

⁸¹⁵ Sunan ibn Majah, Book 1, Hadith 458.

⁸¹⁶ Caponera, D. A. (1992) *Principles of Water Law and Administration: National and International* (London: Taylor & Francis), p. 69.

to land as well. Essentially, it acts as a buffer zone surrounding a water body within which human activities, apart from lawful use of the water, are prohibited. At the most fundamental level, such protective zones must remain undeveloped.⁸¹⁷ Notably, the size of the zone is determined by the size of the water resources it is supposed to protect.⁸¹⁸ Islam's protection of the environment from misuse is thus clearly reflected through the protection of wells and the rules governing this protection.

This links in with the public status Islamic law affords water resources. Based on the holistic nature with which Islam constructs the universe and the interrelationship of all organisms, it is perhaps not surprising that the preservation of water quality equally is an aim of Islamic law. It has been shown so far that clean water in general features very prominently in Islam. Much of that interest may be due to the fact that the law permits only unpolluted water for use in all rituals.⁸¹⁹ As a result, water quality is not a domain where one finds substantial divergence in Islamic jurists' opinions.⁸²⁰ Early on Islamic law adopted a system of water law that recognises riparian rights, establishes a community interest in the utilisation of water and strictly controls appropriative rights. According to Caponera's analysis,

No one can refuse surplus water without sinning against Allah and against man. Also animals must not be allowed to die of thirst, and the water which remains after a man has quenched his thirst must be given to them. It would seem that the Prophet Mohammed declared that water should be, together with pasture and fire, the common entitlement of all Moslems, that he prohibited the

⁸¹⁷ Ibn Fudi, U. (1978) *Bayan Wujub al-Hijra ala l-Ibad. Fontes Historiae Africanae: Series Arabica* (Oxford: Oxford University Press, ed. & transl. F. H. El-Masri), p. 72.

⁸¹⁸ *Ibid*, p. 73.

⁸¹⁹ Dien, *supra*, n. 814, p. 15.

⁸²⁰ Caponera, *supra*, n. 816.

selling of it, and that he had established a community of water use among men.⁸²¹

Generally, Islamic law thus requires a person to exercise a higher standard of care where his action may adversely affect a public interest. He may thus undertake any kind of activity on his land to the extent that does not pollute it or expose living beings to danger or injury, for example by wrong appropriation of the water. Drawing on the status of water as a resources held by society for the common good, ‘the fundamentals of Islamic water law purport to ensure that water is available to all members of the Moslem community. This is why in many modern Moslem countries water legislation considers water resources as belonging to the whole community, i.e., the state, or the public domain’⁸²².

As under Islamic law water thus enjoys a special status, the concern turns to its protection from pollution. For as long as it remains in its natural condition, Islam presumes water to be clean and pure.⁸²³ However, this does not automatically imply that the water in question must also be fit for human consumption. Thus, when a seaman complained to Muhammad that there was a lack of drinking water for ritual washing whilst the ship was at sea, the hadith reports that the Prophet replied that the seawater is ‘clean’.⁸²⁴ So long as water is in its natural state or distilled form, it is considered pure, and, importantly, the things that spring from it are considered pure as well. The Qur'an in this respect provides,

‘And He caused rain to descend on you from heaven to cleanse you therewith’⁸²⁵ and that ‘It is He Who has made the sea of service, that you may eat thereof flesh that is fresh and tender, and that you may bring forth from it

⁸²¹ *Ibid.*

⁸²² *Ibid.*, p. 68.

⁸²³ Dien, *supra*, n. 819, p. 15.

⁸²⁴ Malik ibn Anas (2001) *al-Muwatta: The First Formulation of Islamic Law* (Bookwork, transl. Aisha Abdurrahman Bewley), §27.

⁸²⁵ Qur'an, 8:11.

ornaments to wear, and you see the ships therein that plough the waves, that you may see His bounty.⁸²⁶

Islamic jurists have extensively elaborated on water quality. From an Islamic perspective, water loses its purity when one or more contaminants change its colour, taste, or odor and subsequently becomes impure (*najis*).⁸²⁷ As a means of differentiating between different degrees of water contamination, Islamic law has developed four classification categories with respect to water quality. According to the jurist Sayyid Sabiq, the first water category, which can thus be considered of the highest grade of purity, consists of rain water, snow and hail, sea water, altered water and water from the Zamzam well in Mecca. They are considered to be *mutlaq*. The status of *mutlaq* also extends to other natural bodies of water, even when these have become altered, as long as the alteration has occurred because of long-term storage because of its natural course or location. Equally, if the body of water has become altered because it was mixed with natural substances that cannot be removed, for example algae, it still has not lost its pure status.⁸²⁸

The second category pertains to used water, i.e. the water that had at one point been from a clean source, thus rendering it pure (*mutlaq*) even after it has been used. According to Sabiq,

This category refers to water which drips from the person after he performs ablution (ghusl). It is considered pure because it was pure before its use for ablution, and there is no basis to think that it has lost its purity.⁸²⁹

The third category is water that is mixed with pure elements, which remains legally clean. Sabiq relates that this category of pure substances includes, among others, soap.⁸³⁰

⁸²⁶ Qur'an, 16:14.

⁸²⁷ Wilkinson, J. C. (1978) 'Islamic Water Law with Special Reference to Oasis Settlement', *Journal of Arid Environments*, 1, pp. 87, 89.

⁸²⁸ Sabiq, S. (1991) *Fiqh us-Sunnab*, fiqh 1.2b.

⁸²⁹ *Ibid*, fiqh 1.2c.

Finally, in the fourth category, there is water that is mixed with impure elements. This last classification is further divided into two subcategories. First is where such impurity does not alter any of its characteristics as to taste, colour or odour. Second is where the impurity overwhelms the water such that one of its characteristics of taste, colour, or odour is adversely affected.⁸³¹

Although these examples of Islamic law as it pertains to water may appear archaic to the non-Muslim reader, they do convey an important principle in relation to the degree of water contamination that is considered acceptable before it turns into water pollution. This question has also concerned Western jurists in their quest for an appropriate definition of environmental damage. It is an easy thought exercise to regard pollution as something that is intrinsically bad because the polluted substance may have been rendered unusable or even dangerous. However, Ong discerns that determining what constitutes pollution imparts to some extent a value judgement on behalf of regulators.⁸³² Accordingly, there is a difference between the scientific and legal definition of pollution.⁸³³ The legal definition requires both quantitative and qualitative assessment. A scientific assessment would only attempt to quantify the level of alteration or the change in characteristics of a given substance (e.g. water) or an environment. In this respect, Kindt notes that the term ‘pollution’ has been generally utilised in different ways. On the one hand it has been drawn upon to indicate any change within a given environment, and on the other, it has been used to designate a ‘threshold level of damage or interference which is legally significant’.⁸³⁴ Ong explains that there exists a three-stage process towards ‘an apparently objective definition of the

⁸³⁰ *Ibid*, fiqh 1.3.

⁸³¹ *Ibid*, fiqh 4.

⁸³² Ong, D. (2002) ‘The Relationship between Environmental Damage and Pollution: Marine Oil Pollution Laws in Malaysia and Singapore’, in Bowman, M. and Boyle, A. (eds.) *Environmental Damage in International and Comparative Law. Problems of Definition and Valuation* (Oxford: Oxford University Press), p. 195.

⁸³³ *Ibid*, p. 196.

⁸³⁴ Kindt, J. W. (1986) *Marine Pollution and the Law of the Sea*, Vol. I (New York: Buffalo), p. 34.

occurrence of pollution’, which includes inputs, sufficient amounts of which result in contamination and which, if found in sufficient concentration, finally leads to a state of pollution.⁸³⁵ Whilst the first two stages in this process are straightforwardly quantitative, it is the third stage that requires a value judgement, ‘for which scientists are no better qualified than lawyers to provide a suitable definition’.⁸³⁶ Although there is uncertainty as to whether such scientifically assessed and measured change to the environment can be considered to cause enough ‘damage’ to trigger legal liability is a matter of subjective judgement.⁸³⁷ Interestingly, Ong argues that scientists have shown to be more conservative in their assessment of the different categories of damage, usually limiting themselves to those categories that are easily and objectively quantifiable in monetary terms. Of course this leads to a focus of damage in terms of harm to human property and other economic interests without giving much consideration to environmental or ecological damage.⁸³⁸ This is in stark contrast to what McLoughlin and Bellinger view as a growing recognition that humankind’s interests now include an environment that is as healthy as possible.⁸³⁹ Ong’s conclusion that ‘the legal implications of such quantified pollution are dependent upon [...] qualitative assessment’⁸⁴⁰ and that, in attributing responsibility, it is not just a question of ‘how much harm has occurred?’ but instead ‘how much harm has occurred to whom (or what)?’, rings true with the four categories of water purity in Islamic law outline above.

Good management and conservation of water are thus requirements also contained in Islamic law. The hadith quoted above, whereby the Prophet scolds Sa’ad for using what he considered an excessive amount of water, bears testimony that Islam does not recognise any

⁸³⁵ Ong, *supra*, n. 833.

⁸³⁶ *Ibid.*

⁸³⁷ McLoughlin, J. and Bellinger, E. G. (1993) *Environmental Pollution Control: An Introduction to Principles and Practice of Administration* (The Hague: Kluwer Law Intl.), p. 2.

⁸³⁸ Ong, *supra*, n. 832, p. 197.

⁸³⁹ McLoughlin and Bellinger, *supra*, n. 837, p. 3.

⁸⁴⁰ Ong, *supra*, n.832, p. 197.

acceptable reason for wasting water, not even for what it perhaps considers the most important use of the liquid – the sacred ritual washing before prayer. Through its status as a common resource, water belongs to the realm of matters that Islamic law technically refers to as *huquq Allah*, or in other words the ‘Rights of God’. This heuristic term is used as an interpretive mechanism to frame naturalistic assumptions and subsequently apply them in legal analysis.⁸⁴¹ In contrast to *huquq al-‘ibad*, or ‘Rights of Humankind’, which are mainly contractual or tortious, the ‘Rights of God’ cannot be repealed, remitted or otherwise compromised. Accordingly, the judiciary has very little scope of discretion in their enforcement. They include those rights that concern public interest as a whole.⁸⁴² In a case reported by Malik ibn Anas, the plaintiff, a certain al-Dahak, wanted to connect his plot of land with the water running through a local stream. However, his only viable way of reaching that water was by digging a canal through his neighbour’s property, the defendant, who strongly objected as al-Dahak’s planned canal would reduce his usable share of land. Ultimately, the case was decided in favour of al-Dahak based on the principle of *huquq Allah*.⁸⁴³ Whilst the defendant’s rights were infringed, this took place in view of the wider interest of the community. This is an important aspect to water pollution as large bodies of water such as rivers and lakes – and, indeed, confined transboundary ‘fossil’ aquifers – cannot be anything but the rights of God. Notwithstanding possible individual proprietary rights, the authorities have a higher responsibility in protecting water as a resource than they do in enforcing other laws. In turn, this means that the legalities of preventing water pollution on public land are theoretically straightforward under Islamic law. As water under the principle of *huquq Allah* cannot be made subject to private ownership, the state’s power

⁸⁴¹ Emon, A. M. (2006) ‘Huqūq Allāh and Huqūq al-‘Ibād: A Legal Heuristic for a Natural Rights Regime’, *Islamic Law and Society*, 13(3), p. 325.

⁸⁴² *Ibid.*

⁸⁴³ Malik, *supra*, n. 824, §36.26.33.

to effectively regulate water pollution is theoretically unlimited. Of course, this also implies that the state's responsibility to prevent water pollution, especially of aquifers, is unlimited.

Water and Public Interest in Islamic Law

As has also been outlined above, under Islamic law, water in general acquires the status of a public good in the sense that it is a common resource. Islamic scholars define the public interest according to its objectives instead of looking at the concept in an abstract way. Accordingly, the consideration of whether something is in the public interests revolves primarily on whether its process is achieving good and removes – or at least reduces – harm within the boundaries of what Islam considers to be morally correct.⁸⁴⁴ Referring back to Ong's discourse above, Islamic law focuses from the start on what it considers to be *maslaha*, i.e. not what is an interest according to an individual's, or an individual entity's view, but what Islamic law in accordance with its three main sources (Qur'an, Sunnah and *Ijtihād*) considers to be of interest for the benefit of human society.

The Qur'an accepts the principle of public interest and employs it as part of its approach of general principles towards Islamic legislation. Whereas detailed injunctions would only serve to limit the scope of the last of the four revelations unnecessarily, general principles that are applied according to the circumstances make for a more flexible and holistic legal framework amenable to doctrines such as *Ijtihād*. This approach is exemplified in the mode of traditional forms of government, as they still exist – at least nominally – in countries such as Oman and Qatar. There, the form of government has not been specified

⁸⁴⁴ Dien, *supra*, n. 814, p. 135.

by the Qur'an but rather developed from the general principles that the Qur'an has set, including justice⁸⁴⁵ and consultation⁸⁴⁶, both of which are to work in the public interest.

It should also be noted that the Qur'an acknowledges public interest as a basis for determining the practical daily life of individuals and groups. On the principle that no single person is expected to bear more than his or her capacity,⁸⁴⁷ legal concessions are granted for those who cannot maintain certain duties. Accordingly, a pregnant woman is exempt from the obligation to fast, and an ill person who cannot perform the ritual washing before prayer may still pray and forego ablution. Equally, those who cannot afford a pilgrimage to Mecca (i.e. *hajj*) are excused from doing so. It follows, then, that this method of legislation weighs the public's interest on the ground of necessity. Similarly, the interest of a societal group can be waived in favour of the benefit for society at large.

As a result, Islam and Islamic law do not recognise an absolute interest. Yet by considering the principle outlined above, namely that a particular interest can be overruled in favour of the greater societal good, one can detect a global interest contained in the Qur'an. The Qur'anic Sura *al-Baqarah* notes,

*'It is He who created everything on the earth for you [...]'*⁸⁴⁸

The generality of this verse indicates that everything on earth is given to all its occupants to be enjoyed responsibly. Arguably, it is therefore in the community interest that this verse is kept in a general and somewhat vague manner. On the one hand it provides Muslims with the certainty that indeed God has created the earth and everything on it so that humanity can fulfil its needs. It is this that constitutes the main ground for the legal maxim of 'nothing is prohibited, *haram*, except that which is prohibited by a sound and

⁸⁴⁵ Qur'an, 6:152.

⁸⁴⁶ Qur'an, 3:159.

⁸⁴⁷ Qur'an, 2:286.

⁸⁴⁸ Qur'an, 2:29.

explicit text'⁸⁴⁹. Whilst this allowance could be misunderstood to condone unfettered consumption by humanity, arguably the Qur'anic Sura *al-Baqarah* implies a global environmental interest. Notably, the verse refers to 'you', which does not specify one nation or community. Read in conjunction with the Qur'anic verses discussed above, which clearly indicate that the earth, with all its interests and benefits, was created to be shared by all creatures and by all human communities.

In this context, it is worth noting that al-Shatibi, a significant scholar of the Maliki school of Islamic jurisprudential thought of the twelfth-century (still dominant in North Africa), made a noteworthy definition of what constitutes the common good (*maslaha*):

'There is no absolute benefit, or absolute harm, since they should both be understood according to that which is common knowledge'⁸⁵⁰ [...] 'however, when benefit and harm conflict, judgement should only be passed when one value can clearly be seen to outweigh the other'.⁸⁵¹

Whilst this may read confusing at first, more consideration provides some enlightenment. Arguably, Shatibi's definition can be retold as being aimed at a certain activity, which in its own right can be beneficial for humans. However, the continuation of that activity can also have long-term detrimental effects. This principle can then be extended to many contemporary environmental threats born out of industrial activity that is initially aimed at enriching mankind.

As noted above, the Qur'an, and consequently Islamic legislation, imparts provisions to value and protect the environment and to safeguard its continued availability. These provisions take precedence over individual interests even if these appear to be of an

⁸⁴⁹ Al-Qaradawi, Y. (1994) *The Lawful and the Prohibited in Islam* (Brook: American Trust Publications), p. 14.

⁸⁵⁰ Al-Shatibi, I. b. (2015) *The Reconciliation of the Fundamentals of Islamic Law, Vol. II* (Reading: Garnet Publishing), p. 25.

⁸⁵¹ *Ibid*, p. 31.

overwhelming urgency. Shatibi's statement that 'there is no absolute benefit' also points, therefore, towards a fundamental value of proportionality contained within Islamic law in relation to environmental protection.

Muslims believe that ensuring social justice – or equity – in society is the cornerstone of Islam. Naturally, the notion of equity engulfs the utilisation and sharing of precious water resources as well and the Prophet Muhammad in this regard set the example. In a famous *hadith* conveyed by Abu Dawud, a man disputed with Muhammad's cousin az-Zubayr about streamlets in a plain, which was irrigated by both to grow crops.⁸⁵² The hadith conveys the following:

*The man said, "Release the water and let it run [so that both of us can use it]", but az-Zubayr refused. The Holy Prophet (peace be upon him) said to az-Zubayr: "Water [your ground], Zubayr, then let the water run to your neighbour".*⁸⁵³

Notably, almost every hadith relates in some way to the preservation of equity. A hadith conveyed by al-Bukhari illustrates this point succinctly,

*None of you will have faith till he wishes for his [Muslim] brother what he likes for himself.*⁸⁵⁴

Naturally, this equally applies to the desire for an adequate supply of clean, usable water and the grand theme of equity in the Qur'an is therefore also intrinsically linked to the supply and utilisation of fresh water. General Islamic legal perception makes clear that is

⁸⁵² A *Qanāt* is one of a series of well-like vertical shafts, connected by gently sloping tunnels. Qanāts create a reliable supply of water for human settlements and irrigation in hot, arid, and semi-arid climates. Much of the population of Iran and other arid countries in Asia and North Africa historically depended upon the water from Qanāts; the areas of population corresponded closely to the areas where Qanāts are possible. One of the oldest Qanāt systems still in use can be found in Oman on the Arabian Peninsula. The value of a Qanāt is directly related to the quality, volume, and regularity of the water flow; see generally Wilson, A. (2008) 'Hydraulic Engineering and Water Supply', in Oleson, J. P. (ed.) *Handbook of Engineering and Technology in the Classical World* (New York: Oxford University Press), p. 291 ff.

⁸⁵³ Al-Sijistani, *supra*, n. 654, hadith No. 3630.

⁸⁵⁴ Khan, M. M. (1981) *Sahih al-Bukhari: The Book of Belief* (Riyadh: al-Maktabah Dar-us-Salam), hadith No. 13, p. 61.

unjust for a Muslim to hoard excess water. Instead, he is under a duty to allow others to benefit, too. While the hadith concerning irrigation outlined above already provides an illustrative example to that effect, in another more general hadith the Prophet has reportedly stated that among the three people Allah will ignore on the day of resurrection are

*'a man [who] possessed superfluous water on a way and he withheld it from the travellers.'*⁸⁵⁵

The Qur'an also warns its followers against the unfair distribution of fresh water by asserting that the resources of this world belong first and foremost to God, his Prophet Muhammad, orphans, the needy in general, and the wayfarer,

*'Whatever God has given to His Messenger as spoils from them is by His Grace; you spurred neither horse nor camel for them, but God gives power to His messengers over anyone He wills. God has power over all things – whatever gains God has assigned to His Messenger from the inhabitants of the town is for God and for the Messenger and for his kinsfolk and for orphans and the needy and the wayfarer, so that they may not become the property of those of you who are rich.'*⁸⁵⁶

It thus evident that the recognition of water as a vital resource to which everyone has the right to a fair share. In fact, there is evidence that Islamic law regards water as a community resource to which all members of society have an equal right.

⁸⁵⁵ Khan, M. M. (1981) *Sahih al-Bukhari: The Book of Watering* (Riyadh: al-Maktabah Dar-us-Salam), hadith No. 1093, p. 514.

⁸⁵⁶ Qur'an, 59:6-7.

Specifics of Water Distribution in Islamic Law

It is interesting to note what the word ‘Shari’a’ means. In its most common sense it signifies the moral path that Muslims must pursue to attain salvation. To westerners, the Sharia is the collection of jurisprudential norms known as Islamic law. However, there is a more pointed meaning of the word. Ibn Manzur, the famous Arab lexicographer, notes that ‘shari’a’ is the place from which one descends to water,⁸⁵⁷ and Arabs consequently take Sharia as the law of water (*shur ‘at al-ma*). Mallat submits that the connection between Sharia as a generic term for Islamic law and Sharia as the law of water is not a coincidence.⁸⁵⁸

In the Hadith, the Prophet expressly prohibited the wastage of water, even at times of abundance or where it is used for a holy purpose. The Hadith demonstrates clear examples where Mohammed performs absolution with expressly referenced two-thirds of a litre of water⁸⁵⁹ or where he takes a bath using 2-3 ½ litres⁸⁶⁰. Here Islam demonstrates its strong ethical foundation through three principles: The unity of God and his creations (*tawhid*), the resulting balance that is created because of this unity (*mizān*) and the responsibility of human’s as God’s stewards on earth (*kehalifa*). The Qur’an makes clear that all on earth has been subjected to humans and their free will,⁸⁶¹ but that humans owe their existence to God alone,⁸⁶² and are therefore responsible to Him for their acts against nature.⁸⁶³

Water distribution is treated very seriously in Islam and by the States sharing the Nubian Sandstone Aquifer System. Generally, in compliance with its philosophical roots,

⁸⁵⁷ Ibn Manzur (1957) *Lisan al-Arab*, Vol. 3. (Beirut: n. p.), p. 175.

⁸⁵⁸ Mallat, *supra*, n. 734, pp. 127-37.

⁸⁵⁹ Hadith al-Bukhari, 1.200.

⁸⁶⁰ Hadith al-Tirmidhi, 427.

⁸⁶¹ Qur’an, 22:65, 2:205.

⁸⁶² Qur’an, 2:29.

⁸⁶³ Qur’an, 7:85.

the Shari'a and the Hadiths uphold the principle that all those sharing a water source, irrespective of whether it is a watercourse, a well or groundwater, are to benefit equitably.⁸⁶⁴

The Qur'an clearly embraces two important principles of water management: Supply of water is fixed and therefore it must not be wasted⁸⁶⁵. Significantly, the Hadith decreed that water is to be shared by all Muslims in partnership.⁸⁶⁶ An illustrative example of this is the 'two-ankle' rule whereby an upper riparian could only reasonably irrigate up to a level of one ankle per season. Modern legislation has enforced this Hadith. For example, in a decision by the Moroccan king's representative in 1946, this Hadith was considered and applied.⁸⁶⁷ Specifically, later interpretations concluded that the right to use a river did not extend to a right to claim the river as property. Despite this restriction, people may be entitled to the right of irrigation so long as downstream neighbours are not harmed. Additionally, if the water is to be distributed to a number of users, there is an obligation to implement a scheme of equitable distribution.

Shari'a places very few restrictions on the use or transfer (e.g. by sale or donation) of privately owned goods. Concurrently, most Muslim jurists consider water to be a resource that cannot be made subject to private ownership unless it is taken in absolute possession, e.g. contained in a flask or a privately dug well.⁸⁶⁸ The root for this approach can be found

⁸⁶⁴ Dien, M. I. (1997) 'Islam and the Environment: Theory and Practice', *Journal of Beliefs & Values*, **18**(1), pp. 55-6.

⁸⁶⁵ Qur'an, 7:31, 40:18.

⁸⁶⁶ Faruqui, N. I. (2001) 'Islam and Water Management: Overview of Principles', in Faruqui et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), pp. 1-32, citing Abu Dawood, Book 17, Hadith Number 3470.

⁸⁶⁷ Lapanne-Joinville, J. (1956) 'Arrêt du Tribunal d'Appel du Chraâ sur une Question d'Eau', in *Revue Algérienne, Tunisienne et Marocaine de Législation et de Jurisprudence*, pp. 79-90.

⁸⁶⁸ See for instance the *Hanifi* and *Hanbali* schools of Islamic jurisprudence.

in the prioritisation of water rights whereby the right of quenching one's thirst (*shirb*) takes precedent over the right to water livestock (*haq al shafa'a*) and the right to irrigate fields.⁸⁶⁹

Crucially, schools of Islamic law do not recognise ownership of a source of water. Water resources such as stream and lakes located on private land are identified in Islamic law as restricted public goods. Although there can be no outright ownership of these resources, the land owner does enjoy special rights to them, including the ability to prevent others from using the resources for reasons other than quenching their thirst or sustaining their livestock. Water contained in natural reservoirs such as aquifers are considered public goods.⁸⁷⁰ Private ownership of these waters is forbidden unless an individual 'privatises' a quantity by capturing and adding value through treatment, transportation or storage to it.⁸⁷¹ This position stems from Islam's philosophical roots outlined above whereby human beings act merely as trustees for God's creations on earth. It is only the Maliki school does allow for private ownership of water and the right of refusal by a private individual to distribute that water. However, even the Maliki school only goes so far as granting this right where no lives are at stake; as soon as the withheld water would be needed by others for survival, even followers of this legal school are obliged to provide that water.⁸⁷² The Maliki position appears to be roughly analogous to the Western international legal concept of absolute sovereignty with respect to state ownership of natural resources. However, it appears that the Maliki schools stands isolated among other schools of Islamic law and only found a following in parts of western Africa.

⁸⁶⁹ Mallat, *supra*, n. 734, p. 129.

⁸⁷⁰ Kadouri, M. T. et al (2001) 'Water Rights and Water Trade: An Islamic Perspective', in Faruqui et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), p. 89.

⁸⁷¹ Kadouri, *ibid*, n. 870, pp. 89-90.

⁸⁷² Ruxton, F. H. (1916) *Maliki Law* (London: Luzac & Co.), pp. 255-56.

Although Shari'a's complicated treatment of rights to water alongside its rigidity seems to preclude compatibility with modern 'Western' methods of water management, a number of academics have already described theoretical consistencies between Islam and modern methods of water management.⁸⁷³ Faruqi et al in particular have attempted to demonstrate how Islam can be harmonised or even complement various techniques that Western scholars have identified as possible means of improving the management of water resources.⁸⁷⁴ Almas and Scholz concur with Faruqi to the extent that Shari'a and Western Law need not be mutually exclusive.⁸⁷⁵ Indeed, Islam's prerequisite that man acts as God's trustee on earth provides great potential to underpin modern water management approaches. Modern Muslim governments and theocracies such as Iran and Saudi Arabia demonstrate that the requirements of modern modes of water management and Shari'a can be harmonised. While in Yemen the reuse wastewater was deemed unacceptable because of Islam's emphasis on cleanliness and purity⁸⁷⁶, in Saudi Arabia, a 1978 religious decree endorsed the use of treated wastewater in agriculture, thus freeing up more fresh water for human consumption.⁸⁷⁷ In Palestine, public opinion also broadly supports the notion of reusing wastewater.⁸⁷⁸

⁸⁷³ Mallat, *supra*, n. 734, p. 136; see Abdel Haleem, M. (1989) 'Water in the Qur'an', *Islamic Quarterly*, **33**(1), pp. 34-50.

⁸⁷⁴ Faruqi, *supra*, n. 866.

⁸⁷⁵ Almas, A. and Scholz, M. (2006) 'Agriculture and Water Resources Crisis in Yemen: Need for Sustainable Agriculture', *Journal of Sustainable Agriculture*, **28**(3), pp. 55-75.

⁸⁷⁶ Almas and Scholz, *ibid*, n. 875 p. 55.

⁸⁷⁷ Abderrahman, W. A. (2001) 'Water Demand Management in Saudi Arabia', in Faruqi et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), pp. 74-5.

⁸⁷⁸ Al Khateeb, N. (2001) 'Sociocultural Acceptability of Wastewater Reuse in Palestine', in Faruqi et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press).

The Ownership Utilisation of Water

The debate on Islam's compatibility with Western water management law also extends to the subject of water ownership. While Webb and Iskandarani argue that 'there are religions (for example Islam) that prohibit water allocation by market forces'⁸⁷⁹, Kadouni et al assert that Islam generally does support market water economies provided these are based on principles of equal access and social justice.⁸⁸⁰ There is hardly a Muslim country that does not impose some form of water tariffs, including prominent Islamic theocracies. In Saudi Arabia, for example, the government implemented tariffs in 1994 to encourage greater efficiency in the use of costly desalinated water.⁸⁸¹ In Iran, the Islamic principle of *shirb* and the need for efficiency sit side-by-side as the government provides a minimal amount of water free of charge but demands market rates for any additional volumes.⁸⁸² Accordingly, Faruqi notes that Islam's prioritisation of water for human consumption might develop to become a viable mechanism for intersectoral water allocation within society.⁸⁸³

On the basis of the extensive work carried out by Norvelle⁸⁸⁴, a high quality translation of the legal principles relevant to Islamic water law from the Hanbali School of Islamic jurisprudential thought is available. This school jurisprudence in the Islamic world was established by the renowned scholar Ibn Qudamah al-Maqdisi al-Hanbal (hence the term Hanbali school). According to Norvelle, the Hanbali School has been the pre-eminent

⁸⁷⁹ Webb, P. and Iskandarani, M. (1998) *Water Insecurity and the Poor: Issues and Research Needs* (Bonn: Center for Developmental Research, Universität Bonn), p. 34.

⁸⁸⁰ Kadouri, M. T. et al (2001) 'Water Rights and Water Trade: An Islamic Perspective', in Faruqi et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), p. 90.

⁸⁸¹ Abderrahman, *supra*, n. 877, p. 72.

⁸⁸² Sadr, K. (2001) 'Water Markets and Pricing in Iran', in Faruqi et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), p. 110.

⁸⁸³ Faruqi, N. I. (2001) 'Intersectoral Water Markets in the Middle East and North Africa', in Faruqi et al. (eds.) *Water Management in Islam* (Tokyo: United Nations University Press), xii.

⁸⁸⁴ Norvelle, M. E. (1980) *Water Use and Ownership According to the Texts of Hanbali Fiqh* (Montreal: McGill University).

school of legal thought that is ‘actively applied as the basis for legal discussion within a modern Islamic state currently emphasizing the development of its natural resources, particularly water’.⁸⁸⁵ Norvelle asserts that it has the most direct influence on national policy decisions in relation to the development of water resources, their management as well as their utilisation.⁸⁸⁶

Water in its natural state, as a rule, is not considered to be owned by a property holder and therefore cannot be sold. A complete analysis of this question is provided by Ibn Qudama in the section of *al-Mughni*⁸⁸⁷, entitled ‘The Sale’ (*al-Bai*):

*‘Should there be a well and a spring found on the land, the well itself and the land where the spring is located are owned by the owner of the land. But the water in the well and spring is not owned. This is because the water flows underground to his property and is similar to the water in a river, which flows to his property’.*⁸⁸⁸

However, there exist conflicting views on this particular subject, as espoused in a hadith by Abu Bakr. According to his transliteration of the Prophet’s teachings, the particular source of aquifer water in question is included as part and parcel of the property because it has accumulated within the same.⁸⁸⁹ In other words, if one owns the land, i.e. the soil in the literal sense, one has also acquired mineral rights to the water contained therein. This approach is reminiscent of the previously discussed ‘rule of capture’, whereby mineral rights typically reside with the landowner and not the state.⁸⁹⁰ The associated risk of such an approach to water utilization is competitive drilling, which could encourage unfettered

⁸⁸⁵ *Ibid*, p. 3.

⁸⁸⁶ *Ibid*.

⁸⁸⁷ Ibn Qudamah, al-M. al-H.: *al-Mughni*, translated by Norvelle, *supra*, n. 884.

⁸⁸⁸ Norvelle, *supra*, n. 884, p. 23.

⁸⁸⁹ *Ibid*, p. 24.

⁸⁹⁰ Morris, *supra*, n. 185 p. 206; see also Thalmann, *supra*, n. 185, p. 121.

water consumption by foregoing options to stretch out their availability to the maximum possible in conflict with important principles associated with sustainable development and intergenerational equity. In essence, a private landowner is able to assert his exclusive rights over the water contained in his land and thus give rise to the ‘rule of capture’ and the ‘rule of prior appropriation’.⁸⁹¹ Even though they respectively refer to the domains of either public or private law, would effectively constitute a similar set of affairs. As already discussed above, States or individuals who are not engaged, for whatever reason, in the rapid exploitation of a water deposit would risk losing at least some of the deposit’s natural production potential to a fast-moving neighbour or competitor.⁸⁹² Application of this principle would therefore not just contravene states’ duty to prevent transboundary harm,⁸⁹³ but also be in disaccord with the whole ethos of the *2008 Draft Articles*, ranging from equitable and reasonable utilization, the general obligation to cooperate and the obligation not to cause significant harm.

However, Norvelle relates a slightly contradictory teaching by another of Mohammad’s disciples, Ahmad, who at first corroborates the view of Abu Bakr but subsequently tries to distinguish it. On the basis of Ahmad's authority, legal tradition from the Hanbali perspective indeed suggests that water is a flowing mineral located on owned land, akin to oil, wax, or salt. Ownership rights are analogous to other natural resources found on land, for example trees or other plants. Water is considered in the same context as all of these accretions in the application of the two aforementioned views. Nevertheless, Ahmad also seems to believe that the ownership of water does not entitle its sale:

⁸⁹¹ See Lagoni, *supra*, n. 175, p. 220 for a discussion of the ‘rule of prior appropriation’.

⁸⁹² Toriguian, *supra*, n. 188, p. 271.

⁸⁹³ See discussion in Ch. 3 ‘Pertinent Issues of Resource and Environmental Law’.

*I definitely view with disfavour the selling of water.*⁸⁹⁴

In Norvelle's translation, Al-Hanbal then argues further by relating the testimony of a certain Al-Athram and others, which specified that the Prophet himself forbade the sale of water:

I heard Abu Abdallah when he was asked about a group of people who shared a river from which they irrigated their lands – one man's land for one day and another man's for two days – the apportionment of which was by agreement: 'If my day comes and I do not need [the water], may I rent it for money?' Abu Abdallah said, 'I do not know, but the Prophet, God bless him and grant him salvation, forbade the selling of water.' It was said, 'one is not selling it but renting it.' [Abu Abdallah] said, 'They have adopted stratagems in order to put renting it in a more favourable light, for what is it except selling? Al-Athram related through his isnad according to Jabir and Iyas ibn Abdallah al-Muzani: that 'The Prophet, God bless him and grant him salvation, forbade the selling of water'.⁸⁹⁵

The thus suggested Islamic legal tradition of a prohibition for the sale of water is important as it practically removes the key incentive of capturing more water from either a well or through a dam, than is required for personal consumption. Arguably, therefore, Islamic water law and management is intrinsically linked or, as Wilkinson notes, 'subsumed under land management' and that an important mode of laying claim to water is by cultivating unclaimed, or uncultivated, land.⁸⁹⁶ Whilst on the one hand this suggests strong parallels with the concepts of territorial sovereignty and integrity discussed above, one can also deduce that Islamic law under the Hanbali School clearly intends to limit the extent of

⁸⁹⁴Norvelle, *supra*, n.884, p. 24.

⁸⁹⁵*Ibid.*

⁸⁹⁶Wilkinson, J. C. (1990) 'Muslim Land and Water Law', *Journal of Islamic Studies*, **1**, p. 55.

these acquired mineral rights by distinguishing between ownership of a given quantity of water from ownership of, and control over, its source. Accordingly,

*'[water] is not to be owned, but [the] landlord still has more right to it than anyone else because it is on his land. But, if someone else enters without his permission and takes [some of] it, it becomes [that person's] property.'*⁸⁹⁷

Perhaps the most striking aspect of this hadith is that it does not denounce the taking of water from someone else's property as theft. Quite to the contrary, an individual acquires ownership rights to the water he captured with a vessel he owns. Apart from the specific equitable principle of *maslaha*⁸⁹⁸ to safeguard public welfare, this is consistent with the attitudes Islam portrays towards the relationship between mankind and natural resources. As noted above, Islam regards human beings as God's stewards on earth. It therefore makes sense that humans' rights to fresh water should be protected to the extent that they can be certain to have at their disposal the quantities necessary for land cultivation without being able to stock-pile or claim absolute ownership over the water's source. Indeed, the Hanbali School asserts that water itself is 'common' or 'ownerless' (*mubah*). More specifically:

*'If a person appropriates water in his container [from proprietary land not belonging to him], or in his bundle or in his bag, or if he takes minerals, he owns that which he takes.'*⁸⁹⁹

However, provided that person only has a limited quantity of water at his disposal, i.e. does not own or control the water's source, it can still be sold as personal property:

'This [case] is the same as if a bird built a nest on his land, or a deer entered it, or the water contained fish, and an intruder entered and took some [of the

⁸⁹⁷ Norvelle, *supra*, n. 889, p. 24.

⁸⁹⁸ See preceding discussion.

⁸⁹⁹ Norvelle, *supra*, n. 889.

*wildlife]. [...]Also, if a person stood by his own well or by a common well and extracted water from it in his bucket, by a wheel, or by like means, that water which he brings up is his property and he may sell it. It is his property because he took it in his own vessel.*⁹⁰⁰

Indeed, al-Hanbal asserts that this practice was the origin of the custom in fortified cities to sell and buy water in water-skins along with firewood and forage.⁹⁰¹ It follows that the vital distinction between water in a semi-public domain and in private ownership is that it has been captured in some man-made contraption. This basic tenet is also reflected in another important theme of al-Hanbal teachings: individual mineral rights vis-à-vis long-term equitable distribution of water. At first, the familiar thread of acquiring ownership over a limited amount of water through the creation of a kind of catchment is central to Hanbali jurisprudence on this topic:

*'One does not own it unless he creates a catchment on his land, like a pool or a pond, or digs an irrigation ditch by which he takes water from a large river.*⁹⁰²

*However, Hanbali jurisprudence subsequently recognises the need to negotiate a balance between these mineral rights and the public good. In particular, Islamic law in this instance intends to first reward a person's efforts in cultivating the land by giving the landowner priority to the use of captured water.*⁹⁰³ *Notably, this approach is corroborated by the renowned Islamic jurist ibn Qudama almost 400 years after al-Hanbal's death in 855 AD, suggesting it had become by then a rule in Islamic law that once water has been captured that way, taking it would amount to theft.*⁹⁰⁴ *Nevertheless, another famous Islamic scholar, Al-Babuti (c. 1592 - 1641), by quoting the Prophet, reasserts that*

⁹⁰⁰ *Ibid*, p. 25.

⁹⁰¹ *Ibid*.

⁹⁰² *Ibid*, p. 27.

⁹⁰³ *Ibid*.

⁹⁰⁴ Ibn Qudama, M. al-D. (1968) *al-Mughni, Vol. 4* (Cairo: Maktaba al-Qahira), translated by Norvelle, *supra*, n. 884, pp. 61-63; see also discussion on disappearance of Ijtihād in the tenth century, suggesting that this principle is firm in Islamic law.

water in its natural occurrence remains in the public domain regardless of its location on private or public land:

Water in its natural state (idda) is not to be owned before it is appropriated. The natural state of water means that which has not been removed from its continuous occurrence (madda) like the waters or springs or standing in the well for it is reported [...] that the Prophet, peace be unto him, said, 'Muslims are sharers in three things: in water, pasture, and fire [...] the Prophet, God bless him and grant him salvation, prohibited selling water except that which was carried in a container.'⁹⁰⁵

Finally, to remove any doubt over the state of water contained in private soil, Al-Bahuti reinforces the status of water thus:

If one purchases land that has water available on or in it, the purchaser has priority to the water because he owns the land. However, he does not own the water before he appropriates it.⁹⁰⁶

Arguably, the most interesting aspect of the Islamic jurisprudential discourse in relation to water is its emphasis on its sale. When it comes to earth's resources, their development is mainly ruled by commercial considerations. Consequently, mineral deposits, forests or other resources are developed and utilisation according to market forces. For instance, if the price of oil drops below a certain breakeven price, a particular hydrocarbon deposit might not be developed. In relation to water, although by and large this has not (yet) happened, such a decision could have severe consequences. However, whereas Islamic law (at least as far as the wide-spread Hanbali school of jurisprudential thought is concerned) is very specific on different degrees of ownership and control over freshwater from all sources, Western environmental law has to date said very little in relation to the

⁹⁰⁵ Al-Bahuti, M. b. Y. b. I. (n. d.) *Kashaf al-Qina an Matn al-Iqna*, Vol. 3 (Riyad: Maktaba al-Nasr al-Haditha), p. 160.

⁹⁰⁶ *Ibid*, p. 276.

commercialisation of water. Whilst one is left to speculate, the relative abundance of freshwater in the Western sphere may well have played a role in this apparent gap.

Apart from jurisprudence as to the ownership and sale of water, Islamic jurisprudence also provides norms in relation to irrigation. According to the Hanbali School, water can only occur in two States – either it is in flux or it is static. Regarding water in flux, the School distinguishes between bodies of water that are so vast in scale that ordinary use will not alter its nature, and those for which there is competition. The category undoubtedly refers to large bodies of replenishing water such as the Nile, the Euphrates or the Tigris. The key attribute of these bodies of water is that due to their size, it is generally assumed there is no competition over their use. Consequently, Ibn Qudama and the Hanbali school suggest Islamic law would allow unfettered utilisation of such waters.⁹⁰⁷ However, Ibn Qudama's choice of words strongly suggests that this approach is with the individual in mind and not a State. Whereas it is impossible for an individual farmer to consume the whole of the river Nile, a dam built by a State would certainly be able to choke off water supply for a lower riparian neighbour.⁹⁰⁸

Accordingly, when it comes to more limited resources for which there is competition, those situated nearest to the source will reap most of the benefit or at least enjoy the highest security of supply:

The second situation regards a small river, along which the people are closely situated and compete for its water, or flood water, for which the people residing along its course compete. In this case, he who is situated nearest the source of

⁹⁰⁷ Ibn Qudama, M. al-D. (1968) *al-Mughni*, Vol. 4 (Cairo: Maktaba al-Qahira), translated by Norvelle, *supra*, n. 884, p. 30.

⁹⁰⁸ For a discussion of the Euphrates/Tigris conflict between Turkey, Syria and Iraq, see Wilk, A. (2011) *Can Turkey legally treat its natural water resources like Iraq can treat its crude oil resources?* (Colchester: University of Essex, LL.B. dissertation).

*the river is first to use it. He irrigates and restrains the water until it reaches ankle depth, then he releases it to the next person, who proceeds in the same way. This process is continued until it reaches all of the lands. However, if there is no excess from the first person or from the second, or from those following, then nothing is left for those remaining’.*⁹⁰⁹

Evidently this does not sit well with Western notions of equitable distribution of the water yet it is a uniform view held by other schools of Islamic jurisprudential thought, too, including Maliki and al-Shafi.⁹¹⁰ The rationale behind this approach is that

*‘the one whose land is closer to the source of the river has priority to the water and is, therefore, more entitled to it, like the one who reaches a drinking place (al-mashra’a) first’.*⁹¹¹

This is a very harsh approach to a common water issue in a region where water scarcity is the norm. However, closer inspection of the intricacies of the provision reveals that it only applies to the excess or surplus water available. Equity, therefore, still needs to be taken into account, at least to some extent. Accordingly, al-Hanbal asserts that

*‘If two persons are equidistant from the source of the river, they are to share the water between them, if possible. If this is not possible then they cast lots, and he who wins has first use of the water. If there is no excess, whoever wins should irrigate according to his share of the water, then leave it to the other. He has no right to use all of the water because his neighbour has an equal right to it. The casting of lots is only to establish priority in fulfilling the right, and not the source of the right itself’.*⁹¹²

Interestingly, where the properties of two landowners are located on the same level of elevation so that the rule of attributing priority to the one higher up cannot apply, the

⁹⁰⁹ Norvelle, *supra*, n. 884, p. 30.

⁹¹⁰ *Ibid*, p. 31.

⁹¹¹ *Ibid*, p. 33.

⁹¹² *Ibid*.

amount of water each is entitled to depends on the size of their respective properties. Islamic law in this instance engages in legal fiction to arrive at a solution. The bigger share of water is then allocated to the landowner with the proportionally bigger landholding:

‘if there are two owners of land on the same level, and one of them owns more land than the other, the water is apportioned according to the extent of the property because the excess share of land at the same proximity can be considered as belonging to a third party, who is entitled to a share of water.’⁹¹³

Other important concepts of Western environmental law also feature prominently in Islamic jurisprudence. For instance, the principle of avoiding transboundary harm of a neighbouring state can be detected in the deliberation on the conflicts of interests between a group with cultivated land and designated rights to take water from a river (*rasmu shirbin*) and a third party who occupies uncultivated land (located closer to the source of the river) and only with the intention of cultivating it. Whilst on the one hand the third party’s rights in accordance to the principle of water proximity (*marafiqiba*) needs to be considered, on the other hand the group’s status as seniority by virtue of their status as preceding users with more productive land needs to be weighed.⁹¹⁴ The jurisprudence of Hanbali is decisive in this regard:

‘if a person was the first to arrive at a flow of water or an unclaimed river and he cultivated virgin land at a place farthest downstream, then a second person arrived and cultivated land above that of the first, then a third settled above the second, the person

⁹¹³ *Ibid.*

⁹¹⁴ *Ibid.*, p. 35.

*farthest down- stream would irrigate first then the second, and then the third. So, in this case the priority of cultivation is superior to priority of proximity to the river.*⁹¹⁵

Accordingly, when other interested parties who are already drawing water from its source are at risk of being prevented to fulfil their legitimate needs by a third party's action, they may be entitled to estoppel to preserve their interest, even when the third party's action would be entirely legal. Islamic law, in this particular set of circumstances, is prepared to protect the rights of one party based on their interest's seniority.⁹¹⁶

*If the land of the first claimant to reclamation is lower – as regards a small river – then another reclaims land above his, then a third above the second, the first land user is the first to irrigate, then the second, then the third, because here the consideration is prior claim to the water due to the sequence of reclamation and not closeness to the water course.*⁹¹⁷

Another interesting aspect of Hanbali jurisprudence is the possible apportionment of irrigation water to the extent the parties have invested in the necessary infrastructure, and, where this measurement fails, according to the size of their landholding. Where infrastructure work has been completed and owned by a group, the water is distributed according to the share of work and expenditure that went into developing it. Apportionment rights are therefore attributed in accordance with individual expenditure. In case there is enough water for all interest parties, a dispute is unlikely. If, however, the water is insufficient, the parties can either opt to mutually agree to adopt a distribution scheme of their choosing – e.g. a time-based apportionment system (*mubaya'a*)⁹¹⁸ – or by

⁹¹⁵ Ibn Qudama, M. al-D. (1968) *al-Mughni*, Vol. 5 (Cairo: Maktaba al-Qahira), pp. 430-2, transl. by Norvelle, *ibid*.

⁹¹⁶ Al-Bahuti, M. b. Y. b. I. (n. d.) *Kashaf al-Qina an Matn al-Iqna*, Vol. 4 (Riyad: Maktaba al-Nasr al-Haditha), p. 199, transl. by Norvelle, *ibid*, pp. 35-6.

⁹¹⁷ Al-Bahuti, *ibid*, p. 199.

⁹¹⁸ Ibn Qudama, M. al-D. (1968) *al-Mughni*. Cairo: Maktaba al-Qahira, 5, p. 433, transl. by Norvelle, *supra*, n. 884; *Al-mubaya'a* denotes a system of apportionment based upon the measure of time.

judicial decision, which may apportion the water among them on the basis of the size of their land holdings. In other words,

‘when their properties are unequal, the water is divided according to the amount of land possessed.’⁹¹⁹

As pointed out above, each of them owns a share of the river on that basis as their water rights are subsumed under rights to land.

Summary

This chapter explored the extent to which Islamic water law is congruent with the general thrust of the *2008 Draft Articles*. It first examined the relationship between Islamic law and the environment in general as well as Western environmental law. This was followed by a discussion pertaining to specific hadiths of water distribution, the ownership and the utilisation of water.

Islamic legal traditions and customs are still competing for influence with western water management concepts. This circumstance has led Caponera conclude that Muslim countries have ‘justifiable mistrust’ towards the Western codification of water law for fear that the result might offend Islamic law. This need not be the case. In the Judeo-Christian tradition, God gave the earth to mankind as an everlasting possession. This has been carried forward in both the common law and the civil law traditions. Accordingly, the English philosopher John Locke asserts that regardless of whether one accepts natural reason or believes in God's gift ‘to Adam and, and to Noah, and his sons’, mankind holds the world ‘in common’. Dolzer, meanwhile, argues that ownership rights in a civil law

⁹¹⁹ Ibn Qudama, *ibid*, pp. 430-2.

jurisdiction (Germany) can be limited to benefit the public good, without attributing a right for compensation to the owners.

This acceptance of responsibility is of prime importance when searching for a common set of denominators between the Western and Islamic legal conceptions of transboundary groundwater utilisation. Islam places particular emphasis on morality and it epitomises the circular reference between God, the Qur'an and Islamic law, which represents a cornerstone of the perspective on the environment the Islamic legal system has to offer. In the Muslim faith, God has tasked mankind to be his stewards on earth. The Qur'an makes clear that all on earth has been subjected to humans and their free will, but that they owe their existence to God alone and are therefore responsible to Him for their treatment of nature and its resources.

This acceptance of responsibility is of prime importance when searching for a common set of denominators between the Western and Islamic legal conceptions of transboundary groundwater utilisation. Islam places particular emphasis on morality by not only epitomising the circular reference between God, the Qur'an and Islamic law, but also represents a cornerstone of the perspective on the environment the Islamic legal system has to offer. In the Muslim faith, God has tasked mankind to be his stewards on earth. The Qur'an makes clear that whilst all on earth has been subjected to humans and their free will, they owe their existence to God alone and are therefore responsible to Him for their treatment of nature and its resources. Locke and Muir equally emphasise the individual and collective responsibility humans have towards nature and directly challenge the notion of any human entitlement.

Yet, the word 'environment', i.e. the aggregate of all land, air, water and organisms contained therein, does not appear in the Qur'an. Instead, there is strong emphasis on the different matters (or elements) that constitute one's surrounding. Although nominally Islam

treats all of nature's elements equally, in the author's view, water takes a special place. Water is such an important element of life that Islam seeks to protect it on both a legal and an ethical level, which can be seen in the public status Islamic law affords water resources. Based on the holistic nature with which Islam constructs the universe and the interrelationship of all organisms, it is perhaps not surprising that the preservation of water quality is equally an aim of Islamic law. It has been shown so far that clean water in general features very prominently in Islam. Much of that interest may be due to the fact that the law permits only unpolluted water for use in all rituals. As a result, water quality is not a domain of substantial divergence in Islamic jurists' opinions.

Early on Islamic law adopted a system of water law that recognises riparian rights, establishes a community interest in the utilisation of water and strictly controls appropriative rights. Generally, Islamic law thus requires a person to exercise a higher standard of care where his action may adversely affect a public interest. Although these examples of Islamic law as it pertains to water may sometimes appear archaic to the non-Muslim reader, they do convey an important set of principles in relation to the degree of water contamination that is considered acceptable before it turns into water pollution. This question has also concerned Western jurists in their quest for an appropriate definition of environmental damage and the two legal systems espouse a similar approach in that they consider the degree of contamination before categorising water as 'polluted'. Good management and conservation of water are thus requirements also contained in Islamic law. Notably, through the doctrine of 'Right of God', which includes those rights that concern public interest as a whole, the judiciary has very little scope of discretion in their enforcement.

The debate on Islam's compatibility with rules of Western water management also extends to the subject of water ownership. Arguably, the most interesting aspect of the

Islamic jurisprudential discourse in relation to water is its emphasis on its sale. In essence, the Hanbali as well as the Maliki schools of Islamic jurisprudential thought appear to allow market-based water economies provided these adhere to principles of equal access and social justice. Islamic law (at least as far as the wide-spread Hanbali school of jurisprudential thought is concerned) is very specific on different degrees of ownership and control over freshwater from all sources, thus including groundwater. Notably, there is hardly a Muslim country that does not impose some form of water tariffs, including prominent Islamic theocracies such as Saudi Arabia and Iran. However, Western environmental law has to date said very little in relation to the commercialisation of water. Whilst one is left to speculate, the relative abundance of freshwater in the Western sphere may well have played a role in this apparent gap.

CONCLUSION

This thesis set out to investigate the utilisation of the Nubian Sandstone Aquifer System (NSAS), one of the world's largest transboundary fossil aquifers that stretches underneath the territories of the North African States of Egypt, Libya, Sudan and Chad, in light of Islamic norms and the emerging law of transboundary fossil aquifers. All four States have strong Islamic cultural backgrounds, and Egypt, Libya and Sudan have enshrined Shari'a as a fundamental source of law in their constitutions. They have thus recognised an obligation to ensure all laws applied by their judiciary are consistent with core Islamic norms and values. The constitution of Chad, meanwhile, has affirmed a vision of regional cooperation and legal integration, so that, whilst being secular, it would certainly not be in conflict with the consideration of Islamic norms in an eventual NSAS framework agreement.

The adopted approach to the research was a holistic one, and thereby refrained from adopting an overly rigid or dogmatic methodology but instead sought principles contained in different corpora of international law to advance our understanding of the unique set of problems involved in the utilisation of the NSAS. The basic premise of this approach was the view that the basis of a legal system's normative effect is rooted in its principles, and that it can therefore only be appropriate to draw on legal principles from both general international and Islamic law. The main thrust of this thesis was thus to ascertain the extent

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to which water-related principles of Islamic law could act as a potential bridge for the four Aquifer States where 'Western' international water law has not yet become authoritative enough and thereby contribute to the Aquifer States' decades-old search for a comprehensive utilisation framework for the Aquifer System.

The investigation into the norms of general international and Islamic law drew on an array of important issues relevant to the legal demands of the Nubian Sandstone Aquifer System and covered significant ground in the search for an existing legal framework that could benefit the Aquifer System. Although the transboundary groundwater underneath the four Aquifer States consists of a network of different aquifers, their almost uniform geological characteristics mean that they are best treated as a unitary whole. There can be little doubt that the most defining element of the nature of the Nubian Sandstone Aquifer System is its status as a confined 'fossil' aquifer. This means that it is not recharged via the earth's hydraulic cycle and does not discharge naturally at the surface. Whilst as perhaps the most obvious consequence the NSAS therefore constitutes a finite freshwater resource, it also means that existing international water law regimes such as the *1997 Convention on the Law of non-Navigational Uses of International Watercourses* do not capture this particular type of aquifer because it does not belong or connect to an 'international watercourse'. It was for this very reason that the International Law Commission originally set out to fill that lacuna and propose the *2008 Draft Articles on the Law of Transboundary Aquifers*.

The corpus of international law relating to the environment, and, in particular, to the use of transboundary fossil aquifers is therefore still in flux. Arguably, this is one of the main factors which help to explain why, given their absolute pre-eminence in the supply of fresh water, there remain numerous gaps in the codified body of international law. Although the International Law Commission has produced its set of 19 *Draft Articles* to capture the law of transboundary aquifers in 2008, the Commission's *travaux préparatoires*

and the *Draft Articles*' protracted limbo suggest that States do not share particular enthusiasm towards such an aquifer-specific framework. Whilst the *1997 Convention* progressed at least as slowly (it took the *Convention* almost 40 years from conception to enter into force), there remain considerable legal and hydrological problems with the *2008 Draft Articles*, depending on their eventual status (on which the General Assembly still has to decide), with arguably the most fundamental one pertaining to their actual scope. Whilst the original justification for the *Draft Articles*' inception was the *1997 Convention*'s lack of scope for hydraulically autarkic 'fossil' aquifers, their title suggests that they are now aimed at transboundary aquifers in general although they lack the same breadth and depth of the *1997 Convention*. Another crucial deficiency is the *Draft Articles*' less than adequate attitude towards precaution. Whilst adopting a less stringent approach towards environmental protection and preservation may make the *Draft Articles* more palatable for States and their respective development goals (although it has not so far), the geophysical nature of the Nubian Sandstone Aquifer System makes a strict approach imperative: being a 'fossil' aquifer, it would be impossible to reverse pollution or over-abstraction of its water. Inter alia, the significant risk of international water conflicts in light of weak legal frameworks highlighted by this thesis also suggests that a more authoritative (possibly even in a cultural/religious dimension) instrument will ultimately be needed.

In this context, it has been shown that international human rights provide two important cues for the advancement of such an instrument. On the one hand they highlighting the ideal for States providing adequate amounts of fresh water to their populaces. International human rights therefore provide a reference point for States on what to achieve and thereby underscore the purpose of an utilisation framework. On the other hand, international human rights have not been established to provide States with detailed instructions on *how* to achieve their set-out ideals. It therefore cannot be expected of them to take the place of an aquifer-specific framework. What remains is that

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international human rights have the capacity to highlight the issue at hand but not to provide the solution.

The gap in international law regarding transboundary fossil aquifers has significant consequences for the four Aquifer States. Whilst transboundary groundwater knows no political, economic or social boundaries, the confined and finite nature of the Nubian Sandstone Aquifer System is such that Libya, Egypt, Chad or Sudan cannot simply extract as much water as they wish all at the same time without running the risk of damaging the Aquifer System as a reliable freshwater source. Groundwater development activities of one Aquifer State could thus have irreversible impacts on the capability of another to use the water, for example due to the process of self-equilibration if the groundwater concerned suffers from an alteration to its geological environment (e.g. through an excess drilling of wells). In contrast, static resources such as coal and timber have no potential for self-equilibration and can therefore be more readily divided by neighbouring States. Concurrently, the lack of recharge and discharge means that transboundary fossil aquifers are at increased risk from pollution. Whilst moving watercourses are able to gradually cleanse themselves given enough time under right management, the essentially static nature of fossil aquifers prevents the same from happening.

From within the legal sphere of transboundary resource management, hydrocarbon law may perhaps inform the conception of an aquifer-specific framework, but it does not remove the requirement of a fossil aquifer specific instrument because the production of transboundary hydrocarbons has primarily been governed by a medley of unsatisfactory status quos and industry-specific agreements on state/state and state/company level to conform to special constitutional requirements of various producing nations. As a result, hydrocarbon law has developed to conform more to notions of territorial integrity than the sustainable development or equitable utilisation of transboundary groundwater resources.

Despite the status of territorial sovereignty and integrity as integral parts of international law, they are not without serious drawbacks of their own in relation to the responsible development and utilisation of a transboundary fossil aquifer; dependence on these principles alone is unlikely to achieve desirable results. A key issue in this regard is the indecisiveness of international law in committing to a single definition of what constitutes 'the environment'. As a result of the complexity of environmental issues, the picture that frequently offers itself is that of a fragmented corpus of international environmental law, with a scattered body of sources and frequently vague definitions. Significantly, there are no coherent legal instruments of Western international law that unequivocally capture the concept of 'the environment'. In Islamic law, the Qur'an likewise lacks a unifying definition of the environment and instead focuses on the different elements in isolation. Such a wide range of definitions can be problematic when dealing with interconnected ecosystems. Laws adopted to protect the environment can impose potentially significant economic costs, even if these only extend to limitations on economic opportunities. Consequently, it should not be surprising that the attitude of States towards this subject has broadly been analogous to state sovereignty over hydrocarbons embedded in a nation's territory. States, with their tendency to prioritise their own interests, generally insist that their territorial sovereignty also extends over groundwater within their jurisdiction. This, however, risks the longevity of transboundary resources as maximising national interest is likely to result in resource competition.

This attitude by States towards finite resources as produced a situation where one has to look to sustainable development for principles pertinent to an aquifer utilisation framework even though the NSAS is in essence a finite resource. This is only possible because, unlike theories of territorial sovereignty that promote exclusivity, sustainable development is at its core an integrationist principle. Earlier steps towards the development of the principle, such as the *1972 Stockholm Declaration* attempted to gradually tighten

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environmental controls around national development and natural resource policies whilst also maintaining States' right to consume their natural resources for the purpose of development. The *1992 Rio Declaration* in particular tries to sit on two chairs at once by fully endorsing its 1972 predecessor on the one hand, and on the other tightening said controls. The *New Delhi Declaration* later even expanded the scope of its Rio predecessor by recognising a duty of States to not just ensure that their neighbours' environments – and, by extension, their natural resources – remain uncompromised through their actions, but also by departing from their traditional 'sovereign right to exploit'. Inter alia, it might therefore not come as a surprise that the *New Delhi Declaration* has so far not morphed into binding international law. States therefore retain considerable discretion in the effect they wish to afford sustainable development as a normative factor in their agreements. Even though the ICJ's *Advisory Opinion on the Legality of the Threat or Use of Nuclear Weapons* finds for a general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment, a duty to prevent transboundary environmental harm is rooted more in the respect for another state's sovereignty and territorial integrity rather than environmental protection *per se*. Although in contrast the precautionary principle adopts a more holistic approach and aims to protect environment *per se*, judicial bodies have by and large taken a conservative approach by prioritising territorial sovereignty over the principle of precautionary environmental protection.

Prima facie this represents a shortcoming in international law because it does not serve the prolonged utilisation of the Nubian Sandstone Aquifer System (if not sustainable development) and intergenerational equity, which requires a consistent environmental approach towards its water. In turn this would leave a significant gap in international environmental law were it not for the conceptual overlap between the preventive approach

and the precautionary principle. Whereas prevention aims to limit risk and precaution tackles uncertainty, the very notion of risk comprises uncertainty. It is therefore possible to see the preventive approach as serving both territorial sovereignty and environmental protection. Whilst this could potentially compromise sustainable development and intergenerational equity, it currently seems to be as far as international courts are willing to go at the moment.

The inherent conflict between constrained utilisation in the interest of protecting and conserving precious groundwater and water's centrality to economic development resulted in progress in legal development being slow and only being achieved by compromise. This is not to say, of course, that compromise is inherently undesirable. It sometimes can be a helpful tool to help along the agenda by smoothing out minor creases but too often it weakens the agreed plan of action as it forces the contractual parties to make concessions they may well regard as a loss to their original position. The concept of compromise starts with the notion of two opposing positions that eventually 'meet somewhere in the middle' but have had to make sacrifices along the way. It is not even guaranteed that the opposing sides have made equal sacrifices or acted in good faith, especially when the compromise was achieved based on considerations unrelated to the issue at hand. Consequently, the risk of a self-perceived 'loser' wanting to make good on that 'loss' increases, which in turn reduces the security of the agreement. Instead of mere compromise, the search for common principles should prevail and a solution should be built on that foundation. Unlike compromises, the search for common principles between contracting parties significantly reduces ambiguity and eliminates the notions of 'winners' and 'losers'. As a result, searching for a solution based on shared principles instead of mere compromise improves the prospects of good faith.

Conclusion

In this context, this thesis has studied the potential for Islam in the water-related negotiations between the four Aquifer States. Due to the scope of the thesis, which prohibited a comprehensive comparison between the different schools of Islamic jurisprudence, and, indeed, a somewhat limited availability of English language sources of specific hadiths, the Hanbali School of Islamic jurisprudential thought was primarily consulted. Nevertheless, this School has been recognised as the most widely accepted in the MENA region and water quality is not a domain of substantial divergence in Islamic jurists' opinions because of its importance to Islamic rituals.

Whilst this thesis was not written by a Muslim or an Islamic theologian, the consideration of general principles of Islamic water and environmental law is still a valid exercise because much of international environmental law has to date been reliant on principles to achieve a normative effect on States. Indeed, national legislation in Islamic countries frequently cannot give heed to every sheikh's personal reasoning but have to apply the general thrust of Islamic law. Considering that States are ultimately self-interested and that general international law is of their own creation, Islam, in its capacity as a religion and a codex of binding norms can introduce a vital element of impartial adjudication and common ground among the four Aquifer States. In other words, Islam could potentially provide a bridge where general international law has not yet become authoritative enough. Islam, like many other belief systems, encompasses more than a code for worship. It frequently penetrates aspects of many Muslims' daily lives, ranging from contracts to inheritance and, of course, the use of water. So, while only few Muslim countries base their political, judicial, economic or constitutional systems entirely on Islam, it is equally the case that only Turkey can be seen as a truly secular state in the Middle East. Consequently, a fundamental distinction of Islamic law is its insulation from influence-taking by individuals or society based on the expectation that human minds can easily be corrupted. As a result, from an Islamic perspective, law controls society and cannot be controlled by the latter as it

is the will of God, not public opinion, which determines legality. Although a common critique of Islamic jurisprudence has been that it has thus lost touch with the changing conditions of contemporary life, and is therefore ‘backward’ and incapable of constructively contributing to modern government processes in the fields of legislation and judicial practice, this perceived gap can to considerable extent be attributed to the historic marginalisation of the Islamic legal tool of reasoning and equity: *Ijtihād*. This thesis has therefore argued that although Islam prohibits some routes of inquiry – including the questioning of key pillars of the Islamic faith such as the existence of God – the contemporary Islamic community experiences a growing need for multidisciplinary creative inquiry into new problems and questions arising in an ever-more dynamic world. The doctrine of *Ijtihād* was conceived to do just that whilst following the guidelines already established by the Qur'an and the Sunnah. Given that one of the largest confined ‘fossil’ aquifers stretches underneath the territories of four North African States, three of which recognise Islamic law as an official source of law in their respective constitutions, it is vital that the principles contained within the *2008 Draft Articles* are congruent with general provisions of the Shari'a pertaining to the environment.

Islamic legal traditions and customs are still competing for influence with Western water management concepts. General international law has been slow to advance on the topic of transboundary freshwater resources – and groundwater in particular – and it is therefore no surprise that the basic consideration of Islamic law has advanced slowly since the fateful *San Francisco Conference* of 1945. This circumstance has led Caponera to conclude that Muslim countries have ‘justifiable mistrust’ towards the Western codification of water law for fear that the result might offend Islamic law. Concurrent with this concern comes the chequered attitude the ICJ has shown towards Islamic law. This represents an unfortunate state of affairs because, apart from the Court’s clearly defined role as adjudicator between States, there are also important ‘out of court effects’ brought about by

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the ICJ's presence and the consequential prospect of possible impartial and peaceful conflict resolution. Although Article 38 (1)(c) of the ICJ's Statute stipulates that the Court should consider 'general principles of law recognised by civilised nations', the majority of the Court's judges have resisted interpreting Article 38(1)(c) to require the ICJ to consider Islamic law – or indeed any other body of non-Western law – as norms pertinent to the Court's interpretation of international law. Although it could be pointed out that this view is naïve, the Court has hitherto not explained its historic track record with regards to Islamic law whilst its Statute expressly provides the Court with the authority to consult any legal source it regards as relevant. The ICJ's attitude makes it more difficult to find a potential adjudicator that all four States could potentially agree to. At the very least, depending on how Libya's constitution finally evolves, the Court's apparent reserved attitude towards Islamic jurisprudence could prevent the country from recognising the Court's authority. More drastically, the Court's attitude could also result in the three Aquifer States that firmly root their constitutions in Islamic law – Egypt, Libya and the Sudan – to disengage from mainstream dispensations of justice by resorting to the Islamic International Court of Justice. Even if that might not be a path Chad wishes to choose, such a development would result in yet another obstacle to finding a framework solution for the utilisation of the NSAS. The potential risk of further fragmentation in international law should not be taken lightly, especially not in relation to limited transboundary freshwater resources. Through this codification process, the Commission ultimately aims to stabilise international relations by facilitating stepping stones through the proposal of draft articles such as the *2008 Draft Articles on Transboundary Aquifers*. Since the fragmentation of international law runs counter to the Commission's objectives, it should seek ways and means to overcome the possible detrimental effects of such fragmentation.

Importantly, Islamic water law, just like its Western counterpart, is able to prioritise community interest over individuals' interests, which resonates with Brown Weiss' concept

of intergenerational equity, but which has not yet found its way into binding international law. In contrast, Islamic law benefits from an established set of binding water (and therefore groundwater) law principles that recognise riparian rights, establishes a community interest in the utilisation of water and strictly controls appropriative rights. Generally, Islamic law thus requires a person to exercise a higher standard of care where his action may adversely affect a public interest. Although the examples of Islamic law as it pertains to water may sometimes appear archaic to the non-Muslim reader, they do convey an important set of principles in relation to the degree of water contamination that is considered acceptable before it turns into water pollution. This question has also concerned Western jurists in their quest for an appropriate definition of environmental damage and the two legal systems espouse a similar approach in that they consider the degree of contamination before categorising water as 'polluted'. Good management and conservation of water are thus requirements also contained in Islamic law. Notably, through the doctrine of 'Right of God', which includes those rights that concern public interest as a whole, the judiciary has very little scope of discretion in their enforcement.

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The debate on Islam's compatibility with rules of Western water management also extends to the subject of water ownership. Arguably, the most interesting aspect of the Islamic jurisprudential discourse in relation to water is its emphasis on its sale. In essence, the Hanbali as well as the Maliki schools of Islamic jurisprudential thought appear to allow market-based water economies provided these adhere to principles of equal access and social justice. Islamic law (at least as far as the wide-spread Hanbali school of jurisprudential thought is concerned) is very specific on different degrees of ownership and control over freshwater from all sources, thus including groundwater. Notably, there is hardly a Muslim country that does not impose some form of water tariffs, including prominent Islamic theocracies such as Saudi Arabia and Iran. However, Western environmental law has to date said very little in relation to the commercialisation of water. Whilst one is left to speculate, the relative abundance of freshwater in the Western sphere may well have played a role in this apparent gap.

To the extent that environmental protection and the equitable utilisation of shared water resources, both legal spheres are remarkably compatible. Both the *2008 Draft Articles* and Shari'a encourage consultation and communication between the interested parties. Even more importantly, both advocate responsible use of limited water resources and place stringent demands on the prevention of pollution so as not to unnecessarily harm other interested parties. Unfortunately, however, the *2008 Draft Articles* fall short of being specific enough (although it sets out to be exactly that) to impart 'authoritative punch' when it comes to the obligations of interested parties to a transboundary aquifer. In contrast, Islamic law takes a sweeping approach through its reference to God's supreme authority and thereby bestows a State with extensive responsibilities in relation to the protection of

an aquifer from pollution.

Within the scope of this discussion, it can therefore not be said that either general international groundwater law or the Islamic equivalent is somehow superior over the other. Indeed, the abrupt ending of the programme in 2008 and the significant gaps in the *2013 Strategic Action Programme* attest to that as the concurrent existence of Islamic legal tradition and international water law in its current state have not led to a conclusion of the negotiations between the Aquifer States within CEDARE/IFAD/IDB programme.

Both the *2008 Draft Articles* and Islamic law thrust towards the same goals of sustainable (as possible) use of finite water resources, equitable water distribution and the protection of groundwater from pollution or other threats. Nevertheless, both the *2008 Draft Articles* as the current culmination of ‘Western’ international groundwater law and Islamic law suffer from certain shortcomings. Whilst the former lacks the same binding authority Islamic law enjoys and to date does not elaborate the potential issue of water commercialisation in water scarce regions, the latter lacks the transboundary perspective in relation to groundwater (transboundary fossil aquifers like the NSAS would have been impossible to access, even if their existence had been identified, at the time of the Prophet Muhammad). This highlights the impact Islamic law could have on the on-going negotiations between the NSAS Aquifer States, whereby specific Islamic provisions could provide stepping-stones towards an innovative utilisation framework for the NSAS that adequately addresses the need for precaution and intergenerational equity, which, inter alia, could instil new impetus for a refined set of *Draft Articles*. An alternative future is likely to evolve along the lines of separate agreements and a more fragmented corpus of international law rather than a coherent body of codified international law on transboundary fossil aquifers, which would run counter to the International Law Commission’s objective.

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