

IMPLEMENTING INTERNATIONAL WATERCOURSES LAW THROUGH THE WEF  
NEXUS AND SDGS: AN INTEGRATED APPROACH ILLUSTRATED IN THE  
ZAMBEZI RIVER BASIN

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ABSTRACT

International Watercourses Law (IWL) provides only a broad framework for States to follow and is ill-equipped to systematically consider the trade-offs of water use across multiple sectors such as energy and food. This gap could potentially be filled by turning to policy frameworks such as the Water-Energy-Food Nexus (WEF) and global development agendas, such as the Sustainable Development Goals (SDGs) which could add further substance to the vague provisions contained in IWL. This monograph will argue that utilising these three frameworks in an integrated manner, termed the Law, Nexus, Goals (LNG) approach, could aid riparian states and non-state actors in the consideration of competing water uses, thereby helping to resolve tensions and promote cooperation among concerned states as demonstrated using the Zambezi River Basin (ZRB) as a case study.

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This article is derived from research conducted under €5.5M four-year EU Horizon 2020 funded 'DAFNE' project which concerns the promotion of integrated and adaptive water resources management, explicitly addressing the WEF Nexus and aiming to promote a sustainable economy in regions where new infrastructure and expanding agriculture has to be balanced with social, economic and environmental needs. The project takes a multi- and interdisciplinary approach to the formation of a decision analytical framework (DAF) for participatory and integrated planning, to allow the evaluation of decisions based on social, economic and environmental needs, therefore reflective of sustainable development. This article therefore derives its perspectives from the interdisciplinarity within the project: therefore, while retaining focus on legal frameworks at its core, the article will also look at policy frameworks and will take due note of the role to be played by other disciplines within water governance. For further information on the project *see* <http://dafne-project.eu>.

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## 1 INTRODUCTION

The governance of international watercourses has to overcome diverse social, economic, religious and ethnic differences traversing across international borders. At the same time, a balance must be struck between complex trade-offs and needs while protecting the longevity of the watercourse and its ecosystem. Cooperation is therefore essential in the management of such watercourses, often guided by the principles of International Watercourses Law (IWL). Yet, in many ways, IWL provides only a broad framework for States to follow and is ill-equipped to systematically consider the trade-offs of water use across multiple sectors such as energy and food. This gap could potentially be filled by turning to policy frameworks such as the Water-Energy-Food Nexus (WEF) and global development agendas, such as the Sustainable Development Goals (SDGs)<sup>1</sup> which could add further substance to the vague provisions contained in IWL.

This monograph will argue that utilising these three frameworks in an integrated manner, termed the Law, Nexus, Goals (LNG) approach, could aid riparian states and non-state actors in the consideration of competing water uses, thereby helping to resolve tensions and promote cooperation among concerned states and their communities. This approach has been applied to the Zambezi River Basin (ZRB) an extremely complex and fast-developing watercourse with a strong history of cooperation. Our findings demonstrate that even where sound IWL frameworks and cooperative processes exist, this does not guarantee a focused, measurable and sustainable outcome which is capable of addressing tensions among riparian's and competing water uses in all cases. A more integrated and holistic framework could go some way to developing a more comprehensive and progressive water governance approach within transboundary river basins. Although this integrated approach is not without some drawbacks, such as the continued proliferation of frameworks and paradigms within the sector of water governance, it is argued that the LNG approach offers the potential to build on understanding and further implementation of key principles of IWL. In light of this the key features of the monograph have been introduced next.

International watercourses<sup>2</sup> are vital resources for all forms of life. For humanity they provide (*inter alia*) access to water and sanitation services, opportunities for hydropower development, the water

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<sup>1</sup> Transforming Our World: The 2030 Agenda for Sustainable Development, UNGA Res. A/RES/70/1, 21 October 2015 (hereinafter SDGs)

<sup>2</sup> The exact terminology of freshwater bodies and what they constitute hydrologically, including their hydrological boundaries, differs both within hydrological disciplinary perspectives and legal interpretations. This article uses the term 'international watercourse' in line with the legal definition found in the Convention on the Law of the Non-Navigational Uses of International Watercourses (adopted 21 May 1997, entered into force 17 August 2014) UN Doc A/51/869 (hereinafter UNWC) for consistency, which states in Article 2(b) that an international watercourse 'means

supply for small, medium and mega irrigation and are often a hotspot for tourism activities. The same resources support more than 100,000 species;<sup>3</sup> from fish to large mammals and are responsible for the maintenance of vital freshwater ecosystems.<sup>4</sup> These shared watercourses are critical resources for the socio-economic growth and advancement of both developed and developing countries alike. Today, consideration of the interdependencies between these water uses have never been more crucial given the increasing pressures placed on water resources as a result of global changes such as population growth, climate change, and the increased use of renewable energy resources.<sup>5</sup>

Furthermore, at the time of writing this monograph, the world is dealing with a disease termed COVID-19 which is taking tens of thousands of lives and infected over a million people worldwide; sanitation in general and washing hands in particular has become crucial to contain the speed of the virus and save lives. However, several countries are experiencing shortage of (clean) water to comply with WHO guidelines and recommendations to fight the disease as ‘more than 40% of the world’s population lack adequate access to basic handwashing facilities...Most of these reside in Asia and Africa.’<sup>6</sup> Given that shared watercourses cover up to 40% of human water needs, their governance, protection and availability are important in terms of fighting diseases such as COVID-19.

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a watercourse, parts of which are situated in different States’, the meaning of ‘watercourse’ is defined within Article 2(a) as ‘a system of surface waters and groundwaters constitute by virtue of their physical relationship a unitary whole and normally flowing into a common terminus’.

It should also be noted that this article is only concerned with the non-navigational uses of international watercourses, as navigational and non-navigational uses are treated differently within international law. However, it should also be noted that Article 1(2) of the UN Watercourses Convention provides that where navigational uses impact other water uses, such as water quality, then they do fall under the substantive norms of the convention. For further analysis see Alistair Rieu-Clarke, ‘Definition and Use of Terms’, in Laurence Boisson de Chazournes et al., *The UN convention on the law of the non-navigational uses of international watercourses: a commentary* (First edit ed. 2018) 45-50.

<sup>3</sup> WWF, ‘Freshwaters Overview’ available at <https://www.worldwildlife.org/habitats/freshwaters>, last accessed 25 February 2020.

<sup>4</sup> Ruby Moynihan, ‘Inland water biodiversity: international law on protection of transboundary freshwater ecosystems and biodiversity’, Chapter III.13, in Michael G Faure (Michael G. Faure and Edward Elgar Publishing, *Elgar Encyclopedia of Environmental Law [Internet Resource]* (Cheltenham, UK : Edward Elgar Publishing 2016).

<sup>5</sup> See McCaffrey S, Leb C and Denoon R, ‘Introduction to the Research Handbook on International Water Law’ in Stephen C McCaffrey, Christina Leb and Riley T Denoon, *Research Handbook on International Water Law [Internet Resource]* (Cheltenham, UK 2019).

<sup>6</sup> Karthikeyan Matheswaran and Rajesh Daniel, ‘Access to water and COVID-19: seven measures countries in Asia can take now’ Stockholm Environment Institute, 2<sup>nd</sup> April 2020 <https://www.sei.org/perspectives/access-to-clean-water-is-vital-in-the-fight-against-covid-19-here-are-seven-measures-that-countries-in-asia-can-take-now/> last accessed 10 April 2020

By nature, international watercourses do not belong to a single political or geographical boundary making them subject to multiple governance frameworks with control dispersed across riparian states. The approach taken by each state is often defined by the economic and political priorities of each country, in addition to the physical, geographical and hydrological characteristics of each part of the watercourse. This results in a complex web of different legal and institutional frameworks which aim to respond to a variety of problems. In response, the legal regime of International Watercourses Law (IWL) has emerged, namely through the United Nations Watercourses Convention (hereinafter UNWC)<sup>7</sup> and the United Nations Economic Commission for Europe Convention on the Protection and Use of Transboundary Watercourses and International Lakes (hereinafter UNECE).<sup>8</sup> Together, these two global Conventions provide a normative framework built on a number of key principles, as will be described in Section 2.1. Yet, IWL alone is not always able to fully identify all of the issues at play or find appropriate solutions to complex problems. As a result, a number of water resource management paradigms have emerged in an attempt to balance competing uses and trade-offs such as Integrated Water Resource Management (IWRM)<sup>9</sup>, water security<sup>10</sup>, nature-based solutions<sup>11</sup> and the Water-Energy-Food (WEF) nexus<sup>12</sup>, the last of which will be the focus of this monograph.<sup>13</sup> While such

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<sup>7</sup> Convention on the Law of the Non-Navigational Uses of International Watercourses (adopted 21 May 1997, entered into force 17 August 2014) UN Doc A/51/869.

<sup>8</sup> Convention on the Protection and Use of Transboundary Watercourses and International Lakes (adopted 17 March 1992, entered into force 6 October 1996) 1936 UNTS 269.

<sup>9</sup> The Global Water Partnership defines IWRM as ‘a process which promotes the coordinated development and management of water, land and related resources in order to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems and the environment’, Global Water Partnership (GWP), ‘About IWRM’ (2018) available at <https://www.gwp.org/en/gwp-SAS/ABOUT-GWP-SAS/WHY/About-IWRM/> last accessed 28 June 2019. For a legal perspective of IWRM, see Andrew Allan and Alistair Rieu-Clarke, ‘Good Governance and IWRM--a Legal Perspective’ (2010) 24 *Irrigation and Drainage Systems* 239.

<sup>10</sup> Defined by the UN as ‘The capacity of a population to safeguard sustainable access to adequate quantities of and acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability’ see UN-Water, *Water Security & The Global Water Agenda*, Analytical Brief (2013) available at <https://collections.unu.edu/eserv/UNU:2651/Water-Security-and-the-Global-Water-Agenda.pdf> last accessed 12 June 2019.

<sup>11</sup> Defined by IUCN as ‘actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits’, see IUCN, Commission on Ecosystem Management, ‘Nature-based Solutions’ available at <https://www.iucn.org/commissions/commission-ecosystem-management/our-work/nature-based-solutions>, last accessed 12 June 2019.

<sup>12</sup> Definitions of the WEF nexus vary, however most agree on core aspects including complex interdependencies and linkages between each of the water, energy and food sectors, which includes potential trade-offs and feedback between each sector. Further detail will be provided in Section 2.2.

<sup>13</sup> Rémi Schweizer and Christian Bréthaut, ‘From the Promises of International Water Management Trends to the Reality of Policies and Practices: Some Conclusive Thoughts’ in Christian Bréthaut and Rémi Schweizer (eds), *A Critical Approach to International Water Management Trends: Policy and Practice* (Palgrave Macmillan UK 2018)

frameworks are undoubtedly useful, each approaching water governance from a new angle, the extent to which each of these paradigms is truly novel and able to ignite change can be debated.<sup>14</sup> Focus should not be placed on attempts to ‘reinvent the wheel’, but rather to look holistically at the governance frameworks which do exist and work towards integration which looks beyond the water sector and adds more substance to key IWL provisions.

The WEF nexus hinges on two of the main water uses and sources of conflict (energy and food production) and is particularly essential for consideration within the context of developing countries, by taking a holistic perspective of historically siloed fields.<sup>15</sup> As stated by Pahl-Wostl, ‘interdependencies between these resources have often been neglected in sectoral policies with the consequence of persistent trade-offs rather than identification and strengthening of synergies’.<sup>16</sup> Integration with other sectors is not new in the world of water governance; advocated within the water sector since the origin of IWRM which has been widely incorporated within national and international policies relating to the governance of water resources.<sup>17</sup> IWRM emerged as a dominant paradigm for the management of water resources in the early 1990s, frequently linked to Agenda 21,<sup>18</sup> and calls for holistic management of water resources.<sup>19</sup> IWRM appreciates the cross-sectoral relevance of water which requires integration with other natural resource management processes including land and ecosystems.<sup>20</sup> Its rejection of fragmented and singular approaches therefore resonates with the WEF nexus, however it places less emphasis on the role of water in the production of food, or its use in energy. IWRM has also been fraught with difficulties in implementation, largely driven by a lack of institutional capacity to govern across different sectoral borders, such as energy and agriculture. This institutional difficulty is also faced

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<sup>14</sup> *ibid.*

<sup>15</sup> An example of such conflict can be seen in the Blue Nile Dam controversy – Ethiopia wants to generate electricity while Egypt (and Sudan) need water for agriculture. *See* Zera Yihdego and Alistair Rieu-Clarke, ‘An Exploration of Fairness in International Law through the Blue Nile and GERD’ (2016) 41 *Water International* 528.

<sup>16</sup> Claudia Pahl-Wostl, ‘Governance of the Water-Energy-Food Security Nexus: A Multi-Level Coordination Challenge’ (2019) 92 *Environmental Science and Policy* 356 <<https://doi.org/10.1016/j.envsci.2017.07.017>>.

<sup>17</sup> For further details on the use of IWRM globally, see Maija Bertule and others, ‘Monitoring Water Resources Governance Progress Globally: Experiences from Monitoring SDG Indicator 6.5.1 on Integrated Water Resources Management Implementation’ (2018) 10 *Water (Switzerland)* 1.

<sup>18</sup> Agenda 21 is a non-binding plan of action to be taken globally, nationally and locally with regards to development and the environment. The plan was the main outcome document of the Rio Convention, *see* Agenda 21: A Programme for Action for Sustainable Development, U.N. Doc. A/CONF.151/26 (Vol. II), Annex II (June 13 1992).

<sup>19</sup> Grethel Aguilar and Alejandro Iza, *Governance of Shared Waters: Legal and Institutional Issues*, IUCN, in collaboration with the IUCN Environmental Law Centre (Bonn, Germany, 2011) <<https://www.iucn.org/content/governance-shared-waters-legal-and-institutional-issues>> last accessed 10 April 2020

<sup>20</sup> *ibid.* at 27.

by a WEF nexus approach.<sup>21</sup> In order to combat the issue of integrated institutions, this monograph proposes combining the WEF nexus with the Sustainable Development Goals (SDGs), an agenda which already has global political commitment and can infer normative influence when used by states in the application of IWL, as well as within their own domestic law and policy frameworks.<sup>22</sup>

From the perspective of Otto Spijkers and of this monograph, the SDGs can ‘add substantive flesh to the otherwise abstract skeleton of general international water law’.<sup>23</sup> The SDGs build upon the Millennium Development Goals (MDGs)<sup>24</sup> which formed the first global framework to set a number of targets for global development. The SDGs follow the same course, with a new set of 17 goals and 169 targets which are universal in nature. The SDGs are legally non-binding<sup>25</sup> and as such their achievement will need to be supported by formal rules of domestic and international law.<sup>26</sup> However, despite not directly providing a legal obligation by nature, the SDGs demonstrate

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<sup>21</sup> For an analysis of the relationship between the WEF Nexus and IWRM, See David Benson, Animesh K Gain and Josselin J Rouillard, ‘Water Governance in a Comparative Perspective: From IWRM to a “nexus” Approach?’ (2015) 8 *Water Alternatives* 756.

<sup>22</sup> Existing literature on the relationship between IWL, WEF and the SDGs has linked two of the three frameworks, but no literature considers all three. For discussion of the relationship between the WEF nexus and the SDGs see Julia Terrapon-Pfaff and others, ‘Energising the WEF Nexus to Enhance Sustainable Development at Local Level’ (2018) 223 *Journal of Environmental Management* 409; Raya Marina Stephan and others, ‘Water–Energy–Food Nexus: A Platform for Implementing the Sustainable Development Goals’ (2018) 43 *Water International* 1; Ingrid Boas, ‘Cross-Sectoral Strategies in Global Sustainability Governance: Towards a Nexus Approach.’ (2016) 16 *International Environmental Agreements: Politics, Law & Economics* 449; Mariana Fader and others, ‘Toward an Understanding of Synergies and Trade-Offs Between Water, Energy, and Food SDG Targets’ (2018) 6 *Frontiers in Environmental Science* 112 <<https://www.frontiersin.org/article/10.3389/fenvs.2018.00112>>. ; and Pahl-Wostl (n 17). Some literature has also developed perspectives on the relationship between IWL and the sustainable development goals, namely Goal 6 (the water goal) see Antti Belinskij, ‘Water-Energy-Food Nexus within the Framework of International Water Law’ (2015) 7 *Water (Switzerland)* 5396; Mallory Orme and others, ‘Good Transboundary Water Governance in the 2015 Sustainable Development Goals: A Legal Perspective’ (2015) 40 *Water International* 969; and *ibid*.

<sup>23</sup> Otto Spijkers, ‘The Cross-Fertilization between the Sustainable Development Goals and International Water Law’ (2016) 25 *Review of European Comparative & International Environmental Law* 39.

<sup>24</sup> UN General Assembly, United Nations Millennium Declaration, Resolution Adopted by the General Assembly, 18th September 2000, A/RES/55/2

<sup>25</sup> For discussion on the notion of sustainable development see Vaughan Lowe, ‘Sustainable Development and unsustainable Arguments’, in Alan Boyle and David Freestone (eds.) *International Law and Sustainable Development: Past Achievements and Future Challenges* (Oxford Uni. Press, 1999) 19-37, p. 23 in particular.

<sup>26</sup> In this sense, the SDGs, like the MDGs before them, demonstrate a new trend in international environmental law whereby progress is made in the form of political commitments as opposed to legally binding norms. However, several of the goals are directly relevant to international human rights law, socio-economic and cultural rights in particular see International Covenant on Economic, Social and Cultural Rights (ICESCR) 1966. Article 11 of the Covenant recognises ‘the right of everyone to an adequate standard of living’, which must be read in conjunction with Article 2 (1) of the instrument that obliges states to take steps ‘to the maximum of its available resources, with a view to Achieving progressively the full realization of the rights recognized...’. Further, the human right to water was recognised in November 2002 through General Comment No.15 which defined the right to water as the right to ‘sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses’. In 2010 the

strong political commitment which can be utilised towards the implementation of an LNG approach.<sup>27</sup> This article will focus mainly on the three sectoral goals linked to the WEF nexus but will also give due reference to goals which relate to partnership and cooperation at the international level. To provide further understanding of the LNG approach a case study of the Zambezi River Basin (ZRB) will form the substance of Section 3 of this monograph.

Expansion of hydropower dams, irrigation schemes and population growth are only three of the many complex developments taking place within the ZRB. The ZRB has a strong history of cooperation between its riparian States; although the watercourse has, both historically and to-date, struggled to balance the preservation of the Zambezi river with the regions need for economic growth and development, particularly in the area of hydropower.<sup>28</sup> This context makes the ZRB an appropriate case study for the implementation of new methodologies such as the integrated IWL, the WEF nexus and SDG approach which will be proposed in the monograph, which could be successfully implemented as a result of the existing cooperative frameworks which are in place.

The key question this monograph explores is the extent to which an LNG approach can aid and reinforce the implementation of the core principles of IWL. More specifically, it will demonstrate how the SDGs and WEF nexus can be mutually supportive in tackling the tension between competing uses and trade-offs between sectors. It will illustrate how this approach can, as a result, assist states with fulfilling their international legal commitments relating to IWL by filling substantive gaps in the law. The framework can develop a common language to negotiate risks of cooperation according to the priorities of countries sharing an international watercourse, encouraging cooperation and negotiation and supporting the integration of fragmented institutional systems. This monograph will therefore contribute to scholarship on international watercourses by proposing a novel approach to the governance of international watercourses through the integration of the three frameworks identified above. A further contribution to

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human right to water was formally recognised by the UN General Assembly through Resolution 64/292 and further affirmed through Resolution 15/9 which recognised the right to water as part of existing international law and confirms the right to be binding upon states.

<sup>27</sup> For discussion on the 'soft law' nature of the SDGs see Marcel M.T.A. Brus, 'Soft law in public international law: a pragmatic or principles choice? Comparing the Sustainable Development Goals and the Paris Agreement' Available at [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2945942](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2945942)

<sup>28</sup> See A Tilmant and others, 'Economic Valuation of Benefits and Costs Associated with the Coordinated Development and Management of the Zambezi River Basin' (2012) 14 Water Policy 490.

literature is made through a comprehensive analysis of the most up-to-date legal and institutional structures of the ZRB.

The monograph is divided into four sections: section 1 provides an overview of the normative and conceptual frameworks which will be used throughout, including IWL, the WEF Nexus and the SDGs. The purpose of this section is to articulate the features of these frameworks and the gaps therein when applied independently. Section 2 discusses the main argument proposed in the monograph: integrating the WEF nexus and the SDGs to aid implementation of IWL. It offers an illustration of the potential trade-offs and synergies of the frameworks and demonstrates how their integration can allow countries to benefit from a systematic and holistic application of relevant laws, policies and targets while fulfilling their international legal commitments. Section 3 provides the application of this integrated method to the case study of the ZRB. Finally, Section 4 provides concluding remarks and proposed insights.

## 2 NORMATIVE AND CONCEPTUAL FRAMEWORKS

IWL, the WEF nexus and the SDGs are each discussed within a wealth of literature.<sup>29</sup> Therefore, while this section will provide an overview of each of the frameworks for the purposes of clarity in subsequent sections, it will not repeat in-depth analysis of each framework itself, which can be found in work produced by others. This section will begin with an outline of the key principles of IWL, demonstrating their relevance to the issues and problems addressed in the monograph. It will then discuss the ‘WEF Nexus’ as a conceptual and analytical tool which can be used to frame an approach to the governance of international watercourses and as a means of addressing the tensions between different uses and sectors. Finally, it will discuss the SDGs and their relevance to both IWL and the WEF.

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<sup>29</sup> Despite the rich literature which exists on the WEF nexus, there is little discussion of the role of legal frameworks in general and international law specifically. Claudia Pahl-Wostl, Anik Bhaduri and Antje Bruns, ‘Editorial Special Issue: The Nexus of Water, Energy and Food – An Environmental Governance Perspective’ (2018) 90 *Environmental Science and Policy* 161; Luxon Nhamo and others, ‘The Water-Energy-Food Nexus: Climate Risks and Opportunities in Southern Africa’ (2018) 10 *Water (Switzerland)* 1; Pahl-Wostl (n 15); Boas (n 21); L De Strasser and others, ‘A Methodology to Assess The water Energy Food Ecosystems Nexus in Transboundary River Basins’ (2016) 8 *Water (Switzerland)*; Mike Muller, ‘The “nexus” as a Step Back towards a More Coherent Water Resource Management Paradigm’ (2015) 8 *Water Alternatives* 675; Alex Smajgl, John Ward and Lucie Pluschke, ‘The Water-Food-Energy Nexus - Realising a New Paradigm’ (2016) 533 *Journal of Hydrology* 533; Stephan and others (n 21); Tilmant and others (n 27); Anik Bhaduri and others, ‘Sustainability in the Water–Energy–Food Nexus’ (2015) 40 *Water International* 723.

## 2.1 INTERNATIONAL WATER LAW

It should be stated that it is not the intention of this monograph to analyse the corpus of IWL, but rather to provide a novel approach to its implementation through the utilisation of the WEF Nexus and the SDGs.<sup>30</sup> The focus of discussion will therefore be on the UNWC although it is recognised that there are many other multilateral and bilateral water treaties, as well as a number of regional and basin level frameworks, to which reference will be given, where applicable.<sup>31</sup> The UNECE will also be discussed intermittently due to its complementary relationship with the UNWC and existence at an international level.<sup>32</sup> However, the UNWC more so than the UNECE reflects the substantive and procedural norms of customary international law and will therefore be the main instrument discussed.<sup>33</sup>

Two principles form the foundation of IWL: equitable and reasonable utilisation and the ‘no harm rule’.<sup>34</sup> These two principles, in addition to the general duty to cooperate, act as the substantive core of the UNWC. They are implemented through a number of procedural provisions contained within the second half of the instrument. Yet, specific mechanisms for operationalisation remain sparse and the provisions themselves are vague. While the UNWC clearly details these two basic principles, the UNECE convention goes into greater detail with relation to more ‘modern’ concepts of IWL such as pollution prevention and environmental protection. Further, the

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<sup>30</sup> There are many resources which provide through analysis of IWL, particularly the UNWC. Recently published resources include Boisson de Chazournes and others (n 2); Mara Tignino and Christian Bréthaut, *Research Handbook on Freshwater Law and International Relations* (Cheltenham, Gloucestershire: Edward Elgar Publishing Limited 2018); McCaffrey, Leb and Denoon (n 6).

<sup>31</sup> Additional international and regional level legal frameworks which will be covered within the scope of the article include: the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (adopted 17 March 1992, entered into force 6 October 1996) 1936 UNTS 269.; Revised Protocol on Shared Watercourses in the Southern African Development Community (signed 7 August 2000; in force 22 September 2003); Agreement on the Establishment of the Zambezi Watercourse Commission (ZAMCOM) (signed 13 August 2004; in force 19 June 2011).

<sup>32</sup> Considering the mutual supportiveness of the frameworks, Rieu-Clarke and Kinna describe how the UNWC and UNECE can be used to provide a ‘Package Approach’ to the law of international watercourses, see Alistair Rieu-Clarke and Rémy Kinna, ‘Can Two Global UN Water Conventions Effectively Co-exist? Making the Case for a “Package Approach” to Support Institutional Coordination’ (2014) 23 *Review of European, Comparative & International Environmental Law* 15.

<sup>33</sup> See Stephen C McCaffrey, ‘The Customary Law of International Watercourses’ in Tignino and Bréthaut (n 28), pp. 147. See also *Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)*, Judgement (Merits), 25 September 1977, *ICJ Reports (1997)*, p.7 and *Pulp Mills on the River Uruguay (Argentina v Uruguay)*, Judgement, 20 April 2010, *ICJ Reports (2010)*, p.14. The influence of the principles contained in the UNWC can also be clearly demonstrated by their incorporation in regional and basin level frameworks, as will be demonstrated in subsequent sections with relation to the Southern Africa.

<sup>34</sup> Owen McIntyre, ‘Substantive Rules of International Water Law’ in Alistair Rieu-Clarke, Andrew Allan and Sarah Hendry, *Routledge Handbook of Water Law and Policy* (Taylor and Francis 2017), Ch 17 pp. 234-246

UNECE not only requires states to establish joint bodies (Article 9), but also provides for meetings of the parties (Article 17) and a secretariat (Article 19), all of which are absent from the UNWC, but are features of most modern environmental agreements. Provisions in the UNWC are characterised by a high level of generality in order to apply to widely varying hydrological, climatological and developmental conditions. The UNECE on the other hand provides further detail through its *Guide to Implementing the Water Convention*.<sup>35</sup> Overall focus within the UNWC can be seen to be placed on water quantity, while the UNECE places emphasis on water quality; thus, the two instruments are, in many ways, complementary and mutually reinforcing.<sup>36</sup>

The following sections will consider each of the substantive principles of IWL in turn, followed by a brief overview of the procedural provisions. The principles will not be treated equally as equitable and reasonable use and no significant harm are the main provisions of concern for the purposes of this monograph. Therefore, emphasis will be placed on unpacking the meaning and interpretation of these two principles.

### 2.1.1 *Equitable and Reasonable Use*

The principle of equitable and reasonable use is found in Articles 5 and 6 of the UNWC. Article 5 provides the principle itself, while Article 6 provides a non-exhaustive list of ‘factors’ which should be taken into consideration when determining what is equitable and reasonable. Article 5 notes that watercourse States ‘shall’ use an international watercourse ‘in an equitable and reasonable manner’. It further notes that the watercourse should be ‘used and developed by watercourse States with a view to attaining optimal and sustainable utilisation thereof and benefits therefrom’.<sup>37</sup> Article 5(2) notes that participation in the ‘use, development and protection’ of an international watercourse should include the duty to cooperate. Article 5 therefore demonstrates not only the need to use and protect watercourses in a manner which is equitable and reasonable, but also links this use to sustainability and benefits which can be derived from the watercourse. This wording is significant, linking to both sustainable development and benefit sharing. Article 5 does not, however, provide any definition of what can be considered to be equitable and reasonable, as such a conclusion is to be derived from taking into consideration the factors contained in Article 6.

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<sup>35</sup> See A Tanzi, ‘The Consolidation of International Water Law: A Comparative Analysis of the UN and UNECE Water Conventions’ (2017) *Editoriale Scientifica Napoli*, available at SSRN <https://ssrn.com/abstract=3080819>, last accessed 12<sup>th</sup> February 2020.

<sup>36</sup> Rieu-Clarke and Kinna (n 33).

<sup>37</sup> UNWC, Article 5(1)

The factors contained in Article 6 cover natural characteristics such as hydrological streamflow, social and economic need, population dependency, existing and potential uses of the watercourse, as well as the viability of alternatives and the ‘conservation, protection, development and economy of use’ of the watercourse.<sup>38</sup>Critically, Article 6(3) also states that:

The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

The weight of the factors is somewhat elusive; there is no hierarchical list to be considered and no consensus on where to focus greater weight. The only real guidance regarding prioritisation is contained within Article 10(2) which states that in the event of a conflict ‘special regard’ should be given to ‘vital human needs’. As noted by Van der Zaag et al. equitable and reasonable use is, therefore, ‘defined in general terms and is thus prone to subjective interpretation’.<sup>39</sup> A result of such vagueness, as explained by Lankford, could be that the principle of equitable and reasonable use and its accompanying factors are misleading to states.<sup>40</sup> Lankford further notes that current use and population should be given more weight than others, given that the former is illustrative of the economic context of the current use and the latter is linked to the realisation of the human right to water.<sup>41</sup> Moving from an anthropocentric perspective, Eckstein et al. rightly acknowledge the need for the ‘greening’ of international water law, giving greater consideration for environmental needs.<sup>42</sup>This prioritisation of factors among authors demonstrates how widely opinions are likely to diverge between States, given the lack of direction contained in the factors themselves. Thus, the operationalisation of Article 6 relies on a deliberative process by each State to establish ‘importance’ and ‘weight’. It must be noted that this gap is intentional in the nature of the UNWC as a framework convention, allowing states of an international watercourse to establish

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<sup>38</sup> *ibid*, Article 6(1)(f)

<sup>39</sup> Pieter Van Der Zaag, IM Seyam and Hubert HG Savenije, ‘Towards Measurable Criteria for the Equitable Sharing of International Water Resources’ (2002) 4 *Water Policy* 19, 20

<sup>40</sup> Bruce Lankford, ‘Does Article 6 (Factors Relevant to Equitable and Reasonable Utilization) in the UN Watercourses Convention Misdirect Riparian Countries?’ (2013) 38 *Water International* 130.

<sup>41</sup> *ibid*.

<sup>42</sup> Gabriel Eckstein and others, *The Greening of Water Law: Managing Freshwater Resources for People and the Environment* (September 30, 2010). *United Nations Environmental Program, 2010*. For discussion of the relationship between IWL and ecosystem protection see A Dan Tarlock, ‘Safeguarding International River Ecosystems in Times of Scarcity’ (2000) 3 *Suffolk University Law Review* 231; Owen McIntyre, ‘The Protection of Freshwater Ecosystems Revisited: Towards a Common Understanding of the “Ecosystems Approach” to the Protection of Transboundary Water Resources’ (2014) 23 *Review of European, Comparative and International Environmental Law* 88; Jutta Brunnée and Stephen Toope, ‘Environmental Security and Freshwater Resources: Ecosystem Regime Building’ (1997) 91 *American journal of international law* 26.

such importance and weight based on the specific character of the watercourse concerned. Yet, in doing so, it also leaves significant room for interpretation and, as stated by Lankford it 'leaves unresolved the level of detail and other mechanisms required to take water allocation to a satisfying or unambiguous conclusion'.<sup>43</sup> The complexity of the application of Article 6 is further stated by Dellapenna, as follows:

In attempting to apply the UN Convention [UNWC], one must always recall that 'equitable' does not mean 'equal' – a confusion that can arise in some non-common law countries where the notion of 'equality' in its common law sense is lacking. 'Equity' means a fair share considering the water needs and the availability to use the water efficiently of the several riparian states.<sup>44</sup>

While this statement is correct, as is the interpretation of the law, the importance of equality among concerned riparian's of an international watercourse must not be undermined. In this respect, the Permanent Court of International Justice (PCIJ) in the *River Oder* case asserted that:

[the] community of interest in a navigable river becomes the basis of a common legal right, the essential features of which are the perfect equality of all riparian States in the user of the whole course of the river and the exclusion of any preferential privilege of any one riparian State in relation to the others.<sup>45</sup>

However, equality does not necessarily imply dividing water in equal numbers. Dellapenna further states that:

Non-lawyers, particularly engineers and hydrologists, sometimes see in these catalogues of factors a poorly stated equation. By this view, if one simply fills in numerical values for each factor, one could somehow calculate each watercourse state's share of the water without reference to political or other non-quantitative variables...Any attempt to treat the list of relevant factors as an algorithm simply misses the point entirely.<sup>46</sup>

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<sup>43</sup> Lankford (n 41).

<sup>44</sup> Joseph W Dellapenna, *The customary international law of transboundary fresh waters*, 1 INT. J. GLOB. ENVIRON. ISSUES (2001) 286.

<sup>45</sup> *Territorial Jurisdiction of the International Commission of the River Oder*, Judgement No. 16, P.C.I.J., Series A, No. 23, p.27. This was later endorsed by the ICJ see e.g. *Gabcikovo-Nagymaros Project (Hungary / Slovakia)* Judgment of 25 September 1997 I.C.J. Reports 1997, p.57, para 85

<sup>46</sup> Dellapenna (n 45).

This is an important point and goes to the heart of the matter being discussed in this monograph; the factors under Article 6 cannot be treated as definitive and considered in isolation of all other aspects of governance, they must be used in the context of the watercourse and in harmony with other law and policy frameworks to adapt to the context of the watercourse in which they are being applied. Section 3 of this monograph will illustrate how the WEF Nexus and the SDGs can play such a role by providing scientific and policy considerations which are pertinent for the full assessment of the Article 6 factors. Prior to such discussion, attention must be drawn to the second most important rule of IWL: the no significant harm rule.

### 2.1.2 *No Significant Harm*

In the UNWC the ‘no harm rule’ is contained in Article 7 which obliges states to ‘take all appropriate measures to prevent the causing of significant harm to other watercourse States’.<sup>47</sup> Article 7(2) further notes that where significant harm does occur States shall ‘take all appropriate measures, having due regard for the provisions of articles 5 and 6’, in other words, for equitable and reasonable use. Despite the inclusion of equitable and reasonable use within Article 7(2) the lack of clarity around question of subordination between the two principles has given rise to significant controversy.<sup>48</sup> However, as stated by Salman, ‘it is now widely believed...that the obligation not to cause significant harm subordinates the principle of equitable and reasonable utilization’.<sup>49</sup> As also stated by Wouters, on the relationship between equitable and reasonable use and no significant harm ‘[w]hile the former rule might permit significant harm as a result of an equitable use of the watercourse, the latter would not’.<sup>50</sup> This is compatible with the notion that the no harm duty is not absolute, if it happens the state which causes harm shall compensate for the damages and cooperate with the affected state with the purpose of mitigating or eliminating such harm.

The obligation is limited to the duty not to cause *significant* harm. This threshold is also used within the 2001 ILC Articles on Prevention of Transboundary Harm from Hazardous Activities,<sup>51</sup> although neither instrument provides any further indication of the activities which may or may not fall within this defined scope. In a means to elaborate on the no-harm rule, McIntyre

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<sup>47</sup> UNWC (n 36), Article 7(1)

<sup>48</sup> Salman M.A. Salman, ‘The Obligation not to Cause Significant Harm’ in Boisson de Chazournes and others (n 3) at 95.

<sup>49</sup> *ibid.* at 96.

<sup>50</sup> Patricia K Wouters, *An assessment of recent developments in international watercourse law through the prism of the substantive rules governing use allocation (River Basins)*, 36 Nat. Resour. J. 417–439 (1996) 420.

<sup>51</sup> ILC, ‘Prevention of Transboundary Harm from Hazardous Activities’ (11 May 2001), UN Doc. A/RES/56/82

has linked its due diligence requirements to equitable and reasonable use, noting that the prohibition on causing significant harm could be reached only by taking into account the factors listed in Article 6.<sup>52</sup> Such an action is, of course, still limited by the lack of specificity contained within the factors themselves.

The complicated relationship between equitable and reasonable use and no significant harm has resulted in the former often (although not always) being favoured by upstream states, while the notion of no significant harm has frequently been favoured by downstream states.<sup>53</sup> This preference can also be linked to an assumption which is often made, as stated by Salman, that ‘harm can only be caused by upstream riparian’s to downstream, because harm can only ‘travel’ downstream with the flow of the waters’.<sup>54</sup> However, while the causes of harm flowing downstream may be more obvious such as pollution or reduced water flow, harm can also be caused by states which are downstream by the potential foreclosure of their future use of water.<sup>55</sup> Indeed, the concept of foreclosure has even been included in some basin-wide legal frameworks, such as the Senegal River Water Charter.<sup>56</sup> The language used within the UNWC clearly covers both upstream and downstream states, as no specifications are made.<sup>57</sup> It can also be argued that a mismanagement of water resources downstream can affect the entire ecosystem of an international watercourse due to the connectivity of the water system and the environment around river basins.

Reference to harm is also made in a number of other Articles throughout the UNWC. Article 12 dictates that the requirement for notification of planned measures only requires such notification when there is ‘significant adverse effect’. Article 21 which covers the control of pollution requires states to ‘prevent, reduce, and control’ pollution of an international watercourse which may cause ‘significant harm’. As noted by Salman, entirely new language relating to harm is subsequently used within Article 22 which covers the introduction of new or alien species where ‘effects detrimental’

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<sup>52</sup> Owen McIntyre, *Environmental Protection of International Watercourses under International Law*. [Internet Resource] (Farnham : Ashgate Pub 2007).

<sup>53</sup> Salman MA Salman, ‘The United Nations Watercourses Convention Ten Years Later: Why Has Its Entry into Force Proven Difficult?’ (2007) 32 *Water International* 1.

<sup>54</sup> Salman M.A. Salman, ‘The Obligation not to Cause Significant Harm’ in Boisson de Chazournes and others (n 3). at 116

<sup>55</sup> *ibid.* at 116

<sup>56</sup> Charter of Waters of Senegal River adopted May 28<sup>th</sup> 2002 (not yet in force).

<sup>57</sup> Some authors have also linked the two principles with the level of economic development within each State, *see* Kai Wegerich and Oliver Olsson, ‘Late Developers and the Inequity of “Equitable Utilization” and the Harm of “Do No Harm”’ (2010) 35 *Water International* 707.

to the watercourse must be prevented.<sup>58</sup> Once more, there is no further expansion as to the meaning of each of these levels of ‘harm’ or what the threshold may be for a State to be deemed to have caused such harm. What is clear is that harm comprises both quantitative and qualitative issues such as significant water flow reduction and affecting water quality, respectively.<sup>59</sup>

The ‘no harm’ principle has been widely expressed in the case law of the ICJ. In the *Pulp Mills* case the ICJ articulated the customary rule that ‘[a] State is . . . obliged to use all the means at its disposal in order to avoid activities which take place in its territory, or in any area under its jurisdiction, causing significant damage to the environment of another State’.<sup>60</sup> The *Pulp Mills* ruling followed from a number of earlier cases which expanded and clarified the customary status of the no significant harm principles. The *Trail Smelter Arbitration*<sup>61</sup> noted that ‘no State has the right to use or permit the use of its territory in such a manner as to cause injury . . . to the territory of another’.<sup>62</sup> The *Corfu Channel* case stated that every country is ‘under an obligation not to allow knowingly its territory to be used for acts contrary to the rights of other States’.<sup>63</sup> This statement is similar to the that expressed in *Trail Smelter* and illustrates that the Court has not relied on treaty law, but refers to ‘certain general and well-recognized principles’<sup>64</sup>, the ICJ clearly therefore recognised the existence of a general principle of law prohibiting harm to other States. It is important to note that the *Corfu Channel* case also makes clear that it is not only an act which can be seen to cause harm, but also an omission.<sup>65</sup> Subsequently, the nature of the norm has continued to evolve; while the formulation expressed in *Trail Smelter* was used in the formulation of Principle 21 of the 1972 Stockholm Declaration<sup>66</sup>, by 1992 it had advanced further within Principle 2 of the Rio Declaration.<sup>67</sup> While Principle 21 noted that States have ‘the sovereign right to exploit their resources’ pursuant to their own environmental policies and the ‘responsibility to ensure that activities within their jurisdiction or control do not cause damage’ to the environment of other

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<sup>58</sup> Salman M.A. Salman, ‘The Obligation not to Cause Significant Harm’ in *Boisson de Chazournes and others* (n 3). at 120

<sup>59</sup> *ibid.* at 121

<sup>60</sup> *Pulp Mills on the River Uruguay (Argentina v. Uruguay)* Judgment (2010) ICJ Rep 14.p. 56, para. 101

<sup>61</sup> *Trail Smelter Arbitration (United States v. Canada)*, Trail Smelter Arbitral Tribunal, 16 April 1938, 3 Reports of International Arbitral Awards.

<sup>62</sup> *Trail Smelter Arbitration (United States v. Canada)*, Trail Smelter Arbitral Tribunal, 16 April 1938, 3 Reports of International Arbitral Awards, p.1965

<sup>63</sup> *Corfu Channel Case (United Kingdom/Albania) (Merits)* (1949) ICJ Rep 4 p.22

<sup>64</sup> *ibid.*

<sup>65</sup> *ibid.* p.23

<sup>66</sup> Declaration of the United Nations Conference on the Human Environment, United Nations Conference on the Human Environment (Stockholm, 5–16 June 1972) UN Doc A/CONF.48/14/REV.1. (Stockholm Declaration)

<sup>67</sup> Rio Declaration on Environment and Development, Rio de Janeiro, 13 June 1992, UN Doc. A/CONF.151/26. (Rio Declaration)

States’.<sup>68</sup> In Principle 2 of the Rio Declaration the wording was altered to ‘their own environmental and developmental policies’ thereby recognising the importance of striking a balance between environmental and developmental goals.<sup>69</sup>

This leaves us with three takeaways with respect to the duty of significant harm: first, it is one of the most important but controversial rules of IWL; secondly, the duty is imposed on all riparian states of an international watercourse; and thirdly, it subordinates the core principle, equitable and reasonable use and other issues such as concerns of pollution. As is the case with equitable and reasonable use, determining what can be considered as ‘significant harm’ is difficult and must be dealt with on a case-by-case basis by concerned parties, appropriate commissions, panel of experts or courts and tribunals based upon available evidence.<sup>70</sup> The definition of such harm can be expanded on by each country through a consideration of factors which run much wider than water quality or quantity, as will be demonstrated in Section 3 with regards to the WEF nexus and the SDGs. While the rules of equitable and reasonable use and no significant harm are vital principles for the governance of international watercourses, it is clear that the determination of equity or harm will be impossible without cooperation in good faith.

### 2.1.3 *Duty to Cooperate*

Articulated in Article 8 of the UNWC, the duty to cooperate obliges states to cooperate on the basis of sovereign equality, territorial integrity, mutual benefit and good faith to attain optimal utilisation and adequate protection of an international watercourse. The specific obligations of this duty are somewhat ambiguous. As noted by McCaffrey ‘it is of little use to speak of an ‘obligation to cooperate’ in the abstract’<sup>71</sup>, the general duty to cooperate should be viewed as an overarching term for a number of individual rights and duties detailed in procedural obligations, such as the obligation to exchange data and information. Leb explains that it is therefore possible for States to comply with the duty to cooperate in a number of different ways including ‘through compliance with customary obligations that arise from the general duty and through other unilateral acts of cooperative nature and mutual engagement in negotiations, consultations, planning and joint management’.<sup>72</sup> For the purposes of this monograph it is also important to note that the

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<sup>68</sup> Stockholm Declaration (n 67), Principle 21

<sup>69</sup> Rio Declaration (n 68), Principle 2

<sup>70</sup> See *Pulp Mills* (n 61).

<sup>71</sup> Stephen C McCaffrey, *The Law of International Watercourses* (2nd ed., Oxford 2007).p.470

<sup>72</sup> Christina Leb, *Cooperation in the Law of Transboundary Water Resources* (Cambridge, United Kingdom: Cambridge University Press 2013), p.81

substantive content of the duty to cooperate is found in the need to attain ‘optimal and sustainable utilization’, which, as has already been mentioned, is the goal of Article 5 pertaining to equitable and reasonable use. To enable holistic governance of natural resources, cooperation is key not only within one sector, but across all of those sectors which may impact the resources. The WEF Nexus and the SDGs can supplement or expand on the duty to cooperate as it exists within IWL to look to the energy and food sectors, as well as towards the fulfilment of global goals in the SDGs. For this to happen cooperation must be accompanied with appropriate procedures and processes.

#### 2.1.4 Procedural Provisions

While equitable and reasonable use, the no-harm rule and the duty to cooperate broadly make up the body of substantive norms, the UNWC also details a number of procedural norms which provide guidance to states on how to implement substantive obligations. These norms include the obligation to provide information on planned measures and to consult on the potential effects of such planned measures, as well the exchange of data and information. These principles are normally introduced in water treaty arrangements, but arguably can be considered binding upon all states as part of customary international law.<sup>73</sup> In the latter case, the ICJ underlined that ‘informing, notifying and negotiating constitute an appropriate means’<sup>74</sup> to realise the duty to cooperate when shared water resources are at stake. However, while it is commonplace to draw a linear division between the substantive and procedural rules of IWL,<sup>75</sup> the line is not clear cut. The principle of equitable and reasonable use and no significant harm require looking to the body of procedural rules to add further understanding and definition to the meaning of the substantive rules themselves.<sup>76</sup> As described by Leb:

The doctrinal distinction between procedural and substantive rules of international water law that is observed by many authors facilitates schematisation for analytical purposes, yet it is a simplified conception of the nature of the rules of cooperation.

Wouters also notes that the duty to cooperate can act as a bridge between substantive and procedural obligations since cooperation obligations are made up of both substantive and

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<sup>73</sup> SC McCaffrey, *The Customary Law of International Watercourses* (2018).

<sup>74</sup> *Pulp Mills* (n 34), para 81

<sup>75</sup> For instance, the majority of textbooks or research handbooks focusing on IWL divide chapters by substantive and procedural rules, see Alistair Rieu-Clarke, Andrew Allan and Sarah Hendry, *Routledge Handbook of Water Law and Policy [Internet Resource]* (Abingdon, Oxon ; New York, NY : Routledge, an imprint of the Taylor & Francis Group 2017).

<sup>76</sup> Leb, *Cooperation in the Law of Transboundary Water Resources* (n 73) p.109

procedural content.<sup>77</sup>The duty to cooperate requires States to work together towards the achievement of an equitable and reasonable allocation of uses and benefits from a watercourse (substantive) through information sharing which subsequently leads to consultations and negotiations (procedural). In this sense, the duty to cooperate can actually be seen as an umbrella which covers all of the duties contained within IWL.

International water conventions may adopt different approaches on the way in which procedures are introduced and formulated. For example, there are a number of differences between the procedural obligations of the UNWC and the UNECE. Firstly, while the UNWC states that it does not affect existing agreements, only encouraging states to harmonise existing agreements with the provisions of the treaty<sup>78</sup>, the UNECE obligates states to revise agreements in line with the Convention and ‘eliminate contradictions’.<sup>79</sup> The UNECE also goes further than the UNWC in its requirement for states to establish joint bodies; however, this is somewhat matched by the more elaborate provisions of the UNWC with relation to notification and consultation over ‘planned measures’. Once again, the two conventions can therefore be seen as complementary, acting as one normative framework.

To recap, this sub-section has detailed the key principles of IWL; the principle of equitable and reasonable use, the duty to prevent significant harm; the duty to cooperate and procedural norms, all built from more than 40 years of negotiations. The following two sub-sections will look at the policy framework of the WEF Nexus and the development agenda of the SDGs. It is worth noting that the status of each of these instruments is completely different; they differ in the extent to which they are legally binding, but importantly also in their political power. This difference is what provides strength to the frameworks when utilised together in the LNG approach, as will be explained in Section 3.

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<sup>77</sup> P. Wouters et al. *Sharing Transboundary Waters – An Integrated Assessment of Equitable Entitlement: The Legal Assessment Model*, IHP-VI, Technical Documents in Hydrology, No.74 (Paris: UNESCO, 2005) p.178. *See* also Brown Weiss, ‘The Evolution of International Water Law’, p.207; P.Okowa, ‘Procedural Obligations in International Environmental Agreements’ (1996) 67 BYIL 277

<sup>78</sup> UNWC, Article 3

<sup>79</sup> UNECE, Guide to implementing the water convention at para 241

[https://www.unece.org/fileadmin/DAM/env/water/publications/WAT\\_Guide\\_to\\_implementing\\_Convention/CE\\_MP.WAT\\_39\\_Guide\\_to\\_implementing\\_water\\_convention\\_small\\_size\\_ENG.pdf](https://www.unece.org/fileadmin/DAM/env/water/publications/WAT_Guide_to_implementing_Convention/CE_MP.WAT_39_Guide_to_implementing_water_convention_small_size_ENG.pdf)

## 2.2 WATER-ENERGY-FOOD NEXUS

Increased population growth and progressive urbanisation across the globe has led to recognition of the growing pressures on the demand for water, energy and food, as well as the relationship between these sectors and resources. As a result, the WEF nexus was introduced during the 2008 World Economic Forum annual meeting which sought to develop ‘understanding of how water is linked to economic growth across a nexus of issues’.<sup>80</sup> It has been defined or described as ‘an approach to consider the interactions between water, food and energy, while taking into account the synergies and trade-offs that arise from the management of these three resources, and potential areas of conflict’.<sup>81</sup> The nexus has since become a well-established paradigm within legal, scientific and policy literature.<sup>82</sup>

Interactions across the WEF nexus are numerous, for instance the treatment and distribution of water for drinking supply purposes is highly energy intensive; water is also a necessary component of energy production processes, such as cooling, mining, or hydropower generation. Similarly, energy is required for agricultural production and processing, and countries across the world are increasingly developing crops for biofuels as an energy source.<sup>83</sup> All of these competing uses can necessitate trade-offs being made between different sectors. As such, the WEF nexus has traditionally been framed around notions of security, relating to each of the relevant sectors.<sup>84</sup> However, with an understanding of the interrelated nature of water, energy and food, opportunities are also presented for better water resource management which can be beneficial across all sectors. It is for this reason that the WEF nexus has become known as an important method for framing global development issues concerning natural resources, moving away from the conventional policy approach of decision-making in topical ‘silos’.<sup>85</sup> It is important to note that each sector within the WEF nexus has multifaceted concerns beyond mere resource utilisation. Each sector produces and manages resources to increase and maintain a certain quality of life for

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<sup>80</sup> Pahl-Wostl, Bhaduri and Bruns (n 30).

<sup>81</sup> Stijn Reinhard, Jan Verhagen, Wouter Wolters and Ruerd Ruben, *Water-food-energy-nexus: A quick scan* Wageningen, Wageningen Economic Research, Report 2017 <<https://edepot.wur.nl/424551>> last accessed 10 April 2020

<sup>82</sup> World Economic Forum, *Water Security: The Water-Food-Energy-Climate Nexus* (The World Economic Forum Water Initiative, Island Press 2011), p.xvii.

<sup>83</sup> See ‘Potential Future Impacts of Increased Biofuels Use’, World Bank Blogs, available at <https://blogs.worldbank.org/developmenttalk/potential-future-impacts-of-increased-biofuels-use>, last accessed 1 June 2019

<sup>84</sup> Julia Terrapon-Pfaff and others, ‘Energising the WEF Nexus to Enhance Sustainable Development at Local Level’ (2018) 223 *Journal of Environmental Management* 409 <<https://doi.org/10.1016/j.jenvman.2018.06.037>>.

<sup>85</sup> World Economic Forum, *Water Security: The Water-Food-Energy-Climate Nexus* (The World Economic Forum Water Initiative, Island Press 2011) (n 83).

human populations; as such social development and human wellbeing are at the centre of the WEF nexus. Each sector is also supported and maintained by the environment and ecosystems which natural resources depend on for their sustainability. The WEF nexus is therefore concerned not only with water, food and energy but also with issues such as social inequality, environmental impact and economic volatility.<sup>86</sup>

The WEF nexus is not without criticism<sup>87</sup> particularly with regard to its lack of specificity, described as having traits of a 'nirvana concept'<sup>88</sup> defined by Molle as those that 'embody an ideal image of what the world should tend to. They represent a vision of a 'horizon' that individuals and societies should strive to reach'.<sup>89</sup> However, as stated by Muller, it is 'increasingly widely recognised that no single organisational architecture can serve the diversity of water management situations'.<sup>90</sup> Thus, while taking a critical stance on the WEF nexus with reference to its lack of 'rigour and coherence' Muller ultimately concludes that the WEF paradigm succeeds in shifting focus of water management from 'watersheds to problem-sheds', more directly aligned to the needs and focus of governments, business and citizens.<sup>91</sup> The framing of the WEF nexus is important in this respect, developed from a perspective of business and industry and concerned with the achievement of water, food and energy security. However, as the WEF nexus has developed terminology of security has progressively been replaced by notion of sustainable development.<sup>92</sup> This progression can be viewed positively in light of its alignment with global development at a larger scale while recognising that the WEF nexus alone cannot be viewed as a comprehensive strategy. As argued by Allouche et al., a number of limitations exist when viewing the WEF nexus as an ideal system of optimisation:

It treats the trade-offs between human needs for water, energy and food as a perfect equilibrium model, in which resource allocation can be decided. This can encourage the commodification of resources,

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<sup>86</sup> Holger Hoff, 'Understanding the Nexus. Background Paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus' (2011).

<sup>87</sup> Gareth B Simpson and Graham PW Jewitt, 'The Development of the Water-Energy-Food Nexus as a Framework for Achieving Resource Security: A Review' *Frontiers in Environmental Science* (2019) 7 and Dennis Wichelns, 'The Water-Energy-Food Nexus: Is the Increasing Attention Warranted, from Either a Research or Policy Perspective?' (2017) 69 *Environmental Science and Policy* 113

<sup>88</sup> Carl Middleton and others, 'The Rise and Implications of the Water-Energy-Food Nexus in Southeast Asia through an Environmental Justice Lens' (2015) 8 *Water Alternatives* 627.

<sup>89</sup> Molle F, 'Nirvana Concepts, Narratives and Policy Models: Insight from the Water Sector.' (2008) 1 *Water Alternatives* 131

<sup>90</sup> Mike Muller, *The "nexus" as a step back towards a more coherent water resource management paradigm*, 8 *WATER ALTERN.* 675–694 (2015) 689.

<sup>91</sup> *ibid.*

<sup>92</sup> Pahl-Wostl (n 17).

downplaying environmental externalities, such as biodiversity and climate change, as well as poverty alleviation needs, ignoring day-to-day realities, local priorities and needs.<sup>93</sup>

Allouche et al. stress the need for the WEF<sup>F</sup> nexus to embrace inclusiveness, going beyond the three sectors of which its name is derived.<sup>94</sup> It must also be noted that a power imbalance has persisted between the sectors with economic interests vested in energy and agriculture dominating the narrative and, in some instances, overpowering any notions of equitable and sustainable utilisation of watercourses. It is therefore necessary to move away from the traditionally vertical structures of governance within each of the WEF sectors. Emphasis must be placed on improving the interconnectedness between frameworks, rather than forming new ones. As stated by Bazilian et al. the likelihood of communication failure between the WEF sectors is high given that there are extremely few experts on all three areas.<sup>95</sup> The authors also acknowledge that multisectoral complexities require the creation of a framework which is ‘capable of abstracting the issues at appropriate levels for decision-making’. Furthermore, the lack of normative structures within the nexus could be an issue when asking about implementation and weight of the standards of behaviour expected from it. For these reasons, turning into the various strategies that are already in place which could unite the nexus with other important frameworks. Such a framework exists in the form of the SDGs, with the WEF nexus being used to provide a better understanding of the interdependencies between key areas.

### 2.3 SUSTAINABLE DEVELOPMENT GOALS

SDG 6, the water goal, commits to ‘[e]nsure availability and sustainable management of water and sanitation for all’. Its subsequent targets cover all aspects of water governance including ‘universal and equitable access’ which places homage to the implementation of the human rights to water, the need to ‘improve water equality’ and ‘increase water-use efficiency’, as well as protecting and restoring water related ecosystems. In direct relation to governance, target 6.5 calls for the implementation of ‘integrated water resources management at all levels, including through transboundary cooperation’. This target, while important for its significance in highlighting the need for integrated governance across sectors, is arguably outdated in the landscape of water governance. As mentioned at the outset of this monograph, IWRM has come under criticism for

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<sup>93</sup> Jeremy Allouche, Carl Middleton and Dipak Gyawali, ‘Technical Veil, Hidden Politics: Interrogating the Power Linkages behind the Nexus’ (2015) 8 *Water Alternatives* 610, 617

<sup>94</sup> *ibid.* at 622

<sup>95</sup> Morgan Bazilian and others, ‘Considering the Energy, Water and Food Nexus: Towards an Integrated Modelling Approach’ (2011) 39 *Energy Policy* 7896

its lack of enforcement and its continued water centrism.<sup>96</sup> Its inclusion within the SDGs could therefore be viewed as a missed opportunity to develop a more progressive and inclusive approach which measures advancements in a number of ways, rather than on IWRM alone. The indicators by which target 6.5 is measured are the ‘degree of integrated water resources management’ (indicator 6.5.1)<sup>97</sup> and the ‘proportion of transboundary basin area with an operational arrangement for water cooperation’(indicator 6.5.2). For such an arrangement to be deemed operational there must be existence of a joint body which has regular, formal communication between riparian countries (at least once per year); joint or coordinated management plans or objects; and regular exchange of data and information (at least once per year).<sup>98</sup> Emphasis is therefore clearly placed on cooperation. Of course, there are many different forms of cooperation and it may be the case that less formal mechanisms are in place and functioning, but which do not fall within the scope of the target.

The SDGs continue the siloed approach which has developed within international environmental governance by dividing goals by sector and providing little illustration of the known overlaps and synergies between the goals. Ambitious targets are in place across each of the WEF sectors such as doubling agricultural productivity, increasing renewable energy and improving water quality. Three of the SDGs relate specifically to the WEF nexus: water (SDG 6), energy (SDG 7) and food (SDG 2). Each of the goals are undoubtedly linked; resource management (particularly within the water sector) will be essential for the achievement of each goal, as will the necessary political will and cooperative framework. This interconnectedness provides scope for the establishment of synergies and mutual supportiveness, but also gives rise to the risk of trade-offs being made through the prioritisation of one goal over another.

SDG 2 aims to end hunger, achieve food security, improve nutrition and promote sustainable agriculture. While no specific reference to water is made within the goal or its subsequent targets, reference to sustainable agriculture and ‘resilient agricultural practices’ can be related to the need to utilise water resources in the most efficient way possible.<sup>99</sup> In contrast, SDG 7 focuses on ensuring access to affordable, reliable, sustainable and modern energy for all. Its subsequent targets

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<sup>96</sup> Benson, Gain and Rouillard (n 22).

<sup>97</sup> For further details on monitoring target 6.5.1 *See*, Bertule and others (n 18).

<sup>98</sup> UN-Water, Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation: Targets and Global Indicators (14 July 2017).

<sup>99</sup> Transforming Our World: The 2030 Agenda for Sustainable Development, UNGA Res. A/RES/70/1, 21 October 2015, Goal 2, Target 2.4

and indicators relate to increasing the share of renewable energy and doubling the global rate of improvement in energy efficiency. Once again, no reference is made to water (or indeed to other natural resources) within the goal; despite there being clear links between renewable energy and water resources namely with relation to hydropower.<sup>100</sup>

In 2016, the UN-Water Task Force provided a first evaluation of the interlinkages of SDG 6 with the other SDGs.<sup>101</sup> By focusing on the three pillars of sustainable development: social, economic and environmental, the brief illustrates the complexity of the SDGs and highlights the cross-cutting nature of their implementation. With relation to SDG 2, the report highlights the link between SDG 6 and ending hunger by providing nutritious and sufficient food all year round, ending all forms of malnutrition, doubling agricultural productivity and ensuring sustainable food production systems and resilient agricultural practices.<sup>102</sup> It highlights that these linkages are social in character. With regards to SDG 7, the report highlights the relationship with SDG 6 and the achievement of universal access to modern energy services, increased shares of renewable energy and the doubling of energy efficiency.<sup>103</sup> The report notes that energy is critical for economic development, but highlights that increasing fossil-fuel based energy can increase demands on water. It further notes that some renewable energy, such as hydropower and bioenergy can also have ‘significant impacts on land and water resources and ecosystems’ and states that ‘care should be taken to minimize these impacts’.<sup>104</sup> Furthermore, both SDGs 2 and 7 are discussed with regard to the relationship with SDG 6 in an environmental sense.<sup>105</sup> This interdependency between the goals was also discussed at the 2016 Budapest Water Summit Statement, where water was considered as a connector of various SDGs, highlighting the role of resources, such as international watercourses for the attainment of SDGs across multiple sectors.<sup>106</sup>

Authors and international bodies have also discussed this crucial symbiotic relationship between the SDGs. The UN World Water Assessment Programme illustrated that target 6.3 which focuses

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<sup>100</sup> *ibid.*, Goal 7. Notably specific reference is made to least developed countries and landlocked developing countries within Target 7.b

<sup>101</sup> UN-Water, Water and Sanitation Interlinkages across the 2030 Agenda for Sustainable Development < <http://www.unwater.org/publications/water-sanitation-interlinkages-across-2030-agenda-sustainable-development/>>.

<sup>102</sup> *ibid.* Targets of SDG Goal 2, detailed in Table 1, p. 20.

<sup>103</sup> *ibid.* at Table 2, p. 26

<sup>104</sup> *ibid.* at 25

<sup>105</sup> *ibid.* at 28

<sup>106</sup> Closing document of the BWS2016: The Budapest Water Summit 2016 Messages and Policy Recommendations, available at < [https://www.budapestwatersummit.hu/en/Summit/Documents\\_for\\_Download](https://www.budapestwatersummit.hu/en/Summit/Documents_for_Download)> last accessed 14 June 2019

on improving water quality by reducing pollution, eliminating dumping and minimising the release of hazardous chemicals could challenge SDG 7 on energy, as the collection of wastewater requires a significant amount of energy.<sup>107</sup> In addition, this target is also likely to be financially burdensome on some countries which may not have the financial resources or technology available. Nilsson et al. have provided a systematic way for policy makers to view the interactions between the targets by using a seven-point scale to view those which are inextricably linked to the achievement of another (indivisible) or if targets clash (counteracting).<sup>108</sup> A similar approach is taken to map the relationship between SDG 12 and SDG 16; SDG 12 focuses on sustainable consumption and production, while SDG 16 aims for peaceful and inclusive societies, access to justice and effective accountable institutions at all levels. respectively. The relationship between SDG 6 and 16 has also been highlighted by Orme et al. who suggest that the goals should be addressed together in order to ensure a holistic interpretation and implementation of the SDGs.<sup>109</sup> Further, SDG 13, to ‘take urgent action to combat climate change and its impacts’ is vital to bear in mind across all of the SDGs. Climate change will impact transboundary water resources in many ways, particularly within countries which are already prone to drought.<sup>110</sup> Therefore, climate impacts need to be taken into consideration within the formation of any governance framework.<sup>111</sup>

As has been demonstrated, there is no shortage of literature demonstrating the interlinkages between the SDGs. However, the majority of this literature exists within the political or scientific sphere and therefore does not relate to legal commitments. More importantly, the attainment of the SDGs relevant to this monograph, in relation to the use and conservation of international watercourses, face two challenges: first, fierce competition among riparian states over water resources in order to achieve goals nationally which has the potential to result in conflict. Secondly, even if it is assumed that the SDGs do not cause conflict *per se* and recognising their essential role in inspiring the international community to effect change in society, the achievement of the goals by one or more countries may come at the expense of others. Of course, basin-wide cooperation and management can be found among the indicators of the SDGs. However, this does not negate the possibility of prosperity of one country being detrimental to another as the SDGs alone are

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<sup>107</sup> WWAP (United Nations World Water Assessment Programme), The United Nations World Water Development Report 2017. Wastewater: The Untapped Resource. Paris, UNESCO.

<sup>108</sup> Måns Nilsson, Dave Griggs and Martin Visbeck, ‘Policy: Map the Interactions between Sustainable Development Goals.’ (2016) 534 Nature 320.

<sup>109</sup> Orme and others (n 23).

<sup>110</sup> See Lekan Oyebande, ‘Climate Change Impact on Water Resources at the Transboundary Level in West Africa: The Cases of the Senegal, Niger and Volta Basins’ (2013) 4 The Open Hydrology Journal 163.

<sup>111</sup> Tuula Honkonen, *Water Security and Climate Change: The Need for Adaptive Governance*, 20 POTCHEPSTROOM ELECTRON. LAW J. 1–26 (2017).

not designed to promote equitable and reasonable use of water resources among riparian states. If the SDGs are supplemented by legal frameworks such as IWL, the likelihood of their achievement may be improved, while risks of trade-offs are potentially mitigated, or even eliminated.

### 3 THE LNG APPROACH: TOWARDS INTEGRATION

In order to balance the friction between different sectors and countries and minimise economic losses from inefficiency, a streamlined and holistic approach to water governance should be taken. Both horizontal and vertical integration is needed within governance frameworks, working from local to international level and across a multitude of sectors. The UNWC finds its direction as a result of more than 40 years of negotiations, largely surrounding debates on sovereignty over watercourses and thus relates to the interstate relationship of water resources. The WEF nexus can be traced to the need to recognise the trade-offs made across multiple sectors and industries, particularly as a result of economic growth and population increase, finding its foundation within science and economics. The SDGs predominately focus on accessibility to water resources, as well as food and energy security, developed from a more anthropocentric perspective through the prism of international development. Each of these perspectives bring different approaches to governance and diverse lessons which can be disseminated into one relatively cohesive framework: the LNG approach.

#### 3.1 OVERVIEW OF APPROACH

Section 2 provided a basic understanding of IWL, the WEF Nexus and the SDGs. It has been demonstrated that while each of the frameworks have significant strengths, weaknesses also exist. Each of the three frameworks are well recognised by the international community, but each for different reasons and with varied status with regards to implementation. While the UNWC has struggled to gain support in terms of ratifications, its principles are widely recognised as part of customary international law.<sup>112</sup> In addition, despite ratifications of the Convention itself being few (still only 36), its key principles have been replicated in a number of other regional or basin-scale frameworks, as will be demonstrated in relation to the ZRB in Section 4. Yet, the nature of the UNWC as a framework convention, while allowing states scope to tailor its provisions to their own needs, has also resulted in vague provisions which lack specificity and relatability for watercourse states, resulting in failure or difficulty in fulfilling legal obligations. In comparison, the WEF nexus seeks a balance between achieving water, energy and food security; goals which are better understood and aimed for by all national governments, particularly within a developing country context. However, the strong legal force of the UNWC can be contrasted by the WEF

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<sup>112</sup> See Dellapenna (n 45).

Nexus, which, since its inception in 2011 has been used within scientific and policy literature but has been largely absent from legal discussions. This is despite the UNECE issuing a WEF methodology to demonstrate the importance of the Nexus for sustainable water governance.<sup>113</sup> The WEF has therefore been utilised in a niche way but has not received the level of uptake required to mitigate potential trade-offs between each of the water, energy and food sectors. On the other hand, the SDGs, like the MDGs before them, have garnered enormous international support, likely as a result of their ‘soft law’ non-binding status and global political pressure.<sup>114</sup> But aiming for each individual goal and target in silos, in addition to working towards fulfilling obligations presented by other frameworks, is likely to be a complex task which requires significant capacity, out with the reach of many developing countries. As such, integrating the SDGs and the WEF nexus as a means by which to add flesh to and implement the key principles of IWL could serve as a holistic framework to aid the effectiveness of water governance. The LNG approach would bring together the state-centred international law, the science-driven nexus and the goals and aspirations of the international community.

### 3.2 INTERPRETING AND IMPLEMENTING IWL

The basic thesis of this monograph, as indicated in various sections thus far is that the implementation of IWL could be aided by its incorporation with the WEF Nexus and SDGs. While the law is instrumental in the governance of transboundary watercourses, the two frameworks add further strength to the framework of the UNWC and IWL more generally. The following sections will demonstrate how the WEF Nexus and SDGs can aid the implementation of IWL by adding further substance to key legal principles. As the cardinal rule of IWL, equitable and reasonable use will be examined in detail, with specific analysis of many of the factors contained in Article 6 provided.

#### 3.2.1 *Equitable and Reasonable Use*

Regardless of the way in which equitable and reasonable use is interpreted, it remains ambiguous. This level of uncertainty complicates judgements and makes the application of a principle around

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<sup>113</sup> United Nations, Water-Food-Energy-Ecosystem Neuxs <http://www.unece.org/?id=43460> last accessed 12 April 2020. *See also*, UNECE ‘Methodology for assessing the water-food-energy-ecosystem nexus in transboundary basins and experiences from its application: synthesis’ (New York and Geneva, 2018) [http://www.unece.org/fileadmin/DAM/env/water/publications/WAT\\_55\\_NexusSynthesis/ECE-MP-WAT-55\\_NexusSynthesis\\_Final-for-Web.pdf](http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_55_NexusSynthesis/ECE-MP-WAT-55_NexusSynthesis_Final-for-Web.pdf) last accessed 12 April 2020

<sup>114</sup> For discussion of ‘soft’ power with relation to transboundary watercourses, particularly in the case of hegemonic political contexts, *see* Mark Zeitoun, Naho Mirumachi and Jeroen Warner, ‘Transboundary Water Interaction II: The Influence of “soft” Power’ (2011) 11 *International Environmental Agreements: Politics, Law and Economics* 159.

water equity difficult.<sup>115</sup> As stated by Lankford, having ‘numerous countries in a transboundary basin with numerous criteria leads to mathematical equality rather than jurisprudential equity. It is this misdirection that could potentially create unnecessary contention amongst riparian’s’.<sup>116</sup> Lankford also argues that Article 6, while vague in some ways, is actually too detailed in others. He notes that the provision contains guiding words by stating ‘requires taking into account all relevant factors and circumstances’, this is followed by too many factors and the words ‘weight to be given to each factor’; all of which he argues provides a degree of prescription and method which may take participants towards mathematically equal outcomes.<sup>117</sup> Lankford suggests alterations could be made, such as changing wording to ‘factors shall be taken into account’ or ‘multiple approaches to water allocation shall be taken into account’. However, while removing potentially prescriptive texts and increasing flexibility of implementation may be helpful; the main difficulty with the provisions of equitable and reasonable use is their lack of practical guidance. Indeed, attempts to add more substance to the provisions of equitable and reasonable use are not new. Van de Zaag attempted to put together a number of measurable criteria for defining the allocation of water on an equitable manner<sup>118</sup> while Wouters et al. attempted to create more detailed metrics to inform water cooperation through their Legal Assessment Model.<sup>119</sup> Considering the period of time needed to reach agreement on the UNWC itself, it is not likely that a consensus could be reached regarding amendments to the text of equitable and reasonable use. Instead, attempts must be made to look beyond IWL to additional frameworks including WEF nexus and the SDGs to aid the implementation of key principles such as equitable and reasonable use.

Integration of other key water uses (such as energy and food) give meaning to factors such as existing and future uses of the watercourse vis-à-vis development, particularly as such developments are likely to impact each aspect of the nexus. Such developments will also have an impact on the achievement of the sustainable development goals; building hydropower dams may, for example, add to progress towards the achievement of SDG 7 on energy. It could, at the same time also fail to ensure that the watercourse continues to protect an existing ecosystem, or indeed, sustain the livelihoods of populations dependant on it, resulting in poor progress towards SDG Target 6.6 to ‘protect and restore’ water related ecosystems and Goal 1 which aims to end poverty

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<sup>115</sup> Abby Muricho Onencan and Bartel V. Van de Walle, ‘Equitable and Reasonable Utilization: Reconstructing the Nile Basin Water Allocation Dialogue’ (2018) 10 Water (Switzerland), 2

<sup>116</sup> Lankford (n 41). 139

<sup>117</sup> *ibid.*

<sup>118</sup> Van Der Zaag, Seyam and Savenije (n 40).

<sup>119</sup> P. Wouters et al. *Sharing Transboundary Waters – An Integrated Assessment of Equitable Entitlement: The Legal Assessment Model*, IHP-VI, Technical Documents in Hydrology, No.74 (Paris: UNESCO, 2005)

in all its form everywhere. Without taking a holistic perspective which incorporates these frameworks, it is possible that Governments will see trade-offs which may be of a higher magnitude than necessary. In light of this, the following subsections will illustrate how exactly the LNG approach could reinforce and clarify the factors of equitable and reasonable use in particular.

### 3.2.2 *Factors of Equitable and Reasonable Use*

The list of factors listed under Article 6 are not exhaustive and their consideration will vary on a case-by-case basis as each international watercourse has a variety of natural and man-made characteristics.<sup>120</sup> It is submitted that understanding and applying the factors could be enriched by using the WEF nexus and the SDGs to reconcile a number of different – and often competing – uses of international watercourses. An LNG approach to each of the factors is provided in the following sections.

#### *a) Natural Characteristics*

The first factor considers ‘geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character’.<sup>121</sup> The WEF nexus can link to these natural characteristics when taking into account the different strengths and weaknesses of each watercourse state; for instance, the geographical character of two watercourse states may make one much more suited to irrigation for food production, while another may be better suited to utilisation of the watercourse for hydropower development. These key differences often link to the location of a watercourse based on its positioning in terms of being upstream or downstream on the watercourse and thereby its use of the watercourse being determined by the flow of water.<sup>122</sup> Similarly, although SDG 6 does not refer to such natural factors, it expressly recognises climate change effects on access to water of countries and populations. If this is read in conjunction with Goal 13 (climate action), which refers to ‘human impact of geo-physical disasters’ one appreciates the need ‘to integrate disaster risk measures, sustainable natural resource management...into national development strategies.’ This is clearly relevant to the question of equity in the context of managing international watercourses. Natural characteristics can also be impacted by water uses, as stated by Leb, uses

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<sup>120</sup>For more details *See* Caflisch, ‘Equitable and Reasonable Utilisation and Factors Relevant to Determining Such Utilisation (Articles 5 and 6),’ in Boisson de Chazournes and others (n 3). 77–94.

<sup>121</sup> *ibid.* at 85–86.

<sup>122</sup> The positioning of watercourse states has often formed the basis of their opinions with relation to the provisions of the UNWC, founded on concerns over limitations of sovereignty regarding use of the watercourse. *See* Salman (n 54).

can affect another state's physical territory, for example through flow velocity changes that impact riverbed stability and the geomorphology of the river, or reduction of flood risk and damage through flow regulation. They can affect existing uses or foreclose future water development opportunities in other parts of the basin, for instance by changing the hydropower potential downstream through upstream development. These impacts may cause harm, or they may be beneficial<sup>123</sup>

Thus, the state of natural characteristics is not permanent. Considerations of this factor need to be flexible and adaptive and continuously evaluated during any developments. Inclusion of the WEF nexus allows expansion into two of the sectors most likely to result in a change to natural characteristics, while the scope of the SDGs integrates processes of risk management which are likely to otherwise remain absent.

*b) Social and Economic Needs*

Article 6(1)(b) provides that the 'social and economic needs of the watercourse States concerned' must be taken into account in determining what is equitable and reasonable. This factor requires decision-makers to understand the importance of distributing resource utilisation and balancing trade-offs to meet the socio-economic demands of those uses.<sup>124</sup> This should include taking into consideration the level of economic development and priorities relating to food and energy security while continuing to ensure the protection of the watercourse. It is not clear from the provision how socio-economic criteria should be evaluated, or whether pertinent uses should be distinguished from non-pertinent uses.<sup>125</sup>

This factor can also be linked to Article 6(1)(c) which relates to the population dependant on the watercourse.<sup>126</sup> Population dependency should not be considered solely in terms of the number of people living within the watercourse, but also based on the characteristics of that population. For instance, the requirements of a dense population within an urban area on a watercourse versus that of rural pastoralists would be very different. In this sense, a simplistic perspective of the number

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<sup>123</sup> Christina Leb, 'One Step at a Time: International Law and the Duty to Cooperate in the Management of Shared Water Resources' (2014) 40 *Water International* 1, 21

<sup>124</sup> For further analysis of socio-economic need as a criterion for equitableness see *Delimitation of the Maritime Boundary in the Gulf of Maine Area (Canada v United States)* (1984) ICJ Rep 165. (Gulf of Maine Case).

<sup>125</sup> See Ximena Fuentes, 'The Criteria for the Equitable Utilization of International Rivers' (1997) 67 *The British Year Book of International Law* 337.

<sup>126</sup> Water use increases at more than twice the rate of population growth, See Christina Leb, 'One Step at a Time: International Law and the Duty to Cooperate in the Management of Shared Water Resources' (2014) 40 *Water International* 1, 21

of people dependant on the watercourse is not sufficient, links must be made to their social and economic need including access to and affordability of resources. Interpretation of social and economic need will be shaped by the relations which exist within the region and the country itself in relation to geographical and geopolitical considerations. In this respect, the WEF nexus offers distinct approach to the critical issues' countries face with respect to food, energy and other vital uses of water. Not only quantifying and determining those needs but also proposing potential trade-offs between such different uses of water resources could be important additional tool to determine what is equitable and not so, in light of other factors.

Cases considered by the ICJ have demonstrated reluctance to tackle socio-economic aspects. In the case of *North Sea Continental Shelf*<sup>127</sup> the court stated that its task was to look at delimitation and not the apportionment of the concerned area.<sup>128</sup> This reluctance is likely to be founded in the sensitivity around social and economic status of States concerned. In spite of this, the case of *Gulf of Main* did give some consideration to economic dependence of coastal communities when determining the equitability of delimitation.<sup>129</sup> As noted by Fuentes, although the case did not use economic dependence as a factor for determining the delimitation line, it 'used it as an auxiliary criterion to verify the chosen line did not entail catastrophic repercussions to the livelihood and economic well-being of the costal population of the States concerned'.<sup>130</sup> This consideration of the significance of the natural resource to the livelihood of citizens concerned is testament to the importance of socio-economic factors. In the *Jan Mayen* case, the court, while expressly rejecting giving attention to socio-economic factors, took account of equitable access to the fishery resources present in the area.<sup>131</sup> In contrast, the case of *Tunisia/Libya*, the ICJ, referring to the unpredictability of natural fortune vis-à-vis natural resources argued that '[a] country might be poor today and become rich tomorrow as a result of an event such as the discovery of a valuable economic resource'.<sup>132</sup> The statement was made in relation to an argument made by Tunisia regarding its relative poverty with comparison to Libya with relation to natural resources. The problem highlighted by the Court is the temporal nature of socio-economic factors and their ability

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<sup>127</sup> *North Sea Continental Shelf (Federal Republic of Germany v Denmark)* I.C.J. Reports 1969

<sup>128</sup> *ibid.*, at 22, para 18

<sup>129</sup> *Delimitation of the Maritime Boundary in the Gulf of Maine Area, (Canada v United States)* (1984) ICJ Rep 165 at 77-8, para 107

<sup>130</sup> Fuentes (n 126). 342

<sup>131</sup> *Case Concerning Maritime Delimitation in the Area Between Greenland and Jan Mayen (Denmark v Norway)* (1993) ICJ Rep 38 (Jan Mayen Case) at 71-2, paras 75, 76 and 80

<sup>132</sup> *Case Concerning the Continental Shelf between Tunisia and Libyan Arab Jamahiriya (Tunisia/Libyan Arab Jamahiriya)* (Judgment) (1982) ICJ Rep 18, para 107, page 77

to rapidly change. While notable, this argument is reduced by the fact that each of the factors considered within Article 6 are evolutionary in nature; none of them relate to the consideration of an aspect of the watercourse which is permanent. The difficulty is not, therefore, whether social and economic need should be considered, but rather *how* they should be considered, as noted by Fuentes:

the real objection to the inclusion of socio-economic factors does not lie in a *per se* extra-legal nature of the socio-economic criteria, but on *how* these factors should operate in the process of delimitation so that the decision does not intrude into the political realm

The WEF nexus can once again provide additional information which can be used to add substance to the consideration of this factor. Energy and food security are primary concerns within a number of the countries which share international watercourses.<sup>133</sup> Indeed, many conflicts concerning transboundary basins relate not to the social and economic benefits derived from the watercourse *per se*, but from the benefits which can be gained from its utilisation, such as irrigation for food production or hydropower developments. The need for development in these two areas is vital for many developing countries. Thus, a holistic demonstration of the social and economic need relating to, not only water, but also to energy and food would provide a more rounded image of the development needs of riparian countries. This development must, of course, still be met with the caveat of equitable and reasonable use and sustainable development. The SDGs can play a key role by linking to the achievement of SDGs 2 (food) and 7 (energy), but also Goal 12 which focuses on sustainable consumption and production patterns and Goal 10 which aims to reduce inequality within and among countries, as well as Goal 1 on ending poverty. In terms of social need, Goal 2 requires monitoring the prevalence of undernourishment (indicator 2.1.1) and malnutrition (indicator 2.2.2), as well as the proportion of agricultural area under productive and sustainable agriculture (indicator 2.4.1). Consideration of the social and economic need of States could therefore look at these indicators as demonstrations of social ‘need’ vis-à-vis food security. There is, of course, the potential for such schemes to also damage the potential to reach other targets such as indicator 2.3.2 which looks at the income of small-scale food producers. Large-scale irrigation schemes have the potential to limit opportunities for small-scale farmers, demonstrating another area of analysis which the SDGs can draw importance to. The same is true of Goal 7 which provides indicators relating to the proportion of the population with access to

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<sup>133</sup> See United Nations Economic Commission for Europe, Reconciling resource uses in transboundary basins: assessment of the water-food-energy-ecosystems nexus (New York and Geneva, 2015) [http://www.unece.org/fileadmin/DAM/env/water/publications/WAT\\_46\\_Nexus/ece\\_mp.wat\\_46\\_eng.pdf](http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_46_Nexus/ece_mp.wat_46_eng.pdf)

electricity (indicator 7.1.1) as well as the proportion of renewable energy (indicators 7.1.2, 7.2.1 and 7.b.1). Hydropower developments clearly provide an opportunity to work towards the achievement of these goals, however such developments must be balanced holistically with other goals, particularly those relating to reduced inequality between countries (Goal 10), as well as those with environmental focus, as described with relation to natural characteristics.

*c) Existing, Potential and Alternative Use*

The uses of water and their efficiency is a focus within IWL, the WEF Nexus and the SDGs. In relation to equitable and reasonable use States are required to use and develop the watercourse ‘with a view to attaining optimal and sustainable utilization’.<sup>134</sup> The use of ‘optimal utilisation’ was the subject of controversy during drafting, being concerned that it may have economic connotations which could be used to give the most efficient user of an international watercourse priority over less technologically developed riparian States. As a result, the following information was provided during the drafting process:

[a]ttaining optimal utilization and benefits [of an international watercourse] did not mean achieving ‘maximum’ use or the most technologically efficient use or that the State capable of making the most efficient use of the watercourse should have superior claim to it. It meant the attainment of the best possible uses and benefits for all with a minimum of harm, in the light of all relevant circumstances and a manner consistent with the adequate protection of the watercourse in terms, for instance, of flood or pollution control

This detail is important in when considering the existing, potential and alternative uses of watercourses as the technology deficit existing between countries also plays a significant role here. Efficient water use is a focus of both the SDGs, illustrated through Target 6.4 and the UNWC Article 6(1)(f) relating to economy of use. Despite their inclusion within both frameworks, water efficiency has been demonstrated to be limited as a means of determining equitable utilisation.<sup>135</sup> The nature of the efficiency requirement has been developed further in the case of *Colorado v. New Mexico*<sup>136</sup> within which the court explained that States have an ‘affirmative duty to take reasonable steps to augment the water supply of an interstate stream’<sup>137</sup> and that they have ‘a duty to employ ‘financially and physically feasible’ measures which are ‘adapted to conserving and equalizing the

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<sup>134</sup> UNWC, Article 5(1)

<sup>135</sup> Fuentes (n 126).

<sup>136</sup> *Colorado v. New Mexico* (1982) 459 US 176

<sup>137</sup> *ibid.*, at 185

natural flow'.<sup>138</sup> The reference to 'financially and physically feasible' demonstrates acknowledgement that while some other methods of utilisation may be the most 'efficient' they may not be realistic within some contexts, particularly with relation to developing countries.

In many cases, existing uses will refer to requirements of irrigation or hydropower projects and therefore clearly links to the need to consider the WEF Nexus. In the *Narmada Water Disputes Case* the tribunal took into account the extent of irrigable land, noting that this was one of the most important criteria to be considered.<sup>139</sup> In previous cases tribunals have also given preference to irrigated land, opposed to irrigable land.<sup>140</sup> It is interesting to note that, based on the wording of the factor itself, neither existing or potential use should be given preference, but should instead be treated equally. Thus, a fine balance has to be struck between existing uses and what the potential uses are, while ensuring that due recognition is given to the different development trajectories of each country. In this sense, considerations of existing, potential and alternative uses relate clearly to principles of both intra- and intergenerational equity.<sup>141</sup> Consideration of equity across the same generation also gives rise to discussions of 'fairness' and links to the aforementioned ideas of different meanings of optimal and sustainable utilisation, based upon the financial and technical ability of the States involved.<sup>142</sup>

The UNECE Guide to Implementing the Water Convention also makes clear the link between intergenerational equity and the use of international watercourses; Article 2, paragraph 2(c) should be read in conjunction with Article 2, paragraph 5(c) according to which 'water resources shall be managed so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs'.<sup>143</sup> This is fully in line with the contemporary developments of customary international law with relation to international watercourses, according to which the principle of equitable use incorporates that of sustainable development. That is to say that a use of an international water body may not be considered as equitable, and therefore legal, if it is not sustainable. This is significant when considering developments on international watercourses as uses which may be economically viable to one state today may not be viable to

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<sup>138</sup> *ibid.*

<sup>139</sup> *Report of the Narmada Water Disputes Tribunal* (1969) Vol I, paras 9.5.1 and 9.6.1, p.137 and 138

<sup>140</sup> *Report of the Krishna Water Disputes Tribunal* (2010) Vol 2, pp. 172-4

<sup>141</sup> Intergenerational equity relates to equity between past and future generations. Intragenerational equity refers to equality between people of the same generation, *see* Otto Spijkers, 'Intergenerational Equity and the Sustainable Development Goals' (2018) 10 Sustainability 3836.

<sup>142</sup> *See* Zeray Yihdego, 'The Fairness "Dilemma" in Sharing the Nile Waters: What Lessons from the Grand Ethiopian Renaissance Dam for International Law?' (2017) 2, 1 and Yihdego and Rieu-Clarke (n 16).

<sup>143</sup> UNECE, Guide to Implementing the Water Convention, p.22

another for years to come.<sup>144</sup> Interpretation of this provision must therefore include an understanding of the key sectors and actors which play a major role within the basin, ensuring that governance regimes (and the implementation of IWL in particular) includes taking an active part in consultation processes with stakeholders across all WEF sectors. Both the existing and future uses of the watercourse will be linked to national development plans and strategies formed at a national level and may be formed by a number of different Government departments. By taking an LNG approach, a more cohesive strategy can be developed for the mapping of all existing, potential and alternative uses of watercourses and how they may (or may not) contribute to sustainable development and the achievement of intra- and intergenerational equity. Once again, this factor can clearly be linked to SDG 10 which aims to reduce inequality within and among States and SDG 12 which targets sustainable consumption and production patterns.

*a) Conservation and Protection*

While some sense of ‘watercourse protection’ is included within Article 20 and 21 of the UNWC, environmental considerations are not really represented within Article 6. In this sense, as stated by Burchi, it can be argued that the UNWC and its application has not really kept up with the ‘greening’ of water law.<sup>145</sup> While Article 20 does refer to the ‘protection and preservation of ecosystems’ of international watercourses; this protection and preservation is unlikely to occur through the framework of IWL alone. With regards to the implementation of this provision, authors, such as McIntyre have considered the use of an ‘ecosystem approach’ as ‘crucial to the effective realisation of the fundamental objective of international water law’.<sup>146</sup> However, it is necessary to note that the UNWC was not born from the era of environmental focus; emphasis was placed on water quality rather than quantity. The same is not true of the UNECE which places greater emphasis on water quality and environmental matters within that. In the UNECE equitable and reasonable use is carefully combined with the ecosystem approach, the precautionary principle, polluter pays and sustainable development principles. The Convention also requires the preparation of environmental impact assessments (Article 3, para 1(h)), the establishment of water quality objectives, adoption of water-quality criteria and the implementation of best practices for the reduction of nutrient and hazardous substance inputs from diffuse sources.

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<sup>144</sup> Spijkers (n 24). 46

<sup>145</sup> Stefano Burchi, ‘The Future of Domestic Water Law: Trends and Developments Revisited, and Where Reform Is Headed’ (2019) 44 *Water International* 258 <<https://doi.org/10.1080/02508060.2019.1575999>>.

<sup>146</sup> Owen McIntyre ‘Environmental protection and the ecosystem approach’ in Stephen C McCaffrey, Christina Leb & Riley T Denoon, *Research handbook on international water law* [internet resource] (2019) 129.

However, despite the lack of explicit reference within the provisions themselves, within its commentary to the UNWC, the ILC made clear that ecosystems needed protection and preservation in order ‘to ensure their continued viability as life support systems, thus providing an essential basis for sustainable development’. These obligations can clearly be linked to SDG 6.6 which relates to the protection and restoration of water-related ecosystems, as well as SDG 15 which calls on States to ‘ensure the conservation, restoration and sustainable use of freshwater ecosystems in line with obligations under international agreements’. Indicator 15.1.2 looks at the proportion of important sites for freshwater biodiversity which are covered by protected areas, while indicator 15.6.1 looks at the number of countries which have frameworks in place for the fair and equitable sharing of benefits. The incorporation of these indicators within any considerations of the conservation and protection of an international watercourse could allow an opportunity to work towards the achievement of such SDG indicators.

Further, by using a WEF nexus approach to the conservation and protection of international watercourses issues such as agricultural run-off and ecosystem changes as a result of altered water flow due to large-scale development such as hydropower can be considered. As will be further discussed with regards to the duty to cooperate, one of the main difficulties with on international watercourses is a lack of sufficient data. Using the LNG approach could allow data to be shared across Government departments such as agriculture, energy and water; creating a comprehensive analysis of the uses of the watercourse and enhancing potential planning to mitigate any potential trade-offs and enhance synergies.

### 3.2.3 *No Significant Harm*

As previously noted, integration with the WEF nexus would allow additional input from other sectors to be used within the planning stages of development to be able to prevent significant harm. The expansion of evaluation to the water and energy sectors has the potential to reduce the chances of unforeseen significant harm arising in the aftermath of the project; with relation to trade-offs relating to other sectors. Interpretation of no significant harm through the lens of the WEF nexus also means taking into consideration any potential significant impacts on the food (agriculture) and energy (hydropower) industries. This link can also be aided by tying into the concept of intergenerational equity and sustainable development. As noted by Zeitoun the relevance of IWL to later developing states has been questioned.<sup>147</sup> This is largely because

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<sup>147</sup> Mark Zeitoun, ‘The Relevance of International Water Law to Later-Developing Upstream States’ (2015) 40 *Water International* 949 <<http://dx.doi.org/10.1080/02508060.2015.1101527>>.

developments may take place in states which are further developed which limit the ability of other riparian states to develop at some stage in the future. However, analysis of IWL demonstrates that favour is not provided to either upstream or downstream states, nor first or later developing, but rather evaluates each development on a case-by-case basis. It is this evaluation which can therefore be aided by the incorporation of additional sectoral uses of watercourses.

Within the SDGs obligations which would normally be considered due diligence are placed within the context of sustainable development. In target 6.3, the reduction of pollution is linked to improved water quality and the recycling of water, not to the obligation not to cause harm. This would mean that no significant harm is going over and above a due diligence obligation, linking to concepts of both inter- and intragenerational equity. As noted by Spijkers, Article 7 of the UNWC, the ‘no harm rule’ could be interpreted to mean no harm caused to both present and future generations, as well as to the environment itself, therefore moving beyond the inter-State paradigm of the no-harm rule and indeed of IWL as a whole.<sup>148</sup> While this view is a useful consideration, it is likely to be difficult to enforce due to the ever-evolving nature of transboundary watercourses and their uses. It may therefore be more realistic to imagine the utilisation of the SDGs and the WEF nexus as a counterbalance to understand the trade-offs which may result from developments in the energy and food sectors.

Evidence from the WEF either based upon single projects that are proved to be controversial or a mapping of the nexus within an entire water system can be used in considerations of what may result in ‘significant harm’. These considerations can demonstrate impact across all three WEF sectors and allow States to take appropriate measures to prevent significant harm. This holistic perspective may help to mitigate or eliminate significant harm on the economy or environment of those who have been significantly affected by resorting to applying necessary trade-offs that are acceptable by all concerned. This is not to say that all ills and challenges of applying significant harm would be solved through the LNG approach, but consideration of ‘harm’ can be substantially strengthened in its determination and implementation.

#### *3.2.4 Duty to Cooperate*

Although cooperation or non-cooperation between riparian states is determined by various geopolitical and sovereignty factors, lack of scientific evidence and misunderstanding concerning the risks and benefits of energy, food or drinking water projects relating to a watercourse are often

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<sup>148</sup> Spijkers (n 24). at 45

amongst the major causes of dispute or tension between riparian states. As stated by Subramanian et al. it is essential for cooperation on transboundary watercourses that perceived risks are mitigated as far as possible<sup>149</sup>; the expansion of IWL frameworks to the WEF nexus and SDGs has the potential to assist with this risk mitigation by opening up space for dialogue and cooperation across sectors, including several government agencies and regional authorities as well as increasing stakeholder participation.<sup>150</sup> The integration of the WEF nexus broadens the scope for the inclusion of private sector and industry stakeholders as the nexus has historically been industry orientated, from its formation emphasis was placed on public-private partnerships in order to transform the water sector.<sup>151</sup> Inclusion of the private sector and industry could provide opportunities to access a greater quantity of data than is possible for national governments alone due to financial constraints. This expanded level of communication will aid the implementation of the procedural obligations contained within IWL including obligations to cooperate and exchange of data and information.<sup>152</sup> As stated by Leb, and as previously noted, the ‘main difficulty for any riparian state planning a use is to come by all the information and data required to do a detailed assessment according to the equitable and reasonable use principle. The information needs are wide ranging and not all information is available at the national level.’<sup>153</sup> The WEF nexus could therefore offer not only tangible substantive findings on divergent water uses but also facilitate information exchange, cooperation and the potential of taking joint action to maximise mutual benefits or avert potential risks through the identification of, and acting upon, trade-offs. The obvious weakness of the nexus in the context of the duty at hand is that it does not have a binding force unless studies are solicited as part of legal commitment between concerned states. However, the fact that nexus outcomes involve scholars or independent bodies mean that the parties are likely to positively react to them and enhance their cooperative endeavour. In contrast to the WEF nexus, the SDGs have embraced directly relevant policy commitments to cooperation, supported by indicators of their implementation.

Further, the SDGs could be used by States to add substance to agreements for the joint management of watercourses, thereby enhancing cooperation. Successful transboundary water

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<sup>149</sup> Ashok Subramanian, Bridget Brown and Aaron Wolf, ‘Understanding and Overcoming Risks to Cooperation along Transboundary Rivers’ (2014) 16 *Water Policy* 824.

<sup>150</sup> Spijkers, *supra* note 21 and Owen McIntyre, ‘International Water Law and SDG 6: Mutually Reinforcing Paradigms’ in Duncan French & Louis J Kotzé, *Sustainable Development Goals: law, theory and implementation* (2018) 174

<sup>151</sup> Hoff (n 87). at 225. *See also* Benson, Gain, and Rouillard, *supra* note 19 at 760

<sup>152</sup> UNWC, *supra* note 2, Articles 8 and 9

<sup>153</sup> Christina Leb, ‘Data Innovations for Transboundary Freshwater Resources Management: Are Obligations Related to Information Exchange Still Needed?’ (2020) 4 *Brill Research Perspectives in International Water Law* 3, 21

management is extremely dependant on political buy-in and the commitment of states to cooperate.<sup>154</sup> Creating linkages across sector, increasing participation and promoting information sharing across WEF sectors may improve the willingness of States to cooperate. As noted by McIntyre, ‘the inclusive and participatory process’ of the SDGs as well as the use of their implementation, monitoring and compliance mechanisms can be used to ‘enhance the relevance and legitimacy of progressive water law’.<sup>155</sup>

In sum, this section has shown that the LNG approach brings a holistic and innovating approach to water governance by strengthening substantive and procedural rules of IWL, as will be broadly tested in the ZRB in the following sub-section.

#### 4 THE ZAMBEZI RIVER: LNG APPROACH

The ZRB spans eight countries in Southern Africa: Angola; Botswana; Malawi; Mozambique; Namibia; Tanzania; Zambia; and Zimbabwe. It is the largest river basin contained within the Southern African Development Community (SADC), covering a total area of 1.37 million km<sup>2</sup>. Each of the countries share different proportions of the basin and rely on it to different extents.<sup>156</sup> The basin comprises almost all of Malawi’s territory, 76.4% of Zambia, 54.5% of Zimbabwe, 20.2% of Mozambique and 18.9% of Angola.<sup>157</sup> Each of the basin countries have diverse natural physical characteristics which create a number of governance challenges, but also opportunities, particularly for economic development such as hydropower plants and agriculture, linking to food and energy security.<sup>158</sup> The ZRB is home to around 30 million people, 25% of whom live in urban centres and the rest within rural areas.<sup>159</sup> Poverty continues to impact all of the ZRB states to varying degrees.<sup>160</sup> As a result a fine balance must be struck across the basin, between the use of

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<sup>154</sup> Michelle Lim, ‘Is Water Different from Biodiversity? Governance Criteria for the Effective Management of Transboundary Resources’ (2014) 23 *Review of European, Comparative and International Environmental Law* 96., 99

<sup>155</sup> McIntyre (n 23). at174

<sup>156</sup> ‘World Bank, ‘The Zambezi River Basin: A Multi-Sector Investment Opportunities Analysis - Volume 4: Summary Report’” [Http://Documents.Worldbank.Org/Curated/En/599191468203672747/Modeling-Analysis-and-Input-Data> Last Accessed July 2019’.

<sup>157</sup> See FAO, ‘The Zambezi Basin’ (FOA Corporate Document Repository) <http://www.fao.org/3/W4347E/w4347e0o.htm#the%20zambezi%20basin> (last accessed 10 June 2019)

<sup>158</sup> Significant hydropower facilities are serviced by the Zambezi River and its tributaries, including the joint Zambia and Zimbabwe Kariba Dam, built in 1959, the Itzhi Tezhi Dam in Zambia, built in 1977, the Kafue Gorge Upper hydroelectric scheme in Zambia, commissioned in 1979, and the Cahora Bassa Dam in Mozambique, built in 1974.

<sup>159</sup> World Bank (n 157).

<sup>160</sup> UNDP, ‘Human Development Report 2016: Human Development for Everyone’ 2016 > [http://hdr.undp.org/sites/default/files/2016\\_human\\_development\\_report.pdf](http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf)> The Gross National Income

natural resources for economic growth, the implementation of international and regional legal obligations and the pursuit of sustainable development.

Water law and policy frameworks throughout the ZRB have largely been developed in line with IWL frameworks, the UNWC in particular.<sup>161</sup> This framework has created a strong foundation for the governance of the watercourse. Yet, some gaps remain, particularly with regards to demonstrating linkages between water, energy and food, wider considerations of sustainable development, and the implementation of IWL principles at a national level.

#### 4.1 INTERPRETING AND IMPLEMENTING IWL

Of the ZRB States, only Namibia has ratified the UNWC; although Angola, Botswana, Malawi, Mozambique and Zambia voted in favour of the adoption of the treaty (Tanzania and Zimbabwe were absent from the voting process).<sup>162</sup> The UNWC cannot therefore be applied to the ZRB as an international treaty framework, but as noted previously many of the main principles and rules codified in the UNWC are reflected in customary law and are therefore applicable to all States. The key norms and procedures of the UNWC have also been endorsed in regional and basin-wide legal instruments in the ZRB, as will be discussed below, there is therefore no need for further discussion of customary IWL for the purpose of this monograph. We also note that as the UNWC is a framework convention it needs to be applied to specific international watercourses or basins through separate agreements or with necessary adjustments and details. For these reasons this chapter focuses on regional, basin-wide and national laws and policy instruments relating to the Zambezi.

##### 4.1.1 *Regional Frameworks*

In the Southern African Development Community (SADC),<sup>163</sup> to which all ZRB states belong, the first Protocol concerning international watercourses was signed in 1995 and subsequently entered

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(GNI) Per capita of the countries in the region ranges from \$14, 663 (Botswana), \$9,770 (Namibia) to that of \$1,588 (Zimbabwe), \$1,098 (Mozambique) and \$2,467 (Tanzania).

<sup>161</sup> The UNWC is mentioned within regional and basin level frameworks, *see* Preamble, Revised Protocol on Shared Watercourses in the Southern African Development Community (signed 7 August 2000; in force 22 September 2003) and Preamble, Agreement on the Establishment of the Zambezi Watercourse Commission (ZAMCOM) (signed 13 August 2004; in force June 19 2011).

<sup>162</sup> 'UN General Assembly Official Records, 99th Plenary Meeting, 21 May 1997, UN Doc A/51/PV.99' <[http://www.un.org/ga/search/view\\_doc.asp?symbol=A/51/PV.99](http://www.un.org/ga/search/view_doc.asp?symbol=A/51/PV.99)> accessed 4 September 2017.

<sup>163</sup> Law over transboundary watercourses in Southern Africa has been established through the Southern African Development Community (SADC), a political and economic intergovernmental organisation formally established by the 1992 Treaty of the SADC. The SADC holds the goal to further socio-economic, political and security cooperation and integration among the 15 Southern African state parties, which includes specific objectives to "achieve

into force in 1998.<sup>164</sup> The Protocol was revised following the formation of the UNWC, to become the 2000 Revised Protocol on Shared Watercourses (SADC-PC) which brought its basic principles in line with the developments in IWL, namely the UNWC.<sup>165</sup> The provisions of the SADC-PC largely replicate those of the UNWC, with a couple of alterations.<sup>166</sup> The factors relevant to equitable and reasonable use are identical to the UNWC, with the exception of Article 3(8)(a)(ii) which adds environmental needs of the watercourse State. In addition, within Article 4(2) the obligation not to cause significant harm is applied to both other Watercourse States (as per the UNWC), and their environment, going further than the UNWC with relation to environmental needs. In addition to the Protocol, there have been several policy documents framing the implementation of regional water sector development.<sup>167</sup> In terms of ratification of the SADC-PC, all ZRB states have ratified the agreement, with the exception of Zimbabwe and Angola both who have only signed the agreement. The SADC-PC is well acknowledged as a leading regional framework for water governance, however the extent to which the protocol interacts with other sectors is limited. The factors to be used to determine equitable and reasonable use, contained in Article 8, mirror those of the UNWC. The same is true of the duty not to cause significant harm contained in Article 10. Thus, the SADC-PC, like the UNWC, largely creates a framework convention which can be adapted to fit the circumstances of individual watercourses.

#### 4.1.2 Basin Frameworks

For cooperation to be successful at basin level, there must be a degree of established trust, confidence and information sharing between all of the relevant States. A long history of cooperation exists within the ZRB and developments towards the joint management of water resource at the basin scale have been significant. This paper will focus on the most recent period

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complementarity between national and regional strategies and programmes”, as well as to “achieve sustainable utilisation of natural resources and effective protection of the environment”. Thus, while cooperation is the key goal of the SADC, environmental and natural resource issues are seen to be key components of such cooperation.

<sup>164</sup> 10 SADC countries signed the agreement at the time, Angola was still impacted by civil war at the time. *See* Salman M.A. Salman, Legal Regime for Use and Protection of International Watercourses in the Southern African Region: Evolution and Context, 41 *Natural Resources Journal* 981 (2001).

<sup>165</sup> Revised Protocol on Shared Watercourses in the Southern African Development Community (signed 7 August 2000; in force 22 September 2003).

<sup>166</sup> *See* UN Watercourses Convention User's Guide, UN Watercourses Convention and the SADC Revised Protocol < <https://www.unwatercoursesconvention.org/documents/UNWC-Fact-Sheet-13-Relationship-with-SADC-Revised-Protocol.pdf> > last accessed 12 April 2020

<sup>167</sup> Southern African Development Community Regional Water Policy (adopted August 2005); Southern African Development Community Regional Water Strategy (adopted June 2006); Southern African Development Community Regional Infrastructure Development Master Plan, Water Sector Plan (adopted August 2012); Southern African Development Community Regional Strategic Action Plan on Integrated Water Resources Development and Management Phase IV (2016-2020).

of transboundary water cooperation, beginning with the formation of the Zambezi River Authority (ZRA).<sup>168</sup>

In the aftermath of World War II, the territorial governments of Northern and Southern Rhodesia established the Inter-Territorial Hydroelectric Power Commission in order to research means of ending power outages.<sup>169</sup> The Commission looked into the potential of establishing two dams, the Kariba and the Kafue. The Kariba dam was subsequently built and became operational in 1959 under the jurisdiction of the Federal Power Board, and subsequently the Central African Power Corporation in 1963 and the Zambezi River Authority (ZRA) in 1987. The main objective of the ZRA is to be responsible for ‘the operation and maintenance of the Kariba Dam Complex, investigation and development of new dam sites on the Zambezi River and analysing and disseminating hydrological and environmental information pertaining to the Zambezi River and Lake Kariba’.<sup>170</sup> This is of significant importance within this monograph as it makes clear the importance of the WEF nexus from the very beginning of cooperation within the ZRB.

The ZRA Agreement establishes the ZRA and charges it with the duty to ‘operate, monitor and maintain the Kariba Complex’.<sup>171</sup> The ZRA Agreement entered into force on the 1<sup>st</sup> of October 1987 and takes the form of a bilateral treaty binding upon States’ ratification through national legislation. It calls for efficient and equitable use of the waters of the Zambezi River.<sup>172</sup> It also states that all energy produced from the Kariba Dam should be shared equally<sup>173</sup> and provides further details regarding equal water allocation in Annexure 1.<sup>174</sup> The agreement also provides a number of cooperation and consultation obligations within Article 18(1) which are well developed for the time of its formation. Annexure 1 calls for the exchange of information which is ‘of common interest related to the interconnected systems’(Article 22). It lists a number of obligations regarding consultations over planned measures and abstractions on the watercourse (Article 9(e)

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<sup>168</sup> Early agreements were formed in the imperial era and largely focused on the demarcation of national boundaries, put in place by colonial governments, while agreements which came slightly later were largely bilateral. These agreements are nonetheless important to acknowledge the history of cooperation within the basin. For a full analysis of all of the agreements formed within the ZRB, see Zebediah Phiri and others, *The Zambezi River Basin: Water and Sustainable Development* (Taylor and Francis 2017)..

<sup>169</sup> Soils Incorporated (Pvt) Ltd, WCD Case Study: Kariba Dam Zambia and Zimbabwe Final Report: November 2000, prepared for the World Commission on Dams (WCD)

<sup>170</sup> Zambezi Water Authority, About Us, available at <http://www.zambezi.org/about-us>, last accessed 10 June 2019

<sup>171</sup> Agreement between the Republic of Zimbabwe and the Republic of Zambia concerning the utilization of the Zambezi River (signed at Harare, 28 July 1987), Article 9

<sup>172</sup> *ibid.* at Article 18(1)

<sup>173</sup> *ibid.* at Article 23

<sup>174</sup> *ibid.*

and 18), as well as cooperation over regulation of the water level and maintenance of hydraulic works and installations (Articles 9 and 22). Importantly a joint technical committee is established through Annexure 1<sup>175</sup> and obligations regarding dispute settlement are also put in place.<sup>176</sup> It has to be stressed here that the key principles within the ZRA Agreement are compatible with equitable and reasonable utilisation and the principles of IWL. However, this Agreement went beyond equity by advocating the notion of ‘perfect’ equality of the sharing of benefits between the two parties.

Today, the main legal framework within the ZRB is the ZAMCOM Agreement: an institutional agreement which specifically establishes the Zambezi Watercourse Commission (ZAMCOM).<sup>177</sup> The ZAMCOM treaty is legally binding on all of the States which have ratified it, which currently includes all ZRB States with the exception of Malawi who has only signed the agreement. ZAMCOM states that its objective is ‘to promote the equitable and reasonable utilisation of the water resources of the Zambezi Watercourse as well as the efficient management and sustainable development thereof’.<sup>178</sup> Its overall vision links to regional strategies developed at the SADC level, as well as various plans and policies adopted at basin level to envisage ‘a future characterised by equitable and sustainable utilisation of water for social and environmental justice, regional integration and economic benefit for present and future generations’.<sup>179</sup> Therefore, even from the overall objective and vision clear references to equitable and reasonable utilisation derived from IWL and sustainable development can be seen.

ZAMCOM contains many of the key principles contained in the UNWC; Article 12(1)(h) and 13 cover equitable and reasonable utilisation of the watercourse, with factors relevant to equitable and reasonable use covered in Article 13(2). The obligation to prevent significant harm to other watercourse states is provided in Articles 12(1)(v) and 14(2) which seek to prevent, eliminate, mitigate or control adverse transboundary impacts (Article 14(3)). The agreement also provides full cooperation and support to the Council and Technical Committee of ZAMCOM (Article 14(5)). In terms of the procedural framework, the Agreement establishes a joint institutional framework in Articles 3 to 9. It also promotes the regular exchange of available or obtainable data

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<sup>175</sup> *ibid.* at Article 22

<sup>176</sup> *ibid.* at Article 32

<sup>177</sup> For discussion on the need for greater clarity on the definition of river basin commissions and organisations, *see* Susanne Schmeier, Andrea K Gerlak and Sabine Blumstein, ‘Clearing the Muddy Waters of Shared Watercourses Governance: Conceptualizing International River Basin Organizations’ 16 *International Environmental Agreements: Politics, Law and Economics* 597.

<sup>178</sup> *See* ZAMCOM: Objective, Vision and Mission <http://www.zambezicommission.org/about-zamcom/about-zamcom>

<sup>179</sup> *ibid.*

and information ‘with regard to all aspects of the Zambezi Watercourse’ (Article 15). Procedures regarding the exchange of information on planned measures and notification concerning planned measures with possible adverse effects are included in Article 16. Dispute settlement measures are also included within the Agreement in Article 16(5), 21 and 22. Importantly, a provision is also included regarding the harmonisation of development plans with the Zambezi Strategic Plan in Article 14(9).

However, given the controversy around, for example, the customary status of the duty to exchange data and information in IWL, its inclusion in the ZAMCOM agreement in unambiguous terms, is notable.<sup>180</sup> Furthermore, the law making steps taken by ZAMCOM are not only necessary in order to make the obligations clearer for member states, but also some of the procedural rules have been expanded by the Commission. In February 2016, the ZAMCOM Council approved a new set of ‘Rule and Procedures for Sharing Information and Data’.<sup>181</sup> The rules apply to the sharing of data and information which is relevant to the ‘equitable and reasonable utilisation, management and sustainable development of the Zambezi Watercourse’.<sup>182</sup> Therefore, at the outset of the rules, a clear link to the principles of IWL and to the notion of ‘sustainable development’ is made. The Rules and Procedures consist of two components: rules which apply to cost sharing and the roles of institutions, and the technical procedures and specifications identifying the data to be shared and the procedures which should be used to do so. Adopted in February 2017, the “Procedures for Notification of Planned Measures” aims to provide Member States with detailed “notification requirements” including timelines, formats and supporting documents. In the same vein as the Procedures and Rules on sharing of information described above, the document begins by demonstrating a clear link to IWL, as well as linkages to both Article 16 of the ZAMCOM Agreements and Article 4 of the Revised SADC Protocol on Shared Watercourses.

ZAMCOM has also led to the establishment of basin-wide implementation plans, such as the 2008 Integrated Water Resources Management (IWRM) Strategy and Implementation Plan.<sup>183</sup> The plan

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<sup>180</sup> Christina Leb, ‘General Obligation to Cooperate and Regular Exchange of Data and Information (Articles 8 and 9) in Boisson de Chazournes and others (n 3). at 134

<sup>181</sup> Zambezi Watercourse Commission, Rules and Procedures for Sharing of Data and Information Related to the Management and Development of the Zambezi Watercourse, adopted by the ZAMCOM Council on 25th February 2016, effective 26th of March 2016.

<sup>182</sup> *ibid.* at Article 2

<sup>183</sup> Integrated Water Resources Management Strategy and the Implementation Plan for the Zambezi River Basin, April 2008, available at [http://www.zambezicommission.org/sites/default/files/clusters\\_pdfs/Zambezi%20River Basin IWRM Strategy\\_ZAMSTRAT.pdf](http://www.zambezicommission.org/sites/default/files/clusters_pdfs/Zambezi%20River%20Basin%20IWRM%20Strategy_ZAMSTRAT.pdf), last accessed 4 April 2019

makes reference to all uses of water resources, including agriculture and hydropower and possible plans for expansion. The IWRM Plan notes the SAPP power expansion plan up to 2025 which envisages development of a number of new power plants.<sup>184</sup>With regard to irrigation for agriculture, furthermore, the plan envisages a ‘modest’ expansion of 50%. It makes note that although ‘Prima facie there are ample water resources in the basin’ water availability needs to be assessed in terms of drought years as well as the impact on existing water uses.<sup>185</sup> However, while there is brief mention of a number of international legal frameworks, and the SADC Revised Protocol, there is no mention of the UNWC (although the convention was not yet in force at the time). There is also little to relate the legal obligations to the Plan.

Therefore, at basin scale, elaborate and comprehensive frameworks are in place through ZAMCOM. Significant progress has been made within the basin to form joint cooperative frameworks and establish mechanisms for data and information sharing. However, legal commitments are often lost within the scope of strategy and policy documents and one clear cohesive framework is not easily identified. While plans relating to IWRM demonstrate understanding of the importance in linking the WEF sectors, there is little information regarding how this will be implemented. Better integration across such strategy and policy documents, linked to IWL commitments, but through the frame of the LNG approach could allow the ZRB to streamline targets increase efficiency and sustainability as elaborated next.

#### 4.2 WEF NEXUS

Each aspect of the WEF Nexus can be easily demonstrated within the ZRB. The basin has an estimated 20,000MW of hydropower potential,<sup>186</sup> however to-date only around 5,000MW of this potential has been exploited.<sup>187</sup> As a result, there is great interest in the Zambezi’s hydroelectric potential from international development agencies, international funders and each of the riparian states, as well as countries just outside of the ZRB, such as South Africa.<sup>188</sup> Although hydropower

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<sup>184</sup>Integrated Water Resource Management (IWRM) Strategy and Implementation Plan, April 2008 p.25 available at < [http://www.zambezicommission.org/sites/default/files/clusters\\_pdfs/Zambezi%20River\\_Basin\\_IWRM\\_Strategy\\_ZAMSTRAT.pdf](http://www.zambezicommission.org/sites/default/files/clusters_pdfs/Zambezi%20River_Basin_IWRM_Strategy_ZAMSTRAT.pdf)>

<sup>185</sup> *ibid.* at 26

<sup>186</sup> Michael Tumbare, ‘The Zambezi River: Its Threats and Opportunities’, The Zambezi River: It’s Threats and Opportunities, 7<sup>th</sup> River Symposium, 1-3 September 2004, Brisbane < <http://archive.riversymposium.com/2004/index.php?element=Tumbare+M>> last accessed 12 April 2020

<sup>187</sup> Amaury Tilmant and Regassa Namara, ‘The Economic Potential of the Basin’ in Jonathan Lautze and others (eds), The Zambezi River Basin: Water and sustainable development (Earthscan 2017). 86.

<sup>188</sup> See World Bank, <http://projects.worldbank.org/P133380?lang=en> last accessed 9 June 2019. Further, Under the African Union, the New Partnership for Africa’s Development (NEPAD) runs the Programme for Infrastructure Development in Africa (PIDA), which contributes to the development of regional and continental infrastructure in

is a non-consumptive activity, it still accounts for the largest share of water use within the basin, through loss in evaporation.<sup>189</sup> More than 30 large dams have been built through the Zambezi, some of the major hydropower dams include Mozambique's Cahora Bassa Dam and the Kariba Dam between Zambia and Zimbabwe. These dams provide the majority of the basin's hydropower<sup>190</sup> and therefore also contribute the lion's share of total evaporation with the Cahora Bassa accounting for around 35% and the Kariba accounting for more than half. All of the ZRB states depend on hydroelectricity from the ZRB as a major energy source for industry.<sup>191</sup>

With relation to food, the ZRB is a major contributor to food security in the region, primarily due to its role in sustaining agricultural activities and fisheries. Around 5.2 million hectares are cultivated annually in the basin, and 85% of this area sits within Zimbabwe, Zambia and Malawi.<sup>192</sup> Agriculture is mostly rain-fed or flood dependant, subsistence agriculture is practiced by the majority of the rural population in the basin, along flood plains, swamps, wetlands and at the edges of large water bodies. The river system is therefore vital in maintaining the ecosystem that ensures the seasonal fluctuations sustaining agriculture. While livestock accounts for 0.11% of water use in the basin, irrigated agriculture accounts for 1.43%. Given that much of the agricultural practices in the ZRB are rain-fed the changes brought by climate change of increased erratic, unreliable rainfall with frequent multiyear low rainfall cycles presents a huge challenge to agricultural practices in the basin.<sup>193</sup> In addition, water pollution and unregulated water use, including storage for hydropower generation, threatens the flood plain areas that are important for agriculture, while flood control requires careful cooperation in regard to reservoir operations. This is strong evidence of the tension between water use for energy on the one hand, and for food production on the other hand. There is also an opportunity to use energy production to provide a widely regulated water flow which might help mitigate flooding and a more predictable flow of water to be used for agricultural activities.<sup>194</sup>

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energy and other sectors up to 2030, with a scope that includes transboundary water resources, see 'Programme for Infrastructure Development in Africa (PIDA)' (*Programme for Infrastructure Development in Africa (PIDA)*) <https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/programme-for-infrastructure-development-in-africa-pida/> last accessed 9 June 2019

<sup>189</sup> Zambezi River Authority (ZRA) <http://www.zambezi.org>

<sup>190</sup> World Bank, (n 157).

<sup>191</sup> *ibid.*

<sup>192</sup> Zambezi River Authority, 'Integrated Water Resources Management (IWRM) Strategy and Implementation Plan for the Zambezi River Basin (ZAMSTRAT)' <http://www.zambezicommission.org/publication/integrated-water-resources-management-strategy-and-implementation-plan-zambezi-river-0> last accessed 9 June 2019.

<sup>193</sup> World Bank, (n 157).

<sup>194</sup> These challenges are also relevant to fisheries in the ZRB, which are critically dependent upon sufficient quantities of water of specific quality, supporting the aquatic ecosystem and access to breeding grounds. These factors have been

Water is essential for human need, however, domestic consumption, even with projected population growth in the Zambezi Basin, makes up a very small percentage of use, projected at 0.69% by 2025.<sup>195</sup> Despite the huge quantities of water within the ZRB, many in the region still lack adequate access to clean water and sanitation.<sup>196</sup> A number of water transfer schemes are used throughout the basin to transport water to urban centres which are vulnerable to drought. Tensions between riparian's have occurred previously over similar plans, such as Zimbabwe's Matabeleland Zambezi Water Project which aims to pipe water from the Zambezi to the city of Bulawayo, threatening supply to Mozambique.<sup>197</sup> South Africa has also expressed interest in large water diversions from the Zambezi at Kazungula to travel through Botswana to Pretoria.<sup>198</sup>

Therefore, WEF Nexus issues within the ZRB are easily identifiable, illustrated through a bounty of benefits which can be derived from the watercourse. While a number of developments have already taken place across the ZRB both with relation to hydropower and irrigation schemes, huge potential remains. The importance of the WEF nexus within this region has never been greater; each future development will likely impact one aspect of the nexus and appropriate steps must be taken to ensure that the integrity of the water resource is retained, while developmental goals are pursued. Support for the implementation of a WEF nexus approach can be illustrated at a regional level in the SADC through a number of policy documents and strategies. The SADC Regional Water Policy was adopted in 2005<sup>199</sup> and is implemented through the Regional Strategy Action Plan (RESAP); the current iteration of RESAP (2015-2020) is made up of eight programmes, one of which is the WEF Nexus. Further, the SADC WEF Nexus Operational Framework is currently

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disrupted by large developments and water abstraction, affected flow regimes, water chemistry, sediment load and temperature. For example, the construction of the Kafue dams led to decline in fish production, fish biodiversity and flood plain pasture, and the Cahora Bassa dam has led to there being little seasonal variation in river flow at Tete with unpredictable flooding. The resulting changes in fisheries across the basin has led to economic damage, leading to concerns regarding environmental flow requirements to support ecosystems and biodiversity.

<sup>195</sup> Zambezi River Authority (ZRA) <http://www.zambezi.org>

<sup>196</sup> WHO, 'Quantifying Environmental Health Impacts: Country Profiles of Environmental Burden of Disease' ([www.who.int](http://www.who.int), 2017) <[http://www.who.int/quantifying\\_ehimpacts/national/countryprofile/en/#Z](http://www.who.int/quantifying_ehimpacts/national/countryprofile/en/#Z)>

<sup>197</sup> Ashok Swain, 'Politics or Development: Sharing of International Rivers in the South' in Joakim Öjendal, Stina Hansson and Sofie Hellberg (eds), *Politics and Development in a Transboundary Watershed: The Case of the Lower Mekong Basin* (Springer 2012). At 29; Ashok Swain, *Understanding Emerging Security Challenges: Threats and Opportunities* (2012) 53

<sup>198</sup> Swain, 'Politics or Development: Sharing of International Rivers in the South' (n 198).

<sup>199</sup> SADC, Regional Water Policy (August 2005) available at [https://www.sadc.int/files/1913/5292/8376/Regional\\_Water\\_Policy.pdf](https://www.sadc.int/files/1913/5292/8376/Regional_Water_Policy.pdf) last accessed 15 June 2019

in progress<sup>200</sup> and aims to provide guidance and tools to make decisions, coordinate between different sectors and facilitate nexus investments in the SADC region. It can be assumed that this framework will be utilised in order to guide implementation. As, currently, despite the presence of the WEF Nexus action plan, there is little or no evidence of linkages across the sectors.<sup>201</sup>

In relation to energy, the SADC has a Regional Energy Access Strategy Action Plan which was approved in 2011 and sets broad goals for improving access to modern forms of energy as well as specific policy mechanisms to achieve increased access.<sup>202</sup> The SADC region also formed the Southern African Power Pool (SAPP) in 1995, based on the Protocol on Energy<sup>203</sup>, to strengthen regional cooperation and growth through energy resources.<sup>204</sup> The Regional Agricultural Policy (RAP) adopted in 2014 and is implemented through the Regional Agricultural Investment Plan (RAIP) adopted in March 2017. The RAP discusses integrated approaches on water resources as highlights the importance of water for meeting food security, stressing that scarcity of water resources and increased competition for water across multiple sectors will reduce water availability for agriculture.<sup>205</sup>

Significant investment and commitment at the regional level is demonstratable within each WEF sectors independently, and across the WEF nexus as a whole, illustrating a drive to integrate the governance of the three sectors. This commitment can also be clearly seen though the fact that joint meetings have taken place between the SADC Ministries on Water and Energy in 2016, 2017 and 2018.<sup>206</sup>

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<sup>200</sup> 'SADC Draft WEF Nexus Operational Framework Reviewed at Transboundary River Basin Level' The Water, Energy & Food Security Resource Platform, available at <https://www.water-energy-food.org/resources/resources-detail/implementation-sadc-s-draft-wef-nexus-operational-framework-reviewed-at-transboundary-river-basin-level/>, last accessed 27 May 2019

<sup>201</sup> The SADC is also a partner in the Nexus Regional Dialogues Programme, with an aim to create an enabling environment to drive cross-sectoral engagement and implementation of Nexus investment projects, *See* Nexus Regional Dialogue Programme <https://www.nexus-dialogue-programme.eu>

<sup>202</sup> SADC, Regional Energy Access Strategy and Action Plan (March 2010), available at <http://www.euei-pdf.org/en/sadc-regional-energy-access-strategy-and-action-plan>

<sup>203</sup> Protocol on Energy, Southern African Development Community (signed 24 August 1996, entry into force 17 April 1998)

<sup>204</sup> Southern African Power Pool, *About Us*: <http://www.sapp.co.zw/about-sapp>

<sup>205</sup> SADC, Regional Agricultural Policy, August 2014, Section 10.5 available at <https://www.nepad.org/publication/sadc-regional-agricultural-policy-0>

<sup>206</sup> South African Development Community (SADC), 2018. 'The Joint Meeting of SADC Ministers of Energy and Water held on 27th June', Available from: <https://www.sadc.int/news-events/news/joint-meeting-sadc-ministers-energy-and-water-held-27th-june/>.

#### 4.3 THE SUSTAINABLE DEVELOPMENT GOALS

As will be discussed in the following section commitment to the SDGs is illustrated within the National Development Plans (NDPs) of many of ZRB States. Further, there are a number of references to sustainable development and intergenerational equity across the national laws of the ZRB.<sup>207</sup> As has previously been stated, the long history of cooperation within the ZRB will already go a long way to the achievement of SDG Target 6. For instance, with regards to Target 6.5, ZAMCOM are already able to assess the operational success of the Integrated Water Resources Management Strategy, demonstrating the alignment of the basin with the SDGs. This established framework can then be improved and strengthened, subject to continuous review. The first period of reporting on the progress of indicator 6.5.2 demonstrated strong operational arrangements in place with relation to the Southern African Development Community (SADC), where over 70 per cent of transboundary river and lake basins are covered by operational arrangements.<sup>208</sup>

However, more could be done to explicitly demonstrate the interlinkages across the SDGs, increasing focus on the achievement of SDGs 2 (food) and 7 (energy) as well as SDG 6 (water). As has previously been stated, the achievement of each of the SDGs will have strong dependence on water resources: as such, clear and focused evaluation of the needs and uses of the resources must be made, utilising both the WEF nexus and the framework of IWL. ZAMCOM is also in a unique position to be able to take a holistic overview of the basin and its resources, identifying the best means of benefit sharing to ensure resources are used in the most sustainable and equitable way across the basin countries. For this reason, it is essentially that monitoring is conducted at a basin level ensuring that such decisions are evidence-based and data-driven, enhancing policy making.

As it currently stands the regional and basin approaches applicable to the ZRB are strong, at least on paper. There is, however, little evidence of the extent to which the various plans and policy frameworks are implemented; and in particular, the extent to which they are implemented uniformly across the basin. The plethora of documents, plans and strategies risks the focus of

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<sup>207</sup> Angola: 1998 Environmental Law No. 5/98; Malawi: 2013 Water Management Act (No. 2 of 2013), Articles 2 and 104; 2001 Irrigation Act (No. 16 of 2001); Mozambique: 1997 Act No. 20/97 approving the Environment Act; Namibia: 2013 Water Resources Management Act (No. 11 of 2013), Article 3(d); 2007 Environmental Management Act (No. 7 of 2007), Article 1 and 3(2)(f); Tanzania: 2009 Water Resources Management Act (No. 11 of 2009), Article 5; 2005 Environmental Impact Assessment and Audit Regulations, (G.N. No. 349 of 2005), Article 45(a); Zambia: 2011 Water Resources Management Act (No. 21 of 2011), Article 2; 2011 Environmental Management Act (No. 12 of 2011), Article 2 Zimbabwe: 2002 Environmental Management Agency Act [Chapter 20:27], Article 4(2)(e).

<sup>208</sup> 'Progress on Transboundary Water Cooperation: Global baseline for SDG indicator 6.5.2' UN and UNESCO (on behalf of UN Water) 2018, 36

ZAMCOM being split across the achievement of too many targets, limiting capacity and leading to poor utilisation of resources. Adopting the LNG approach, with a focus on IWL at the core, substantiated by the WEF Nexus and driving towards the SDG targets and indicators may provide a more streamlined approach to the governance of the basin. Of course, the operationalisation of such an approach will be further aided by ensuring a degree of consistency across each of the basin States. Therefore, the following section will provide a snapshot of the existing frameworks within each ZRB country.

#### 4.4 NATIONAL STRATEGIES: LNG PERSPECTIVE

In order for IWL to be implemented successfully, national principles of water governance must be generally consistent, if not identical, across basin States.<sup>209</sup> At the national level in the ZRB, there is a lack of consistent domestication of key principles of IWL. It is not within the scope of this article to provide an overview of the implementation of each of the principles of IWL at national level, therefore only a brief discussion of key principles and rules will be considered. National Development Plans (NDP), policies and legal frameworks have also been reviewed for the purpose of understanding not only the legal commitments made by each State, but also the future and more aspirational agendas which are often contained within policy and development frameworks, allowing for greater articulation and ultimate implementation of the LNG approach.<sup>210</sup>

##### 4.4.1 *Angola*

As previously noted, Angola has not formally ratified the UNWC, but has ratified the SADC Revised Protocol and the ZAMCOM agreement, both of which incorporate the core principles of IWL. Some of these principles have also been domesticated through the National Water Law (Act 6 of 2002).<sup>211</sup> Article 19(1b) provides for the ‘fair and reasonable assignment of waters of common interest or joint interest thereof, in accordance with the interests and obligations assumed in the republic of Angola’. Although the provision does not contain explicit reference to equitable and reasonable use, ‘fair and reasonable’ demonstrate some intention to manage shared watercourses in a manner which is equitable. Decree 82 also notes that water must be used efficiently although

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<sup>209</sup> For discussion of the need to give due regard to the asymmetry between countries on watercourses, see Pieter Zaag, ‘Asymmetry and Equity in Water Resources Management Critical Institutional Issues for Southern Africa. (Report)’ (2007) 21 *Water Resources Management* 1993.

<sup>210</sup> It should be noted that due to language constraints, it has not been possible to conduct a comprehensive analysis of the legal and policy frameworks of Angola. While similar difficulties were found with regard to Mozambique, enough information could be gathered from translation of documents.

<sup>211</sup> Law on Water Use (No 6 of 2002), 21<sup>st</sup> June 2002 (Lei n 6/02) <<http://extwprlegs1.fao.org/docs/pdf/ang63753.pdf>>

no further detail is provided as to the meaning of the phrase or how it might be determined.<sup>212</sup> Significantly, the principle of equitable and reasonable use is included within some of the bilateral agreements which Angola is party to. The CUVECOM<sup>213</sup> Agreement Article 4(1) contains a provision on equitable and reasonable use. The obligation not to cause significant harm is also included within bi- and multilateral agreements, as well as legislation relating to environmental impact assessments, but not within legislation which relates to water directly. Article 11(3) of the CUVECOM states that countries should take all appropriate measures to prevent the causing of 'significant harm'. There are also no provisions on notification for planned developments within the water law of Angola.

In its report submitted for indicator 6.5.2, little information was included by Angola. However, the main challenge cited was 'lack of human and financial resources and lack of effective institutions at river basin level'.<sup>214</sup> Angola also cited as its main achievement the establishment of Joint River Basin Commission, the establishment of Permanent Secretariats for river basin commissions, the design of basin-wide strategic plans, political will, good neighbourliness and a common vision among riparian countries.<sup>215</sup>

Little information could be found regarding any use of a WEF Nexus approach within Angola. It is recognised that this is likely a limitation resulting from language constraints and may not be representative of the use of the framework within the country. Based on the information which could be sourced, it is still possible to make a preliminary observation that the problem of human and financial capacity may be aided by creating a more streamlined approach, such as the LNG approach. The fact that Angola reported on indicator 6.5.2 should be viewed positively as evidence of willingness to work towards the achievement of the SDGs.

#### 4.4.2 Botswana

Legislation covering water resources in Botswana is no longer in line with more recent ambitions as expressed within the Draft Water Bill or the National Water Policy. The Water Act of 1969, the

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<sup>212</sup> Law on Water Use (No 6 of 2002), 21<sup>st</sup> June 2002 (Lei n 6/02,) Article 10(1)

<sup>213</sup> Agreement between the Government of the Republic of Angola and The Government of the Republic of Namibia on the Establishment of Cuvelai Watercourse Commission (CUVECOM), 16 September 2014

<sup>214</sup> UNECE, Reporting under SDG Indicator 6.5.2, Angola Country Report  
<[https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/ANGOLA\\_Reporting\\_SDG652\\_final\\_19.06.2017.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/ANGOLA_Reporting_SDG652_final_19.06.2017.pdf)> last accessed 12 April 2020

<sup>215</sup> Angola Country Report  
[https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/ANGOLA\\_Reporting\\_SDG652\\_final\\_19.06.2017.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/ANGOLA_Reporting_SDG652_final_19.06.2017.pdf) last accessed 12 April 2020

Water Works Act 1969, the Water Utilities Corporation Act 1970 and the Borehole Act 1956, represent a different era of water resources governance. Therefore, in 2005 a Draft Water Bill was formed to give a much-needed update to the existing legal framework. The 2005 Draft Water Bill for Botswana refers to the promotion of ‘equitable and effective regional cooperation in the management of shared watercourse systems’<sup>216</sup>, it further states that the Minister shall ‘keep under review any bilateral and multilateral regional agreements for the purposes of promoting Botswana’s interest in the mutual co-operation of States on shared waters on an equitable basis and in line with any developing international legal norms.’<sup>217</sup>The framework therefore makes tracks towards the domestication of IWL principles. However, the draft has remained at Bill stage since 2005. The principle of no significant harm is also not present within the legal framework of water governance but is in place via Environmental Impact Assessment requirements.<sup>218</sup>

In the absence of progress in legislation, the Government has made some developments with policy frameworks. The 1991 National Water Master Plan and 2006 review, as well as the 2012 Water Policy<sup>219</sup> and the 2013 Integrated Water Resource Management Efficiency Plan 2013 (IWRM-EP).<sup>220</sup> The National Water Policy sets out a number of principles to guide water resources management, namely; equity, sustainability and sufficiency. While equitable and reasonable use is not detailed as a fundamental objective of the policy, ‘equitable and reasonable use’ between transboundary states is one of its aims. Significant harm is not discussed within the policy. Priority of use with relation to water resources is given to basic needs, acting in line with the UNWC, while the environment, agriculture and industry are subsequent priorities. There is no mention of how water allocation relating to each of these services also links to transboundary needs. This omission is significant given that elsewhere in the policies and plans formed by Botswana transboundary issues and the importance of international agreements is highlighted. For instance, Chapter 12 of the Water Policy is dedicated to international cooperation and contains a number of specific domestic strategies to facilitate international cooperation. Included in such strategies are the strengthening of the institutional and policy framework to support an integrated approach to transboundary resources, consolidating and strengthening transboundary agreements, provisions

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<sup>216</sup> Botswana: Draft Water Bill 2005, available at [http://www.orangesenqurak.org/UserFiles/File/National%20Water%20Departments/Botswana/draft%20Botswana%20WATER\\_BILL%201.pdf](http://www.orangesenqurak.org/UserFiles/File/National%20Water%20Departments/Botswana/draft%20Botswana%20WATER_BILL%201.pdf). last accessed 10 July 2019, Article 55

<sup>217</sup> *ibid.*

<sup>218</sup> Botswana: Environmental Assessment Act (No.10 of 2011) Form E, Regulation 8

<sup>219</sup> Botswana National Water Policy, October 2012 <<http://extwprlegs1.fao.org/docs/pdf/bot179129.pdf>>

<sup>220</sup> Botswana Integrated Water Resources Management & Water Efficiency Plan, May 2013 <<https://www.gwp.org/globalassets/global/activities/impact-stories/further-reading/iwr-mp-we-plan.pdf>>

of guidance for their management, benefit sharing, cooperation with riparian states in the development, use and protection of resources, implementing a comprehensive and compatible monitoring system for shared information, developing national systems to monitor obligations of international agreements, the promotion of joint planning and the use and protection of such resources, in addition to implementing best practice for stakeholder engagement. The inclusion of these provisions within the Water Policy are positive and largely in line with, if not the direct principles expressed in IWL, at least the overarching goals such as cooperation. However, their inclusion within a non-binding policy framework provides them with no legal authority, existing within the remit of soft law.

Significantly, within the IWRM-EP Botswana also proposes the consideration of sector ‘quotas’ for irrigation and allocation of water resources, yet there are no legal provisions which would actually allow this. Nonetheless the inclusion is notable due to its alignment with the LNG approach developed within this monograph. Botswana is also one of few ZRB countries which mentions benefit sharing within its 2012 Water Policy.<sup>221</sup> No expansion of what this would involve is given, but the development of ‘guidelines’ to facilitate the benefit sharing is proposed. The IWRM-EP is also highlighted in Botswana’s eleventh National Development Plan (NDP11); noted that the plan will promote ‘the optimal utilisation of energy and water resources’.<sup>222</sup> NDP11 also mentions the importance of IWRM more generally and places emphasis on the role which transboundary water resources play in Botswana’s water security ‘as the country will depend heavily on international waters’.<sup>223</sup> The NDP recognises the scarcity of water resources and identifies water and energy as challenges for the agricultural sector, therefore recognising the relationship between each aspect of the WEF nexus. It further states that ‘for the SDGs to be realised, the projects to deliver Botswana’s new Vision and national priorities set out in NDP11 will be designed in a way which delivers the targets under each goal to the greatest extent possible’.<sup>224</sup>

In the report submitted relating to indicator 6.5.2, regarding the Zambezi, Botswana highlighted that one of the main difficulties faced with implementing the frameworks in place is that the EIA for each member state are not well aligned with the revised SADC Protocol. It is also stated that

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<sup>221</sup> Botswana National Water Policy, October 2012 <<http://extwprlegs1.fao.org/docs/pdf/bot179129.pdf>> Section 12.1.6 and 3.1.12

<sup>222</sup> ‘Botswana, Eleventh National Development Plan (2017-2023) Available at <Http://Www.Ncngo.Info/Wp-Content/Uploads/2017/02/NDP-11.Pdf>. at 110

<sup>223</sup> *ibid.* at 134

<sup>224</sup> *ibid.* at 24

interpretation of certain clauses within basin agreements, such as ZAMCOM differ; in particular, equitable use is cited as a provision for which interpretation differs. Botswana notes the sharing of water in the Zambezi as a positive, emphasising that conflict resolution processes work well. Botswana notes that there are no difficulties or challenges with relation to data exchange, noting that the management of extreme events like floods and droughts are one of the main benefits from data exchange. One of the main achievements of joint monitoring was highlighted as frequent sharing of up-to-date information, while one of the main difficulties was limited funding for planned activities, capacity building and upgrading. With regard to joint assessments conducted by all riparian States, Botswana highlights the ongoing development of a Decision Support System and ZAMCOM strategic plan which will be a ‘master development plan comprising a general planning tool and process for the identification, categorisation and prioritisation of project and programmes for the efficient management and sustainable development’ of the Zambezi watercourse.

In answering the question of what the main challenges the country faces in cooperating on transboundary water were, Botswana listed the lack of available data, the irregular attendance of scheduled meetings by other member states, and that the sovereignty of member states still seem to prevail with limited clarity on the benefits of cooperation.<sup>225</sup> The main achievements of cooperation on transboundary waters were highlighted as the sharing of the waters, the sustenance of the basins ecosystems, economic benefits for member states and compliance with the SADC Protocol. Funding support gained from donor agencies was also noted as a positive. Under further comments, Botswana notes that it still requires funding to address the short fall in water resources management. That there needs to be increased capacity of riparian states to adopt a basin-wide approach to issues as there are still difficulties when trying to ‘draw a line between national interests and basin interests’.<sup>226</sup>

What is clear from the policy framework in Botswana is that an LNG approach would be well placed to tie together existing goals. What is currently absent is a strong legal framework which could act as the backbone for such developments. In the revision of the legal framework Botswana

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<sup>225</sup> UNECE, Reporting under SDG Indicator 6.5.2, Botswana Country Report [https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/BOTSWAN\\_A\\_Reporting\\_SDG652\\_final\\_23.06.2017.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/BOTSWAN_A_Reporting_SDG652_final_23.06.2017.pdf)

<sup>226</sup> UNECE, Reporting under SDG Indicator 6.5.2, Botswana Country Report [https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/BOTSWAN\\_A\\_Reporting\\_SDG652\\_final\\_23.06.2017.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/BOTSWAN_A_Reporting_SDG652_final_23.06.2017.pdf)

could draw upon the LNG approach to integrate the principles of IWL within national legislation; subsequently adding intersectoral water allocation, as is desired in the IWRM-WE, in line with the WEF Nexus; and finally linking the holistic strategy for implementing the SDGs as expressed in NDP11.

#### 4.4.3 *Malawi*

Malawi has not ratified the UNWC but is party to the SADC Revised Protocol and the ZAMCOM Agreement. Water resources are regulated at a national level through The Water Resources Act No. 2 of 2013 (WRA). The WRA does not enact many of the provisions of the UNWC (in effect basin-wide instruments) and in the instances where IWL provisions are included, the language used does not denote positive obligations to take action, but rather is often framed within the language of steps which ‘may’ be taken if deemed appropriate. Reference to ‘equitable, efficient and sustainable utilization’ of watercourses in conformity with ‘national legislation, and with regional and international water and environmental conventions’ is, however, detailed under the obligations of catchment management committees in Article 33.<sup>227</sup>

A National Water Policy was developed in 2005 and the 2013 Water Resources Act notes that the Water Policy aims to direct the way that water resources are managed, protected, used, developed, conserved and controlled.<sup>228</sup> The WRA states that the objectives and goals of water policy must be translated into practice when implementing the Act. It also provides for the development of a National Water Resources Master Plan which was published in 2013 and provides a reasonably detailed outlook of water management.<sup>229</sup> The National Water Policy details principles of IWL such as equitable, efficient and sustainable use.<sup>230</sup> There is, therefore, a gap between law and policy with regards to the domestication of principles of IWL. Within the Master Plan, water allocation with relation to the WEF Nexus is discussed. The water balance with relation to irrigation is discussed, while hydropower is noted as a feasible option. Yet, while the water actually required for hydropower is noted, there is no discussion of water availability as it relates to hydropower.

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<sup>227</sup> The Water Resources Act (No. 2 of 2013) < <http://extwprlegs1.fao.org/docs/pdf/mlw167598.pdf>

<sup>228</sup> The Water Resources Act (No. 2 of 2013) < <http://extwprlegs1.fao.org/docs/pdf/mlw167598.pdf>, Part IV, Section 34(1)

<sup>229</sup> National Water Resources Master Plan, 2013 < [https://openjicareport.jica.go.jp/pdf/12184537\\_07.pdf](https://openjicareport.jica.go.jp/pdf/12184537_07.pdf)> last accessed 12 April 2020

<sup>230</sup> National Water Policy 2005, Section 2.0, 3.3.1, 4.1.5 < [https://cepa.rmpportal.net/Library/government-publications/National%20Water%20Policy%202005.pdf/at\\_download/file](https://cepa.rmpportal.net/Library/government-publications/National%20Water%20Policy%202005.pdf/at_download/file)>

The Malawi Growth and Development Strategy (MGDS) (2017-2022) and Vision 2020 view water governance through the lens of a LNG approach.<sup>231</sup> The importance of the relationship between agriculture and water development is immediately stated at the outset of the strategy, which states that ‘efforts to improve agricultural productivity will not yet yield meaningful results unless water resources management and other related aspects are improved’.<sup>232</sup> The plan continues to state that ‘increased investment in irrigation cannot succeed without addressing water conservation and catchment area, as well as ecosystems management’.<sup>233</sup> The MGDS also makes note of the importance of the SDGs, as well as making linkages to a number of other international law and policy documents.<sup>234</sup> Despite being lighted within the MGDS, a report relating to indicator 6.5.2 was not submitted by Malawi. The strategy also specifically recognises that it is ‘imperative that national plans domesticate all the international, regional and continental frameworks for easy implementation, monitoring and reporting’.<sup>235</sup> The overall goal for agriculture, water development and climate change management is ‘to achieve sustainable agricultural transformation and water development that is adaptive to climate change and enhances ecosystem services’.<sup>236</sup> The subsequent strategy for the realisation of this goal clearly recognises the WEF nexus, bringing together food security with IWRM.<sup>237</sup> The importance of energy is also recognised within the strategy, although cross-cutting linkages with water and food are not provided. Within Vision 2020, increasing access to water is listed as one of the ambitions of the vision, noting that current water supplies are from unreliable sources and run by inadequate institutional arrangements.

Therefore, in a similar vein to Botswana, the policy framework of Malawi is more advanced than the legal framework. The goals of the MGDS and Vision 2020 are in harmony with the LNG approach. In the absence of a national legal framework which can act as the backbone of such developments, Malawi could look to IWL, as represented in the SADC-PC and the ZAMCOM Agreement.

#### 4.4.4 *Mozambique*

Like Angola, Mozambique also follows the approach that international law comes into force as soon as it is ratified and can be applied in national courts. Mozambique has not formally ratified

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<sup>231</sup>Malawi Growth and Development Strategy (MGDS) III (2017).

<sup>232</sup> *ibid.* at 16

<sup>233</sup> *ibid.*

<sup>234</sup> *ibid.* at 32

<sup>235</sup> *ibid.* at 33

<sup>236</sup> *ibid.* at 57

<sup>237</sup> *ibid.* at 59

the UN Convention and has therefore not domesticated it into national water law; however, it has ratified the ZAMCOM Agreement and the SADC Protocol. The Water Law of 1991 is the primary framework for water governance, which emphasises the need for management of water on the basis of river basins, pricing and water allocation, as well as providing a decentralised system of governance. The Water Law states that international cooperation should aim to adopt coordinated measures for the management of watercourses within the same river basin, taking into account the interests of all states concerned which demonstrates, even if indirectly, the spirit of equitable and reasonable use.<sup>238</sup>

In Mozambique's Agenda 2025<sup>239</sup> the importance of land, water and hydropower potential is emphasised.<sup>240</sup> The document also cites the enforcement of international and regional protocols and conventions, and specifically those for sharing waters of international rivers, as providing opportunity for development.<sup>241</sup> Significantly, under the threats listed, the document states that 'water and energy shortages may give rise to difficult relations between SADC States'.<sup>242</sup> This point is reiterated later within the document, stating that it is 'foreseen that in forthcoming years water becomes one of the main sources of conflict between the countries in the region', the document emphasises the downstream position of Mozambique and the need for cooperation. No mention is made of the SDGs or the WEF Nexus within the document and no report was submitted with relation to SDG 6.5.2.

Therefore, what can reasonably be stated is that clearly each of the LNG components are important for the development of Mozambique's international watercourses.

#### 4.4.5 *Namibia*

In 2004 Namibia brought into force the Water Resources Management Act (24 of 2004) to replace the Water Act (54 of 1965). The 1965 Act was based largely on private ownership of water and gave little regard to principles of equitable and reasonable use. While the 2004 Act should have

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<sup>238</sup> Mozambique: 1991 Act No. 16/91 regulating water resources belonging to the public domain. Mozambique also has in place a 1995 Water Policy; however, it was not possible to obtain or interpret due to limitations with relation to the language barrier.

<sup>239</sup> For an analysis of the different stages of water governance which have taken place in Mozambique, see Rossella Alba and Alex Bolding, "IWRM Avant la Lettre? Four key episodes in the policy articulation of IWRM in downstream Mozambique, WATER ALTERNATIVES (2016) 9(3)

<sup>240</sup> Mozambique, Agenda 2025 < <https://www.foresightfordevelopment.org/sobipro/55/130-agenda-2025-the-nations-vision-andstrategies> > 59

<sup>241</sup> *ibid.* at 60

<sup>242</sup> *ibid.* at 61

made some headway to progress the legal framework, it was never brought into effect and was subsequently repealed and replaced in the 2013 Water Resources Management Act (No.11 of 2013). The 2013 Act advocates the ‘furtherance of the objectives of the Southern African Development Community Revised Protocol on Shared Watercourses’ in Article 28(b) which includes the provision of equitable and reasonable use, however no further reference to equitable and reasonable use or no significant harm are present. While the 2013 Act may not have made explicit reference to the principles of IWL, it would have signified progression in the water sector. However, the 2013 Act has not been brought into effect and as a result in Water Act of 1956 remains in force. Interestingly, despite the Act not being in force, some efforts have been made to implement some of the provisions of the Act: eight Basin Management Committees as well as a Water Advisory Council have been established and are in operation.<sup>243</sup>

As a means of compensating for the gap in the legal framework, a number of policy documents have been developed including the Water Supply and Sanitation Policy of 2008<sup>244</sup> and the Integrated Water Resources Management Plan 2010. Namibia’s Water Supply and Sanitation Policy of 2008 links with Namibia’s Vision 2030 and its NDP, stating that the financial performance of the water and sanitation sector will likely influence the pace of national development.<sup>245</sup> The policy recognises the link between the agricultural sector<sup>246</sup> and energy in relation to economic development.<sup>247</sup> However, more explicit references to sustainable development in the form of intergenerational equity or any mention of equitable and reasonable use or no significant harm are absent from the policy.

Namibia’s 5th NDP is the third five-year implementation plan to contribute to the achievement of Vision 2030.<sup>248</sup> Section 5.1 of NDP5 focuses on the need for increased investment in infrastructure development and looks at all aspects of the WEF nexus. In relation to water it states that agriculture (irrigation) is the largest water consumer and will remain to be so until 2030. Focus within the section is on the use of resources for economic growth and industrialisation, rather than for protection and preservation. Overall water scarcity is referenced as a problem throughout the

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<sup>243</sup> Equivalence Assessment of National Water Laws among Riparian States in the Zambezi River Basin: ZAMCOM Agreement Comparative Assessment & Gap Analysis, 11 September 2017, p.190

<sup>244</sup> National Water Supply and Sanitation Policy, July 2008 <  
[http://portal.unesco.org/fr/files/47370/12670872251Namibia\\_wsaspolicy.pdf/Namibia\\_wsaspolicy.pdf](http://portal.unesco.org/fr/files/47370/12670872251Namibia_wsaspolicy.pdf/Namibia_wsaspolicy.pdf)>

<sup>245</sup> National Water Supply and Sanitation Policy 2008, Government of Namibia, Section 2.2

<sup>246</sup> *ibid.* Section 2.6.5

<sup>247</sup> *ibid.* Section 2.5.1

<sup>248</sup> Namibia Vision 2030 <[https://www.npc.gov.na/?page\\_id=210](https://www.npc.gov.na/?page_id=210)>

document. It is stated that domestic purposes (including livestock) are given priority with relation to water resources, with the second priority being economic activities such as mining, industry and irrigation.<sup>249</sup> No reference to the SDGs is given within the NDP.

In its report submitted with relation to indicator 6.5.2, Namibia notes that the main difficulty it faces with relation to implementing the ZAMCOM agreement is with regards to flood management, the control of alien species and sustainable fishing.<sup>250</sup> The country highlights the projects undertaken by ZAMCOM and the commitment level of member states as a positive. Difficulties are also cited with relation to data exchange which is described as sometimes being outdated and/or delayed. With regards to the main challenges the country faces in cooperating on transboundary waters, Namibia states the exchange of information and being a downstream user is difficult. When describing the main achievements, building trust and multi-country cooperation are highlighted.

Namibia, as with many of the other ZRB States, has a number of different policy documents in place, without the backing of a strong legal framework. The LNG approach could therefore be used in the revision of the legal framework to create a more streamlined approach to governance, given the clear relevance of the WEF Nexus and the SDGs to the development strategies of the country.

#### 4.4.6 *Tanzania*

Tanzania's legal framework is relatively well developed, with the Water Resources Management Act (11 of 2009) (WRMA) working in conjunction with the Environmental Management Act (10 of 2004). Mention of equitable utilisation is included within Article 98(1) of Tanzania's Water Resources Management Act which states that 'the Minister may develop policies and strategies for the purposes of ensuring sustainable, equitable utilisation and management of transboundary waters', however this does not extend to any determination of what would be considered equitable use. Similarly, Tanzania does not explicitly provide for no significant harm to States within its water laws, however it does provide in Article 59 of the 2005 Environmental Impact Assessment and Audit Regulations that where a project is likely to have transboundary impact 'appropriate measures' are to be taken 'to mitigate any adverse impacts taking into account any existing treaties

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<sup>249</sup> National Water Supply and Sanitation Policy 2008, Government of Namibia. at 36

<sup>250</sup> UNECE, Reporting under SDG Indicator 6.5.2, Namibia Country Report <[https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/NAMIBIA\\_Reporting\\_SDG652\\_final\\_23.01.2018.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/NAMIBIA_Reporting_SDG652_final_23.01.2018.pdf)>

and agreements between the United Republic and the other States'. The WRMA has a specific chapter dedicated to transboundary resources.<sup>251</sup> It is largely empowering in nature, not requiring steps to be taken, but encouraging them. Such steps include actions such as collecting information about the environmental integrity of transboundary resources, developing policies which ensure equitable and sustainable use and measures to create a common database for transboundary waters. Section 100 of the WRMA also requires the Minister to collect and analyse a list of minimum information in order to conduct transboundary functions, including the volume of water abstracted and beneficial uses, economic value, people dependant on the resources, information relating to discharges and environmental integrity. Section 32 also provides for the classification of water resources with relation to water equality objectives.

The country has also developed a number of policies and strategies with relation to the water sector including the National Water Policy of 2002 and the National Water Sector Development Strategy 2006-2013. The National Water Policy details the need to create a comprehensive framework for sustainable development, detailing a number of national targets. The policy also links to Tanzania's Vision 2025, which covers water resources management, and recognises the WEF nexus linking to the national agricultural policy regarding rain-fed agriculture and irrigation projects and to the energy sector highlighting the importance of hydropower development. As with many of the Zambezi countries, the policy also states that an IWRM approach is adopted to ensure that 'multi-sectoral linkages' are included in the planning of water resource development.<sup>252</sup> In relation to transboundary waters, the policy highlights that cooperation is necessary in accordance with the principle of equitable and reasonable use, as well as technical cooperation in research, data collection and information dissemination.<sup>253</sup> Tanzania's five year NDP (2016/17 – 2020/21)<sup>254</sup> also makes various references to the importance of water, energy and food.

Direct references to the SDGs are absent from the policy frameworks of Tanzania and no report was submitted with regards to indicator 6.5.2. However, from the information provided, it appears clear that utilising an LNG approach could be useful for Tanzania in order to bring together the

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<sup>251</sup> Water Resources Management Act (No 11 of 2009), Part XII <<http://extwprlegs1.fao.org/docs/pdf/tan96340.pdf>>

<sup>252</sup> National Water Policy, United Republic of Tanzania (July 2002), at 14

<sup>253</sup> *ibid.* at 16

<sup>254</sup> National Five Year Development Plan, 2016/17-2020/21, United Republic of Tanzania, June 2016 [https://mof.go.tz/mofdocs/msemaji/Five%202016\\_17\\_2020\\_21.pdf](https://mof.go.tz/mofdocs/msemaji/Five%202016_17_2020_21.pdf)

multiple plans, strategies and frameworks which have been put in place which can be supportively backed by the well-developed legal framework at a national level.

#### 4.4.7 *Zambia*

Zambia's Water Resources Management Act (No. 21 of 2011) defines 'equitable' as 'fair, reasonable and just' in Article 2 and it ensures through Article 57 that 'the principles of equitable, reasonable and sustainable utilisation of shared water resources' are operationalised, by taking into account the factors of equitable and reasonable use as contained within Article 6 of the UNWC.<sup>255</sup> The Act demonstrates strong implementation of IWL principles, stating in Article 60(1)(c) that the use of water shall 'avoid or minimise the adverse impact of that use on other users of water'. However, this does not make the application to transboundary states explicit. A more explicit reference to transboundary resources is given in the 2011 Environmental Management Act which states in Article 85(1) that 'the Minister may...collaborate with the relevant countries on environmental management programmes and measures to avoid and minimise transboundary environmental impacts' as well as requiring in Article (2)(b) that State of the Environment Report shall describe any significant adverse effects caused or likely to be caused and identify the causes and trends. The legal regime in Zambia is fairly comprehensive. However, the relationship between national goals and complying with international law is not always clear.

Zambia's Seventh National Development Plan (7NDP) for the period of 2017-2021 contributes to its Vision 2030 and aims to work towards Zambia becoming a middle-income country by 2030.<sup>256</sup> In the context of agricultural development, the plan notes 'increasing agricultural outputs leads to the development of both upstream and downstream activities, the consolidation of value chains and the expansion of agro-industries, which are significant sources of employment and present real opportunities for economic diversification'.<sup>257</sup> Therefore, while the plan recognises the relationship between agricultural activities on both upstream and downstream areas, it does not go further to state the relationship with water use. The plan also states that 'irrigation development remains a key intervention for increasing crop diversification, production and productivity'.<sup>258</sup> Regarding energy, the 7<sup>th</sup> NDP states that there is need to increase supply in order

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<sup>255</sup> Zambia Water Resources Management Act (No.21 of 2011)

<sup>256</sup> Zambia, Seventh National Development Plan (2017-2021) available at <http://extwprlegs1.fao.org/docs/pdf/zam170109.pdf> .last accessed 10 July 2019

<sup>257</sup> Zambia, Seventh National Development Plan (2017-2021) available at <http://extwprlegs1.fao.org/docs/pdf/zam170109.pdf> .last accessed 10 July 2019, 65

<sup>258</sup> *ibid.* at 66

to meet demand and as a result to ‘promote investment in hydro, nuclear, geothermal, wind and solar energy generation’.<sup>259</sup> One of the development outcomes highlighted within the plan is ‘improved water resources development and management’, which states that ‘water resources infrastructure is a critical component in the provision of sustainable water resources management and services for engineered irrigation, drainage, water supply and sanitation, hydropower generation, flood control and food security’.<sup>260</sup> Therefore, the plan explicitly recognises the link between water resources and food security. The plan cites a number of strategies which will be used to address water development and management issues with a view to ‘increasing availability of water resources for utilisation by productive sectors, for enhanced health and sustainable economic growth’.<sup>261</sup> These include the construction of small, medium and large dams, to meet various water needs, ‘particularly for domestic, agriculture and hydropower generation’.<sup>262</sup>

The SDGs are also referenced throughout the 7<sup>th</sup> NDP, stressing the importance of domesticating the goals within national plans.<sup>263</sup> In its report submitted with relation to indicator 6.5.2 Zambia noted inadequate capacity and resources as the main difficulty in implementation of basin agreements.<sup>264</sup> Describing main achievements, Zambia notes that a dedicated government department for international waters had been set up and that they key to success was to ensure there is adequate funding to the sector and work on building capacity for transboundary water resources management. With regards to data exchange Zambia noted the inadequate collection by member states, while enhanced monitoring and management of water resources are the main benefits of data exchange. As a main challenge in cooperating on transboundary waters Zambia cited inadequate resources and the lack of a national mechanism for dealing with provisions of international waters instruments. The main achievements of transboundary cooperation were highlighted as data access and sharing, with the willingness to cooperate and support being key to the achievement of this.

The frameworks in place within Zambia are well developed and incorporate all aspects of the LNG approach. However, it is not clear how each of the developed strategies relate to one another and

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<sup>259</sup> *ibid.* at 72

<sup>260</sup> *ibid.* at 78

<sup>261</sup> *ibid.* at 79

<sup>262</sup> *ibid.* at 79

<sup>263</sup> NDP 7 <http://extwprlegs1.fao.org/docs/pdf/zam170109.pdf> page 7

<sup>264</sup> UNECE, Reporting under SDG Indicator 6.5.2, Zambia Country Report <[https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/ZAMBIA\\_Reporting\\_SDG652\\_final\\_12.06.2017.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/ZAMBIA_Reporting_SDG652_final_12.06.2017.pdf)>

if there is any degree of mutual supportiveness. As with many of the other ZRB States, Zambia highlighted the difficulty of data exchange. The LNG approach could therefore be used to tie together existing frameworks, enhance mutual supportiveness and provide greater cooperation across sectors which may contribute to increased information and data sharing.

#### 4.4.8 Zimbabwe

Zimbabwe's Water Act (21 of 1998) [Chapter 20:24] and the Environmental Management Act 2002 (13 of 22)[Chapter 20:27] are the main pieces of legislation covering water resources while the Zimbabwe National Water Authority Act [Chapter 20:25] (11 of 1998) create a statutory authority for implementation. The 2002 Zimbabwe Environment Management Act Article 99(c) and(d) states that the contents of an Environmental Impact Assessment (EIA) report must 'give a detailed description of the likely impact the project may have on the environment or any segment thereof, covering the direct, indirect, cumulative, short-term and long-term effects of the project' and 'specify the measures proposed for eliminating, reducing or mitigating any anticipated adverse impacts'. A provision relating to significant harm also present in the 2002 Environmental Management Agency Act, Article 99(e) states that an EIA report on a project shall 'indicate whether the environment of any other country is likely to be affected by the project and any measures to be taken to minimise any damage to that environment'.

A National Water Policy was published in 2012 in the context of collapsed water revenues and decline in water supply infrastructure.<sup>265</sup> The policy was therefore designed around rebuilding the sector. As the policy was developed after the legal framework, it is not represented within any legal provisions. Equitable and reasonable use is not present within the legal framework of Zimbabwe, however the legal framework does provide for the promotion of equitable, efficient and sustainable allocation and distribution of resources nationally.<sup>266</sup> In addition, Zimbabwe's National Water Policy of 2012 states in Section 7.6.5 that it 'promotes efficient and equitable utilisation of water resources', although this is not stated within the context of transboundary water resources.

Zimbabwe has adopted a number of *ad hoc* plans which do not quite form the same level of comprehensive development strategy as found in the NDPs of the other Zambezi riparian states.

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<sup>265</sup> National Water Policy, Government of Zimbabwe, August 2012

[https://wsaz.files.wordpress.com/2019/02/zimbabwe-national-water-policy\\_2012.pdf](https://wsaz.files.wordpress.com/2019/02/zimbabwe-national-water-policy_2012.pdf)

<sup>266</sup> Zimbabwe: 1998 Zimbabwe National Water Authority Act [Chapter 20:25], Article 5(1)(d) and 1998 Water Act [Chapter 20:24], Article 6(1)(c).

The most recent of which is the Medium-Term Plan (MTP, 2011-2015)<sup>267</sup>, ZimAsset (2013-2018)<sup>268</sup> and the Ten-Point Plan. All of the documents are either approaching or have past their point of expiration, as such, it can be expected that new development strategies will be put in place imminently. The MTP discusses the importance of natural resources and cites sustainable development as a key principle of the plan. It further states that people have the right to benefit from environmental goods, but also have a duty to look after them.<sup>269</sup> Within the ZimAsset, references to the environment are less obvious although reference is made to a number of environmental challenges, including water pollution. Emphasis is placed on water infrastructure and water supply related development within the document.

In the report submitted with relation to indicator 6.5.2 Zimbabwe noted that integrated cooperation in water resources was key to the implementation of basin agreements.<sup>270</sup> With relation to the main issues with the operation of ZAMCOM, Zimbabwe noted limited financial resources towards country contributions and unexpected extreme events such as floods and droughts. The main achievement was highlighted as the coordination of water resources development. The main difficulties of data exchange were highlighted as the quality of data and harmonisation across riparian states, with the main benefit being effective and informed water resources planning.

The frameworks in place in Zimbabwe provide little reference to key principles of IWL, the WEF or the SDGs. However, the fact that the country reported on indicator 6.5.2 is positive and demonstrates willingness to work towards the achievement of the SDGs. Once again, difficulties of data exchange and harmonisation were also listed as a difficulty within the ZRB.

#### 4.5 TAKEAWAYS FROM NATIONAL PRACTICE

These practices of basin states provide strong presence of most, if not all, components of the LNG approach to (shared) water governance. While there is an overall commitment to relevant principles and rules of IWL from basin states, some have made bold reference to the key principles and rules while others have not. Similarly, many basin states have relevant policies and vision

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<sup>267</sup> Zimbabwe Medium Term Plan 2011-2015 <

[http://www.zw.one.un.org/sites/default/files/Zimbabwe\\_MediumTermPlan2011-2015.pdf](http://www.zw.one.un.org/sites/default/files/Zimbabwe_MediumTermPlan2011-2015.pdf)>

<sup>268</sup> Zimbabwe Agenda for Socio-Economic Transformation (Zim-Asset), October 2013-December 2018 <

<http://www.zw.one.un.org/sites/default/files/Zim%20Asset.pdf>>

<sup>269</sup> Government of Zimbabwe, Medium Term Plan (2011-2015) <

<http://extwprlegs1.fao.org/docs/pdf/zim151067.pdf>>

<sup>270</sup> UNECE, Reporting under SDG Indicator 6.5.2, Zimbabwe Country Report <  
[https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting\\_convention/All\\_countries/ZIMBABWE\\_Reporting\\_SDG652\\_final\\_14.07.2017.pdf](https://www.unece.org/fileadmin/DAM/env/water/activities/Reporting_convention/All_countries/ZIMBABWE_Reporting_SDG652_final_14.07.2017.pdf)>

compatible with the WEF nexus and the SDGs, although priorities, emphasis, and the way in which they have been articulated varies from country to country. Within many countries a plethora of policies and legal frameworks exist and difficulties with capacity are highlighted. It is possible that the adoption of an LNG approach could provide a framework for streamlining this multitude of frameworks allowing capacity to be maximised. Of course, it must be noted that to create such an alteration to existing frameworks requires capacity itself. Ideally, changes would also be adopted at a basin scale and subsequently implemented nationally in order to provide the best opportunity for harmonisation. For this reason, the advocacy of the LNG approach is only demonstrated in the case of the ZRB as ‘food for thought’ and the authors provide this information with full awareness of the complexity and shortcomings in adopting the recommendations given.

## 5 CONCLUSION

This monograph sheds light on, firstly, the linkages between three conceptual frameworks—IWL, the WEF nexus and the SDGs, along with their strengths and shortcomings, in relation to the governance of international watercourses. It has detailed the differences between each of the frameworks and the opportunities which this may create with relation to the mitigation of trade-offs and the creation of synergies. IWL has been demonstrated as a permanent long-lasting normative framework of legal principles such as equitable and reasonable use and no significant harm. Yet, due to political will, capacity or vagueness of provisions, implementation of the normative standards offered by IWL is often a challenge. The WEF Nexus, arguably the newest of the three frameworks (if the SDGs are viewed as an extension, or a new ‘phase’ of the MDGs), can provide valuable insight into sectors beyond water – energy and food – which are essential for holistic management of international watercourses. Its origin in industry brings a fresh perspective to the consideration of factors of equitable and reasonable use; as well as the possibility to aid the implementation of procedural provisions such as the exchange of information. The SDG provide clear targets and indicators which can be linked to IWL and the WEF Nexus, providing a tangible framework for governance and scope to maximise capacity by adopting an LNG approach. Although the SDGs are time-bound, set to expire in 2030, it is important to note that it is likely that the replacement framework will be in a similar vein, as has been the case in the progression from the MDGs and SDGs; therefore, although the framework is ‘temporary’ in nature, the goals and aspirations will continue, albeit with different format and focus; it is thus extremely likely that a subsequent global development agenda will be put in its place.

Notably, IWL as a legally binding normative framework<sup>271</sup> provides predictability and stability, while the WEF nexus and SDGs are conceptual and policy frameworks, respectively, that offer well-thought-out options and targets. That is not to say that one has more merit than another; the status of the WEF and SDGs mean that States can easily adopt them at national or inter-state levels, while becoming a part of an international legal framework can bring greater political difficulties. Equally, the frameworks of IWL provide substantive and institutional mechanisms which are crucial to enforcing its principles, but with its own shortcomings, as previously mentioned. Nonetheless, it is important to recognise that a framework of IWL, such as the UNWC (particularly given the status of key principles as customary international law) is likely to have greater longevity than the WEF or the SDGs frameworks. Therefore, an integrated framework hinged on IWL provides a robust normative foundation upon which the more detailed, arguably more relatable frameworks of the WEF and SDGs can be implemented, allowing the whole framework to be firmly rooted upon foundational principles of water governance.

This, while each framework has distinct features and different advantages, this monograph finds that our understanding, interpretation and implementation of IWL could be enhanced and its gaps better remedied through the LNG integrated approach to the governance of shared watercourses. The substantive and procedural norms and commitments of IWL serve as the main pillar of this proposed approach, aided by (a) the WEF nexus which enhances understanding regarding tension and trade-offs among the three key aspects of water use and (b) the SDGs that offer a more focused and dynamic aspirations and concrete plans to the equitable and sustainable governance of water resources. It highlights in particular that the Nexus and the Goals are appropriate frameworks to help implement the principle of equitable and reasonable utilisation, the duties to prevent significant harm and the duty to cooperate.

Secondly, after systematically applying the three frameworks to the ZRB at various levels, the monograph finds that IWL, the WEF nexus and the SDGs are well recognised to varying extents across the ZRB. The WEF nexus is illustrated through the NDPs and development strategies of the ZRB states; principles of IWL are present within legal and policy frameworks; and while the SDGs specifically are not as widely found, notions of intergenerational equity and sustainable development more generally are common. The ZRB should therefore be recognised as a progressive example of an integrated approach to the governance of watercourses at regional, basin

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<sup>271</sup> Legally binding upon those who have ratified the convention, although as stated previously many of the principles of the UNWC are recognised as customary international law.

and national levels. This should be read with caution, however, given that there are a number of inconsistencies in the application of IWL, the WEF nexus and the SDGs at national level which may challenge the realisation of regional and basin-wide relevant laws, policies and programmes within each riparian state of the ZRB.

Thirdly, there continues to be a strong focus on IWRM within water sector strategies and legislation in the ZRB riparian states. The core elements of the LNG approach can therefore be found within the frameworks, however linkages between each framework are weak. The implementation of new and old frameworks, including IWRM, and the LNGs as standalone agendas, will increase strain on capacity and financial resources, as well as likely decreasing efficiency and effectiveness. An integrated perspective, through the LNG approach detailed in this paper could serve to maximise the benefits of the resources and as well as ensuring that the use of resources is balanced between competing uses. Further, by linking development strategies through an LNG approach, national governments can increase the temporal scope of the agenda, putting together a long-term strategy towards the successful implementation of international legal and policy frameworks. This approach can help them cooperate with each other with a better understanding of potential benefits and risks of their plans and projects.

Fourthly, it has been shown that international (water) law is neither perfect nor does it exist in a vacuum. As stated by Fox and Sneddon ‘reliance on general principles of IWL, whose overarching goals support the maintenance of sovereign rights, undermine[s] ecological certainty’.<sup>272</sup> The authors continue to state that:

representing basin ecosystems as simplified watercourses, where the flow of water in the main channel and major tributaries is virtually the only concern, discursively transforms them from unpredictable, variable, complex land-water ecosystems into legal structures and natural resources, both of which can be demarcated, reduced to parts, rationally managed, and subjected to substantive rules of law such as equitable and reasonable utilisation<sup>273</sup>

In essence, the authors argue that there are inherent problems in the perspective of the notion of a river as a solely legal structure. The LNG approach advocated in this monograph could go some

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<sup>272</sup> Coleen A Fox and Chris Sneddon, ‘Transboundary River Basin Agreements in the Mekong and Zambezi Basins: Enhancing Environmental Security or Securitizing the Environment?’ (2007) 7 *International Environmental Agreements: Politics, Law and Economics* 237, 246

<sup>273</sup> *ibid.*

way to moving away from the state-based legal frameworks of IWL, towards a more holistic integrated approach which allows greater understanding to be given to the key principles of IWL based upon science, policy and aspirations of countries and communities. The fact that the Nexus is usually undertaken by scientists and impartial bodies independently of, or in collaboration with, concerned parties, it offers a much-needed contribution to implementing IWL and fostering cooperation from state officials or policy makers. In this regard, and as illustrated in relevant chapters above, the Nexus and Goals frameworks can help to fill the gap left by IWL, particularly with relation to the application of equitable and reasonable use and the factors which are used to determine it. The WEF Nexus brings a unique viewpoint to the implementation of the legal framework, unpacking the key issues around water, energy and food, which are essential when taking into consideration the factors of Article 6 of the UNWC, such as social and economic need. The SDGs similarly provide specific objectives across all three sectors. Given that the SDGs are specific and measurable within a specific time frame, the normative framework benefits from this by making the implementation of the law more measurable. The WEF and the SDGs could also assist with the progression of IWL and provide a route through future challenges such as population growth and climate change could be tackled. In particular, the SDGs are very dynamic in the sense that they succeeded the MDGs, and are likely to be reviewed and replaced by other similar, if not identical, goals in the years to come, connotes that they are capable of making IWL instruments more progressive than usually are, if appropriately and consensually integrated into the application of the law. It is likely that without taking into consideration additional soft law, policy or science-based frameworks such as the WEF nexus and SDGs, IWL could remain static; equally, without the strong normative framework of IWL underpinning their methodologies and monitoring processes, it is likely that the SDG targets will not be met and a comprehensive WEF nexus process will not be achieved.

To conclude, while being mindful of the risks of the proliferation of various water governance frameworks and the complexity of bringing them together, we submit that the LNG approach to transboundary water governance provides strong case for predictable, adaptable and measurable water governance framework, human and nature-centred approach that is capable of serving existing and future generations, and international law scholarship to move from purely doctrinal to interdisciplinary research for purposes of better application and a progressive development of the law but also for making impact on mitigating real global and regional challenges of our time including fierce competition over shared watercourses by states and communities.

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