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**'Implementing International Watercourses Law
Through the WEF Nexus and SDGS: An Integrated Approach
Illustrated in the Zambesi River Basin'**

By

Zeray Yihdego and Julie Gibson

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

*Zeray Yihdego and Julie Gibson**

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 among various uses and needs, whilst protecting the longevity of the watercourse and its ecosystem. Cooperation is therefore essential in the management of such watercourses, which can be guided by the principles of International Watercourses Law (IWL). Yet, in many cases IWL provides only broad guidance for States to follow and is ill-equipped to systematically consider the trade-offs of water use across multiple sectors. Further, existing literature on IWL tends to neglect issues which link water, energy and food. The concept of Sustainable Development has also become part of the parcel of many water governance frameworks, but often fails to make explicit links to IWL, or indeed, to the Sustainable Development Goals (SDGs).

In order to address this gap, this article seeks to demonstrate how the implementation of key IWL principles can be aided by integrating with the WEF nexus and the SDGs. It advocates that utilising these three frameworks in an integrated manner, which we call the Law, Nexus, Goals (LNG) approach to water governance, could aid riparian states 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. The findings of the article demonstrate that even where sound IWL frameworks and cooperative processes exist, this does not guarantee a focused, measurable and sustainable outcome capable of addressing tensions; illustrating that 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 risks—such as the continuous proliferation of frameworks and paradigms within the sector of water governance, which may lead to inconsistencies, lack of focused measures and inefficient use of resources, it is argued that the advantages of the LNG approach outweigh the challenges to better deliver equitable and reasonable results for existing and future generations.

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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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INTRODUCTION

International watercourses¹ provide, *inter alia*, access to water and sanitation services, hydropower development (thereby contributing to energy security), and play an essential role in food production through small, medium or mega irrigation schemes. They are critical resources for the socio-economic growth and advancement of both developed and developing countries alike. Consideration of the interdependencies between these uses have never been more crucial given the increasing pressures on water resources due to global change such as population growth, climate change, and the increased use of renewable energy resources. Such international watercourses do not adhere to political or geographical boundaries and are therefore often subject to multiple governance frameworks with control dispersed across riparian states. Moreover, these approaches are often defined by the economic and political priorities of each state, in addition to the physical, geographical and hydrological characteristics of each part of the watercourse. Given the complexities of the problem, IWL alone is not always able to fully identify the issues at play or find appropriate compromises or solutions.

As a means of balancing the competing uses and trade-offs within international watercourses a number of water resource management paradigms have been developed; this includes concepts such as

¹ 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 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.

Integrated Water Resource Management (IWRM)², water security³, nature-based solutions⁴ and the WaterEnergy- Food (WEF) nexus⁵ approach, the last of which will be the focus of this article.⁶ While such 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.⁷ Further, as will be discussed in later sections, the temporal scope of such frameworks may mean that they are in fact counterproductive, acting as a distraction from the implementation of key principles of water governance, which can be derived from IWL.

Trade-offs, within the context of this research, describe the balance between resource management and development, whereby the development of one resource, such as hydropower, may result in a less favourable course of action over another, such as water quality.⁸ Synergies are used to define the positive effects of establishing mutually beneficial policies or infrastructure which can facilitate the implementation of the key principles of IWL, as well as the Sustainable Development Goals (SDGs).⁹ It should be noted that the main focus of this research is the 1997 United Nations Watercourses Convention (UNWC)¹⁰, 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.¹¹ It should be stated that it is not the intention of this article 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.¹²

The WEF nexus aims to take a holistic perspective of historically siloed fields. As stated by PahlWostl, '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'.¹³ It can be argued that such an approach has been 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.¹⁴ IWRM emerged as a dominant paradigm for the management of water resources in the early

² 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', GWP (2018) available at <https://www.gwp.org/en/gwpSAS/ABOUT-GWP-SAS/WHY/About-IWRM/> last accessed 28 June 2019. For a legal perspective of IWRM, see Andrew Allan & Alistair Rieu-Clarke, *Good governance and IWRM--a legal perspective*, 24 IRRIG. DRAIN. SYST. 239-248 (2010).

³ 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 waterborne 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.

⁴ 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, available at <https://www.iucn.org/commissions/commission-ecosystemmanagement/our-work/nature-based-solutions>, last accessed 12 June 2019.

⁵ 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 within Section I.B.

⁶ Rémi Schweizer & Christian Bréthaut, *From the Promises of International Water Management Trends to the Reality of Policies and Practices: Some Conclusive Thoughts*, in A CRITICAL APPROACH TO INTERNATIONAL WATER MANAGEMENT TRENDS: POLICY AND PRACTICE 269-293 (Christian Bréthaut & Rémi Schweizer eds., 2018), https://doi.org/10.1057/978-1-137-60086-8_11.

⁷ *Id.*

⁸ See Marianela Fader et al., *Toward an Understanding of Synergies and Trade-Offs Between Water, Energy, and Food SDG Targets*, 6 FRONT. ENVIRON. SCI. 112 (2018), <https://www.frontiersin.org/article/10.3389/fenvs.2018.00112>.

⁹ Transforming Our World: The 2030 Agenda for Sustainable Development, UNGA Res. A/RES/70/1, 21 October 2015 (The Sustainable Development Goals).

¹⁰ UNWC, *supra* note 2.

¹¹ 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 (UNECE Convention); 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).

¹² There are many resources which provide through analysis of IWL, particularly the UNWC. Two recently published resources include Boisson de Chazournes et al., *supra* note 2.; Mara Tignino & Christian Bréthaut, Research Handbook on Freshwater Law and International Relations (2018).

¹³ Claudia Pahl-Wostl, *Governance of the water-energy-food security nexus: A multi-level coordination challenge*, 92 ENVIRON. SCI. POLICY 356–367 (2019), <https://doi.org/10.1016/j.envsci.2017.07.017>.

¹⁴ For further details on the use of IWRM globally, see Maija Bertule et al., *Monitoring water resources governance progress globally: Experiences from monitoring SDG indicator 6.5.1 on integrated water resources management implementation*, 10 WATER (SWITZERLAND) 1–20 (2018).

1990s, frequently linked to Agenda 21,¹⁵ and calls for holistic management of water resources.¹⁶ IWRM appreciates the cross-sectoral relevance of water which requires integration with other natural resource management processes including land and ecosystems.¹⁷ 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 lack of institutional capacity to govern across different sectoral borders, such as energy and agriculture. This institutional difficulty is also faced by a WEF nexus approach.¹⁸ This article therefore proposes combining the WEF nexus with the SDGs, an agenda which already has global political commitment and can infer normative influence when used by States in the application of international law, as well as within their own domestic law and policy frameworks.¹⁹ From the perspective of Otto Spijkers and of this article, the SDGs can therefore ‘add substantive flesh to the otherwise abstract skeleton of general international water law’.²⁰ This is further expanded with the addition of the WEF nexus which resonates with the social and economic needs of developing countries, such as the ZRB riparian states.

The ZRB is an extremely complex and fast-developing watercourse experiencing an expansion of hydropower dams, irrigation schemes and population growth. 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.²¹ This context makes the ZRB an appropriate case study for the implementation of new methodologies such as the integrated IWL, WEF and SDG approach which will be advocated within this article, which could be successfully implemented as a result of the existing cooperative frameworks which are in place.

The key question this article explores is the extent to which the WEF nexus and SDG approach support a better application of the core principles of IWL: and the cardinal principle of equitable and reasonable use in particular. More specifically, it will ask and 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. Finally, the article will apply this approach to the ZRB, demonstrating its use within developing countries. It 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 in this article. A further contribution to literature is made through a comprehensive analysis of the most up-to-date legal and institutional structures of the ZRB. The framework, linking the

¹⁵ 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), .

¹⁶ 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)

¹⁷ *Id.* at 27.

¹⁸ For an analysis of the relationship between the WEF Nexus and IWRM, See David Benson, Animesh K. Gain & Josselin J. Rouillard, *Water governance in a comparative perspective: From IWRM to a “nexus” approach?*, 8 WATER ALTERN. 756–773 (2015).

¹⁹ 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; Fader et al., *supra* note 9. ; and Pahl-Wostl, *supra* note 14. 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-EnergyFood 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 Owen McIntyre, *International water law and SDG 6: mutually reinforcing paradigms* 173–200 (2018).

²⁰ Otto Spijkers, *The Cross-fertilization between the Sustainable Development Goals and International Water Law*, 25 REV. EUR. COMP. INT. ENVIRON. LAW 39–50 (2016).

²¹ *See* A. Tilmant et al., *Economic valuation of benefits and costs associated with the coordinated development and management of the Zambezi river basin*, 14 WATER POLICY 490–508 (2012).

WEF nexus and the SDGs to IWL will be referred to as the Law, Nexus, Goals (LNG) approach throughout the article for the purpose of concision.

The article is divided into four sections. Section I provides an overview of the normative and conceptual frameworks which will be used throughout. Section II discusses the main argument proposed within the article: 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, while fulfilling their international legal commitments. Section III provides the application of this integrated method to the case study of the ZRB. Finally, Section IV offers our key concluding remarks.

I. NORMATIVE AND CONCEPTUAL FRAMEWORKS

This section will discuss the key principles of IWL and their relevance within the scope of this article. 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, as a means of addressing the tensions between different uses and sectors. Finally, it will detail the SDGs which are of key relevance to both IWL and the WEF nexus.

A. *The United Nations Watercourses Convention*

Two fundamental principles underpin IWL: equitable and reasonable use and no significant harm. The historical evolution of these key principles has demonstrable ties to the WEF nexus, namely through the production of energy. The first modern multilateral agreement in IWL was born from the need for a framework relating to the generation of hydropower: the Convention Relative to the Development of Hydraulic Power affecting more than one state was signed in 1923.²² The significance of this treaty within this article is twofold: it marked the beginning of multilateral governance of international watercourses and it focused specifically on energy development, illustrating the crucial link between water and energy. The treaty obligated states to enter into discussions in the planning stages of developments relating to hydraulic power, with the goal of 'arriving at a solution most favourable to their interests as a whole'.²³ Article 6 of the treaty focuses on the potential content of such agreements which includes the protection of interests of third parties; the settlement of disputes; and the equitable allocation of financial contributions and risks. However, the equitable allocation contained within the 1923 treaty applied only to financial issues, not to the utilisation of the resource itself.

Subsequently, the Salzburg Declaration²⁴ issued in 1961 also begins with an acknowledgement of the 'economic importance' of water, but recognises the 'common' interest in ensuring 'maximum benefits for all concerned'²⁵ and declares that the obligation not to cause harm is one of the basic principles of good neighbourly relations.²⁶ Article III also states that any disagreements will be settled on the 'basis of equity, taking into consideration the respective needs of the States'. No further details are provided regarding how such 'needs' should be determined; however, the inclusion of this provision demonstrates progression towards the notion of cooperation and equitable and reasonable use.

It was not until the 1966 International Law Association's (ILA) 'Helsinki Rules on the Use of Waters of International Rivers'²⁷ were issued that the principle of equitable and reasonable use was 'widely accepted, if not fully comprehended'.²⁸ The Helsinki Rules established the principle of equitable and

reasonable use within Article IV, as well as the factors by which it could be determined in Article V. These provisions, with slight alterations, were subsequently included in the UNWC.

²² Convention relative to the Development of Hydraulic Power affecting more than One State (9 December 1923) 35 League of Nations Treaty Series 75. Contracting states included Austria, Belgium, The British Empire (with New Zealand), Bulgaria, Chile, Denmark.

²³ *Id.* at Article 2

²⁴ Institute of International Law, “Utilization on Non-Maritime International Waters (Except for Navigation)” (1961) 49 (II) Yearbook of the IIL 371 (Salzburg Declaration).

²⁵ *Id.* at Article VI

²⁶ *Id.* at Preamble

²⁷ International Law Association. The Helsinki Rules on the Uses of the Waters of International Rivers, Adopted by the International Law Association; International Law Association: London, UK, 1967, .

²⁸ Robert D. Hayton, *The Law of International Aquifers*, 22 NAT. RESOUR. J. 71–93 (1982).

The UNWC²⁹ was finally adopted on the 21st of May 1997, almost 40 years after the study of freshwater resources within the UN began.³⁰ However, the UNWC did not enter into force for another 17 years until the ratification by Vietnam on the 21st of August 2014. The reasons for such a delay, and presumably for the limited number of ratifications to date (still only 36), stated by McCaffrey, include: water treaties already existing between some states; the fact that some states do not share such freshwater bodies; the wide acknowledgement that most of the provisions of the Convention reflect customary international law; and the fact that ‘states did not perceive any urgency to join the treaty’.³¹ In addition, Salman emphasises misconceptions and misunderstandings over the rule of equitable utilisation, significant harm, and confusion regarding the relationship between the Convention and other treaties as reasons ‘for States’ inaction in ratifying or acceding’ to it. ³² From this it seems clear that sovereignty and political considerations are among the key causes for the limited number of ratifications. Nonetheless, given the recognised status of many of the key principles of the UNWC as customary international law, the number of ratifications do not diminish the global and normative significance of the framework.³³

The UNWC establishes a number of key substantive guiding principles for the governance of international watercourses. Of crucial importance, as previously mentioned, are Articles 5 and 6 which focus on equitable and reasonable use and Article 7 on the obligation not to cause significant harm, respectively. Article 5 requires that international watercourses are ‘used and developed’ in order to attain ‘optimal and sustainable utilisation’ and ‘benefits therefrom’ while also ensuring that the interests of watercourse states are taken into consideration and that there is ‘adequate protection’ of the watercourse.³⁴ Article 5(2) explicitly requires states to participate in the ‘use, development and protection of an international watercourse in an equitable and reasonable manner’. It is further noted that this participation includes both the right to utilise the watercourse and the duty to cooperate in its protection and development. From this provision it is already clear how IWL can relate clearly to the WEF nexus; three factors are at play within it: cooperation, protection and development. Each of these factors are key in the WEF nexus: cooperation is required to ensure the best utilisation of resources; protection is necessary to ensure such resources are not overly exploited; and development fundamentally links to the social and economic importance of developing resources such as international watercourses and irrigation schemes for use. No further expansion of the meaning of equitable and reasonable use is provided within Article 5. However, factors which are relevant to determining what can be considered as equitable and reasonable are provided subsequently in Article 6.

The list of factors contained within 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.³⁵ The factors are extremely relevant to using the WEF nexus to aid the implementation of IWL, as they seek to reconcile a number of different – and often competing – uses of international watercourses. The first factor considers ‘geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character’³⁶, this is important for the consideration of the WEF nexus 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 water resource for hydropower development. It should be noted that such considerations often ultimately 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. The positioning of watercourse states has often formed the basis of their opinions with relation to the provisions of the UNWC, founded

²⁹ UNWC, *supra* note 2. 36 countries are states parties to the Convention, although most of the principles enshrined in the treaty represent international customary international law). See Stephen McCaffrey, *The Law of International Watercourses*, Second Edition (Oxford University Press, 2007).

³⁰ For an in-depth review of the historical evolution of the UNWC see Boisson de Chazournes et al., *supra* note 2.

³¹ McCaffrey, “Introduction: The Path to the UN Watercourses Convention and Beyond,” in *Id.* at 12.

³² Salman Salman, ‘Misconceptions regarding the interpretation of the UN Watercourses Convention’ in Loures and Rieu-Clarke, *The UN Watercourses Convention in Force* (Earthscan, 2013) 28–33.

³³ S McCaffrey, ‘The Customary Law of International Watercourses’ in Tignino and Bréthaut, *supra* note 13. For the long-standing contribution of domestic courts, the US Supreme Court in particular, to the development of the key principles of IWL see Itzhak E Kornfeld, *Transboundary Water Disputes : State Conflict and the Assessment of their Adjudication* (2019) 75-84.

³⁴ UNWC, *supra* note 2, Article 5(1)

³⁵ For more details See Caffisch, ‘Equitable and Reasonable Utilisation and Factors Relevant to Determining Such Utilisation (Articles 5 and 6),’ in Boisson de Chazournes et al., *supra* note 2. 77–94. ³⁶ *Id.* at 85–86.

on concerns over limitations of sovereignty regarding use of the watercourse.³⁷ This will be discussed further with regard to the relationship between equitable and reasonable use and no significant harm.

The second factor listed in Article 6 is the social and economic needs of a watercourse state³⁸. 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.³⁹ 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 socioeconomic criteria should be evaluated, or whether pertinent uses should be distinguished from nonpertinent uses.⁴⁰

This factor can also be linked to Article 6(1)(c) which takes into consideration the population dependant on the watercourse within each watercourse state. This factor should not be considered solely in terms of the number of people living within the watercourse, but also 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 of people dependant on the watercourse is not sufficient, links must be made to their social and economic need. Article 6(1)(d) further requires that any uses of a watercourse must take into consideration the impact on other watercourse states, which can be linked to the obligation not to cause significant harm and to fulfil due diligence obligations towards other watercourse states.⁴¹ The remaining factors consider the existing and potential use of the watercourse, the conservation, protection, development and economy of use of the watercourse and the consideration of alternatives of comparable value.⁴²

The weighing and balancing of the different demands and the needs of states based upon such factors is a complex matter. Article 6(3) states that ‘[t]he weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors’ and that ‘all relevant factors are to be considered together and a conclusion reached on the basis of the whole’. The operationalisation of this provision is therefore not clear within its wording as it relies on deliberative processes to establish ‘importance’ and ‘weight’. This gap is intentional in the nature of the UNWC as a framework convention, allowing states of an international watercourse to establish 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’.⁴³ The complexity of the application of Article 6 is further stated by Dellapenna, who notes:

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.⁴⁴

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’.⁴⁵

³⁷ See Salman M A Salman, *The United Nations Watercourses Convention Ten Years Later: Why Has its Entry into Force Proven Difficult?*, 32 WATER INT. 1–15 (2007).

³⁸ Boisson de Chazournes et al., *supra* note 2. at 86.

³⁹ 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).

⁴⁰ See Ximena Fuentes, *The Criteria for the Equitable Utilization of International Rivers*, 67 BR. YEAR B. INT. LAW 337–412 (1997).

⁴¹ Salman, S, 'The Obligation Not to Cause Significant Harm (Article 7),' in Boisson de Chazournes et al., *supra* note 2. 95–122.

⁴² McIntyre, Owen, 'Protection of Freshwater Ecosystems (Articles 20-23),' in *Id.* at 193–213.

⁴³ Bruce Lankford, *Does Article 6 (Factors Relevant to Equitable and Reasonable Utilization) in the UN Watercourses Convention misdirect riparian countries?*, 38 WATER INT. 130–145 (2013).

⁴⁴ Joseph W Dellapenna, *The customary international law of transboundary fresh waters*, 1 INT. J. GLOB. ENVIRON. ISSUES (2001) 286. ⁴⁵ *Id.* The point made by Dellapenna is important and goes to the heart of the matter being discussed within this article; the factors contained within 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, such as the nexus and goals at issue. While no order of priority is given to the factors contained within Article 6, the UNWC states that '[i]n the event of a conflict between uses of an international watercourse, it shall be resolved...with special regard being given to the requirements of vital human needs'.⁴⁶ With regard to the meaning of vital human need, a Statement of Understanding on Article 10(2) was included in the Report of the UN General Assembly Working Group, which finalised drafting of the convention, which stated:

[i]n determining "vital human needs" special attention is to be paid to providing sufficient water to sustain human life, including both drinking water and water required for production of food in order to prevent starvation.⁴⁷

It is therefore clear that the interpretation of Article 10(2) and the application of the factors contained within Article 6 should be done with regard not only to the use of water resources for drinking, but also for food production. This link is also detailed within Article 2.20 of the ILA Berlin Rules of 2004⁴⁸ which states that human needs describe the waters used for immediate human survival including cooking and sanitary needs, as well as that needed for the immediate sustenance of a household. Of course, as will be further detailed with regard to the WEF nexus, the production of food almost always considers some degree of energy, therefore illustrating the WEF and the need for the consideration of water, energy and food in the implementation of IWL.

The weighting of factors has continued to be elusive, with no consensus over where to focus weighting. For example, Lankford argues that the factors of 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.⁴⁹ Others may equally argue that greater importance should be afforded to the environment and the maintenance of minimum environmental flows.⁵⁰ 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.⁵¹ 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'.⁵² An 'ecosystem approach' requires:

'consideration of the whole system rather than individual components. Living species and their physical environments must be recognized as inter-connected, and the focus must be on the interaction between different sub-systems and their responses to stresses resulting from human activity'⁵³

Therefore, while not the focus of this particular research, the ecosystem approach also provides a vital contribution to IWL, and further demonstrates the importance of looking beyond IWL to give greater definition to the provisions contained therein. The incorporation of stronger environmental references such as the ecosystem approach can be considered another substantive gap within IWL which can be filled through the incorporation of additional frameworks such as the SDGs, as will be further detailed within subsequent Section II.

⁴⁶ UNWC, *supra* note 2, Article 10(2)

⁴⁷ Oral report of the coordinator of the informal consultations on Article 10(2), UN Doc. A/C.6/51/SR.57 (1997) at 3

⁴⁸ International Law Association, Report of the 71st Conference 3 (2004); 71 ILA 337, 385 (2004) 'Berlin Rules' ⁴⁹ Lankford, *supra* note 44.

⁵⁰ For discussion of the relationship between IWL and ecosystem protection see A Dan Tarlock, *Safeguarding International River Ecosystems in Times of Scarcity*, 3 Suffolk Univ. Law Rev. 231–373 (2000).

⁵¹ Stefano Burchi, *The future of domestic water law: trends and developments revisited, and where reform is headed*, 44 Water Int. 258–277 (2019), <https://doi.org/10.1080/02508060.2019.1575999>.

⁵² 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.

⁵³ Jutta Brunnée & Stephen Toope, *Environmental security and freshwater resources: ecosystem regime building*, 91 AM. J. INT. LAW 26–59 (1997).

The obligation not to cause significant harm contained within Article 7 of the UNWC has been the subject of great controversy.⁵⁴ This controversy is largely a result of lack of clarity around the meaning of the term 'significant harm', as well as the relationship between significant harm, equitable and reasonable use, and the question of which subordinates the other. 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'.⁵⁵ Such a conclusion stems from the Article 7 provision which states 'having due regard to the provisions of Articles 5 and 6', therefore requiring equitable and reasonable use to be taken into consideration when determining significant harm. Therefore, as 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'.⁵⁶

The relationship between the two provisions has resulted in the principles of equitable and reasonable use being favoured by upstream states, while the notion of no significant harm has been favoured by downstream states.⁵⁷ 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'.⁵⁸ 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.⁵⁹ Indeed, the concept of foreclosure has even been included in some basin-wide legal frameworks, such as the Senegal River Water Charter.⁶⁰ The language used within the UNWC clearly covers both upstream and downstream states, as no specifications are made.⁶¹

Reference to harm is also contained in a number of other Articles throughout the UNWC. Article 12 which dictates the requirement for notification of planned measures only requires such 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' to the watercourse must be prevented.⁶² 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 have deemed to have caused such harm.

While the general status of the duty to cooperate in international law as a whole is unclear, within Article 8, cooperation is presented as a legal obligation.⁶³ Article 8 encourages states to 'consider the establishment of joint mechanisms or commissions...to facilitate cooperation on relevant measures and procedures'. The importance of Article 8 was also emphasised by the 1994 ILC Commentary on the draft of Article 8, stating that the Article 'refers to the most fundamental principles upon which cooperation between watercourse states is founded', describing the principles of sovereign equality, territorial integrity, mutual benefit and good faith.⁶⁴ Encompassed within the duty to cooperate are procedural duties of prior information and prior consultation, as contained within Articles 11-19. Each of the Articles contain procedural obligations regarding notification and consultation processes for planned measures on international watercourses, relating either to a new use or an alteration to an existing use. The procedures are in place in order to provide a framework for cooperation and avoid disputes taking place. Should any disputes subsequently arise the UNWC also provides for methods of dispute resolution within Article 33.

54 Salman M.A. Salman, 'The Obligation not to Cause Significant Harm' in Boisson de Chazournes et al., *supra* note 2. at 95.

55 *Id.* at 96.

56 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. 57 Salman, *supra* note 38.

58 Salman M.A. Salman, 'The Obligation not to Cause Significant Harm' in Boisson de Chazournes et al., *supra* note 2. at 116

59 *Id.* at 116

60 Charter of Waters of Senegal River, adopted May 28th 2002 (not yet in force).

61 Some authors have also linked the two principles with the level of economic development within each State, *see* Kai Wegerich & Oliver Olsson, *Late developers and the inequity of "equitable utilization" and the harm of "do no harm"*, 35 WATER INT. 707–717 (2010). 62 Salman M.A. Salman, 'The Obligation not to Cause Significant Harm' in Boisson de Chazournes et al., *supra* note 2. at 120

63 Ruby Moynihan, Bjørn-Oliver Magsig & Alistair Rieu-Clarke, *UN Watercourses Convention : User's Guide* (2013) 123.

64 Further details on the duty to cooperate and its importance within IWL can be seen in C Leeb, *The significance of the duty to cooperate for transboundary water resources management under international water law*, Routledge Handbook of Water Law and Policy (Taylor and Francis, 2017).

B. The 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 identified 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'.⁶⁵ The nexus has since become a well-established paradigm within legal, scientific and policy literature.⁶⁶

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.⁶⁷ 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.⁶⁸

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'.⁶⁹ 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 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.⁷⁰

Within IWL the WEF nexus has been most notably utilised as a methodology for the United Nations Economic Commission for Europe Water Convention (UNECE).⁷¹ The methodology is formed of a number of key steps including identification of intersectoral issues, future developments and opportunities for improvements.⁷² The methodology is extremely progressive for many reasons: 1) it is derived from a position of international water law; 2) it is framed within the context of application within transboundary river basins, as opposed to being a national level framework; 3) it clearly demonstrates a process, rather than merely a conceptual framework; and 4) it states that the WEF nexus will be essential for the fulfilment of the SDGs. However, the mapping process which is undertaken within the methodology will undoubtedly require funding for its operation and will require a progressive plan to be put in place for the findings to be implemented once the initial methodological process has been completed. In addition, despite now being international in scale, the UNECE has not received much support within developing countries. For instance, with regard to the Zambezi, none of the basin states have yet ratified the UNECE, the long historical cooperative framework developed in the region is instead reflective of the UNWC (*see* Section III).

65 Claudia Pahl-Wostl, Anik Bhaduri & Antje Bruns, *Editorial special issue: The Nexus of water, energy and food – An environmental governance perspective*, 90 ENVIRON. SCI. POLICY 161–163 (2018), <https://doi.org/10.1016/j.envsci.2018.06.021>.

66 World Economic Forum, *Water Security: The Water-Food-Energy-Climate Nexus* (The World Economic Forum Water Initiative, Island Press 2011), p.xvii.

67 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 68 Terrapon-Pfaff et al., *supra* note 20.

69 World Economic Forum, *Water Security: The Water-Food-Energy-Climate Nexus* (The World Economic Forum Water Initiative, Island Press 2011).

70 Holger Hoff, *Understanding the Nexus. Background paper for the Bonn2011 Conference: The Water, Energy and Food Security Nexus*, Stockholm Environment Institute (2011).

71 UNECE, *Methodology for assessing the water-food-energy-ecosystems nexus in transboundary basins and experiences from its application: synthesis*, 2018, ECE/MP.WAT/66, .

72 *Id.* at 16

The WEF nexus is not without criticism particularly with regard to its lack of specificity, described as having traits of a 'nirvana concept'⁷³ 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'.⁷⁴ However, as stated by Muller, it is 'increasingly widely recognised that no single organisational architecture can serve the diversity of water management situations'.⁷⁵ 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 does succeed in shifting focus of water management from 'watersheds to problem-sheds', more directly aligned to the needs and focus of governments, business and citizens.⁷⁶ 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.⁷⁷ It is therefore surprising that the recognised linkages within the WEF nexus were not explicitly stated within the SDGs.

It can be argued 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. Equally, emphasis must be placed on improving the interconnectedness between the 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.⁷⁸ 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'. However, in many cases strategies are already in place which could be united: the SDGs represent an opportunity for such a unification.

C. The Sustainable Development Goals

The SDGs build upon the Millennium Development Goals (MDGs)⁷⁹, the first global framework to set a number of targets for global development. The SDGs follow the same course, with a new set of goals which are now universal in nature. A total of 17 goals and 169 targets are included within the agenda. 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.

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. The SDGs were agreed in 2015 and provide global objectives for achieving economic, social and environmental sustainability until 2030. 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).

The goals are undoubtedly linked, resource management (particularly within the water sector) will be essential for each of their achievement, 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. The

⁷³ Carl Middleton et al., *The rise and implications of the water-energy-food nexus in Southeast Asia through an environmental justice lens*, 8 WATER ALTERN. 627–654 (2015).

⁷⁴ Molle F, *Nirvana concepts, narratives and policy models: Insight from the water sector.*, 1 WATER ALTERN. 131–156 (2008), <http://www.water-alternatives.org/index.php/all-abs/20-a-1-1-8/file>.

⁷⁵ Mike Muller, *The “nexus” as a step back towards a more coherent water resource management paradigm*, 8 WATER ALTERN. 675–694 (2015) 689.

⁷⁶ *Id.*

⁷⁷ Pahl-Wostl, *supra* note 14.

⁷⁸ Morgan Bazilian et al., *Considering the energy, water and food nexus: Towards an integrated modelling approach*, 39 ENERGY POLICY 7896–7906 (2011), <http://dx.doi.org/10.1016/j.enpol.2011.09.039>.

⁷⁹ UN General Assembly, United Nations Millennium Declaration, Resolution Adopted by the General Assembly, 18th September 2000, A/RES/55/2

SDGs are legally non-binding⁸⁰ and as such their achievement will need to be supported by formal rules of domestic and international law.⁸¹ However, as part of the body of soft law, while they do not directly provide a legal obligation by nature, they nonetheless demonstrate strong political commitment.⁸²

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.⁸³ SDG 7 focuses on ensuring access to affordable, reliable, sustainable and modern energy for all. Its subsequent targets 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.⁸⁴

SDG 6, the water goal, has potential synergies across a number of the SDGs; therefore, the achievement of the water goal will make it easier to achieve the targets contained within a number of the other goals. SDG 6 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 pays homage to the implementation of the human right to water, the need to ‘improve water quality’ 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 water governance across sectors, is arguably outdated in the landscape of water governance. As mentioned at the outset of this paper, IWRM has come under criticism for its lack of enforcement and its continued water centrism.⁸⁵ Therefore, its direct inclusion in the SDGs could be viewed as a missed opportunity for the development of a more progressive approach and limiting States to the use of one framework. The indicators by which target 6.5 will be measured are the ‘degree of integrated water resources management’ (indicator 6.5.1)⁸⁶ 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).⁸⁷ Emphasis is therefore clearly placed on cooperation.

In 2016, the UN-Water Task Force provided a first evaluation of the interlinkages of SDG 6 with the other SDGs.⁸⁸ 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

⁸⁰ 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, p23 in particular.

⁸¹ 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, United Nations, *Treaty Series*, vol.1993, p. 3. 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 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.

⁸² 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

⁸³ SDGs Goal 2, Target 2.4

⁸⁴ SDGs Goal 7. Notably specific reference is made to least developed countries and landlocked developing countries within Target 7.b

⁸⁵ Benson, Gain, and Rouillard, *supra* note 19.

⁸⁶ For further details on monitoring target 6.5.1 See, Bertule et al., *supra* note 15.

⁸⁷ Integrated Monitoring Guide for Sustainable Development Goal 6 on Water and Sanitation: Targets and Global Indicators, UN Water (14 July 2017).

⁸⁸ 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/>>, .

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.⁸⁹ 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.⁹⁰ 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'.⁹¹ Furthermore, both SDGs 2 and 7 are discussed with regard to the relationship with SDG 6 in an environmental sense.⁹² 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.⁹³

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 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.⁹⁴ 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).⁹⁵ 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 was 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.⁹⁶ 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.⁹⁷ Therefore, climate impacts need to be taken into consideration within the formation of any governance framework.⁹⁸

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 article, 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. If

⁸⁹ *Id.* Targets of SDG Goal 2, detailed in Table 1, 20.

⁹⁰ *Id.* at Table 2, 26

⁹¹ *Id.* at 25

⁹² *Id.* at 28

⁹³ 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> last accessed 14 June 2019

⁹⁴ WWAP (United Nations World Water Assessment Programme). 2017. The United Nations World Water Development Report 2017. Wastewater: The Untapped Resource. Paris, UNESCO.

⁹⁵ Måns Nilsson, Dave Griggs & Martin Visbeck, *Policy: Map the interactions between Sustainable Development Goals.*, 534 NATURE 320–322 (2016).

⁹⁶ Orme et al., *supra* note 20.

⁹⁷ 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*, 4 OPEN HYDROL. J. 163–172 (2013).

⁹⁸ Tuula Honkonen, *Water Security and Climate Change: The Need for Adaptive Governance*, 20 POTCHEFSTROOM ELECTRON. LAW J. 1–26 (2017).

the SDGs are used to aid existing legal frameworks such as IWL, such risks may well be mitigated, if not eliminated.

II. 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 governance should be taken. Both horizontal and vertical integration across governance is needed, working from the local to national level and across a multitude of sectors. This section will demonstrate how an LNG approach can aid a systematic and holistic application of relevant laws and further implementation of international legal commitments.

It is important to bear in mind that the perspective from which each of these frameworks is derived is different. The UNWC finds its direction as a result of more than 40 years of negotiations, largely surrounding debates on sovereignty over watercourses and therefore 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 and through the prism of international development. Each of these perspectives brings different approaches to governance and diverse lessons which can be disseminated into one cohesive framework.

As has previously been stated, the UNWC is a framework convention which allows states scope to tailor its provisions to their own needs; yet at the same time, such vague provisions also 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, a goal better understood and aimed for by all national governments, particularly within a developing country context. In addition, the SDGs have significant political backing and provide an array of goals and targets which can be strived for by national governments. However, to aim for each goal and target individually is not likely to be within the capacity of many developing countries. As such, the coordination between both the WEF nexus and the SDGs in order to implement the obligations of IWL could serve as a holistic framework to aid water governance. The following section will detail some of the potential strengths which could be gained from the LNG approach.

A. Increased Benefits from the Watercourse

All three of the frameworks aim to maximise the benefits which can be derived from international watercourses in the most sustainable way. IWL, as codified in the UNWC, seeks to ensure watercourses are used and developed with a view to ‘attaining optimal and sustainable utilization thereof and benefits therefrom’⁹⁹; the WEF nexus seeks to ‘address externalities across sectors to achieve overall resource

efficiency'¹⁰⁰; and the SDGs aspire to ensure 'availability and sustainable management of water and sanitation for all'¹⁰¹ along with the need for food and energy security. The three frameworks can, therefore, be seen as having the overarching goals of optimal utilisation, resource efficiency and sustainable management, which all combine to provide water (and the additional benefits derived from the watercourse) to all.¹⁰² While this optimal utilisation is key to the sustainable management of international watercourses, considered in isolation none of the three frameworks will present an accurate vision of what could be determined to be 'optimal' and 'sustainable'. Through the LNG approach the uses of international watercourses can be assessed in relation to additional sectoral needs such as those relating to agriculture and irrigation (food production) and hydropower (energy), ensuring that water resource management is not conducted within a vacuum.¹⁰³ When determining the overall course of action for utilisation, the targets and indicators of the SDGs can also be used to evaluate whether the chosen path would advance or be

⁹⁹ UNWC, *supra* note 2, Article 5(1).

¹⁰⁰ Hoff, *supra* note 71.

¹⁰¹ SDG, Goal 6

¹⁰² See D Grey & C Sadoff, *Beyond the river: the benefits of cooperation on international rivers*, 47 WATER SCI. TECHNOL. 91–96 (2003). ¹⁰³ A Grzybowski, Stephen McCaffrey & Richard Paisley, *Critical Intersections for Energy & Water Law: Exploring New Challenges and Opportunities: Beyond International Water Law: Successfully Negotiating Mutual Gains Agreements for International Watercourses*, 22 PAC. MCGEORGE GLOB. BUS. DEV. LJ 139–401 (2010).

detrimental to the goals. These considerations can then be looked at through the rules of IWL and those of equitable and reasonable use and no significant harm in particular; elaborating on the considerations which can be made under Article 6 and 7 of the UNWC.

B. Risk Reduction & Strengthened Cooperation

As stated by Subramanian et al. it is essential for cooperation on transboundary watercourses that perceived risks are mitigated as far as possible¹⁰⁴; 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 across sectors, including several government agencies and regional authorities as well as increasing stakeholder participation.¹⁰⁵ 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.¹⁰⁶ 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 data and information.¹⁰⁷

C. Temporal Scope, Recognition and Legal Status

Each of the three frameworks are well recognised by the international community. While the UNWC has struggled to gain support in terms of ratifications, its principles are widely recognised as part of customary international law.¹⁰⁸ In addition, despite ratifications being few in terms of the convention itself, in many cases the provisions contained within the convention have been replicated in other regional or basin-scale frameworks, as will be demonstrated in relation to the ZRB in Section III. Since its inception in 2011, the WEF Nexus has continued to be utilised within science and policy, although legal literature on the concept is extremely limited, the formation of the UNECE WEF Methodology as previously discussed, demonstrates the importance of the nexus within the sector of water governance. The SDGs, like the MDGs before them, have garnered enormous international support: likely a result of their 'soft law' nonbinding status, as below.¹⁰⁹ National Governments have generally been supportive of the goals and they have become embedded within many National Development Plans (NDPs). It is also expected that using a WEF nexus approach would allow more efficient, focused and robust implementation of the SDGs.¹¹⁰

The three frameworks differ in their temporal scope and legal status. IWL can be said to offer a permanent long-lasting normative framework of legal principles such as equitable and reasonable use and no significant harm. The WEF Nexus is arguably the newest of the three frameworks (if the SDGs are viewed as an extension, or a new 'phase' of the MDGs), despite the relationship between each of the three

sectors being recognised long before its inception. It is not possible to definitively state what the temporal scope of the WEF Nexus will be, however, some insight can be gained from the peaks and troughs of popularity relating to other conceptual frameworks, such as IWRM. While IWRM is still an important water governance framework, even represented within the SDGs, its popularity can be said to have declined in recent years.¹ In addition, the framework has been criticised for its water centrality.¹¹² The SDGs are timebound, set to expire in 2030, when they will likely be replaced by a new framework. 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

¹⁰⁴ Ashok Subramanian, Bridget Brown & Aaron Wolf, *Understanding and overcoming risks to cooperation along transboundary rivers*, 16 WATER POLICY 824–843 (2014).

¹⁰⁵ 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

¹⁰⁶ HOFF, *supra* note 71. at 225. See also Benson, Gain, and Rouillard, *supra* note 19 at 760 ¹⁰⁷ UNWC, *supra* note 2, Articles 8 and 9 ¹⁰⁸ See Dellapenna, *supra* note 45.

¹⁰⁹ For discussion of 'soft' power with relation to transboundary watercourses, particularly in the case of hegemonic political contexts, see Mark Zeitoun, Naho Mirumachi & Jeroen Warner, *Transboundary water interaction II: The influence of "soft" power*, 11 INT. ENVIRON. AGREEMENTS POLIT. LAW ECON. 159–178 (2011).

¹¹⁰ K.K. Yumkella & P.T. Yillia, *Framing the Water-energy Nexus for the Post-2015 Development Agenda*, 5 AQUAT. PROCEDIA 8–12 (2015). progression from the MDGs and SDGs; therefore, although the framework is time-bound and thus 'temporary' in nature, it is extremely likely that a subsequent global development agenda will be put in its place.

Notably, IWL is a legally binding normative framework¹¹³ which 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 international law, such as the UNWC (particularly given the status of key principles as customary international law) is likely to have greater longevity than other conceptual or policy frameworks, such as the WEF or the SDGs. 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.

D. Interpreting and Implementing IWL

As stated throughout this article, IWL, while instrumental in the governance of transboundary watercourses, can also be aided by the incorporation of the WEF Nexus and SDGs in its implementation. The SDGs can be used to improve participation within IWL on which the UNWC is essentially silent. Regarding the obligation for public participation, Spijkers states:

“There appears to be no explicit legal basis for such an obligation in international water law, but if the SDGs call upon all States to strengthen equitable, participatory and accountable water governance, then this gives us the confidence to interpret Article 32...as explicitly acknowledging an obligation to facilitate public participation in freshwater resources management at the global, regional and domestic level”¹¹⁴

This is also highlighted by McIntyre who stresses ‘the inclusive and participatory process’ of the SDGs as well as the use of their implementation, monitoring and compliance mechanisms which can be used to ‘enhance the relevance and legitimacy of progressive water law’.¹¹⁵ This highlights another means of aiding the implementation of IWL: the use of monitoring and compliance mechanisms, on which the UNWC is also silent. Further, McIntyre also argues that the universal adoption of SDG 6 may serve to further enforce

¹ Lyla Mehta & William Derman, *The rise and fall of integrated Water Resources Management* (2016), <https://www.ids.ac.uk/opinions/the-rise-and-fall-of-integrated-water-resources-management/>. ¹¹² Benson, Gain, and Rouillard, *supra* note 19.

the priority given to vital human needs under Article 10(2), making ‘their safe-guarding even more of a *sine qua non* in international water resources law’.²

Efficient water use is a focus of both the SDGs, illustrated through Target 6.4, and the UNWC, demonstrated within 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.¹¹⁷ The nature of the efficiency requirement has been developed further in the case of *Colorado v. New Mexico* within which the court explained that States have an ‘affirmative duty to take reasonable steps to augment the water supply of an interstate stream’ and that they have ‘a duty to employ ‘financially and physically feasible’ measures which are ‘adapted to conserving and equalizing the natural flow’.¹¹⁸ 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. The importance of efficient water use which is demonstrable within IWL will assist with the implementation of SDG target 6; at the same time, the drive to reach target 6.4 as well as the monitoring and compliance mechanisms of the SDGs, could aid the implementation of water efficiency in IWL.

¹¹³ 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.

¹¹⁴ Spijkers, *supra* note 21. at 48

¹¹⁵ McIntyre, *supra* note 20. at174

E. Intra- and Intergenerational Equity

Spijkers argues that 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.¹¹⁹ This can also be extended to Article 6 and the factors relating to ‘existing and potential uses’ which can be extrapolated to mean both the uses that exist within this generation and those which will need to be used within the future. Importantly, by considering intergenerational equity, Article 6 would consider the potential and existing uses for all states across all time, rather than on a project-by-project basis as is often the case. His argument also extends to the principle of equitable and reasonable use, to be applied not only to intergenerational equity, but also to intragenerational equity, meaning equity within the same generation.¹²⁰ The consideration of equity across the same generation 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.¹²¹ Consideration of the three frameworks can therefore further advance conceptualised notions of ‘sustainable development’ including intra- and intergenerational equity within the sector of IWL.

III. THE ZAMBEZI RIVER BASIN: A LAW, NEXUS, GOALS PERSPECTIVE

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 km². Each of the countries share different proportions of the basin and rely on it to different extents.¹²² 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.¹²³ 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.¹²⁴ The ZRB is home to around 30 million people, 25% of whom live in urban centres and the rest within rural areas.¹²⁵ Poverty continues to impact all of the ZRB states to varying degrees.¹²⁶ As a result a fine balance must be struck across the basin, between the use of natural resources for economic growth, the implementation of international and regional legal obligations and the pursuit of sustainable development.

² *Id.* at184

¹¹⁷ Fuentes, *supra* note 41.

¹¹⁸ *Colorado v. New Mexico* 459 US 176 (1982) at 185

A. Applicable Water Law and Policy Frameworks

Water law and policy frameworks throughout the ZRB have largely been developed in line with IWL frameworks, the UNWC in particular.¹²⁷ This framework has created a strong foundation for the governance of the watercourse. Yet, some gaps remain, particularly with regards to demonstrating linkages

¹¹⁹ Spijkers, *supra* note 21. at 45

¹²⁰ 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*, 10 SUSTAINABILITY 3836 (2018).

¹²¹ 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 Zeray Yihdego & Alistair Rieu-Clarke, *An exploration of fairness in international law through the Blue Nile and GERD*, 41 WATER INT. 528–549 (2016).

¹²² World Bank, "The Zambezi River Basin: A Multi-Sector Investment Opportunities Analysis - Volume 1: Summary Report."

¹²³ 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)

¹²⁴ 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.

¹²⁵ World Bank, "The Zambezi River Basin: A Multi-Sector Investment Opportunities Analysis - Volume 1: Summary Report"

¹²⁶ UNDP, 'Human Development Report 2016: Human Development for Everyone' 199-200. The Gross National Income (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).

¹²⁷ 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).

between water, energy and food, wider considerations of sustainable development, and the implementation of IWL principles at a national level.

1. The United Nations Watercourses Convention

Only Namibia has ratified the UNWC, although Angola, Botswana, Malawi, Mozambique and Zambia voted in favour of the adoption of the Treaty by the UNGA on 21 May 1997. Tanzania and Zimbabwe were absent from the voting process at the UN.¹²⁸ The UNWC cannot therefore be applied to the ZRB as an international treaty framework, however, as stated 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 discussed below, therefore there is no need for further discussion of customary IWL for the purpose of this research. We also note that the UNWC is a framework convention which needs to be applied to specific international watercourses or basins 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.

2. Regional Frameworks

In the Southern African Development Community (SADC),¹²⁹ to which all ZRB states belong, the first Protocol concerning international watercourses was signed in 1995 and subsequently entered into force in 1998.¹³⁰ The 1995 Protocol was built on the Helsinki Rules and the ILCs work on non-navigational uses of international watercourses. 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.¹³¹ The provisions of the SADC-PC largely replicate those of the UNWC, with a couple of alterations; 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.¹³² In terms of ratification of the SADCPC, all ZRB states have ratified the agreement, with the exception of Zimbabwe and Angola both who have only signed the agreement.

Support for the implementation of a WEF nexus approach can be illustrated in the SADC through a number of policy documents and strategies. The SADC Regional Water Policy was adopted in 2005¹³³ 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

¹²⁸ '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> accessed 4 September 2017.

¹²⁹ 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 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.

¹³⁰ 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).

¹³¹ Revised Protocol on Shared Watercourses in the Southern African Development Community (signed 7 August 2000; in force 22 September 2003).

¹³² 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).

¹³³ SADC, Regional Water Policy (August 2005) available at

https://www.sadc.int/files/1913/5292/8376/Regional_Water_Policy.pdf last accessed 15 June 2019

Nexus Operational Framework is currently in progress¹³⁴ 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.¹³⁵

In relation to energy, the Community 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.¹³⁶ The SADC region formed the Southern African Power Pool (SAPP) in 1995, based on the Protocol on Energy¹³⁷, to strengthen regional cooperation and growth through energy resources.¹³⁸ 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.¹³⁹

Significant investment and commitment at the regional level is demonstrable 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 through the fact that joint meetings have taken place between the SADC Ministries on Water and Energy in 2016, 2017 and 2018.¹⁴⁰

3. 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 of transboundary water cooperation, beginning with the formation of the Zambezi River Authority (ZRA).¹⁴¹

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.¹⁴² 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’.¹⁴³ Therefore, even from its inception, the governance frameworks of the ZRB demonstrated the WEF Nexus.

¹³⁴ ‘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-draft-wef-nexus-operational-framework-reviewed-at-transboundary-river-basin-level/>, last accessed 27 May 2019

¹³⁵ 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>

¹³⁶ SADC, Regional Energy Access Strategy and Action Plan (March 2010), available at <http://www.euei-pdf.org/en/sadc-regionalenergy-access-strategy-and-action-plan>

¹³⁷ Protocol on Energy, Southern African Development Community (signed 24 August 1996, entry into force 17 April 1998)

¹³⁸ See <http://www.sapp.co.zw/about-sapp>

¹³⁹ SADC, Regional Agricultural Policy, August 2014, Section 10.5 available at <https://www.nepad.org/publication/sadc-regionalagricultural-policy-0>

¹⁴⁰ 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-27thjune/>.

¹⁴¹ 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 Jonathan, L., P. Zebediah, S. Vladimir & S. Davison. 2017. *The Zambezi River Basin: Water and sustainable development*. Taylor and Francis.

¹⁴² Soils Incorporated (Pvt) Ltd, WCD Case Study: Kariba Dam Zambia and Zimbabwe Final Report: November 2000, prepared for the World Commission on Dams (WCD)

¹⁴³ Zambezi Water Authority, About Us, available at <http://www.zambezi.org/about-us>, last accessed 10 June 2019

The ZRA Agreement is an institutional agreement which specifically establishes the ZRA and charges it with the duty to ‘operate, monitor and maintain the Kariba Complex’.¹⁴⁴ The ZRA Agreement entered into force on the 1st 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.¹⁴⁵ It also states that all energy produced from the Kariba Dam should be shared equally¹⁴⁶ and provides further details regarding equal water allocation in Annexure 1.¹⁴⁷ The agreement also provides a number of cooperation and consultation obligations within Article 18(1). The procedural mechanisms contained within the agreement 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) 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 1¹⁴⁸ and obligations regarding dispute settlement are also put in place.¹⁴⁹ It has to be stressed here that the key principles that dictates 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).¹⁵⁰ 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’.¹⁵¹ 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’.³

³ *Id.*

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 a number of the substantive and procedural rules: Article 12(1)(h) and 13 cover equitable and reasonable utilization 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)). It 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 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.¹⁵³ 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

¹⁴⁴ 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

¹⁴⁵ *Id.* at Article 18(1) ¹⁴⁶ *Id.* at Article 23 ¹⁴⁷ *Id.*

¹⁴⁸ *Id.* at Article 22

¹⁴⁹ *Id.* at Article 32

¹⁵⁰ For discussion on the need for greater clarity on the definition of river basin commissions and organisations, see Susanne Schmeier, Andrea K Gerlak & Sabine Blumstein, *Clearing the muddy waters of shared watercourses governance: conceptualizing international River Basin Organizations*, 16 INT. ENVIRON. AGREEMENTS POLIT. LAW ECON. 597–619.

¹⁵¹ See ZAMCOM: Objective, Vision and Mission <http://www.zambezicommission.org/about-zamcom/about-zamcom>

Commission. In February 2016, the ZAMCOM Council approved a new set of ‘Rule and Procedures for Sharing Information and Data’.¹⁵⁴ 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’.¹⁵⁵ 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.¹⁵⁶ The plan 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.¹⁵⁷ 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.¹⁵⁸ 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

¹⁵³ Christina Leb, ‘General Obligation to Cooperate and Regular Exchange of Data and Information (Articles 8 and 9)’ in Boisson de Chazournes et al., *supra* note 2. at 134

the scope of strategy and policy documents and one clear cohesive framework is not easily identified. Better integration across such strategy and policy documents, linked to IWL commitments, but through the frame of the Law, Nexus, Goals approach could allow the ZRB to streamline targets increase efficiency and sustainability.

B. *The 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,¹⁵⁹ however to-date only around 5,000MW of this potential has been exploited.¹⁶⁰ 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.¹⁶¹

¹⁵⁴ 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, . ¹⁵⁵ *Id.* at Article 2

¹⁵⁶ 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_ZAMSTRA_T.pdf, last accessed 4 April 2019

¹⁵⁷ Integrated Water Resource Management (IWRM) Strategy and Implementation Plan, 25.

¹⁵⁸ *Id.* at 26

¹⁵⁹ Michael Tumbare, 'The Zambezi River: Its Threats and Opportunities' (2004).

¹⁶⁰ 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.

¹⁶¹ 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 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

Although hydropower is a non-consumptive activity, it still accounts for the largest share of water use within the basin, through loss in evaporation.¹⁶² 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 hydropower¹⁶³ 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.¹⁶⁴

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.¹⁶⁵ 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.¹⁶⁶ 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.¹⁶⁷

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 2025.¹⁶⁸

Despite the huge quantities of water within the ZRB, many in the region still lack adequate access to clean water and sanitation.¹⁶⁹ 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.⁴ South Africa has also expressed interest in large water diversions from the Zambezi at Kazungula to travel through Botswana to Pretoria.¹⁷¹

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.

¹⁶² Zambezi River Authority (ZRA) <http://www.zambezi.org>

¹⁶³ World Bank, "The Zambezi River Basin: A Multi-Sector Investment Opportunities Analysis - Volume 3: State of the Basin."

¹⁶⁴ World Bank, "The Zambezi River Basin: A Multi-Sector Investment Opportunities Analysis - Volume 1: Summary Report" ¹⁶⁵ Zambezi River Authority, 'Integrated Water Resources Management (IWRM) Strategy and Implementation Plan for the Zambezi River Basin (ZAMSTRAT)' <http://www.zambezi.commission.org/publication/integrated-water-resourcesmanagement-strategy-and-implementation-plan-zambezi-river-0> last accessed 9 June 2019.

¹⁶⁶ World Bank, 'Zambezi River Basin: Sustainable Agriculture Water Development' (The World Bank 2008).

¹⁶⁷ 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 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. ¹⁶⁸ ZRA, *supra* note 162

¹⁶⁹ WHO, 'Quantifying Environmental Health Impacts: Country Profiles of Environmental Burden of Disease' (www.who.int, 2017) <http://www.who.int/quantifying_ehimpacts/national/countryprofile/en/#Z>

C. The Sustainable Development Goals

As illustrated within the previous section, commitment to the SDGs is illustrated within the 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.¹⁷² 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.¹⁷³

More could however 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.

⁴ Ashok Swain, *Politics or development: Sharing of international Rivers in the South*, in *POLITICS AND DEVELOPMENT IN A TRANSBOUNDARY WATERSHED: THE CASE OF THE LOWER MEKONG BASIN* 19–35 (Joakim Öjendal, Stina Hansson, & Sofie Hellberg eds., 2012). At 29; Ashok Swain, *Understanding Emerging Security Challenges: Threats and Opportunities* (2012) 53 ¹⁷¹ Swain, *supra* note 173.

D. National Implementation of LNG Approach

In order for IWL to be implemented successfully, national principles of water governance must be consistent across basin States.¹⁷⁴ 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 will be given. 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 of the LNG approach.¹⁷⁵

In Mozambique's Agenda 2025¹⁷⁶ the importance of land, water and hydropower potential is emphasised.¹⁷⁷ 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

¹⁷² 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 (Mo. 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).

¹⁷³ 'Progress on Transboundary Water Cooperation: Global baseline for SDG indicator 6.5.2' UN and UNESCO (on behalf of UN Water) 2018, 36

¹⁷⁴ 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. (Author abstract)(Report)*, 21 WATER RESOUR. MANAG. 1993 (2007).

¹⁷⁵ 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.

¹⁷⁶ 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)

¹⁷⁷ Mozambique, Agenda 2025 < <https://www.foresightfordevelopment.org/sobipro/55/130-agenda-2025-the-nations-visionandstrategies>> 59

development.⁵Significantly, under the threats listed, the document states that 'water and energy shortages may give rise to difficult relations between SADC States'.⁶This 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.⁷ Legislation in Mozambique furthers this notion of cooperation, stating 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.¹⁸¹

In its eleventh NDP (NDP11), Botswana 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'.¹⁸²The 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 also states that the Government will implement an Integrated Water and Energy Resource Management Programme which 'promotes the optimal utilisation of energy and water resources'.⁸ NDP11 also mentions the importance of IWRM more

⁵ *Id.* at 60

⁶ *Id.* at 61

⁷ *Id.* at 81

¹⁸¹ Mozambique: 1991 Act No. 16/91 regulating water resources belonging to the public domain. ¹⁸² Botswana, Eleventh National Development Plan (2017-2023) available at

<http://www.ncongo.info/wpcontent/uploads/2017/02/NDP-11.pdf>, last accessed 10 July 2019, 24

⁸ *Id.* at 110

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'.⁹ While the policy framework is therefore in line with a LNG approach, the legal framework in Botswana does not include the key principle of equitable and reasonable use.

The 2005 Draft Water Bill does refer to the promotion of 'equitable and effective regional cooperation in the management of shared watercourse systems'¹⁸⁵, 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.'¹⁰ 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.¹⁸⁷

In Malawi, The Water Resources Act (No. 2 of 2013) does not enact many of the provisions of the UNWC and where such 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.

Yet, the policy and development frameworks, expressed through the Malawi Growth and Development Strategy (MGDS) (2017-2022) and Vision 2020 view water governance through the lens of a LNG approach.¹⁸⁸ 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'.¹¹ The plan continues to state that 'increased investment in irrigation cannot succeed without addressing water conservation and catchment area, as well as ecosystems management'.¹⁹⁰ 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.¹² 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'.¹⁹² 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'.¹⁹³ The subsequent strategy for the realisation of this goal clearly recognises the WEF nexus, bringing together food security with integrated water resources management.¹⁹⁴ 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.

Tanzania's National Water Policy 2002 links to its Vision 2025, 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.¹⁹⁵ 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.¹⁹⁶ Mention of equitable utilisation is included within Article 98(1) of Tanzania's Water Resources Management Act (No.11 of 2009) which states that 'the Minister may

⁹ *Id.* at 134

¹⁸⁵ Botswana: Draft Water Bill 2005, available at http://www.orangesenqurak.org/UserFiles/File/National%20Water%20Departments/Botswana/draft%20Botswana%20WATER_BILL%201.pdf, . last accessed 10 July 2019, Article 55

¹⁰ *Id.*

¹⁸⁷ Botswana: Environmental Assessment Act (No.10 of 2011) Form E, Regulation 8 ¹⁸⁸Malawi Growth and Development Strategy (MGDS) III (2017).

¹¹ *Id.* at 16 ¹⁹⁰

Id.

¹² *Id.* at 32

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 and agreements between the United Republic and the other States’.

Namibia’s 2013 Water Resources Management Act (No.11 of 2013) 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. 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.¹⁹⁷ The policy recognises the link between the agricultural sector¹⁹⁸ and energy in relation to economic development.¹⁹⁹ 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. 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 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.²⁰⁰

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. 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-

¹⁹² *Id.* at 33

¹⁹³ *Id.* at 57

¹⁹⁴ *Id.* at 59

¹⁹⁵ National Water Policy, United Republic of Tanzania (July 2002), at 14

¹⁹⁶ *Id.* at 16

¹⁹⁷ National Water Supply and Sanitation Policy 2008, Government of Namibia, Section 2.2

¹⁹⁸ *Id.* Section 2.6.5

¹⁹⁹ *Id.* Section 2.5.1

²⁰⁰ *Id.* at 36

industries, which are significant sources of employment and present real opportunities for economic diversification’.²⁰¹ 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’.¹³ Regarding energy, the 7th NDP states that there is need to increase supply in order to meet demand and as a result to ‘promote investment in hydro, nuclear, geothermal, wind and solar energy generation’.¹⁴ 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’.¹⁵ 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

¹³ *Id.* at 66

¹⁴ *Id.* at 72

¹⁵ *Id.* at 78

sustainable economic growth'.¹⁶ These include the construction of small, medium and large dams, to meet various water needs, 'particularly for domestic, agriculture and hydropower generation'.¹⁷

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.²⁰⁷ Zambia's 2011 Water Resources Management 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.

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. The most recent of which is the Medium-Term Plan (MTP, 2011-2015), ZimAsset (2013-2018) 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.²⁰⁸ 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. 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.²⁰⁹ 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. 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

²⁰¹Zambia, Seventh National Development Plan (2017-2021) available at <http://extwprlegs1.fao.org/docs/pdf/zam170109.pdf>. Last accessed 10 July 2019, 65

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'.

IV. CONCLUSION

This article sheds light on, firstly, the linkages between three conceptual frameworks—IWL, the WEF nexus and the SDGs, along their strengths and shortcomings, in relation to the governance of international watercourses. Secondly, while each of them have distinct features and offer different advantages, the article finds that our understanding, interpretation and implementation of IWL could be enhanced and its gaps better remedied through the Law, Nexus, Goals integrated approach to the governance of shared watercourses; the substantive and process-related norms and commitments serve as the main pillar of this proposed approach, aided by (a) the WEF nexus which enhances understanding

¹⁶ *Id.* at 79

¹⁷ *Id.* at 79

²⁰⁷ Zambia Water Resources Management Act (No.21 of 2011)

²⁰⁸ Government of Zimbabwe, Medium Term Plan (2011-2015) < <http://extwprlegs1.fao.org/docs/pdf/zim151067.pdf>> ²⁰⁹ 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).

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.

Thirdly, after systematically applying the three frameworks to the ZRB at various levels, the article 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. Most importantly, regional, basin-wide and national legal and policy commitments in the ZRB have clarified and supplemented some of the ambiguous legal norms of IWL. The ZRB should therefore be recognised as a progressive example of an integrated approach to the governance of watercourses at regional, basin and national levels. This should be read with caution, however, 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.

Fourthly, 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.

Fifthly, it has further 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'.²¹⁰ 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 landwater 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'

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 within this paper could go some 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. In this regard, and as illustrated in the article, the Nexus and Goals frameworks can help to fill the gap left by IWL, particularly with relation to the application of

²¹⁰ Coleen A. Fox and Chris Sneddon, 'Transboundary river basin agreements in the Mekong and Zambezi basins: enhancing environmental security or securitizing the environment?' *INTERNATIONAL ENVIRONMENTAL AGREEMENTS* (2007) 7, 246

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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