

**OWNERSHIP IN TRANS-BOUNDARY WATER RESOURCES– A
CASE STUDY OF THE ZAMBEZI WATERCOURSE**

By

Cecil Dulu Nundwe

A Thesis submitted to the University of Zambia in fulfillment of the Degree of Master of
Science in Integrated Water Resource Management in the Department of Geology,
School of Mines

The University of Zambia
(November 2015)

DECLARATION

This thesis was written and submitted in accordance with the rules and regulations governing the award of Master of Science in Integrated Water Resources Management of the University of Zambia. I further declare that the thesis has neither in part nor in whole been presented as substance, for the award of any degree, either to this or any other University. Where other peoples' work has been drawn upon, acknowledgment has been made.

I bear absolute responsibility for errors, defects or any omissions therein.

Signature of Author:.....

Date:

© 2015 by Cecil Dulu Nundwe. All rights reserved

APPROVAL

This thesis of Nundwe Cecil Dulu is approved as a fulfillment of the degree of Masters of Science in Integrated Water Resources Management of the University of Zambia.

Signature: Chairperson:.....

1st Internal Examiner:.....

2nd Internal Examiner:.....

External Examiner:.....

ABSTRACT

This research was undertaken to contribute to the body of knowledge policy makers may apply when determining the kinds of trans-boundary water agreements they would like to have in place. The objective was to explore notions and determine levels of ‘ownership’ in relation to water resources and its implications for water sharing agreements. The subject of ownership was explored through selected agreements and legal doctrines with a bearing on the Zambezi Watercourse.

The rights of access, use and control of the trans-boundary waters of the Zambezi Watercourse among interested countries that would like to secure and use the Watercourse for their social and economic benefit are uncertain. This represents a risk of conflict between countries in the event that certain considerations such as water scarcity and competition come into play. Risk of conflict can also result when opportunity cost and beneficial use considerations are brought to the fore. This is despite the existence of a number of trans-boundary water agreements within the basin. Ownership in water has not been given sufficient explicit consideration in the formulation of trans-boundary water sharing arrangements in the basin. Principles of equitable and reasonable utilisation are instead globally being promoted as the sound basis of sharing water.

Legal reasoning was the primary methodology applied in the research. Informed by literature review, a framework for analysis was constructed to aid the determination of the dimensions of ownership associated with legal doctrines and agreements with respect to water resources. The results confirm that there are incidents of ownership in water and affirm that, regardless of the various water sharing arrangements and legal doctrines applied; the final outcome or result is the conferring of various degrees of ownership congruent with the bundle of rights metaphor or, Lockean theories of property. All existing agreements in the Zambezi Watercourse region confer incidents of ownership in water. States can determine where they stand in relation to ownership or in the very least their rights of access, use and control by knowing the incidents of ownership conferred within water sharing agreements. This appreciation of their situation could help states reposition themselves to secure their interests more effectively. Negotiations and agreements regarding the sharing of trans-boundary water resources should include aspects of water ownership and the application of the beneficial use principle.

Further research possibilities to compliment the recommendations of this research may include a study to estimate and quantify benefits from the Zambezi Watercourse with a focus on existing schemes; benefits forgone based on current arrangements and benefits accruable based on the application of principles of ownership and beneficial use. Another area could be a legal review of existing schemes in the Watercourse and a design of optional arrangements to satisfy the beneficial use principle.

ACKNOWLEDGEMENT

Many thanks to all those who supported and encouraged me to pursue this path and this Thesis. Many thanks to the creative qualities of those who brought the Internet into being and to those who continue to feed it with valuable information.

Thanks to Professor Patrick Mvunga and Doctor Marcus Wishart for letting me pursue this topic and the valuable advice and support provided. Thanks to Professor Mvunga for encouraging me to explore ownership from the perspective of Dias, Honore and Paton.

Thanks to Micheal Mutale, Wilson Mwandira, Kambole Chituwo, Kachana Banda, Lynda Mataka and Wezi Chirwa, for their advice and support.

CONTENTS

| | |
|---|-----|
| ABSTRACT..... | iv |
| ACKNOWLEDGEMENT | v |
| TABLE OF CASES | ix |
| TABLE OF STATUTES AND LEGAL AGREEMENTS | ix |
| LIST OF FIGURES | x |
| LIST OF TABLES | x |
| LIST OF ABBREVIATIONS | xii |
| CHAPTER 1: INTRODUCTION | 1 |
| 1.0 Access, Use and Control of Water Resources..... | 2 |
| 1.1 Statement of Problem..... | 2 |
| 1.2 Objective | 4 |
| 1.3 Research Questions | 4 |
| 1.4 Rationale..... | 4 |
| 1.5 Scope of Work..... | 5 |
| 1.5.1 Literature Review and Data Collection..... | 5 |
| 1.5.2 Key Informant Discussions | 6 |
| 1.5.3 Development of a Framework for Analysis | 7 |
| 1.6 Thesis Outline | 7 |
| CHAPTER 2: AREA OF STUDY – ZAMBEZI WATERCOURSE SYSTEM | 10 |
| CHAPTER 3: LITERATURE REVIEW | 15 |
| 3.1 Doctrines Applied at National Level..... | 16 |
| 3.1.1 Riparian Doctrine | 16 |
| 3.1.2 Prior Appropriation Doctrine | 17 |
| 3.1.3 Beneficial Use Principle..... | 18 |
| 3.1.4 Public Trust Doctrine | 21 |
| 3.1.5 Hybrid Doctrines | 21 |
| 3.2 Doctrines Applied at Trans-Boundary Level | 21 |
| 3.2.1 Doctrine of Absolute Territorial Sovereignty | 21 |
| 3.2.2 Doctrine of Absolute Territorial Integrity | 22 |
| 3.2.3 Doctrine of Limited Territorial Sovereignty | 22 |

| | | |
|------------------------------|--|----|
| 3.2.4 | Doctrine of Equitable and Reasonable Utilisation | 23 |
| 3.2.5 | The No Harm Rule | 26 |
| 3.2.6 | Community of Interest | 26 |
| 3.3 | Trans-boundary Water Agreements in the Zambezi | 27 |
| 3.3.1 | United Nations Convention | 32 |
| 3.3.2 | Revised SADC Protocol on Shared Watercourses | 33 |
| 3.3.3 | Zambezi River Authority Agreement..... | 34 |
| 3.3.4 | ZAMCOM Agreement | 36 |
| 3.3.5 | Cahora Bassa Treaty..... | 37 |
| 3.4 | Ownership | 39 |
| 3.4.1 | Occurrence of Ownership..... | 39 |
| 3.4.2 | Definitions of Ownership | 40 |
| 3.4.3 | Things Associated with Ownership..... | 41 |
| 3.4.4 | Introduction to Bundle of Rights..... | 42 |
| 3.4.6 | Regulation of Ownership | 43 |
| 3.4.7 | Ownership and Control of Power by Managerial Experts | 45 |
| 3.4.8 | Significance of Land and its Relation to Water | 46 |
| 3.4.9 | Other Scholarly Views on Ownership..... | 46 |
| 3.5 | Derivative Jurisprudence..... | 48 |
| 3.6 | John Locke's Theories on Ownership..... | 48 |
| 3.7 | Application of Bundle of Rights in Water | 51 |
| 3.7.1 | Exclusion Rights | 53 |
| 3.7.2 | Management Rights..... | 53 |
| 3.7.3 | Right of Access | 54 |
| 3.7.4 | Use Rights | 54 |
| 3.7.5 | Alienation Rights..... | 54 |
| 3.7.6 | Prohibition of Harmful Use..... | 54 |
| 3.8 | Ownership Provisions in Statutes and Constitutions | 55 |
| CHAPTER 4: METHODOLOGY | | 59 |
| 4.1. | Legal Reasoning..... | 60 |
| 4.2 | Framework for Analysis..... | 61 |

| | | |
|--|--|-----|
| 4.3 | Lockean Tables | 68 |
| CHAPTER 5: RESULTS AND DISCUSSION..... | | 72 |
| 5.1 | Analysis of Legal Doctrines..... | 73 |
| 5.1.1 | Reconstruction of the Riparian Doctrine..... | 73 |
| 5.1.2 | Reconstruction of the Prior Appropriation Doctrine..... | 73 |
| 5.1.3 | Reconstruction of the ERU Doctrine | 75 |
| 5.2 | Analysis of Selected Agreements..... | 78 |
| 5.2.1 | Zambezi River Authority Agreement (ZRA)..... | 78 |
| 5.2.1.1 | Zambia’s Incidents of Ownership in ZRA | 80 |
| 5.2.1.2 | Zimbabwe’s Incidents of Ownership in ZRA | 84 |
| 5.2.1.3 | Zambezi River Authority’s Incidents of Ownership in ZRA..... | 86 |
| 5.2.2 | Cahora Bassa Treaty..... | 92 |
| 5.2.2.1 | Mozambique’s Incidents of Ownership in Cahora Bassa | 93 |
| 5.2.2.2 | South Africa’s Incidents of Ownership in Cahora Bassa..... | 97 |
| 5.2.2.3 | Portugal’s Incidents of Ownership in Cahora Bassa..... | 100 |
| 5.2.3 | Zambezi Watercourse Commission Agreement..... | 106 |
| 5.2.3.1 | Member States’ Incidents of Ownership under ZAMCOM..... | 108 |
| 5.2.3.2 | ZAMCOM’s Incidents of Ownership under ZAMCOM | 112 |
| CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS | | 124 |
| 6.1 | On Ownership in Water..... | 124 |
| 6.2 | On Legal Doctrines and the Conferring of Ownership | 124 |
| 6.3 | On Water Agreements and the Conferring of Ownership..... | 125 |
| 6.4 | On Countries Standings in Relation to these Agreements | 125 |
| 6.5 | Recommendations | 126 |
| REFERENCES..... | | 129 |
| APPENDICES | | 141 |

TABLE OF CASES

Abigail v Lapin [1934] AC 491 at 502

American Trail Smelter Arbitration Case (United States Vs Canada) 1941, U.N. Rep. Int'l Arb

Embrey v. Owen (1851) 6 Exch. 353

TABLE OF STATUTES AND LEGAL AGREEMENTS

Agreement Between the Governments of the Republic of Portugal, the People's Republic of Mozambique and the Republic of South Africa Relative to the Cahora Bassa Project - 1984

Agreement on the Establishment of the Zambezi Watercourse Commission- 2004

Revised SADC Protocol on Shared Watercourses- 2000

Treaty of the Southern African Development Community 1992

The Constitution of the State of California -1879

The Constitution of the Republic of Angola- 2010

The Constitution of the Republic of Malawi- 1998

The Constitution of the Republic of Mozambique- 1990

The Constitution of the Republic of Namibia- 2010

The Constitution of the Republic of Zambia- 1996

The Constitution of the Republic of Zimbabwe- 2009

The Constitution of the United Republic of Tanzania- 1998

Water Resources Act (No 21 of 2002) of the Laws of Angola

Water Act 2005- Chapter 34 of the laws of Botswana

Water Resources Act 2007- Chapter 72 of the Laws of Malawi

Water Act (No. 16 of 1991) of the laws of Mozambique

Water Resources Management Act (No. 11 of 2013) of the Laws of Namibia

Water Resources Management Act of the laws of Tanzania

Water Resources Management Act No. 21 of 2011 of the Laws of Zambia

Water Act Chapter 31 of 1998 of the laws of Zimbabwe

Zambezi River Authority Act 1978- Chapter 467 of the Law of Zambia

United Nations Convention On Non Navigational Uses of Water- 1997

LIST OF FIGURES

| | |
|---|-----|
| Figure 1: Schematic of the Zambezi River..... | 13 |
| Figure 2: History of the Zambezi River Agreements..... | 30 |
| Figure 3: Kariba Dam Catchment | 79 |
| Figure 4: Distribution of Large Dams across the Mainland in Zambezi River Basin | 91 |
| Figure 5: Cahora-Bassa Dam Catchment Area..... | 92 |
| Figure 6: Zambezi River Basin Catchment Area | 107 |

LIST OF TABLES

| | |
|--|----|
| Table 1: The Zambezi Basin Areas and Rainfall by Country | 11 |
| Table 2: Bundle of Rights Matrix | 62 |
| Table 3: Degree of the Implication of Bundle of Rights Associated with Object of Water | 64 |
| Table 4: Purposes of Use | 65 |
| Table 5: Application of the Beneficial Use Principle | 66 |

| | |
|---|-----|
| Table 6: Combined Table Template..... | 67 |
| Table 7: Combined Table of Countries in the Cahora Bassa Treaty..... | 69 |
| Table 8: Bundle of Rights Framework for Analysis –Zambia..... | 81 |
| Table 9: Bundle of Rights Framework for Analysis –Zimbabwe..... | 85 |
| Table 10: Bundle of Rights Framework for Analysis –Zambezi River Authority | 88 |
| Table 11: Combined Incidents of Ownership: Zambezi River Authority Agreement..... | 89 |
| Table 12: Bundle of Rights Framework for Analysis –Mozambique..... | 94 |
| Table 13: Bundle of Rights Framework for Analysis- South Africa | 99 |
| Table 14: Bundle of Rights Framework for Analysis- Portugal..... | 102 |
| Table 15: Country Incidents of Ownership- Cahora Bassa Treaty | 104 |
| Table 16: Bundle of Rights Framework for Analysis – ZAMCOM Member States | 111 |
| Table 17: Bundle of Rights Framework for Analysis- ZAMCOM | 114 |
| Table 18: Combined Table of Countries in the ZAMCOM Agreement | 116 |
| Table 19: A Review of the National Legislation in Selected Countries | 141 |
| Table 20: Lockean Tables..... | 177 |

LIST OF ABBREVIATIONS

B1- Basis 1

B2- Basis 2

B3- Basis 3

C1- Category 1

C2- Category 2

C3- Category 3

C4- Category 4

C5- Category 5

C6- Category 6

DWAF- Department of Water Affairs and Forestry

ERU- Equitable and Reasonable Utilisation

HCB- Hidroeléctrica de CahoraBassa

HVDC- High Voltage Direct Current

I – Intermediate

IA- Intermediate Access

IE- Intermediate Exclusion

IM- Intermediate Management

L- Limited

LA- Limited Access

LE- Limited Exclusion

LM- Limited Management

LHT- Lesotho Highlands Treaty

MOZ- Mozambique

MP- Multiple Purpose

NRCS- Natural Resources Conservation Service

OECD- Organisation for Economic Co-operation and Development

PORT- Portugal

SA- South Africa

SADC- Southern Africa Development Community

SP- Single Purpose

TA- Towards Absolute

TAA- Towards Absolute Access

TAE- Towards Absolute Exclusion

TAM- Towards Absolute Management

TAP- Towards Absolute Purpose

U1- Use 1

U2- Use 2

U3- Use 3

UN- United Nations

ZAM- Zambia

ZAMCOM- Zambezi Watercourse Commission

ZAMSEC- Zambezi Watercourse Commission Secretariat

ZAMTEC- Zambezi Watercourse Commission Technical Committee

ZIM- Zimbabwe

ZRA- Zambezi River Authority

CHAPTER 1: INTRODUCTION

Water resources institutions are normally formed for the purposes of establishing an agreed relationship between an individual entity and the state or among states with respect to the access, use and control of water. The water resources institutions are normally formalised through ‘water law’ or ‘trans-boundary water agreements’ at national or international levels respectively. A system of enforceable rules that governs the human use of water resources within a state is normally referred to as water law (Water Encyclopedia, 2015). Similarly, a trans-boundary water agreement is a system of enforceable rules that control the use of trans-boundary waters between countries (Anders, 2001, p. 1). Water resources institutions between states also get established based on norms of behaviour without the existence of formal agreement. There are certain instances where water in a trans-boundary river system is accessed, controlled and used by one state without formal agreement with another (Cooley & Gleick, 2011, p. 3).

In Africa, every country on the continent intersects with at least one of eighty international river basins. There is an extensive body of literature supporting the notion that integrated development of these internationally shared trans-boundary water resources can deliver substantial benefits and contribute significantly to the socio-economic development of the riparian countries sharing these rivers and lakes (United Nations Economic Commission for Africa- UNECA, 2000, p. IX).

To deal with the challenges of internationally shared trans-boundary water resources, a robust enforceable legal and institutional framework is often required to ensure equity in the allocation of resources and the optimization of development opportunities. More than 400 such treaties around international waters have been signed, covering a significant number of the worlds’ trans-boundary Watercourses (Wolf, 2004, p. 6). In many cases cooperation is institutionalized by the establishment of water sharing rules and development agreements governing various aspects of the resource. The rules may be in relation to use, access, protection and control.

1.0 Access, Use and Control of Water Resources

Water management at the level of the basin always attracts questions concerning these interests in water. In general, governments will assume rights or interests in water using various approaches or techniques including the application of legal principles governing access, use and control through agreement or a superior keenness, force, or application of sovereign principles. This is because interests in water do not only refer to rights of access and use of water, but are also about issues of control (Meinzen-Dick & Bruns, 2000, p. 24).

Access and use of water takes into consideration aspects such as quantity, quality, timing, duration, and place of acquisition. Interests in water are also determined by issues of control and decision making about the management of such waters, including the rights to establish authority for sanctioning, legitimating, reinforcing charters and exclusiveness (Bruns & Ringler, 2005, p. 195).

1.1 Statement of Problem

The rights of access, use and control¹ of the trans-boundary waters of the Zambezi Watercourse² among interested countries that would like to secure and use the basin waters for their social and economic benefit are uncertain.

This represents a risk of conflict among countries in the event that certain considerations such as water scarcity and competition come into play. Risk of conflict can also result when opportunity cost and beneficial use considerations are brought to the fore. This could be prominent in situations where various interested states and entities believe themselves to have a bona fide interest or ownership in the water. The following are examples of such ownership claims. In 2011, Mozambique denied Malawi the rights of

¹ . Access, use and control are segments of a broader aspect known as “ownership” (Ostrom & Schlager, 1992, pp. 250-251)

² The term Watercourse means a system of surface and ground waters consisting by virtue of their physical relationship a unitary whole normally flowing into a common terminus such as the sea, lake or aquifer (Convention on the Law of the Non-navigational Uses of International Watercourses, 1997, p. 3).

access to the sea via the Zambezi River by barge from the Nsanje port on the Shire river (AIM, 2012).

Zambia was until recently reluctant to sign the Zambezi Watercourse Commission Agreement (ZAMCOM) on sharing the Zambezi River with other basin states on the basis that 75 percent of the Watercourse is within her territory and that she contributes 42 percent of the river waters (Zambian Watch Dog, 2015)³. Though the Agreement is in force, Malawi is yet to sign up to the same agreement for the sharing of the basin waters (The World Bank Group, 2015, p. 2). Whilst these situations provide ideal incentives for riparian countries to jointly develop collaborative actions to safeguard water supplies, such situations can also become the occasion for escalating tensions (Rosegrant, 1995, pp. 1-2).

The predominant notion from literature suggests that there should not be ownership in water. For example, Paul Matthews (n.d) argues that “water is not like real property, and using traditional property rights concepts should be avoided when discussing water” (Matthews, n.d, p. 21). Matthews refers to water as a shared resource that is mobile and is inherently different from land and that law controlling such water should reflect such differences. This is because, unlike land (real property) that has boundaries that can be surveyed, creating “ownership” boundaries around water, a mobile resource, is more difficult. Shotton Ross (1999) also asserts that “*sovereignty is merely the right to control and not ownership*” (Food and Agriculture Organisation, 2000, p. 42). Shotton suggests that a water body cannot be owned, but only the rights that safeguard the water body and its resources can be awarded to governments and individuals. Others hold the view that:

Ownership in water is nothing and it does not exist in an entire water body but only the quantity of water is capable of being owned only by one who takes it into his possession by appropriating it or capturing it from the source” (Trelease J. , 1957, p. 640).

³ This citation and that of AIM is from the public media. This is meant to show that there are tensions regarding water that have been brought to the attention of the public. They are not meant to stand as authorities in this thesis. Tensions regarding water issues amongst states are rarely displayed in public and are kept within the confines of Government corridors. The examples, however, have occurred as matter of fact. The efficacy of some of the positions have been confirmed later in the thesis in Chapter two, and Chapter five.

While there is a lot of literature around the concepts of ownership of water, few explicitly acknowledge ownership of water by states in a trans-boundary Watercourse. This is particularly true for the Zambezi Watercourse. The problem of ownership of water among Zambezi Watercourse states is still outstanding.

1.2 Objective

The objective of this research was to explore notions of ownership among riparian states and determine levels of ‘ownership’ in relation to water resources and its implications for water sharing agreements at trans-boundary level.

1.3 Research Questions

The research addressed the following questions:

- i. Can there be ownership in water and do legal rules governing water resources management confer incidents of ownership in water?
- ii. What are the water agreements in the Zambezi Watercourse and what do they confer in-terms of incidents of ownership in water?
- iii. How do the countries relate to each other with respect to the Zambezi River Authority ⁴, Zambezi Watercourse Commission ⁵ and the Cahora Bassa ⁶ agreements?
- iv. How can considerations of ownership inform cooperation and benefit sharing?

1.4 Rationale

The determination of the nature of agreements among states in the Zambezi Watercourse vis-a-vis ownership of water is important for the current and future orderly development of water resources. This is premised on the idea that concepts of ownership are the primary mode with which aspects of access, use and control of water resources are

⁴ The Zambezi River Authority Agreement is an agreement between Zambia and Zimbabwe regarding the joint management of the Kariba Dam and reservoir (The Zambezi River Authority Act Cap 467, 1987, pp. 6- SCHEDULE paragraph 2)

⁵ The Zambezi Watercourse Commission is an agreement between Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe meant to promote the equitable and reasonable utilization of the water resources of the Zambezi Watercourse as well as the efficient management and sustainable development (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004).

⁶ The Agreement on the Cahora Bassa Hydroelectric power scheme is between Mozambique Portugal and South Africa meant for the management, generation and transmission of power primarily to South Africa (Southern Africa Record, 1984, p. 3)

secured. Such considerations are important at a time when water resource reforms are under implementation from a regional perspective. It is posited that an open and systematic consideration and the application of concepts of ownership could positively inform cooperation and benefit sharing between states in the basin. It is suggested that trans-boundary water agreements such as the ZAMCOM agreement, Zambezi River Authority Agreement and the agreement on the Cahora Bassa all introduce notions of ownership embedded within them. A greater appreciation of concepts of ownership and how they are formalized can support the orderly revision and/or establishment of more effective water sharing arrangements. Current global trends with respect to the sharing of trans-boundary water resources promote the setting of limits on the application of sovereign principles. The claiming of ownership in water, by states, whose sources emanate from within their territories, is also discouraged (Rahaman, 2009, p. 210). Principles of equitable and reasonable utilisation are instead being promoted as the sound basis of sharing water among states. Therefore, ownership in water has not been given sufficient explicit consideration in the formulation of trans-boundary water sharing arrangements in the basin. This study will contribute to the development of approaches policy makers could apply when determining the kind of trans-boundary water agreements countries would like to have in place.

1.5 Scope of Work

The scope of work to inform the research comprised the following: literature review, the development of a framework for analysis, data collection and key informant discussions including participation in selected trans-boundary water projects.

1.5.1 Literature Review and Data Collection

This activity included the collection and review of relevant water laws and trans-boundary water agreements with a primary focus on the Zambezi Watercourse. It also included the collection and review of literature in the fields of water law; international water law; property law and, jurisprudence with a focus on ownership. This was with a view to getting an in-depth understanding of water law and its basis. The in-depth understanding of water law and the subject of ownership were used to aid the

development of an analytical tool to be used in the determination of ownership and its implications in trans-boundary water resources management.

1.5.2 Key Informant Discussions

This activity involved holding discussions with a few key experts in the water sector in Zambia and in the region. These included officials working in the Ministry of Energy and Water Development responsible for water in Zambia and officials working for the Zambezi Watercourse Commission. This also involved participation in project activities related to the operationalization of ZAMCOM; the development of the proposed Batoka hydro-electric scheme and the rehabilitation of the Kariba Dam. The discussions with key informants were directed at finding out whether issues of ownership were an explicit subject for consideration.

The participation in project activities focused on making observations as to whether issues of ownership of water were an explicit part of the planning and development process. Participation in projects involved a series of preparatory initiatives with ZAMCOM secretariat, SADC secretariat and the Zambezi River Authority. A summary of the project details are outlined below:

- i. Kariba Dam Rehabilitation Project is meant to assist the Zambezi River Authority in securing the long-term safety and reliability of the Kariba Dam Hydro-Electric Scheme by carrying out rehabilitation works. The estimated cost of the project is 300 Million United States dollars. The project is being financed using grants and concessional loans from the European Union, Sweden, the African Development Bank and the World Bank (The World Bank Group, November 24, 2014, p. 5).
- ii. Zambezi River Basin Development project is meant to help strengthen cooperative management and development within the Zambezi River Basin to facilitate sustainable, climate resilient growth by among others supporting the development of hydropower potential within the Zambezi River by advancing the preparation of the proposed Batoka hydroelectric scheme (The World Bank Group, 2015, p. 5).
- iii. Zambezi River Basin Management project is meant to help strengthen cooperative management and development within the Zambezi River Basin to facilitate

sustainable, climate resilient growth by among others, providing support in institutional development of the ZAMCOM Secretariat (World Bank, 2015, p. 4).

1.5.3 Development of a Framework for Analysis

A framework for analysis was devised to assist with the determination of degrees of ownership conferred upon the countries through the various trans-boundary water agreements they secure. In addition; an approach to determine the underlying character of the doctrines governing water from the perspective of ownership was devised based on relevant literature derived from jurisprudence related to ownership of land and natural resources. This was with a view of bringing to the fore, as many dimensions of water that give rise to ownership. Selected trans-boundary water agreements and legal doctrines were analysed from the perspective of ownership. The framework for analysis supported by, literature review, key informant discussions and observations made during the participation in trans-boundary water initiatives within the Zambezi Watercourse and SADC were used in attempting to answer research questions meant to determine ‘ownership’ in relation to water resources and its implications for institutional design at trans-boundary level. Legal reasoning was the fundamental approach applied to aid the development of the framework for analysis, discussions and conclusion on the subject matter.

1.6 Thesis Outline

The outline of this thesis is as presented in six chapters. Chapter one provides a general introduction to the subject matter. It highlights the importance of water resources from the perspective of access, use and control, its linkages to the ownership of trans-boundary water resources by states sharing the resource, provides the research questions and the general approach to the entire research and provides a justification of the area and focus of study. Chapter two presents the main area of study, the Zambezi Watercourse, where the main case examples for the research were drawn from. Chapter three presents the literature review which covers three broad areas, namely:

- i. Literature review of legal doctrines in water, in general. This is with a view to establishing what legal principles inform trans-boundary

water agreements. Specific focus was on primary legal doctrines that have a bearing on the Zambezi Watercourse.

- ii. Leading from the above, a literature review of trans-boundary water agreements in general and more specifically, the agreements in the Zambezi Watercourse system such as the Revised SADC Protocol on Shared Watercourse (2000), the Zambezi River Authority Agreement, the Zambezi Watercourse Agreement and the agreement on the Cahora- Bassa hydroelectric power scheme was carried out. This was with a view to show the importance of trans-boundary water agreements, to highlight recent trends with respect to the character of guiding principles, and establish whether or not ownership of water resources by states is given explicit consideration in trans-boundary water agreements.
- iii. Literature review focused on ownership in general, and on the ownership in water in particular. An investigation of actual evidence of the treatment of water as something owned by states is also carried out. This review was carried out in order to establish a basis for interrogating the trans-boundary water agreements and associated legal doctrines from the perspective of ownership.

Chapter four presents the methodology derived in part from the literature on ownership; this methodology creates a framework for analysis which is to be applied in the interrogation of selected trans-boundary agreements and legal doctrines from the perspective of ownership. Chapter five focuses on the application and discussion of the results of the framework for analysis to selected water agreements and legal doctrines. Firstly, three legal agreements have been analysed to determine how countries relate to each other with respect to ownership. In addition, three legal doctrines were reviewed to determine their characteristics with respect to ownership. Finally, Chapter six outlines the conclusions and recommendations resulting from the study. Furthermore, suggestions on further research studies in the subject matter are proposed.

This Chapter introduced the notion that the management of water resources are important from the perspective of access, use and control by countries and issues of ownership vis-a-vis water resources have not been given explicit consideration in the development of water sharing agreements amongst countries. It provided the research questions and the general approach to the entire research and provided a justification of the area and focus of study.

CHAPTER 2: AREA OF STUDY – ZAMBEZI WATERCOURSE SYSTEM

Chapter two presents the main area of study, the Zambezi Watercourse, where the main case examples for the research were drawn from. The purpose is to provide information on the water of the Zambezi Watercourse showing areas of coverage and contributions to the Watercourse flows by country and by sub-basin area. This information was provided to inform the analysis in the thesis by providing an indication of how much each territory contributes to the waters of the Watercourse. It also provides some indication of the extent to which a country may be affected by water agreements on account of the areas of coverage and volume of contribution.

The Zambezi Watercourse system is one of the most diverse and valuable natural resource in Africa. Its waters are critical to sustainable economic growth and poverty reduction in the region. In addition to meeting the basic needs of more than 30 million people and sustaining a rich and diverse natural environment, the river plays a central role in the economies of the eight riparian countries - Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, and Zimbabwe (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004, p. 2). It provides important environmental goods and services to the region, and is essential to regional food security and hydropower production.

The Zambezi river basin is the fourth largest river basin in Africa. The average annual rainfall in the basin is 950 mm/yr. Derived from the rainfall, the Zambezi River Basin discharges an average of around 2600 m³/s (or 82 km³ per year) through its Watercourse systems into the Indian Ocean. The average discharge of the Zambezi is similar to that of the Nile (2830 m³/s) or the Rhine (2200 m³/s) (Beck, 2010, p. 4). The Zambezi River flows eastwards for about 3000 km from its source, the Kalene hills in the North-Western Province of Zambia, to the Indian Ocean (The World Bank Group, 2010, p. 4). Its total area spreads over eight countries. Characterized by strong climatic variability, the river and its tributaries are subject to strong seasonal variation in the hydrological regime, with a cycle of floods and droughts that have devastating effects on the people

Table 1 also shows the following:

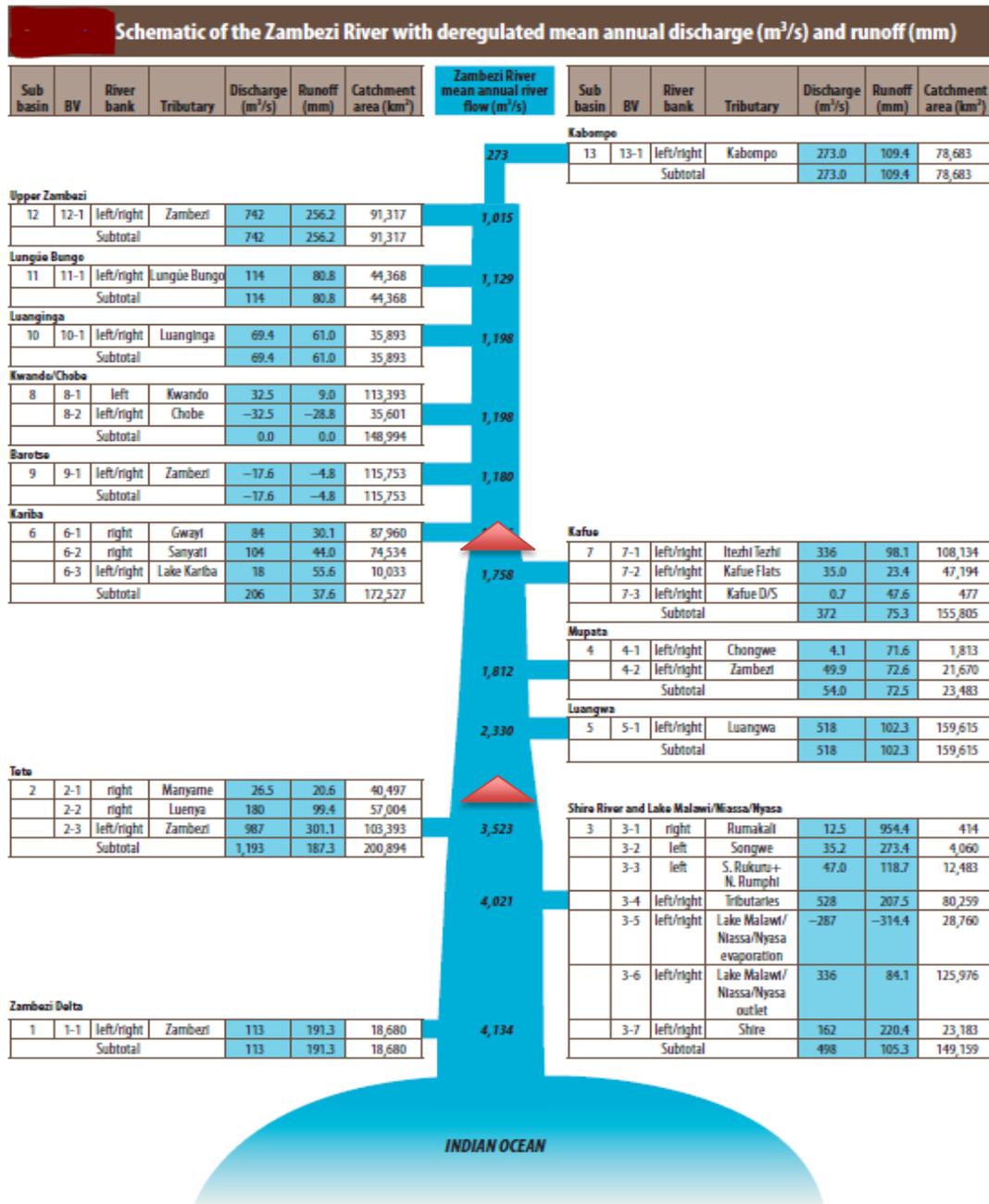
- i. The total area of each country
- ii. The area of the country within the Watercourse system
- iii. The Watercourse area in each country as a percentage of the entire Watercourse
- iv. The percentage area of the country covered by the Watercourse system
- v. The average rainfall in the Watercourse system area of each country and
- vi. An estimate of how much water each territory contributes (yield) to the Watercourse as a percentage of the total yield.

The Watercourse has seen a growing demand for both in stream and abstractive uses of water from all members who form part of the basin as well as other countries beyond the basin such as South Africa (The World Bank Group, 2009, pp. 41-45). The uneven expansion of water use in the future is likely to become a source of conflict within and among the eight riparian countries (Beck, 2010, pp. 21 -22). Water is considered scarce in Sub-Sahara Africa (Freitas, 2013, p. 1).

These facts will inform the analysis in the thesis by providing an indication of how much each territory contributes to the waters of the Watercourse. It also provides some indication of the extent to which a country may be affected by water agreements on account of the areas of coverage described above and reflected in Table 1. It provides a platform upon which countries; their agreements or related undertakings can be described and discussed within the context of the Watercourse system.

Further, to aid the analysis, Figure 1 is introduced to give an indication of sub catchment contributions to the Watercourse.

Figure 1: Schematic of the Zambezi River



(Source: (The World Bank Group, 2010, p. 6)

Figure 1 is presented as a schematic of the Zambezi Watercourse showing the contributing flows into the Zambezi River from the source to the Indian Ocean from each catchment highlighted in shades of blue in Table 1. It enables a rough estimation and description of country contributions at any point at sub catchment level. For example, it is possible to establish which territories contribute water to Lake Kariba. It is also possible to provide an indication of the relative contribution of water into the lake from each territory.

Based on the presentation of the main area of study, the information provided enables the estimation of water contribution by country in terms of area of coverage and volume of contribution. This information was used to aid discussions in Chapter Five vis-a-vis ownership of water.

CHAPTER 3: LITERATURE REVIEW

This chapter presents the literature review which covers three broad areas. It includes, literature review of legal doctrines in water, in general. This is with a view to establish what legal principles inform trans-boundary water agreements. Specific focus was on primary legal doctrines that have a bearing on the Zambezi. Leading from the above, a literature review of trans-boundary water agreements in general and more specifically, the agreements in the Zambezi Watercourse system such as the revised SADC protocol on shared Watercourses, the Zambezi River Authority Agreement, the Zambezi Watercourse Agreement and the agreement on the Cahora- Bassa hydroelectric power scheme. This was with a view to show the importance of trans-boundary water agreements, to highlight recent trends with respect to the character of guiding principles, and establish whether or not ownership of water resources by states is given explicit consideration in trans-boundary water agreements. To establish whether ownership considerations are a factor to be considered, an in-depth understanding of ownership is required. A Literature review focused on ownership in general, and on the ownership in water in particular, was carried out. An investigation of actual evidence of the treatment of water as something owned by states was also carried out. This review was also carried out in order to establish a basis for interrogating the trans-boundary water agreements and their associated legal doctrines from the perspective of ownership.

3.0 Water Doctrines

There are two main sets of legal doctrines existent in the world; those commonly applied at national level and those applied at trans-boundary level. The first set includes the “riparian” and the “prior appropriation” (Tarlock, 2001, p. 881). Others within the first set include the “public trust” and the “hybrid” doctrines (Saxer, 2010, p. 63). The second set attempts to define and delineate the rights of river basin states to use water from a trans-boundary river system. These principles and laws have evolved at different times and reflect responses to the suites of different claims consistently being received from riparian states (Salman, 2007, p. 625). The main doctrines include: absolute territorial sovereignty; absolute territorial integrity and limited territorial sovereignty.

Each of the three doctrines reflect different historical and judicial approaches to solving the problems experienced by riparian states (Van Wyk, 1998).

These doctrines when applied to Watercourse agreements provide clarity on the kind of rights and duties secured by participating states. Their review is therefore important for answering the questions regarding the ownership of water. The various doctrines are highlighted in more detail below. Out of these, the **riparian, prior appropriation and equitable and reasonable utilisation (ERU)** are interrogated in more detail in chapter 5. The selection of these is based on the notion that riparian and prior appropriation, are the base doctrines that have evolved into trans-boundary doctrines (Spiegel, 2005, pp. 335-6). Further, that ERU is currently the most widely accepted doctrine in the water resources management discourse (Rahaman, 2009, p. 207). In addition, this doctrine has been adopted in the Zambezi Watercourse system as will be shown below.

3.1 Doctrines Applied at National Level

The following subsection discusses doctrines applied at national level.

3.1.1 Riparian Doctrine

The Riparian doctrine occurs as a consequence of landownership. A landowner who owns land that physically abuts a river, stream, pond, or lake has an equal right to the use of water from that source. The water may be used as it passes through the property of the landowner, but it cannot be unreasonably detained or diverted, and it must be returned to the stream from which it was obtained (University of North Dakota Energy & Environmental Research Center (UND EERC), n.d, p. 1). Numerous scholars have defined the riparian doctrine similarly. Hutchins and Steel (nd, p. 279), state that riparian land is defined as land contiguous to the channel of a surface stream and has certain rights in the flow of the stream. Water may be used for various purposes but must be reasonable with respect to the requirements of all others. The classic dictum by Parke B in *Embrey v. Owen (1851) 6 Exch. 353* (Cited in (Kalinoe, 1998, p. 19)) best describes the substance and context of riparian rights, as follows:

*The right to have a stream flow in its natural state, without diminution or alteration, is an incident of property in the land through which it passes; but flowing water is **publici juris**¹, not in the sense that it is a **bonum vacans**², to which the first occupant may acquire an exclusive right, but that it is public and common in this sense only, that all may reasonably use it who have a right of access to it, and that none can have any property in the water itself, except in the particular portion which he may choose to abstract from the stream and take into his possession, and that during the time of his ownership only. But each proprietor of the adjacent land has the right to the usufruct of the stream which flows through it (Kalinoe, 1998, p. 19).*

Note that this description suggests that there are instances in which water is owned by a proprietor. It also makes reference to notions about rights of access and the right to water as an incident of property in land. It therefore on the face of it, addresses water in relation to property or ownership.

3.1.2 Prior Appropriation Doctrine

The prior appropriation doctrine, also known as the Colorado doctrine is a system of formalizing access, use and control from a water source that is thought to be markedly different from riparian water rights (U.S. Fish and Wildlife Service, n.d, p. 5). Under this doctrine, water belongs to the state but users can acquire the right to use water. A user who has put water to a beneficial use is entitled to continue to use that quantity of water for that purpose.

The allocation of water rests upon the fundamental dictum of "first in time, first in right." Hence the first person to use water acquires the right of priority to its future use as against a later user. If a "downstream" landowner has the earlier priority date (they initiated their water right in 1910) the "upstream" landowner may have to let the water pass unused to meet the needs of the senior, downstream water right holder. The basis of prior appropriation is tied to the doctrine of 'beneficial use.' Basically if you can show that you need to use water 'beneficially,' then you shall be entitled to it (University of North Dakota Energy & Environmental Research Center (UND EERC), n.d, p. 2).

¹Publici juris means 'of public right' (Black, 1968, p. 1473).

² Bonum vacans means 'property without an owner' (Clark & Renard, 1970, p. 477).

The doctrine of prior appropriation embodies seven basic principles, firstly it relates to the beneficial use of water as a basis of the right to use water. Secondly, the water right user must have a definite quantity of water that they intend to abstract and this is measured by the first principle, which is beneficial use. Thirdly, there must be intent to appropriate and pursue the diversion of water with diligence. Diversion is made simply by removing water from its natural course or location or by controlling water, which remains in its natural course. Fourthly notice must be given to other users or potential users. Fifth, the water rights are ranked in a system of priority in time (first come first serve) (Utton & Teclaff, 1978).

The priority of an appropriative right is, in itself, considered as valuable property (Hutchins & Steele, nd, p. 279). Sixth, the water right is transferable and forfeitable. Seventh, the entire system is administered by the state and the derivative water rights are well defined (Utton & Teclaff, 1978). This description suggests that a number of scholars' view prior appropriation rights in water as property. Further, the water entitlement has been defined according to quantity, purpose of use and time. The resultant is a well-defined description of water as a thing that can be transferred or managed separate from land. Note that riparian water entitlements lack this kind of specificity thus making it difficult to be managed as something separate from land. In addition it is important to observe the reference of ownership in water as vesting in the state. On the face of it, this doctrine too, addresses water in relation to ownership.

3.1.3 Beneficial Use Principle

The beneficial use principle is discussed below, owing to its importance as part of the framework for analysis that will be developed in the methodology in chapter four of this thesis. Its importance will also be demonstrated in connection with aspects of water allocation and use as they relate to the general welfare of the public. Literature in general, defines beneficial use as;

A legal term describing a person's right to enjoy the benefits of specific property, especially a view access to light, air, or water, even though title to that property is held by another person (Garner, 2001, p. 236).

This definition can be complimented with the idea that the beneficial uses are to be applied in light of the public interest. “Beneficial use” means the use of water, including the method of diversion, storage, transportation, and application, that is reasonable and consistent with the public interest in the proper utilization of water resources, including, but not limited to domestic, agricultural, industrial, power, municipal, navigational, fish, wildlife, and recreational uses (Moise, 1959, p. 111). Moise (1959) placed emphasis on the concept of beneficial use, on the public interest in the proper utilization of water resources.

A good example of the primary importance of the beneficial use principle can be seen in parts of Article X section 2 of the California Constitution. Its description reveals the idea that beneficial uses of water must accrue to the general welfare of all in the state. The California Water Plan, Article X section 2 states as follows:

It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to ensure the reasonable and beneficial use thereof in the interest of the people and for the public welfare. The right to use the flow of water from any natural stream or Watercourse is in the state and shall be reasonably required for the beneficial use to be served, and such right do not extend to the waste, unreasonable method of use and diversions of water. Whilst Riparian rights are for the purposes of which lands may be made adaptable in view of such reasonable and beneficial uses; provided. Nothing herein contained shall be construed as depriving any riparian owner of the reasonable use of water. Under riparian rights reasonable methods of diversion, use and depriving any appropriator of water is lawfully entitled. This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained (California Water Plan, 2009, p. 1) .

The beneficial use principle is an inherent part of the prior appropriation doctrine and is applicable to some national jurisdictions in the Zambezi River basin. As an example, this principle applies in Zambia (Nundwe, 2007, p. 45).

Beneficial uses of water must therefore be associated with the interest of the people and their public welfare. As a consequence beneficial use of water is associated with the existence of a commonwealth. Otherwise it is not beneficial use. The meaning of commonwealth adopted is Hobbes' definition, and its basis is the reduction of transaction costs³.

*"(...) one person, of whose acts a great multitude, by mutual covenants one with another, have made themselves every one the author, to the end he may use the strength and means of them all as he shall think expedient for their peace and common defense (...)"*⁴.

The application of the beneficial use principle can be said to presuppose the existence of a sovereign authority who oversees the commonwealth of the state on behalf of the people associated with that commonwealth. It sits as part of the overall framework for security and the management of transaction costs that should accrue to both the individual and the commonwealth.

Deliberate emphasis in this section is to create a linkage between the beneficial use principle, the sovereign and the commonwealth. Uruena (2006) suggests that the commonwealth shares a *raison d'être* with property rights: the reduction of transaction costs. Further, that costs lie deep inside the birth of both institutions, and explain how the creation of the commonwealth follows the same pattern and seeks exactly the same ends as the establishment of property rights. Whilst property is not comparable to the commonwealth as such, it is comparable to sovereignty. Therefore, sovereignty and property are equivalent institutions.

Public international law as a system that regulates the behaviour of sovereign states may be seen as not much more than regulation of property: limits to the exercise of such a right and general norms regarding due respect to other owners which would only be justifiable if efficient (Uruena, 2006, p. 213). The application of the beneficial use

³ The term transaction cost is understood in relation to Hobbes's three laws of nature in which he shows that is efficient to increase cooperation among individuals. See (Rene, 2006, pp. 206-210).

⁴Thomas, Hobbes, op. cit., chapter XVII.

principle justifies the maintenance of the commonwealth at national level. Applying the same principle at international level is an important point to consider.

It is worth the mention that the beneficial use principle does not feature as major point of consideration in practice. Its roots and origin is not discussed in the present water discuss in the Zambezi Watercourse discourse as will be should section 3.3 below. This gap is especially highlighted for this reason.

3.1.4 Public Trust Doctrine

Under the public trust doctrine, control of water is vested in a state and it decides how water rights are administered (Saxer, 2010, p. 64).

3.1.5 Hybrid Doctrines

The hybrid doctrine recognizes a mix of doctrines. Riparian and appropriative water rights may be found in one jurisdiction. This duality may result from the fact that riparian rights were historically recognized, but the state has changed to an appropriative system and public policy dictates that certain occurrences of water are to remain riparian in character (Sawyers, n.d, p. 5).

3.2 Doctrines Applied at Trans-Boundary Level

The following subsection discusses doctrines applied at trans-boundary level.

3.2.1 Doctrine of Absolute Territorial Sovereignty

Absolute territorial sovereignty claims the complete autonomy of a riparian state, to utilize the waters derived from and flowing through its territory. Sometimes this is anticipated to occur regardless of the consequences in other countries without the duty to consult (Rahaman, 2009, p. 209). The doctrine is also thought to favour the upstream states that are free to divert all the water from a shared Watercourse without considering the need for downstream states. However, it is worth qualifying, that there are upstream states that are not endowed with sufficient water within their territories contributing to a so-called Watercourse compared to some downstream states. For example, Botswana and Namibia with respect to the Zambezi Watercourse system are upstream countries that have less contribution than Mozambique (See Table 1, in Chapter two on page 24).

Therefore, it is not necessarily about being an upstream or downstream state. Rather, it is about the derivative territory where water is coming from. This theory is also known as the **Harmon Doctrine** named after US Attorney General, Mr. Judson Harmon who declared the absolute right of the USA to divert the Rio-Grande in 1895:

The fact that the Rio Grande lacks sufficient water to permit its use by the inhabitants of both countries does not entitle Mexico to impose restrictions on the USA which would hamper the development of the latter's territory or deprive its inhabitants of an advantage with which nature had endowed it and which is situated entirely within its territory. To admit such a principle would be completely contrary to the principle that USA exercises full sovereignty over its national territory (Ibid, 2009, p. 209).

3.2.2 Doctrine of Absolute Territorial Integrity

Absolute territorial integrity is derived from the common law riparian rights doctrine. Lower riparian's have claims to the right to receive their share of the water resource uninterrupted. Interference with this right thus requires the consent of the lower riparian states (Dellapenna, 2001, p. 280). An upstream State cannot put the water to use for any benefit. Often, downstream states support this theory as it guarantees them the use of an international river in an unaltered condition. Like the Harmon doctrine, this theory has limited support in state practice, or the writings of commentators (Kliota & Shmuelia, 2001, p. 234). This doctrine has been applied on several occasions in some jurisdictions. As exemplified in the American Trail Smelter Arbitration Case (United States Vs Canada) 1941, U.N. Rep. Int'l Arb, the legal advice of the US State Department stated:

It is a fundamental principle of the law of nations that sovereign state is supreme within its own territorial domain and that it and its nationals are entitled to use and enjoy their territory and property without interference from an outside source (McIntyre, 2013, p. 20).

3.2.3 Doctrine of Limited Territorial Sovereignty

The doctrine of limited territorial sovereignty follows the general legal obligation to use one's property in a manner that it will not cause injury to others. This approach is used by most domestic and international tribunals. It calls for equitable utilization to be made of water to accommodate their respective needs and interest. Therefore, it is the promoted doctrine in solving trans-boundary water issues. The theory of limited

territorial sovereignty reflects the general legal principle of *sic utere tuo ut alienum non laedas*⁵ and is based on the assertion that every state is free to use the waters of shared rivers flowing on its territory as long as such utilization does not prejudice the rights and interests of the co-riparians (McCaffrey, 1986, p. 90). In this case, sovereignty over shared waters is relative and qualified.

The co-riparians have reciprocal rights and duties in the utilization of the waters of their international Watercourse and each is entitled to an equitable share of its benefits (Ibid, 1986, p. 91). The advantage of this theory is that it simultaneously recognizes the rights of both downstream and upstream countries as it guarantees the right of reasonable use by the upstream country in the framework of equitable use by all interested parties. Today, it counts among customary international water law and is widely reflected in attempts to codify international water law for example, the Helsinki Rules⁶ and the International Watercourse Convention-IWC⁷ (Lazerwitz, 1999, p. 259). The main controversial question regarding this principle today is the scope and nature of the limitations imposed by international law upon a state's sovereignty in the utilization of the waters in its territory in the interest of its co-riparians (Epiney, 2003, p. 393). This doctrine has some offshoots that are highlighted below.

3.2.4 Doctrine of Equitable and Reasonable Utilisation

The doctrine of equitable and reasonable utilization already discussed above is a subset of the doctrine of limited territorial sovereignty and suggests that each basin state has a right to utilize the water of a basin and as such is entitled to a reasonable share of the basin. It is specifically highlighted below owing to its importance in the current trans-boundary water resources management discourse. It concentrates on the water rights and obligations of states located within a shared river basin.

⁵ Means: use your property in such a way that you do not damage others (Smead, 1936, p. 276)

⁶The Helsinki Rules on the uses of the waters of international rivers were adopted by the International Law Association at the fifty-second conference, held at Helsinki in August 1966. General applicable rules of international law are set out for the use of water resources based on a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin (Watercourse) (International Law Association, 1967).

⁷ International Watercourse Convention is an international treaty that establishes a framework for the utilization, development, conservation, management, and protection of international watercourses, whilst promoting optimal and sustainable utilization thereof for present and future generations, and accounting for the special situation and needs of developing countries (United Nations, n.d.)

This use-orientated or (Helsinki Rule) doctrine focuses on the 'principle of the sovereign equality of states by entitling each basin state to an equitable and reasonable use respectively (Schroeder-Wildberg, 2002, p. 14). Equitable share does not mean equal division of the waters of a basin; what it actually means is that, all relevant factors such as population, geography, pre-existing uses, or the availability of alternative resources have to be considered in each individual case when allocating water rights (Rahaman, 2009, p. 209). The aim is to distribute the water of an international river in such a manner that satisfies the co-riparians' conflicting economic and social needs. This is to be done to the greatest extent possible thereby, achieving maximum beneficial and minimum detrimental effects among the states (Wouters & Vinogradov, 1998, p. 131). Therefore, there exists a relative rather than absolute equality of the basin states, and the respective share of each basin state has to be identified on a case-by-case basis (Kroes, 1997, p. 86). As far as the occurrence of negative impacts is concerned, harm to other riparian particularly the lower riparian represents only one factor for the determination of equitable utilization. The doctrine of equitable utilization is considered as one of the most crucial in international water law today. The actual text from the UN convention on the Non-Navigational Uses of Water is highlighted below and was used as the basis of comparison when analysing the doctrine in this thesis. Article 5 states that:

1. Watercourse states shall in their respective territories utilise an international Watercourse in an equitable and reasonable manner. In particular, an international Watercourse shall be used and developed by Watercourse states with a view to attaining optimal and sustainable utilisation thereof and benefits there from, taking into account the interests of the Watercourse states concerned, consistent with adequate protection of the Watercourse.

2. Watercourse states shall participate in the use, development and protection of an international Watercourse in an equitable and reasonable manner; such in participation includes both the right to utilise the Watercourse and the duty to co-operate in the protection and development thereof, as provided in the present convention (Convention on the Law of the Non-navigational Uses of International Watercourses, 1997, p. 4).

Article 6 provides for factors relevant to equitable and reasonable utilization states that:

1. Utilisation of an international Watercourse in an equitable and reasonable manner within the meaning of Article 5 requires taking into account all relevant factors and circumstances, including:

- a) Geographic, hydrographic, hydrological, climatic, ecological and other factors of a natural character;*
- b) The social and economic needs of the Watercourse states concerned;*
- c) The population dependent on the Watercourse in each Watercourse state;*
- d) The effects of the use or uses of the Watercourses in one Watercourse state on other Watercourse states;*
- e) Existing and potential uses of the Watercourse;*
- f) Conservation, protection, development and economy of use of the water resources of the Watercourse and the costs of measures taken to that effect;*
- g) The availability of alternatives, of comparable value, to a particular planned or existing use (Ibid, 1997, p. 5).*

The rationale of the equitable utilization - Helsinki Rule doctrine is highlighted below. Each basin state, within its own territory, is entitled to a reasonable and equitable share in the beneficial uses of water within an international drainage basin;

- a. The interests of each basin state should be satisfied, without causing substantial injury to another basin state;
- b. One basin state may not deny another state the reasonable use of water in an international drainage basin for the purpose of reserving the water for itself; and
- c. An existing reasonable use may also continue, unless it can be shown that it needs to be changed or stopped to accommodate a more urgent beneficial use, problem or concern (Ganoulis, Kolokytha, & Mylopoulos, 2007, p. 3).

The casting of this doctrine is devoid of the words ownership and property. However, it is worth noting that the word equity normally deals with property. There is a maxim which states that equity will protect only rights of property (Paton, 1972, p. 513).

3.2.5 The No Harm Rule

The No- Harm Rule may also be considered as being a subset of the doctrine of Limited territorial sovereignty. It applies the principle of '*sic utere tuo ut alienum non laedas*' but regards the equality of states from the protection-orientated side (Gleick, 1993, p. 107). The territorial integrity of states plays a key role (Epiney, 2003, pp. 392-393). The 'doctrine not to cause significant harm' emphasizes that, a state's right to use the waters of an international river is limited by the right of the co-basin states to not being harmed significantly. Thus, every state is obliged to take all measures necessary to prevent extraterritorial damage through actions to international Watercourses that would harm public health, activities, property or the environment of co-basin states. On the legal level, 'significant' defines the threshold above which an activity's harmful consequences become legally relevant to the application of the rule or, in other words, for tolerable state behaviour (Schroeder-Wildberg, 2002, p. 15). Thus, the definition of 'significant' is necessary to clear the extent of the limitation to the sovereignty of states. The significant harm is not to the water per se, it's in terms of the environmental and economic impacts resulting from this use and the determination of the extent of responsibility for those impacts are necessary. Because this data is difficult to ascertain, the application of the no-harm rule already becomes complicated before the states even start to argue about the threshold of permitted harm (Caponera, 1992, p. 213). Consequently, it counts among customary international water law. The doctrine is often cited by downstream states to protect their environment and pre-existing uses. In contrast, upper riparians emphasize that the rule forecloses development.

3.2.6 Community of Interest

The community of interest doctrine assumes communality or riparian communalism of interest between basin states and treats the total volume of the basin water as a shared resource (Naff, n.d, p. 1). This is known as the common management formula, which occurs where there is a community of interests in water, created by the natural unity of a Watercourse, which forces the riparian states into a cooperative legal relationship of physical interdependence to manage the Watercourse as an integrated whole. Under this doctrine strong emphasis is placed on management and incorporated programs that are jointly designed by all riparian states. Such considerations lead to the accomplishment of

development for the entire basin. It does not support boundaries on a river basin, but instead supports the idea that a basin should be regarded as an economic and physical unit. Therefore, all economic benefits generated from the river basin either through agriculture, tourism and hydro electricity production through dams must be equally shared by all those riparian states. In addition, a state is not allowed to dispose of the waters without consultations or co-operation of other riparian states. One riparian state cannot divert the water, impound or sell a right of water usage to outsiders for its own economic gain without consultations or approval of the states within this community.

From both the above, it is observed that trans-boundary water doctrines are in part modified versions of traditional primary national level doctrines such as riparian and prior appropriation (Spiegel, 2005, pp. 335-6). For example, the doctrine of prior appropriation could be deemed to inform the absolute territorial sovereignty or integrity theories. As highlighted above it applies the equitable maxim, first in time -first in right principle which encourages a state's claim depending on its upstream or downstream position including time of claim.

3.3 Trans-boundary Water Agreements in the Zambezi

Africa accounts for more than one quarter of the world's total known trans-boundary water law with early agreements dating back to 1891. There are 153 water law agreements relating to Africa's trans-boundary waters (Lautze & Giordano, 2005, p. 1056). All but two colonial agreements are bilateral and none provided for the creation of management institutions such as river basin organisations or technical bodies (although attempts were made to establish the Zambezi Basin Organisation (Wishart & WorldBank, Working Paper, p. 26).

This was followed by a proliferation of prominently multi-lateral agreements during the post-independence period following the United Nations convention on the non-navigational uses of water⁸. The convention included provisions for water management

⁸ The United Nations Convention on Non- Navigational Uses of Water is an international treaty, adopted by the United Nations on 21 May 1997, pertaining to the uses and conservation of all waters that cross international

institutions aimed at facilitating collective decision management of shared water resources (Lautze & Giordano, 2005, p. 1056). Three African states (Nigeria, Egypt and South Africa) account for more than 55 percent of all substantive agreements, with South Africa a signatory to about 30 percent of all trans-boundary agreements in Africa (Ibid, 2005, p. 1072).

In relation to trans-boundary water resources management in the Zambezi River basin, it was not until the late 1800s, when the British and Portuguese began demonstrating their interest in the basin, In August 1949, representatives from the British colonial territories in the sub-region met in Johannesburg to discuss the use and control of the Zambezi River (Barkved, 1996, p. 22).

The agenda of the meeting also included sections such as: i) consideration of various development projects in the Zambezi River basin; ii) legal aspects of implementation of such projects; iii) a proposal to establish a Zambezi River authority and an interim commission; iv) a proposal to organize an international conference. This meeting concluded that all riparian countries should be kept fully informed and consulted on all projects affecting the flow of the Zambezi River, even if some of these countries did not make any demand on the water resources of the river. This suggests a collective interest in water was being promoted and not ownership in water by a single state in the Watercourse.

The meeting further agreed that no state/country should be allowed to alter the natural conditions of the river on its own territory to the disadvantage of the natural conditions of the territory of a neighbouring state. The meeting suggested intergovernmental consultations to clarify the effects of various existing treaties on projects on the use of the Zambezi River system. Efforts in the 1930s and 40s to establish a river basin organization failed (Wishart & WorldBank, Working Paper, p. 25). It was not until

boundaries, including both surface and groundwater. It is the only treaty governing shared freshwater resources that is of universal applicability (McCarffrey, 1997).

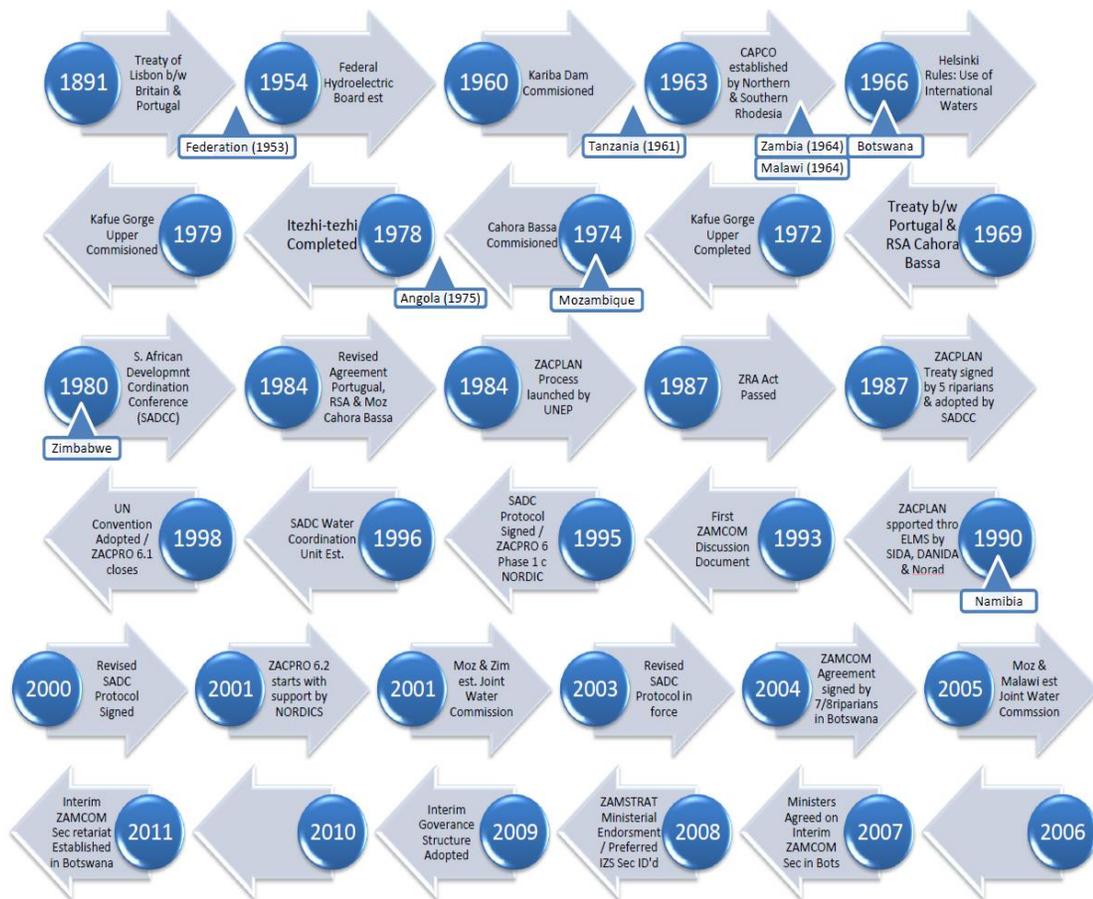
2014 that the agreement on establishment of the Zambezi Watercourse agreement came into force.

The Inter-Territorial Hydro-Electric Power Commission was established in 1946 to study the possibilities of the Kariba and Kafue hydroelectric power projects, and any other large sources of hydroelectric power available for joint development among the states. It further recommended the establishment of a river authority for the following purposes: (i) accumulation of hydrological information pertaining to the river and its main tributaries; (ii) determination of necessary measures to preserve or improve the regime of the river; (iii) the equitable apportionment of the waters of the river between the riparian territories; and, (iv) consideration of any other matters affecting the common interest in and usage of the river, including power production, navigation and transport (World Bank, 2013, p. 15).

Figure 2 shows the evolution of major water resources development initiatives and agreements over time against the backdrop of political changes by way of countries becoming independent. Its main purpose in this thesis is to show there is a relationship between the exercise or sovereign power vis a vis access, use and control of water. Of note, is the observation that no joint development initiative by territorial states has taken place in the Zambezi Watercourse since 1891. This is with the exception of the 1960 Kariba hydro-electric scheme between the territories now referred to as Malawi, Zambia, and Zimbabwe. It must be qualified that the Kariba scheme was developed during the federation of the three territories, which fell under the colonial influence and authority of one political entity, the British Government. All other development schemes have since been carried out in a country's own territory, suggesting territorial claims to water. The Cahora Bassa hydroelectric scheme is another exception, but comprises countries outside the Watercourse. The Cahora-Bassa is based on the 1969 treaty between Portugal and the Republic of South Africa. The treaty was later revised in 1984 to include Mozambique. It came into being against a backdrop of territorial claims and war.

From this background, it is worth stating that it has taken a total of 113 years to come up with joint agreement regarding the water resources of the Zambezi Watercourse among all basin states in the name of ZAMCOM. This agreement is yet to be fully operationalised. The history of agreements in the Zambezi Watercourse highlights the complexities and underlying tensions related to territorial claims with respect to the ownership of water.

Figure 2: History of the Zambezi River Agreements



Source: (World Bank, 2015)

The dominant contemporary paradigm governing the management of water resources, advocates for an integrated approach that aims to manage and develop water resources in a sustainable and balanced way, taking into account the social, economic and environmental interests. Recent water reforms meant to address water resources management challenges in trans-boundary waters internationally, promote the adoption

of this approach in the development and formalization of Watercourse agreements. Many Zambezi Watercourse states in particular have adopted this approach both at national and trans-boundary level.

The integrated approach is meant to co-ordinate water resources management across several sectors, interested groups and from local to international levels. This is particularly important within the international context where water resource is shared by various riparian states. It emphasises involvement in national policy and law making processes, establishing mechanisms focused on enhancing governance and creating what would be considered as more effective institutional and regulatory arrangements as routes to more equitable, sustainable water development and management decisions. This factor is further supported by the Integrated Water Resources Management (IWRM) approach that recognises the many different competing interest groups, have over the water (Academia, 2015, p. 1).

The promotion and formalization of this approach has been effected through the global adoption of the United Nations Convention on Non-Navigational Uses of Water. As will be shown later in the chapter⁹, this convention has influenced and informed the character of the more recent Watercourse wide agreements in the Zambezi. The main motivation for this is the notion that it allows the use of practical and unbiased sharing of water resources for the beneficial uses within each riparian's own territory.

Water sharing and management arrangements associated with trans-boundary waters have been formalized by applying various kinds of legal agreements. For example, ZAMCOM is an agreement formalized under the SADC treaty¹⁰ (Treaty of The Southern African Development Community: As Amended, 1992, p. 7) and; ZRA is governed by twin acts of parliament in Zambia and Zimbabwe, namely *The Zambezi*

⁹ Section 3.3.2 and 3.3.4 of Chapter 3

¹⁰ The SADC Treaty is the founding document for the establishment of the Southern African Development Community (SADC). In pursuance of the principles of Towards a Southern African Development Community, a declaration was made by the Heads of State or Government of Southern Africa, at Windhoek, Namibia, in August 1992 affirming their commitment to establish a Development Community in the region (Southern African Development Community -SADC, 1992).

River Authority Chapter 467, 17 of 1987 (The Zambezi River Authority Act- Chapter 467, 1987, p. 2). Some management arrangements have taken the form of memorandums of understanding (MoUs) such as the Joint Operating Technical Committee¹¹ (JOTC) between ZRA and “Hidroeléctrica de Cahora Bassa¹²”(HCB) (International Hydropower Association, 1995), which are state owned entities participating in structures aimed at improving management of matters of common interest. The UN convention; the Watercourse wide agreements under the umbrella of SADC (United Nations, 1997, p. 1) and; the other existing agreements most of which predate the UN Convention are highlighted below. The highlights are presented to inform the line of discussion that is to be pursued later in Chapter five. In addition, they represent a data collection process of the agreements that would be interrogated based on the framework for analysis in this thesis. These as mentioned in the introduction include: the agreement on the Zambezi River Authority; the ZAMCOM agreement and; the treaty on the Cahora Bassa hydro-electric scheme.

3.3.1 United Nations Convention

The United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses was adopted by the General Assembly of the United Nations on 21 May 1997 and it entered into force on 17 August 2014. The convention provides for the development of international water laws that are to be applied in non-navigable and trans-boundary rivers worldwide (Spiegel, 2005, p. 334). Further, it provides for the creation of advanced methods that aid various riparian states to manage shared trans-boundary rivers in an equitable, reasonable and sustainable manner

The Watercourse Convention allowed for the modification of international trans-boundary water doctrines that were previously founded on the riparian and prior-appropriation water rights. Out of these doctrines, the principle of equitable and

¹¹ Joint Operating Technical Committee is a committee that implements policies and decisions of the Council of Ministers responsible for the overall guidance, strategic planning supervision, financial overview and decisions, connecting with institutions outside the Zambezi River Basin, and evaluation of programmes. The technical committee also makes legal, political and technical recommendations to the Council and is intended to supervise the ZAMCOM secretariat -ZAMSEC (The World Bank Group, 2010, p. 36)

¹² Hidroeléctrica de Cahora Bassa (HCB) is a company located in Tete Province, Mozambique. It operates the Cahora Bassa hydropower plant, which has an installed capacity of 2,060MW. HCB's mission is to generate, transmit and sell clean electricity efficiently and sustainably, maximising the benefits for the shareholders and generating wealth for the country (International Hydropower Association, n.d.)

reasonable use which is a part of the Helsinki Principle¹³ was highly favoured and found major approval due to the fact that it supports the rational and impartial sharing of water resources for the beneficial uses within each riparian's own territory (Rahaman, 2009, p. 210).

The draft Articles drawn up by the International Law Commission promote the concepts of prior consultation between basin states, and the mutual sharing of data and information in reaching agreement (Rahman, 1995, p. 9). An interesting aspect of these draft Articles is that, in the event of two states and in the case of water conflicts, it is important for institutions and countries to have a mutual framework of criteria and agreements to provide the basis for decisions. This also requires widespread agreement on the sharing of information and data, rather than each participant retaining (withholding) the information that can be useful to all basin states (Ashton, 2007, p. 8). All participants need to be acquainted with the sets of rules and constraints within which they need to work; as this will help facilitate the joint development of alternative options or solutions to a particular development.

3.3.2 Revised SADC Protocol on Shared Watercourses

The SADC Protocol was first enacted in 1995 and revised in 2000. The objective of the revised protocol was to foster closer cooperation for judicious, sustainable and coordinated management of shared Watercourses on the protection and utilization of shared Watercourses. Further, it aims to advance the SADC agenda of regional integration and alleviation of poverty (Revised SADC Protocol on Shared Watercourses, 2000, p. 3). The Protocol is based on the principles of integrated water resources management and upholds the rules for international waters management as laid out in the UN Convention on the Law of Non-Navigational Uses of International Watercourses (Rosegrant, 1995, p. 334). In addition, it provides for the establishment of bilateral and multilateral institutions for the management of shared Watercourses and for the continued operation of Watercourse agreements.

¹³ The Helsinki Rules on the uses of the waters of international rivers were adopted by the International Law Association at the fifty-second conference, held at Helsinki in August 1966. General applicable rules of international law are set out for the use of water resources based on a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin (Watercourse) (International Law Association, 1967).

It is worth noting that one of the differences between the revised SADC Protocol 2000 and the 1995 Protocol, was the deviation away from the principles of community of interest protocol as espoused in Article 2 of the old protocol. Article 2 of the Revised SADC Protocol 2000 stated that:

Member States are to 'respect and abide by the principles of community of interests in the equitable utilisation of [shared Watercourse] systems and related resources (Food and Agriculture Organization of the United Nations, 1997, p. 21).

The Revised SADC Protocol on the other hand does not contain any corresponding provision but rather follows the approach taken under the 1997 UN Convention.

The principles of ZAMCOM draw from the principles of the SADC protocol in guiding the Southern African Development Community (SADC), which was established in 1992 through a Treaty. The objective of SADC, among others, is the promotion of economic integration and “sustainable utilization of natural resources and effective protection of the environment”. Of note and for later reference is the observation that, regional integration is associated with the application of the principles of the community of interest.

3.3.3 Zambezi River Authority Agreement

The agreement between the Republics of Zimbabwe and Zambia concerning the utilization of the Zambezi River was signed on July 28, 1987 in Harare. The agreement entered into force in the same year with the passing of the Zambezi River Authority Act in both Zambia and Zimbabwe (The Zambezi River Authority Act- Chapter 467, 1987, p. 18), respectively (Shela, 2000, p. 74). The agreement articulates the desire of the two states to obtain the greatest possible benefit offered by the waters of the Zambezi River, to improve it, and intensify the utilization of the waters for the production of energy, social economic development. For these reasons the two states agreed to utilize, operate and maintain the "Zambezi Scheme"¹⁴.

¹⁴As defined in the Zambezi River Authority agreement "Kariba complex" means-(i) Kariba dam and reservoir; (ii) all telemetering stations relating to the Kariba dam;(iii) any other installations owned by the authority at Kariba. "Zambezi scheme" means the Kariba complex and any additional dams, reservoirs and installations that may be constructed or installed on the Zambezi river;

The ZRA Act established the Zambezi River Authority as a body corporate. The functions of the ZRA are spelt out in the schedule to the act under Article 9. Functions directly relevant to this thesis are quoted below:

- (a) Operate, monitor and maintain the Kariba complex;*
- (b) (...) investigate the desirability of constructing new dams on the Zambezi River and make recommendations thereon to the council;*
- (c) (...) construct, operate, monitor and maintain any other dams on the Zambezi River;*
- (d) Collect, accumulate and process hydrological and environmental data of the Zambezi River for the better performance of its functions and for any other purpose beneficial to the contracting states;*
- (e) (...)regulate the water level in the Kariba reservoir and in any other reservoir owned by the authority;*
- (f) Make such recommendations to the council as will ensure the effective and efficient use of the waters and other resources of the Zambezi River;*
- (i) From time to time and subject to the approval of the council, make such revisions of salaries, wages and other remuneration to its employees as it considers appropriate; (The Zambezi River Authority Act- Chapter 467, 1987, p. 10).*

An additional important function of the ZRA is spelt out in Article 18 of the Act. Article 18 states that:

So as to ensure the efficient and equitable use of the waters of the Zambezi River, the contracting states undertake to; (a) keep each other informed of any proposals approved by them for the abstraction of water from the Kariba dam or any other dam that may be constructed on the Zambezi River or for the impounding or abstraction of water from the sources of the said dam or other future dams for irrigation or other purposes;(b) consult the authority on any proposals for the impounding or abstraction of substantial quantities of water from the Kariba dam or any other dams that may be constructed on the Zambezi River and seek the approval of each other before approving such impounding or abstraction;(c) consult with each other and the authority, if so requested by the authority through the council in regard to any problems arising from the abstraction of water from the Kariba dam or any other future dams that may be constructed on the Zambezi river, or the impounding or abstraction of water from the sources of the said dam or other future dams; 2. They further undertake to ensure that the ministers responsible for energy in their respective territories liaise and co-ordinate with each other on all matters affecting the public interest of their two territories in relation to the ownership, management, control and operation of the authority (The Zambezi River Authority Act- Chapter 467, 1987, p. 18).

3.3.4 ZAMCOM Agreement

The “agreement on the establishment of the Zambezi Watercourse Commission”, (the ZAMCOM agreement) was signed on July 13, 2004 in Kasane, Botswana, by Ministers responsible for water from seven of the eight riparian states - Angola, Botswana, Malawi, Mozambique, Namibia, the United Republic of Tanzania, and Zimbabwe. It came into force on June 26, 2011 after six of the eight riparian countries completed their ratification processes and deposited their ratification instruments with the SADC secretariat as required under the agreement (Mwiinga, 2010, p. 12). Zambia acceded to the agreement on July 2013 while Malawi, signed on July 13, 2004 but has not yet ratified the agreement. The objective of this agreement is to establish a commission to promote the equitable and reasonable utilization of the water resources of the Zambezi Watercourse as well as the efficient management and sustainable development thereof.

The organs of the commission established under the agreement include: (a) The council of ministers; (b) The technical committee; and, (c) The secretariat.

The commission has the following functions:

- (a) Collect, evaluate and disseminate all data and information on the Zambezi Watercourse as may be necessary for the implementation of this agreement;*
- (b) Promote, support, coordinate and harmonise the management and development of the water resources of the Zambezi Watercourse;*
- (c) Advise member states on the planning, management, utilization, development, protection and conservation of the Zambezi Watercourse as well as on the role and position of the public with regard to such activities and the possible impact thereof on social and cultural heritage matters;*
- (d) Advise member states on measures necessary for the avoidance of disputes and assist in the resolution of conflicts among member states with regard to the planning, management, utilization, development, protection and conservation of the Zambezi Watercourse;*
- (e) Foster greater awareness among the inhabitants of the Zambezi Watercourse of the equitable and reasonable utilization and the efficient management and sustainable development of the resources of the Zambezi Watercourse;*
- (f) Co-operate with the institutions of SADC as well as other international and national organisations where necessary;*

- (g) Promote and assist in the harmonization of national water policies and legislative measures;*
- (h) Carry out such other functions and responsibilities as the member states may assign from time to time; and*
- (i) Promote the application and development of this agreement according to its objective and the principles referred to under Article 12* (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004, p. 11).

3.3.5 Cahora Bassa Treaty

The Cahora Bassa Treaty was entered into on 19th September 1969 between Portugal and the Republic of South Africa concerning the establishment and operation of a hydro-electric scheme known as the Cahora Bassa project (Isaacman & Isaacman, 2003, p. 3). The agreement catered for the generation and supply of electricity for use within the territories of Mozambique and South Africa and possibly other countries. The tripartite agreement, with time, would take account of the changed conditions prevailing in the region. The agreement was revised in 1984 to include the states of the Republic of Portugal, the People's Republic of Mozambique and the Republic of South Africa relative to the Cahora Bassa Project (Food and Agriculture Organisation of the United Nations, 1997). The changes were on account of changed circumstances prevailing in the region at the time. Key provisions under the treaty provide for the following:

- (i) The three countries agreed to continue the operations of the scheme. This was centred on the idea that the continued generation and supply of electricity from the Cahora Bassa project can significantly contribute to the peace and prosperity of the region as a whole, as well as to the economic development and welfare of their respective peoples and countries.
- (ii) HCB, a limited liability joint-stock company duly constituted in accordance with the laws of Mozambique on 23rd June 1975, operates the scheme based on agreed undertakings as stipulated in the agreement. The main undertaking is to satisfy the supply contract entered into between HCB and Escom for the supply of power to Escom for use in the People's Republic of Mozambique and the Republic of South Africa.

- (iii) The Government of the Republic of South Africa guarantees and ensures that Escom will comply with the provisions of the supply contract. Similarly, the Governments of the Republic of Portugal and the People's Republic of Mozambique jointly guarantee and ensure that HCB will comply with the provisions of the supply contract.
- (iv) Power from the Cahora Bassa project is not supplied to any consumer outside Mozambique at a price which is more favourable, taking into account the load factor, than that payable by Escom in terms of the supply contract, unless otherwise agreed by the Parties.
- (v) The Government of the People's Republic of Mozambique shall be entitled to receive from HCB 28.57 percent of the premium referred to in clause 11, paragraph 2) of the supply contract as a contribution towards the costs incurred by that Government.
- (vi) A Permanent joint committee is established by the three which provides advice and recommendations on any operational, maintenance or economic aspect of the Cahora Bassa project.
- (vii) The duration of the agreement is from 2nd May 1984 and remains in force until the date of termination of the supply contract but may be renewed by the parties with such amendments as they may agree upon (Southern Africa Record, 1984, pp. 4-10).

This review confirms knowledge gaps as intimated in the introduction in the following ways. In the outline of the various legal doctrines and agreements, the highlights are devoid of explicit reference to ownership in water, by states. The doctrine of equitable and reasonable utilization almost completely avoids using any word that can be associated with ownership. It falls short by using the word equitable. But someone would have to know that the word equity (or equitable) was originally and is normally associated with ownership or property. The agreements highlighted do not state, in their provisions, who owns what quantities of water. There is a general inclination to view water as a collective interest and not some existing specified quantity (as betrayed in chapter two) owned by a single state in a river system. This interest is not clearly defined

within the context of the water itself. The application of the beneficial use principle does not feature as a point of consideration in the agreements and in practice within in the Zambezi Watercourse discourse as shown above.

3.4 Ownership

The discourse on ownership according to Paton (1972, pp. 505-552) and Dias (1976, pp. 395 -414) and Honore (1961, pp. 107-147) is quite revealing. In general, parallels can be drawn between ownership and trends with respect to the access, use and control of water resources. Based on the three authorities, key aspects of interest to this thesis are highlighted below. These include: Definitions of ownership and property; the Bundle of rights; Things associated with ownership; Occurrence of ownership; Regulation of ownership and; Ownership control and power by managerial experts. The subject of ownership is wide. The aspects selected are fundamental to the subject of ownership. In addition, for this thesis, they have a bearing on the issue of who has, or can have control, access and use authority, over the water. It would be important to establish whether these aspects are applicable to water. Effort is made to provide an initial indication of how water may stand in relation to ownership. This outline will be used to support the development of the methodology and analysis of ownership in water in chapters four and five. This will also be complimented by the review of other works that have attempted to discuss water within the context of ownership.

3.4.1 Occurrence of Ownership

Ownership is necessary only when there is a community of persons. “A man by himself on a desert island has no need of ownership.” The distinguishing of rights and duties with respect to things becomes a requirement when there is at least one other person involved, resulting in the need to determine those things that belong to one or the other. This is so as not to interfere with one another (Dias, 1976, p. 402). Similarly considering countries, Mauritius as an island country has no need to claim ownership of water occurring within its territory in relation to other countries unless such other country has an interest in such waters. Such a requirement is likely to occur between countries within a continent. The protection of these rights and duties including the right

to exclude others can hardly be effective until there is a developed legal order or capacity by one to protect one's own rights. Until there is a coordinating power or the growth of a community, conflicts between groups are determined by force and not by law (Paton, 1972, p. 520). The case example of the Cahora Bassa scheme highlighted above is one such example.

3.4.2 Definitions of Ownership

Ownership is in terms of a relationship between persons with respect to a thing and where the relationship can be seen as a property relationship (Dias, 1976, p. 395). The distinctive characters of the relations which are called rights of ownership in the law, are dependent on one hand, on the extent of the 'owner's' powers to exclude or permit others to enjoy the thing, the subject of the right, and, on the other hand, on the nature of the thing itself (Paton, 1972, p. 517). Influenced by liberal individualism the French civil code defined ownership as:

The right of enjoying and disposing of things in the most absolute manner, provided that one abstains from any use forbidden by statute or subordinate legislation.

Even the Soviet civil code, framed in a socialist context, provides, in very similar language, that 'within the limits laid down by law, the owner has the right to possess, to use and to dispose of his property (Honore, 1961, p. 110).

Noyes regards ownership as that magnetic core which remains when all present rights of enjoyment are removed from it and which attracts to itself the various elements temporarily held by others as they lapse. An owner may cede so many rights associated with a thing and still remain owner (Paton, 1972, p. 517). For example, if a lease or water right expires, or an easement is lost, it is the owner of the land who benefits as such ceded rights return to the owner (e.g. the state ownership of water). Some attempts have been made to distinguish ownership as:

- a. *ultimate ownership, where but the residual core is left to the owner, the rights of present enjoyment being held temporarily by others;*
- b. *complete or beneficial ownership, where the owner enjoys all the rights and privileges which it is legally possible for an owner to have and;*

- c. *fractions split off from ownership, some or all of which may be held by persons other than the owner, so long as the 'magnetic core' remains in the owner (Ibid, 1972, p. 519)*

One can readily describe the different kinds of existing water rights regimes in manner similar to the above. That is, riparian, appropriation and so on.

3.4.3 Things Associated with Ownership

As noted from above the term "ownership" is used with reference to "things". A "Thing" may be "Corporeal or Incorporeal". Since ownership is only of "things", it, too: is "corporeal" or "incorporeal". "Corporeal things" refers to physical objects for example, Land. "Corporeal" means the objects that can be owned by an individual or state (Dias, 1976, p. 401). Whereas "Incorporeal" refers to rights and claims that a state or individual has over an object. Incorporeal property is of two kinds: (1) *jura in repropria*, i.e., proprietary rights over immaterial things, e.g., patents, copyrights and trademarks, and (2) *jura in re aliena* (encumbrances) whether material or immaterial things, e.g., leases, mortgages and servitudes. The former refers to physical objects, the latter to certain claims, liberties, etc. Every legal right has a thing as its object as described above; Ownership is merely a relation between persons with respect to a thing. Relations between persons can hardly be Corporeal. Therefore, rights between persons with respect to a thing are Incorporeal.

Ownership in its most comprehensive signification denotes the relation between a person and any right that is vested in him. That which a man owns in this sense is in all cases a right. According Salmond Ownership is, therefore, "incorporeal" (Paton, 1972, pp. 508-515).

Based on the broad definition of things by the scholars, water is something corporeal but as shown above all rights associated with things, are incorporeal. Ownership in water could therefore be argued as being the relationship among persons or states, with respect to water. This relationship takes the form of rights and duties and may consist of bundle of claims to prevent others from using the water. Suffice to say the outline of water sharing arrangements in the Zambezi Watercourse highlighted above, if viewed with this lens, appears to be about rights and duties with respect to the access use and control of water resources and as a consequence, is about ownership of water among states.

3.4.4 Introduction to Bundle of Rights

The bundles of claims are, commonly referred to as the bundle of rights. One of the most important of these powers is the right to exclude others. Ownership essentially includes a guarantee to exclude others from the use handling of the thing. The right of ownership encompasses benefits and burdens. The former consist of claims, liberties, powers and immunities, but the latter provides curtailing by duties, liabilities and disabilities (Dias, 1976, p. 403).

Honore (1961) suggests that the standard incidents of ownership do not vary from system to system in the erratic unpredictable way but have a tendency to remain the same from place to place throughout time. The full rights of an owner are: (a) the power of enjoyment (e.g. the determination of the use to which the thing is to be put, the power to deal with produce as he pleases, the power to destroy); (b) possession which includes the right to exclude others; (c) power to alienate inter vivos, or to charge as security; (d) power to leave the thing by will. One of the most important of these powers is the right to exclude others. The property right may be described essentially as a guarantee of the exclusion of others (Paton, 1972, p. 517). According to Honore, ownership comprises:

The right to possess, the right to use, the right to manage, the right to the income of the thing, the right to the capital, the right to security, the rights or incidents of transmissibility and absence of term, the prohibition of harmful use, liability to execution, and the incident of residuary” (Honore, 1961, p. 112).

For the sake of this thesis four standard incidents of ownership from Honore are directly quoted below. This is to provide a detailed description and insight, based on authority, of what is truly meant by the key incidents of ownership applied in this thesis.

a) The right to possess:

The right to possess, viz. to have exclusive physical control of a thing, or to have such control as the nature of the thing admits, is the foundation on which the whole superstructure of ownership rests. It may be divided into two aspects, the right (claim) to be put in exclusive control of a thing and the right to remain in control, viz. the claim that others should not without permission, interfere. Unless a legal system provides some rules

and procedures for attaining these ends it cannot be said to protect ownership. Remedies should be available to the owner in the usual case in which no other person has a right to exclude him from the thing (Ibid, 1961, p. 113).

b) The right to use:

The present incident and the next two overlap. On a wide interpretation of 'use', management and income fall within use. On a narrow interpretation, 'use' refers to the owner's personal use and enjoyment of the thing owned. On this interpretation, it excludes management and income. The right (liberty) to use at one's discretion has rightly been recognized as a cardinal feature of ownership (Ibid, 1961, p. 116).

c) The right to manage:

The right to manage is the right to decide how and by whom the thing owned shall be used. This right depends, legally, on a cluster of powers, chiefly powers of licensing acts which would otherwise be unlawful and powers of contracting: the power to admit others to one's land, to permit others to use one's things, to define the limits of such permission, and to contract effectively in regard to the use (in the literal sense) and exploitation of the thing owned (Ibid, 1961, p. 116).

d) The prohibition of harmful use:

An owner's liberty to use and manage the thing owned as he chooses is in mature systems of law, as in primitive systems, subject to the condition that uses harmful to other members of society are forbidden. There may, indeed, be much dispute over what is to count as 'harm' and to what extent give and take demands that minor inconvenience between neighbours shall be tolerated. Nevertheless, at least for material objects, one can always point to abuses which a legal system will not allow (Ibid, 1961, p. 123).

3.4.6 Regulation of Ownership

Ownership, like other interests is associated with social obligations that need to be met. Ownership is fundamental to the rights of the individual. The extent of the rights and duties exercisable by an owner, to which he is subject, reveal the social policy of the legal system concerned. The degree of individual ownership and degrees of the constraints in the interest societal interests have created a spectrum of limits on ownership over times based on policies or positions adopted by authorities.

According to Paton (1972):

What is apparent is that absolute rights are ceasing to exist, if they ever did exist, and are being replaced by qualified rights the exercise of which is limited by the philosophy and needs of the community in question (Paton, 1972, p. 543).

This position is also supported by Austin, who in fact, was very careful to show that the liberties of the owner are not unlimited, but indefinite. Limitations though fewer in the past have always represented the need to compromise between individual interests and life in society (Dias, 1976, p. 408).

At the height of the individualist era, preference was to give the "fundamental rights" of the individual the fullest possible consideration. This was reflected, in the way in which ownership, as a fundamental' right of property, had and still has, a large number of values that mirror an individual's independence and sanctity of property (Dias, 1976, p. 407). In some jurisdictions the community interest was regarded as superior to the individual rights of the owner. Though an owner may still have many sovereign rights, the area of complete freedom is being gradually restricted. There is now a general accepted view that:

No individual, however powerful he may be, can today create wealth without the help of the social framework and the co-operation of his fellows, and therefore society can well demand that, once created, wealth should be used for those purposes which will be of greatest benefit to the community (Paton, 1972, pp. 519 - 542).

Some examples of regulatory interventions are highlighted below to inform the possibilities of control measures that could have a bearing on ownership.

- a) Control of monopolies where certain commodities (for example, water) can be managed in such a way as to hold society to ransom (Dias, 1976, p. 409).
- b) Vesting of ownership of the means of production in the State (For example, State ownership of water resources) and the permitting of opening ownership of consumer goods to private individuals. Note here that the distinction lies, not in the nature of ownership, but in what things are capable of being owned (Ibid, 1976, p. 410).
- c) Legislative controls on profits, interests and rents; income tax, value added tax and rates. These are arguably a means of compelling people to put their profits to

public use. Scaled taxation is used to level the unequal distribution of wealth. (Ibid, 1976, p. 411).

Some examples of underlying ideas influencing ownership are highlighted below to inform possibilities of the basis upon which ownership could be structured:

- a) Property should be as a result of effort or should involve the giving of service that is ethically justifiable. However, property which is an undeserved claim on the wealth produced by others, such as those based on the priori theory, is not (Paton, 1972, p. 540).
- b) Application of the Hegelian theory where every member can, by labour within his powers, acquires such property as is necessary for true self-realization. Based on this theory the regulation of ownership is necessary for the appropriate development of personality. The community has progressed from status to contract, from group holding to individual property. Liberty has grown in the process and it is the control of property that makes men free.

3.4.7 Ownership and Control of Power by Managerial Experts

The spectrum of authority derived from the incident of ownership, ‘the right to manage,’ has been observed as having grown in managerial power, divorced from legal ownership. (Honore, 1961, p. 112). With complex and highly technical undertakings, power is now concentrated not in the corporation which owns the property or in its shareholders, but managerial experts (Dias, 1976, p. 412). Honore (1961) suggests that:

The power to direct how resources are to be used and exploited is one of the cardinal types of economic and political power; the owner's legal powers of management are one possible basis for it (Honore, 1961, p. 112).

Paton (1972) supports this position by stating:

It is therefore evident that we are dealing not only with distinct but often with opposing groups; ownership on the one side, control on the other; a control which tends to move further and further away from ownership and ultimately to lie in the hands of the management itself, a management capable of perpetuating its own position. The concentration of economic power separate from ownership has, in fact, created economic empires relegating owners to the position of those who supply the means (Ibid, 1972, p. 533).

The control of managers and by implication, those who control the managers, presents a problem as to how the adequate control of the exercise of power in such cases can be secured (Dias, 1976, p. 412). Therefore, in the scheme of things, the manner in which the right to manage is orchestrated and applied is of great importance.

3.4.8 Significance of Land and its Relation to Water

Land is central to the discourse on ownership and stands as the primary basis upon which ownership and property law is derived. There are future interests in land which are of a definite value on account of its enduring nature. Land is finite. While other things such as herds of cattle may multiply by natural increase, the quantity of land remains the same save for expensive works of reclamation (Paton, 1972, p. 513). This position is true for water. The foundation for most human undertakings is land. Land is therefore the main form of wealth though it is gradually being displaced by the advancement of industrialism. According to Paton (1972) Land is real property and immovable. Proprietary rights in land may be said to be projected on the plane of time. The category of quantity, of duration, is applied to them and exclusive possession creates an interest in land. Land as real property and based on its definition, is a material thing over which certain rights, corporeal and incorporeal, may exist. Such rights may exist concurrently. Scholars have described land a three-dimensional space and it extends to the skies and to the centre of the earth (Ibid, 1972, p. 508). Similarly, it is argued that water being an integral part of land, is real property and immovable in law.

The Latin maxim *Cuius est solum, eius est usque ad coelum* means a person entitled to possession of land has exclusive rights upwards to the sun and downward to the centre of the earth. The earth hath in law a great extent upwards, not only of water ... but of air and all other things even up to the heaven (Oxford University Press, 2015, p. 1).

3.4.9 Other Scholarly Views on Ownership

The common view is that property is something tangible, which is owned by a person. Nonetheless this is not necessarily the case. "Ownership consists of a large and varied bundle of rights and liberties" John Maurice Clark (1939). According to Klein and Robinson (2011), they suggest that property is;

Not a single absolute right, but a bundle of rights. The different rights, which compose it, may be distributed among individuals and society. Some are public and some private, some definite, and there is one that is indefinite. The terms which will best indicate this distinction are partial and full rights of property. Partial rights are definite and full rights are the indefinite residuum. The first definite right to be deducted from the total right of property is the public right of eminent domain. This is the definite right, which belongs to the state in its organized capacity of purchasing any property whatsoever at its market value, whenever public safety, interest, or expediency requires. It is merely a definite restriction upon the unlimited control which belongs to the individual (Commons, 1893, p. 93), (Klein & Robinson, 2011, p. 196).

In political science and sociology, property has been referred to as “the first fundamental institution in the distribution of wealth. Any action abolishing private property would affect distribution. The problem of distribution would have to be addressed and resolved in a different manner. It was stated by Ely (1899) that such a distribution could be feasible if brought about by the collective authority of society (Ibid, 2011, p. 196). Property has also been considered as a relationship between a person and object, here regarding the incidents of private ownership as well as public and communal (Arnold, 2010, p. 168).

“Bundle of rights” (Bundle of Sticks) metaphor was introduced in the 19th century and Gray (1991) refers to them as:

A systematic expression of the degrees and forms of control, use, and enjoyment that are recognized and protected by law

These rights include the right to possess, the right to manage, the right to receive income from and the right to be secure from interference from others, as well as the right to transfer to a chosen successor (Gray, 1991, pp. 1-3) including the “duties to prevent harm and the liability of having the property expropriated by the government or to pay debt (Chambers, 2001, pp. 1-3). In addition to looking at the types of rights and sources from which they derive, it is important to consider the strength of those rights, i.e. the degree to which they can be defended (Roth, Wiebe, & Lawry, 1992, p. 158) .

It is important to note that some scholars have questioned the validity and efficacy of the wide use of the bundle of rights metaphor. For example, an alternative to the bundle of rights metaphor- the ‘web of interest’ has been proposed to replace the bundle of rights

(Hardy, 2008, p. 720). An examination of the ‘web of interest’ approach includes the incidences of ownership as suggested in the bundle of rights metaphor. Suffice to say, these incidences of ownership are necessary ingredients in the definition and understanding of ownership.

3.5 Derivative Jurisprudence

An outline of the underlying jurisprudence behind the bundle of rights metaphor is worth consideration for a number of reasons. Firstly, it gives the derivative basis of the ‘rights’ and attempts to settle the question as to whether the bundle of rights is logical. Secondly, it reveals the fact that the bundle of rights metaphor is linked to other concepts and ideas such as sovereignty, wealth creation, and economics. This linkage is important in order to understand the way in which nations relate to one another and how issues of ownership and natural resources sharing are affected.

Below is the brief outline of Locke’s theories on ownership. It is observed that these theories form the fundamental basis of the bundle of rights.

3.6 John Locke’s Theories on Ownership

Ownership or original appropriation was consolidated after John Locke a British philosopher (1634–1704), wrote the Second Treatise of Government (Hay, 1823, p. 10). In this book, Locke suggests that, man in his natural state is bound by the law of nature. John Locke’s theory lays a backbone to original appropriation of property in the following ways. That is, nature belongs to mankind in common. However, man needs to mix his labour with the natural resource for him to have absolute control over it (ownership). Locke explains that the best theory of right to ownership is entrenched in the fact that each person owns his or her own body and that includes all the labour that he or she performs with that body. So when an individual adds his own physical labour, which is his own property, to a foreign object or material; that object and any resulting products become his property as well. He further defines labour as the determining factor of value, the tool by which humans make their world a more efficient and rewarding place for all (Bennett, 1960, p. 11).

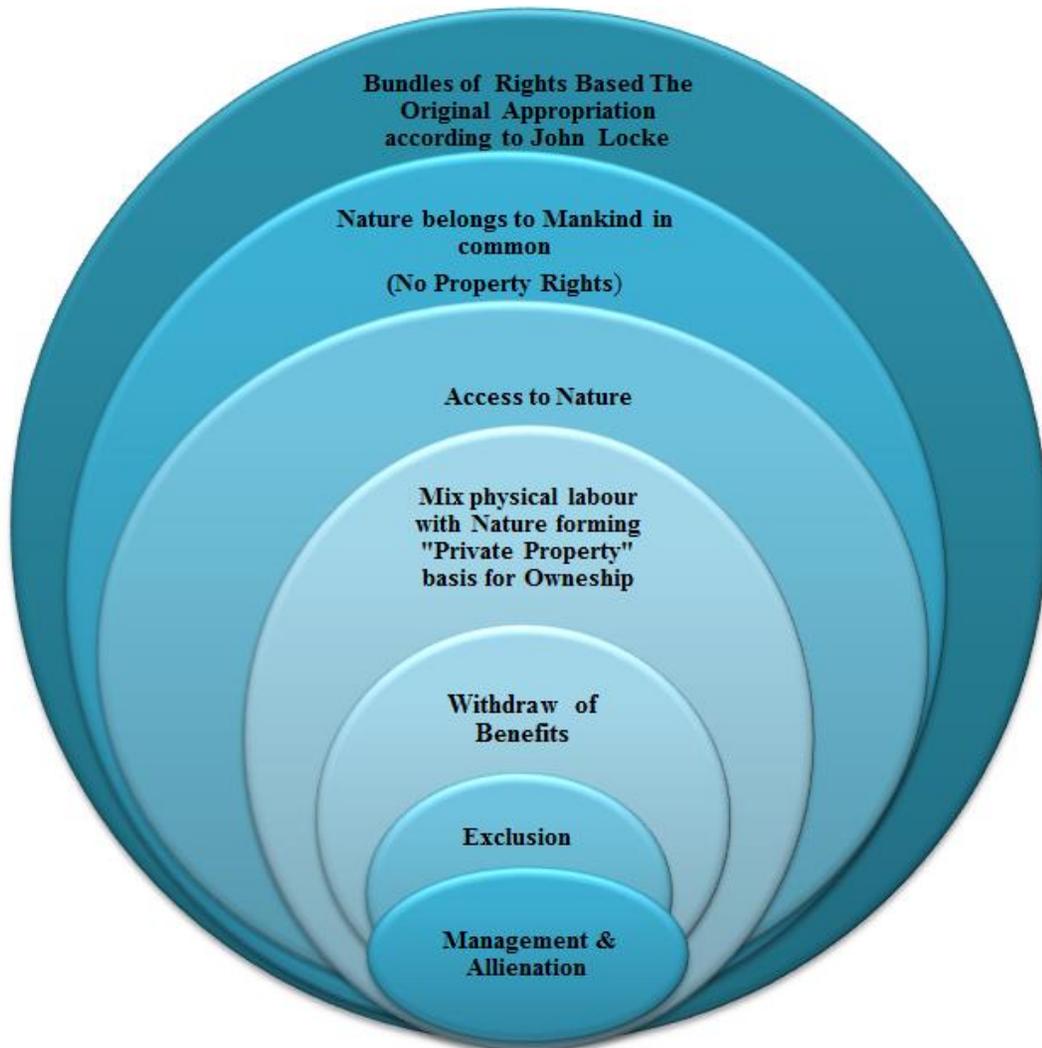
Given that the modern state has assumed responsibility for the commons, the contemporary successor to Locke's source of rights is not the atomistic individual, but the state frequently separated for administrative convenience into land, water, and various other elements.

This philosophy gave birth to some profoundly influential currents of thought. First, the notion of individual sovereignty gave rise to modern liberalism, a celebration of the rights of the individual and a legitimization of the ambition, which in turn facilitated economic expansion. Both property and modern economics share these roots. Second, it conceptualized government as a creation of the people, not as a disconnected abstraction or a remote and alien external force. It positioned government as an instrument to protect the property (and other) interests of individuals, not as a threat to them. Lastly, it visualized property as an original, root entity, comparable with individual life and liberty as a basic right in the state of nature (Edwards, 2007, p. 131).

Locke's theories have been influential in the property rights discourse. However, there is disagreement amongst scholars as to what he was actually saying. Unlike most scholars who have different positions on John Locke, Karl Widerquist (2010, pp. 4-5) rather focused on identifying the arrays of reasonable interpretations and extensions of the theory derived from contemporary literature. The output is a menu of options that can be used to justify property rights. A claim to reject appropriation based on property rights must address all potentially valid options. Subject to further analysis, it appears that the content in the menu of options serve as tools countries used to claim ownership or ownership in their territories. The same claims could be said to apply in the water resources discourse. Based on the above, there is a clear indication that the Lockean property theory is a major contribution foundation of all property rights and methods individual or states can use to claim ownership over a thing such as land and natural resources, including water resources. The menu of options as established by Widerquist is presented in annex 2 and modified into tables to aide further application and analysis.

The Figure 3 explains the bundle of rights as having their original foundation from John Locke theory of original appropriation. In addition, one condition associated with ownership is taken into account. That is, the duty to prohibit harmful use of the water resource.

Figure 3: Bundle of Rights



Based on Locke, for ownership to be established, one must carry out a number of steps; the steps which make up the bundle of rights in property law (Simmons, 1989, p. 456). These are:

1. An individual must mix his physical labour with nature or the thing. This means that first the individual must obtain rights to enter a defined physical property in order to

mix his/her labour, for example enter a river to collect the water (Access rights). The sole purpose of entering and mixing one's labour is mainly aimed at obtaining benefits (Withdraw rights). These benefits from the resource, then cause the individual to develop and modify the resource in order to obtain more profits or benefits as well as protect it, this process involves determining who will and will not have access to the resource (Exclusion rights).

2. Water and the resource that labour of an individual has been mixed with forms private property, meaning that the established private property right forms the basis for control (ownership). This results in an individual making decision on how the resources should be utilized and regulated (Management rights).

3. Locke further goes on to say that a person is only entitled to transfer property from common to private ownership if enough and as good is left for others (No Harm Rule rights) (Ibid, 1989, p. 456).

4. Locke provided for replacement of scarce resources, e.g., through markets opportunities or cash (Alienation).

3.7 Application of Bundle of Rights in Water

There are a number of previous works that support the notion of the bundle of rights in water. Some of these are highlighted below. This is to illustrate that there is general support of the idea that incidents of ownership exist in water.

The bundle of rights metaphor is intended to identify and describe all sorts of property rights in water resources. Additionally, when these rights are applied to water they reflect the public trust doctrine, which safeguards public access for critical purposes such as navigation and subsistence use (Sheard, 1961, p. 6).

Different people, groups, or agencies may hold different and overlapping bundles of rights over the same resource. As an example, at national level, animal owners may have the right to feed their herds or flocks at certain places, farmers who have rights to divert water for their crops using irrigation systems, while the village community, irrigators association, the state also claims rights on the timing of water use, changes to

the river, and granting of permission to new users (control rights). In other words, rights are only as strong as the institutions that stand behind them. In most instances; the state is a primary institution that supports property rights (Schlager & Ostrom, 1992, pp. 1-3). A parallel can be drawn at trans-boundary level. The state is the primary institution to secure the ownership of land and of water in a river system. The securing of these rights will inevitably be influenced by the strength of states and the institutions, which manage trans-boundary waters.

Subsequently, we have to view property as a legal construct, and water as a potential subject matter to that construct. Historically, property rights were not clearly understood, ownership was attributed to the relation tied to a physical entity (Schroeder, 1996, pp. 10-11). During the twentieth century, approaches such as the Hohfeldian analysis on law and economics were introduced. It was during this time that the relationship between individuals and a physical entity or thing, had to be bundled up into legal rights to be derived from combinations of incidents or attributes associated with ownership. Property rights including those associated with water have to have a quasi-property relationship because they merely are relational; rather the property rights are described in physical control has over the water resource, whether tangible or intangible. The incomparable aspect of property law, as opposed to contract, tort, or public law, is its concern with things (Guillet, 2000b, p. 1). A coherent conception of property must recognize both the human relationships with an object or entity. Additionally, the bundle of rights in property rights gives a person the legal rights to control and exclude, and limit the use of the object (Water) from everybody.

At international level, the claim is based in sovereign principles. The sovereign principles, (Muhammad, 2009, pp. 209-210) are derived from the same fundamental parameters that define ownership of land and natural resources in the world, that is, original appropriation primarily derived from the Lockean theory. ‘Original Appropriation’, “that is first in time, first in right” is the fundamental derivative principle. The key feature is normally presented explicitly or implicitly as part of the

establishment of any entitlement to land and natural resources. Other occurrences of property could be said to flow from this principle and additional Lockean theories.

This thesis relied on the bundle of rights metaphor to define property and did not focus on discussing or defining to the minute detail of the meaning of property in water. Rather it took a practical approach to identify the critical incidents of ownership and investigates whether these incidents of ownership are being applied. An absolute definition of property or property in water is therefore not necessary. The bundles of rights of importance in this instance are those associated with the securing of rights of access, use and control and the degrees of exclusion associated with the enjoyment of these rights. Within the context of this thesis and to provide for simple analysis, the main bundles of rights to be applied subsequently are detailed below. The bundles of rights are deemed to constitute the broad aspects of the access; use and control of water resources discussed above.

3.7.1 Exclusion Rights

Exclusive rights relate to the right to have exclusive physical control over the water resource. This is the right to be put in or right to assume exclusive control of the water entitlement and to remain in control without undue interference. Remaining in control, relates to the right of security entitlement an entity holds to retain water indefinitely, in other words a form of immunity from expropriation. It includes the right to determine who will have an access right, and how that right may be transferred. The right of exclusion is a collective choice right authorizing its holders to develop operational level rights of access. Individuals who hold rights of exclusion have the authority to define the qualifications that individuals must meet in order to access a resource (Ostrom & Schlager, 1992, p. 251).

3.7.2 Management Rights

Management rights are rights that give individuals or government the authority to make choices on how the resource will be used and regulated. These rights are associated with the capacity to take part in the managerial decisions regarding implementation of water allocation, distribution, as well as water fees. Management rights also provide the

ability to define access or withdrawal rights. The right of management is a collective-choice right authorizing its holders to develop operational level withdrawal rights governing the use of a resource (Ibid, 1992, p. 250).

3.7.3 Right of Access

The rights to enter a defined physical property: This might apply to recreational water use (like swimming), where the main ‘use’ is simply to be in the water, but would generally apply only to non-consumptive, in stream uses. This property can be divided into three types: open access, closed access, and government. (1) Public open access, there is no governance and everyone can use and take part in the benefit stream(s) or river of a particular resource. (2) Public property is the closed access, which is jointly managed and owned (Ibid, 1992, p. 250).

3.7.4 Use Rights

The right to use the water resource includes a cluster of rights such as the right to enjoy the use of water to ones’ discretion including the right to use of water to generate income. It includes the rights to obtain the benefits from the water resources by developing it or taking out some of the flow (Withdrawal rights). In water resources, the right to use may include in-stream uses or withdrawal rights (Nundwe, 2007, p. 20).

3.7.5 Alienation Rights

Alienation rights include the right to sell, lease, or bequeath the water resource. The right of alienation is a collective choice right permitting its holder to transfer part or all of the collective choice rights to another individual or group. Exercising a right of alienation means that an individual sells or leases the rights of management, exclusion rights, or both. Having alienated those rights, the former rights-holder can no longer exercise these authorities in relation to a resource or a part thereof (Ostrom & Schlager, 1992, pp. 250-51).

3.7.6 Prohibition of Harmful Use

Prohibition of harmful use is a duty where the owner’s liberty to use and manage property is subject to the condition that the user does not do harm to other members of

society. This prohibition is essential for the existence of an orderly society without which the concept of ownership could in fact be destructive (Nundwe, 2007, pp. 25-26).

3.8 Ownership Provisions in Statutes and Constitutions

A review of national water legislation of the eight countries whose territories intersect with the Zambezi Watercourse shows the vesting of water or ownership in water in the government (see summary of Table 20, page 140: appendix A. The table gives an indication of the eight riparian countries' institutional and legal framework for the management and development of water sources national and internationally shared water resources with regard to ownership and management). These vest ownership of the entire surface and ground water systems within their territory in the government or their presidents on behalf of the people. For example, the Botswana Water Act states that:

The water resources of Botswana vest in the Republic (Botswana Water Act, 2005, pp. Part II, Section 4)

While the Tanzanian Water Resources Management Act states that:

All water resources in mainland Tanzania shall continue to be public shall continue to be public water and vested in the President as trustee for and on behalf of citizens (Water Management Resources Act, 2009, pp. Part III, Section 10).

The government has power over water and any rights associated with its use, power in the sense of sovereignty or *imperium*. That is the general power to dictate the laws of property and to regulate its use as well as secure the public interest (*publici juris*) (Trelease F. J., 1957, p. 640). It is in fact important to note that some of these provisions are covenants in the national constitutions reflecting an entrenched position as to ownership of water. That is, a change in the Constitution of the country would need to be made before ceding ownership of territorial waters. To change constitutional provision is always a difficult proposition owing to due process required to change such Articles. Table 2 provides a simple indication whether the Acts of parliament and constitutions of States that are part of the Zambezi Watercourse provide provisions on ownership in water. It also provides an indication whether ownership can vest in an individual in the state and whether there are trans-boundary provisions that limit

ownership by the state. This is meant to provide a view of how countries treat the ownership in water.

Table 2: Provisions Vesting Ownership in Water

| Country | Ownership by Government | Ownership by water permit holders | Trans-boundary provisions limiting ownership | Trans-boundary agreements facilitating sharing water | Ownership of Water Ownership in the Constitution |
|------------|-------------------------|-----------------------------------|--|--|--|
| Angola | Yes | No | Yes | Yes | Yes |
| Botswana | Yes | No | Yes | Yes | No |
| Malawi | Yes | No | No provisions | No provisions | Yes |
| Mozambique | Yes | No | Yes | Yes | Yes |
| Namibia | Yes | No | Yes | Yes | Yes |
| Tanzania | Yes | No | Yes | Yes | Yes |
| Zambia | Yes | No | Yes | Yes | Yes |
| Zimbabwe | Yes | No | Yes | Yes | Yes |

Note that all countries listed in the Table 2 vest ownership of water in the state and then move to remove the vesting of ownership in the citizen or individual in the state. For example, the water resources act in Malawi states that:

All water resources are hereby vested in the State, subject to any rights of a user granted by or under this act or any other written law (Malawi Water Resources Act, 2007, pp. Part I, Section 5).

A similar example is observed in the water resources management act of Zambia where it is stated that:

Subject to this Act and notwithstanding any other law, instrument or document, all water, in its natural state, in Zambia vests in the President and is held by the President on behalf and benefit of the people of Zambia” (Water Resources Management Act, 2011, pp. Part I, Section 3).

They instead confer limited bundles of rights to the individual with a view to maintain control and provide for the orderly exploitation of the resources. Nonetheless, the

residual bundles of rights left to the individual are also incidences of property and confer “ownership” within the bundle of rights.

The provisions on international water confer an authority that is advisory in nature and do not necessary confer and release any rights of ownership in the instance of the acts.

Angolan water laws for example, on trans-boundary water resources, state that:

Angola regards trans-boundary co-operation as being of cardinal importance. Adoption of co-ordinated measures for the management of water resources in shared catchment basins, taking into account the interests of all states in the basin; Just and reasonable allocation of common water or its joint use, in conformity with the interests and obligations assumed by the Republic of Angola; and control of water quality and soil erosion (Water Resources Act (No 21 of 2002) of the laws of Angola, 2002).

Namibia’s Water Management Act states:

For the purpose of ensuring compliance with Namibia’s obligations under an international agreement relating to the protection, use and management of a shared water resource, the Minister may establish, by notice in the Gazette, and under the name stated in the notice, an international water management institution to be responsible for implementing the international agreement (Water Resource Act (No. 11 of 2013) of the Laws of Namibia, 2004).

Therefore, there is claim of ownership at first and then an indicative interest to secure or release interests in water through agreement.

As mentioned earlier this chapter confirms knowledge gaps with respect to ownership in water as intimated in the introduction. In the outline of the various legal doctrines and agreements, the highlights are devoid of explicit reference to ownership in water, by States. There is a general inclination to view water as a collective interest and not some existing specified quantity (as betrayed in chapter two) owned by a single state in a river system. This represents recent trends reflecting modern guiding principles. This interest is not clearly defined within the context of the water itself. The application of the beneficial use principle does not feature as point of consideration in the agreements and in practice within the Zambezi Watercourse discourse.

This shows that ownership in water resources by states has not been given explicit consideration in trans-boundary water agreements. Yet at National level, ownership by the State, is the ruling theme. The in-depth understanding of ownership aspects suggests water is something that fits quite squarely with the jurisprudence on ownership. As stated above the insights on how ownership is structured in societies shows for example of the prior appropriation doctrine is applied as a principle in water and yet water is not discussed within the context of ownership. Yet this principle is associated with ownership. The same can be said of the No Harm Rule if compared to the incident of ownership has per Honore on the duty not to cause harm. Yet there is no explicit consideration of who owns what between states.

CHAPTER 4: METHODOLOGY

This Chapter presents the methodology derived in part from the literature on ownership. This methodology creates a framework for analysis which is to be applied in the interrogation of selected trans-boundary agreements and legal doctrines from the perspective of ownership. Using this framework and methodology, any legal agreement on water or any Law on water can be reviewed from the perspective of ownership. This can be done with the same lens allowing comparisons to be made between parties to an agreement or across agreements. Informed by the literature review in chapter three on the subject of ownership and based on legal reasoning, a framework for analysis was constructed to support a systematic review and determination of how dimensions of ownership are associated with water sharing agreements and legal doctrines. That is, determining the nature of agreements between states vis-a-vis ownership of water. Further, to establish how interested states that depend on water, use trans-boundary water agreements, their associated legal doctrines and other legal devices to secure interests from the perspective of ownership. The applicability of the concepts of ownership in water, are posited as being the primary mode with which aspects of access, use and control are secured.

The developed framework has two parts. The first is referred to as the “bundle of rights framework”. This framework is meant to facilitate the analysis of agreements in a uniform manner and aid the determination of incidences of ownership therein. The second, referred to as the “Lockean tables”, is meant to aid the analysis of legal doctrines related to water. The framework for analysis is detailed in section 4.2 below.

The derivative outcomes and trend of thought with respect to ownership emanating from the application of the framework for analysis, was then highlighted in the discussion, conclusions and recommendations, to show how aspects of ownership in water are important in trans-boundary water sharing arrangements.

4.1. Legal Reasoning

Legal reasoning is a method of arguing or solving conflict, which applies legal rules to seek evidence to a situation, problem and issue in order to arrive at a conclusion (Bench-Capon et al. (2009, p. 4). This method is made up of three distinct steps. Firstly, the facts of the case determine the issue. Secondly, the issue is governed by a distinct legal rule and the issue automatically determines what rule is applied. Thirdly, the facts at hand shall be compared to the rule for analysis and a conclusion shall be drawn therefrom. This approach to legal reasoning is based on deductive and inductive reasoning. Inductive and deductive reasoning applied in this research are briefly described below.

Deductive reasoning refers to a method of collection of clues which are then narrowed down to a specific conclusion. This is also known as “top-down” approach (Ibid, n.d, p. 5). For instance, the theory about a topic of interest is posited. From there, that topic would be narrowed down into more specific hypotheses that can be tested. In short, logic and facts are used where a series of events or conditions are studied to arrive at a true conclusion in solving a problem.

Inductive reasoning on the other hand, relates to a type of reasoning where conjectures are used to arrive at a conclusion. This method involves moving from specific observations to broader generalizations and theories. Inductive reasoning is also known as the “bottom up” approach. Based on specific observations and measures, the method prompts the detection patterns and regularities, thereby aiding in formulating some tentative hypotheses to explore, and finally ends up developing some general conclusions or theories (Ramee, 2002, pp. 1-10).

The bundle of rights framework was constructed to aid the application of organized deductive reasoning to analyse and reveal the presence of general legal principles and provisions, within particular agreements that confer incidences of ownership to interested parties therein.

With respect to the application of Lockean tables, through organised inductive reasoning, an analogy is drawn between legal doctrines on water and legal theories on ownership. The Lockean table was drawn from existing literature on theories of property and used to reconstruct legal doctrines on water. The resultant expression was expected to be similar to the water doctrines sourced from existing literature. Sample legal doctrines on water were tested to show the efficacy of the analogy and to help draw a conclusion on the relationship between the water doctrines and ownership.

4.2 Framework for Analysis

Relying on the bundle of rights framework and the Lockean theories of property focusing on justifications for unilateral appropriation (Widerquist, 2010, pp. 4-5), an attempt was made to construct a framework for analysis that was used to analyse and determine degrees of ownership conferred by water doctrines, and/or agreements relating to the access, use and control of water. Derived from the bundle of rights framework, a matrix for analysis was constructed as shown below. This matrix is a modification of the similar matrix drawn by (Ostrom & Schlager, 1992, p. 252). The matrix represents a framework that can be used to show the bundle of rights associated with certain degrees of ownership an entity may have over a water body.

The water body in this instance is a subject matter for consideration with respect to ownership and these could represent a Watercourse or specified reservoir and/or volume of water abstracted from a source. It is therefore important to describe the object of water to be interrogated before proceeding with the analysis. Categories of degrees of ownership are then introduced based on a combination of bundle of rights associated with the applicability of the incidents of ownership. These are introduced for consideration in Table 3. The incidents of ownership associated with the categories are proposed to represent the spectrum of authorities conferred upon various organizations and entities that have legal obligations with respect to the defined water body. They could also represent the spectrum of authorities conferred by various legal doctrines.

Table 2: Bundle of Rights Matrix

| Combinations of incidences of ownership | | | | | | | | | |
|---|--------------------|----------------------------|------------------------------------|----|-----|----|----|----|--|
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C 3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |

Exclusion rights -Relates to the rights to have exclusive physical control over the water resource. It is the right to be put in or right to assume exclusive control of the water entitlement and to remain in control without undue interference.

Management rights – These are rights that give individuals or government the authority to make choices on how the resource will be used or the rights to regulate use of the water body.

Use and Withdrawal - The right to use the water resource includes a cluster of rights such as the right to enjoy the use of water to ones' discretion; including the right to use of water to generate income.

Alienation rights - Includes the right to sell, lease, or bequeath the water resource. The right of alienation is a collective choice right permitting its holder to transfer part or all of the collective choice rights to another individual or group.

Access - The rights to enter a defined physical property.

Prohibition of harmful use - This is a duty where the owners liberty to use and manage property is subject to the condition that uses harmful to other members of society are forbidden.

Six categories have been adopted in this thesis. The six are in part based on the same approach as proposed by (Ostrom & Schlager, 1992, p. 252). A meaningful distinction is made among classes of property rights by categorising the five incidents of ownership that are independent of each other. In this thesis, an interdependent “duty not to cause harm” is included as part of the categorisation owing to its importance in the water resources management discourse as reflected in the literature review in Chapter Three.

Included is an additional combination of incidents of ownership, “C6”, that proposes a categorisation that does not include the rights of use and withdrawal as well as alienation. This is based on the observation from practice that, there are water organisations in existence that do not have “use and withdrawal rights” conferred upon them. The additional category, “Cn+1” suggests the possibility of there being other categories not considered in this analysis. For ease of reference, the incidents of ownership are listed within the table.

Additional tables are introduced to further categorize, albeit in general terms, degrees to which the particular bundles of rights are related to the object of water. The rights to manage, the rights of exclusion and the rights of access are further broken into sub-categories that reflect the tendencies of the rights towards being absolute, intermediate and limited. Refer to Table 3. The nuanced sub-categories in Table 4 (absolute, intermediate and limited) are drawn from the idea that ownership in water is also dependent on the purposes of use and a level of authority obtaining, with respect to the exercise of rights¹. There may be varied ways of establishing the sub categories based on observations and experience. The important requirement is to subject the analysis of water agreements to the same kind of criteria, which criteria must be associated with incidences of ownership and the extent of their applicability. Grouping the incidences of ownership into sub categories provides an opportunity for a more detailed review of how the water body is being treated in practice. The sub categories adopted in this thesis are described within the table 4.

¹ Refer to 3.4.2 and 3.4.6 in Chapter 3.

Table 3: Degree of the Implication of Bundle of Rights Associated with Object of Water

| Degree of Incidents of Ownership | | | |
|---|----------------------------|------------------------|-------------------|
| | Towards Absolute-TA | Intermediate- I | Limited -L |
| Management | TAM | IM | LM |
| Exclusion | TAE | IE | LE |
| Access | TAA | IA | LA |

- TAM represents a situation where the rights to manage tend towards being absolute. That is to say, the controlling authority has the capacity and leeway to manage every aspect of the water body to the exclusion of all others.
- IM represents a situation where the elements that form the rights to manage are present to an intermediate degree. An intermediate degree, being characterized as circumstances where certain elements with respect to right to manage cannot be exercised or do not apply. E.g. an authority may have the right to allocate water to one sector but may not have the rights to allocate water to other sectors. Or the rights are limited to a defined body of water out of much larger body, which is managed by other authorities. The idea being that there are instances where an authority may not have all the elements associated with the rights to management as earlier described and may as a consequence have limited leeway to effect certain management rights.
- LM represents a situation where the rights to manage are limited. As an example, such rights to manage may only provide for the scope of an authority to influence managerial decisions and not necessarily exact such managerial decisions as to water use. The managerial realm may be facilitator in character or may be limited to the extent that it affects limited functions without clear capacity to enforce.
- TAE represents a situation where rights of exclusion tend towards being absolute. All the elements associated with exclusion apply.
- IE represents a situation where some of the elements associated with the rights of exclusion do not apply or elements whose applicability is uncertain.
- LE represents situations where the rights of exclusion are limited; the extent to which an Authority can be interfered with is high, or exclusion is based on a declaration, with limited capacity of enforcement.
- TAA represents situations where the rights access tends towards being absolute
- IA represents situations where the rights of access do not necessarily cover the spectrum of uses or situations where there is some level of uncertainty as to the degree of access available to an authority.
- LA represents situations where the rights of access are limited. As an example these could be based on some declaration without a clear mode of execution or a declaration that cannot be readily enforced or whose mode of enforcement is not clear.

An additional consideration with respect to the purpose of use is also included with a view to demonstrate that the object of water can be used for various purposes and each purpose could be deemed to be associated with certain and varied bundles of rights. Refer to Table 5. As an example, ownership may occur with respect to the use of water for energy generation only, whilst ownership of the entire water body vests elsewhere. Table 5 therefore, introduces a prompt for the consideration of ownership based on the purpose of use.

Table 4: Purposes of Use

| Purposes of Use | | | |
|--|-------------------------|-----------------|-----------------------|
| | Towards Absolute | Multiple | Single purpose |
| Purposes of Use | TAP | MP | SP |
| <p>TAP - represents situations where the rights of use are unilateral and not limited by any third party.</p> <p>MP - represents situations where the rights of use accrue to select multiple uses of the water body. Any other purposes other than those selected ideally should have no rights of use.</p> <p>SP – represents the situations where the rights of use are associated with a single purpose. Ideally rights of use, by other users are not available.</p> | | | |

Table 6 is introduced to take into account benefit sharing considerations and the identification of entities that benefit from the agreements. An effort is also made to investigate whether the beneficial use principle is applied. This is owing to its importance within the Lockean framework of thought in relation to ownership in a state where civil governments exist as highlighted in the literature review.

Table 5: Application of the Beneficial Use Principle

| Benefit Sharing Arrangements | | |
|--|----|----|
| Benefits | U1 | U2 |
| Ad –hoc B1 | B1 | B1 |
| Rational B2 | B2 | B2 |
| <p>U1 – Planned benefits accrue to all states; U2 – Planned benefits accrue one or a few States</p> <p>B1 - refers to a situation where some benefits accrue to a few or all states in the basin an account of an act or omission by one or more states without prior rational thought or policy application as to how they accrue.</p> <p>B2 - refers to a situation where a systematic, rational assessment of benefits and the beneficial use principle has been applied. Note that the “Beneficial use”- means the use of water, including the method of diversion, storage, transportation, and application, that is reasonable and consistent with the public interest in the proper utilization of water resources, including, but not limited to, domestic, agricultural, industrial, power, municipal, navigational, fish and wildlife and, recreational uses. Note that the application of the beneficial use principle justifies the assignment of bundles of rights in water and the maintenance of the commonwealth. The meaning of commonwealth adopted is Hobbes’, definition: “(...) <i>One person, of whose acts a great multitude, by mutual covenants one with another, have made themselves every one the author, to the end he may use the strength and means of them all as he shall think expedient for their peace and common defense (...)</i>”.</p> | | |

When carrying out the analysis of the selected agreements, Tables 3, 4, 5 and 6, are presented as one combined table as shown in Table 7. The incidences of ownership secured by a country or entity through agreement are identified by interrogating the provisions which confer such rights therein. The incidences identified; the extent of their application and; benefit sharing outcomes are then highlighted in the combined table (Table 7) for each country or entity. The outputs from the analysis are then discussed taking into account the Zambezi Watercourse system as briefly described in chapter two of this thesis and further elaborated below within the context of this methodology.

Table 6: Combined Table Template

| Country /Entity – Agreement/Scheme | | | | | | | | | |
|---|--------------------|----------------------------|------------------------------------|----|----|----------------|----|----|--|
| Combinations of incidences of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| Depth in Incidences of Ownership | | | | | | | | | |
| | | Towards Absolute-TA | Intermediate- I | | | Limited- L | | | |
| Management | | TAM | IM | | | LM | | | |
| Exclusion | | TAE | IE | | | LE | | | |
| Access | | TAA | IA | | | LA | | | |
| Purposes of Use | | | | | | | | | |
| | | Towards Absolute | Multiple | | | Single purpose | | | |
| Purposes of Use | | TAP | MP | | | SP | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| Benefits | U1 | | | U2 | | | | | |
| Ad –hoc | B1 | | | B1 | | | | | |
| Rational | B2 | | | B2 | | | | | |

Based on chapter two, it should be possible to explain the waters involved in any agreement. The bundle of rights framework can then be used to show the incidences of ownership in water accruing to the states, or organizations that are party to, or related to

the agreements. It should also be possible to reveal which water contributing states are excluded. Informed by the literature review in chapter 3, additional research information, the outputs of the analysis are discussed and concluded upon. The analysis and discussion is also to be informed by, observations from actual project activities and key informant discussions as outlined in chapter one. Table 8 shows how countries and or entities relate to each other in the agreement.

4.3 Lockean Tables

Lockean tables were derived from the works of Widerquist (2010) (Annex B; Table 21). The ‘tables’, are constructed from the broad outline of Lockean theories of property. The approach taken is to simply move to analyse the legal doctrines and agreements based on the categorization set out in the outline. The general idea being that it is possible to draw and explain the basic tenets of the doctrines and agreements on the basis of the theories. This is done by reconstructing the doctrines by selecting elements in the contents of the Lockean tables that suit the description of the doctrine under analysis. The categorizations are derived from a research that investigated various claims on the unilateral appropriation of natural resources by various scholars who attempted to analyse and interpret the Lockean theories of property. These cover individuals’ claim of natural resources in a state of nature. They also cover claims in situations where civil government is established. The outputs as reconstructed are then discussed in relation to the description of the legal doctrines as normally outlined in literature and, in this instance as presented, in the literature review in chapter three, ownership and the beneficial use principle. The attempt is made with a view to show that a number, if not all, of the base doctrines on water are congruent with Lockean theories of property. The broad outline of theories of property is presented below as a menu of Lockean theories.

Table 7: Combined Table of Countries in the Cahora Bassa Treaty

| Cahora Bassa Scheme | | | | | |
|---|---------------------------|----------------------------|---------------------------|---------------------------|---------------------------|
| Combinations of incidents of ownership | | | | | |
| Category of Incidents of Ownership | | | | | |
| | | | country /entity | country /entity | country /entity |
| Ownership | Access Use Control | Use and Withdrawal | | | |
| | | Management | | | |
| | | Exclusion | | | |
| | | Alienation | | | |
| | | Access | | | |
| | | Prohibition of Harmful Use | | | |
| Depth in incidents of ownership | | | | | |
| | Management | | Scale | Scale | Scale |
| | Exclusion | | Scale | Scale | Scale |
| | Access | | Scale | Scale | Scale |
| Purposes of use | | | | | |
| | Purpose | | Multiple or single | Multiple or single | Multiple or single |
| Benefit sharing arrangements | | | | | |
| | | | | | |

- 1) *In a state of nature, individuals have equal claim, or equal lack of claim, to unused natural resources (particularly land), meaning that resources are [one of the following]*
- A) *unowned, or B) owned in common, for the use of everyone but the property of no one, or C) collectively owned as if by a corporation in which everyone owns a share.*
- 2) *In the state of nature, a natural resource may be unilaterally appropriated, [all three of the following]*
- A) *by the first person(s) [one or more of the following]*
- i) *to alter it significantly through work,*
- ii) *to use, claim, possess, or discover it,*
- B) *because [any combination of the following]*
- i) *the first appropriator has an unconditional right to take what s/he needs or wants to pursue her projects without interference;*
- ii) *the first labourer deserves the benefit of his or her efforts;*
- iii) *the modified asset embodies the appropriator's labor;*
- iv) *labour improves and accounts for most of a good's value;*
- v) *improving land effectively makes more resources available for others;*
- vi) *property can help overcome the tragedy of the commons;*
- vii) *a stable property rights system creates benefits for everyone; and/or*
- viii) *property takes a pivotal role in a person's life;*
- C) *providing [any combination of the following]*
- i) *none of the resource is wasted (the no-waste proviso),*
- ii) *everyone has access to subsistence (the charity proviso) , and/or*
- iii) *a sufficient amount is left for others to use (the enough-and-as-good proviso).*
- 3) *The (combined) proviso(s) can be fulfilled [all of the following]*
- A) *either [one of the following]*
- i) *in kind: in the same resources taken by the appropriator, or*
- ii) *by replacement, through*
- (a) *market opportunities,*
- (b) *government services, or*
- (c) *cash;*
- B) *in terms of [either]*
- (i) *standard of living or*
- (ii) *independent functioning, and*
- C) *at the following level [one of the following]*
- (i) *weak,*
- (ii) *strong, or*
- (iii) *maximum strength².*
- 4) *Civil society is established, at which time [both of the following]*

² For an explanation of what is meant by weak, strong or maximum strength see pages 12 – 14 of the cited Journal.

A) property rights [one of the following]

- i) become partially or entirely subject to (and contingent upon) social agreement, or*
- ii) are carried over into civil society, because [all of the following]*
 - a) the propertyless tacitly agree to unequal property,*
 - b) the protection of property is the reason civil society exists, and*
 - c) a statute of limitations protects current property holders from the responsibility for past injustices;*

B) the proviso(s) [one of the following]

- i) are partially or entirely obviated by agreement,*
- ii) remain in effect but are fulfilled by an unregulated market, or*
- iii) remain in effect and justify government regulation of property.*

5) In civil society, government may not arbitrarily seize property. It may tax and regulate property, [one of the following]

A) only with the consent of the majority of the governed [any combination of the following]

- i) to protect self-ownership and property rights,*
- ii) to maintain necessary government expenditure (such as public roads and services), and/or*
- iii) to enforce whatever provisos remain in effect (if necessary); or*

B) only with the individual consent of each specific owner (Widerquist, 2010, pp. 19-20).

This chapter resulted in a framework comprising the bundle of rights framework and the Lockean tables. As mentioned these can be used to review agreements and Laws with an ownership lens as espoused in literature, on the bundle of rights and Lockean theories of property. The framework was applied to the selected legal agreements and legal doctrines as presented in Chapter five below. The idea is to determine whether or not there is ownership in water by investigating ownership aspects in greater detail.

CHAPTER 5: RESULTS AND DISCUSSION

This chapter focuses on the application and discussion of results of the framework for analysis to selected water agreements and legal doctrines. Three legal agreements were analysed using the framework for analysis. These are the Zambezi Watercourse Commission agreement (ZAMCOM); the Zambezi River Authority (ZRA) agreement and; the Cahora Bassa Treaty. Although the Cahora Bassa is not normally deemed to be a trans-boundary water agreement (Turton, 2008, p. 27), there are a number of aspects with respect to the institutional arrangements that suggest that the Cahora Bassa enterprise, ought to be a subject for consideration in the trans-boundary water resources management discourse.

As mentioned in Chapter Four, these agreements were interrogated to determine whether or not there is ownership in water by investigating ownership aspects in greater detail. They were also used to determine the degree to which countries have secured incidents of ownership in water based on the agreements.

In addition, three legal doctrines were analysed using the Lockean tables. This was done by reconstructing the legal doctrines based on Lockean theories of property. The reconstruction was informed by outlines of selected legal doctrines derived from existing literature. The doctrines selected for analysis included the Riparian; Prior Appropriation and; Equitable and Reasonable Utilization (ERU).

The basis of these selections was to firstly demonstrate the workability of the framework for analysis. Secondly, the selected agreements are the main existing ones in the Zambezi Watercourse. Based on literature review, the Riparian and Prior Appropriation doctrines are the primary principles in water law. Others are modifications of these. The selection of the ERU is on account of the fact that it is the main doctrine adopted in the ZAMCOM agreement. The interrogation was meant to show that water doctrines are derived from jurisprudence on ownership. It was also meant to establish the various

ways in which incidents of ownership can materialize based on the construct of the agreements.

5.1 Analysis of Legal Doctrines

Three legal doctrines were analysed out of the main existing ones. Based on the methodology (legal reasoning), the outputs from the analysis of the doctrines are considered to be representative of all others.

5.1.1 Reconstruction of the Riparian Doctrine

A reconstruction of the Riparian doctrine using the Lockean tables is made using the following sections as a combination of **(4(a) (i),(ii), 2(b) (i-viii),2(c)(i)(ii),3(a),(b). or (4,5,1,(b), substitution of 2(c) by 3)**. That is:

In a state of nature or in a civil state, individuals have equal claim, or equal lack of claim, to unused natural resources (Say land or and water). The resources are, owned in common through civil state, for the use of everyone but the property of no one. The land and water resource may be unilaterally appropriated, provided: none of the resource is wasted (the no-waste proviso), and everyone has access to subsistence (the charity proviso), and, a sufficient amount is left for others to use (the enough-and-as-good proviso). In the instance where the proviso cannot be satisfied directly, they can be satisfied through state services as well as beneficial use to all¹.

5.1.2 Reconstruction of the Prior Appropriation Doctrine

A reconstruction of the 'Prior Appropriation' doctrine using the Lockean tables is made using the following sections as a combination of **4;1(b),(2 (a)(i)or(ii),2(b) (i)-(vii);2(c)(i); 5 a(i and/or ii and/or iii), and 5b**. That is:

Civil society is established, at a time when property rights become partially or entirely subject to (and contingent upon) social agreement, or were carried over into civil society, because the property less tacitly agree

¹This could be under stood to address the limits of access set by riparian rights accruing only to those who own land adjacent to the water body

to unequal property or, the protection of property is the reason civil society exists, and a statute of limitations protects current property holders from the responsibility for past injustices. In addition, the proviso(s) are partially or entirely obviated by agreement or, remain in effect but are fulfilled by an unregulated market, or remain in effect and justify state regulation of property. Individuals have equal claim, or equal lack of claim, to unused natural resources (particularly land and in this case water), meaning that resources are owned in common, for the use of everyone but the property of no one. The water resource may be appropriated, by the first person(s) to alter it significantly through work, to use, claim, possess, and discover it because the first appropriator has an unconditional right to take what s/he needs to pursue her projects without interference; and/or the first labourer deserves the benefit of his or her efforts; and the modified asset embodies the appropriator's labour; because the labour improves and accounts for most of a good's value; thereby improving land effectively making more resources available for others; The property can help overcome the tragedy of the commons; a stable property rights system creates benefits for everyone. Property takes a pivotal role in a person's life. This is so, providing none of the resource is wasted (the no-waste proviso). States may not arbitrarily seize property or in this case the water entitlement. It may tax and regulate property or entitlement only with the consent of the majority of the governed protect self-ownership and property rights, and or to maintain necessary state expenditure (such as public roads and services), and/or to enforce whatever provisos remain in effect if necessary or only with the individual consent of each specific owner.

Numerous scholarly findings have pointed out the differences between Riparian and Prior appropriation doctrines (Elrawady & Mohammed, 2005, p. 4), (Adams, Levina, & Levina, 2006, p. 13). But there have not been any explicit findings that have pointed out the core similarities shared by the two doctrines. These similarities have been noted in

this thesis based on the above re-constructs of the two doctrines. The core similarities are that: both have their foundation in land or are attached to land ownership. This entails that the prior appropriation right to use the water from the river or water resources is acquired, through the first in time first in right principle based on the state's rule. Importantly, the beneficial use principle is a prior condition for the application of the first in time first in right equitable rule. The water resource is associated with an identified parcel of land, whereas the riparian automatically obtains rights to the river as long as it is adjacent to the individual's owned land (Hillbom, 2007, p. 11). The fundamental principle is that there must be land ownership first before water rights (ownership) can occur. Both go hand in hand since an individual or the state holds the rights to both the land and water. Therefore, seen from another perspective, the Riparian doctrine could be said to represent a shade of the Appropriation doctrine. The first in time, first in right principle applies to the Riparian doctrine through its application in land allocation regimes. In many jurisdictions land allocation is based on and managed through prior appropriation (Pepeteka, 2013, p. 1). As with prior appropriation, the beneficial principle use applies. The land associated with the water entitlement must be put to beneficial use; otherwise, both entitlements may be withdrawn by an authority.

5.1.3 Reconstruction of the ERU Doctrine

How does this doctrine sit within the framework of the Lockean tables? Answering this question provided some useful insights with respect to the form and character of the doctrine from the perspective of the Lockean theories of appropriation. The following expression was applied: **1(b), 2 a (ii), 2b (i, ii, iv, v), c (i, iii)**. This reads as follows:

In a state of nature, individuals (countries) have equal claim, or equal lack of claim, to unused natural resources (particularly land and in this case 'water'), meaning that resources are owned in common, for the use of everyone but the property of no one. Further, in the state of nature, a natural resource may be unilaterally² appropriated, by the first person(s) to use, claim or possess it because the first appropriator has an unconditional right to take what s/he needs or wants to pursue her projects

²In the instance of the paper in this paragraph, a unilateral action signifies a right to appropriate. In this instance it is subject to a negotiated process on account of consultations based on other provisions of the conventions and/or agreements.

without interference or the first labourer deserves the benefit of his or her efforts or labour improves and accounts for most of a good's value or improving land effectively makes more resources available for others. This is provided that none of the resource is wasted (the no-waste proviso) in addition that a sufficient amount is left for others to use (the enough-and-as-good proviso).

This expression is closest to the definition similar to the ERU doctrine using the Lockean table. This revealed the following: utilisation of water in an equitable and reasonable manner based on listed factors to be taken into account signifies the withdrawal of a certain level of ownership from individual country to the collective. So that ownership is in commons. Further such utilization is focused more on satisfying the "as enough-and as good proviso." Sufficient amounts must be left for other countries to use. All factors set out under Article 6 are primarily meant to address how the "enough and as good proviso" should be satisfied. Only Article 6(i), E, when introducing the need to take into account existing and potential uses of the Watercourse, introduces the idea of prior appropriation. In addition, original or prior appropriation was introduced by the definition of Watercourse and the resultant claims states have on the water. Important, though not explicitly stated, once water is secured and utilised on the basis of ERU, and the associated due process, the secured and utilised waters are as matter of fact appropriated by the beneficiary states in full. Therefore, Article 6(i), E, introduces the key element of the doctrine of prior appropriation namely first in time, first in right. Attaining optimal and sustainable utilisation is in part, primarily linked to the continuous securing of benefits and therefore linked to E. Based on the above, it is evident that the output of the construct of the doctrine based on the Lockean table is to a very great extent equivalent to the doctrine as outlined in the convention. The use of the Lockean tables reveals some other aspects regarding ERU. Some of these observations are shared below.

1. The ERU doctrine presupposes that we are not living in an age of water scarcity and the individual or country should not appropriate more than it needs for its

basic sustenance. Further, we are not living in an age where civil society and state is established and alternatives to satisfying the Lockean provisos are not available. Property and the fundamental bases of state as portrayed in the Lockean Tables 3, 4, and 5 do not apply. Of course this is not the reality of the situation. Civil society and civil state have been formed; the formation of most civil collectives within the SADC was based on civil struggles for freedom and some with bloodshed. The territorial claims of a collective are in part, inevitably linked to the protection of property, land and natural resources. These are revealed by most national laws and constitutions, which include provisions on the vesting of ownership of water in the states.

2. The land area of coverage of the Watercourse is the basis of participation in the Watercourse agreement. This participation is based on the jurisdiction civil States have over land and natural resources (including water) within their territories. This creates a contradiction with respect to what ERU introduces because there is at first, an individual state territorial claim of ownership of land and natural resources which is acknowledged through the definition of the Watercourse and the rights of exclusion accruing to those participating member states only. ERU confers the ownership to the commons. This becomes a collective ownership without the recognition of individual country ownership which ownership at first has formed the basis of participation.
3. ERU by its construct removes some incidents of ownership, such as the right to alienate between states, and yet allows for such rights to accrue at national level between the individual and the state. Therefore, individuals within a state pay for water, through their water rights systems, whilst countries appropriate such waters for free which waters are further sold in a manner of speaking to the individuals of within those states. Note that such individuals could very well be, depending on the construct of their legal fiction, another country outside the Watercourse. Alienation can occur through contract or any other legal device. It is important to note that these individuals do not live within the same socio and economic environment. There are not equal in many respects. A rule in equity

must deal with equals³. The political, social and economic conditions of the countries in SADC or the Zambezi river basin are very different. The implication of this statement if considered to be true is that, the political social and economic standing of individual countries within the member states are not equal.

4. Notwithstanding the words used to craft ERU away from the issues of ownership of water, this effort falls short, as the initial recognition of Watercourse states is based on the ownership of land and the associated water resource. In addition, the end results, is that water allocations accrue to member states, the allocations to a very great extent, manifest all the incidents of ownership.

The reconstruction of legal doctrines confirms that the various doctrines can be considered as being derived from the broad base theories on ownership or from the theories of Locke. The three reconstructed doctrines confirm the idea that

the water resources management discourse is associated with matters related to incidents of ownership and the application of the beneficial use principle. The doctrines represent legal approaches that have been devised, over time and depending on the circumstances prevailing, to secure incidents of ownership.

The results of the outcome of the application of all water doctrines, both those devised at both national or trans-boundary level, indicate that securing of water through the incidents of ownership is the main goal. In addition, based on the reconstruction of the doctrines, all water doctrines include the application of the beneficial use principle. This principle is ignored or not applied at trans-boundary level.

5.2 Analysis of Selected Agreements

The analysis of selected agreements is presented below.

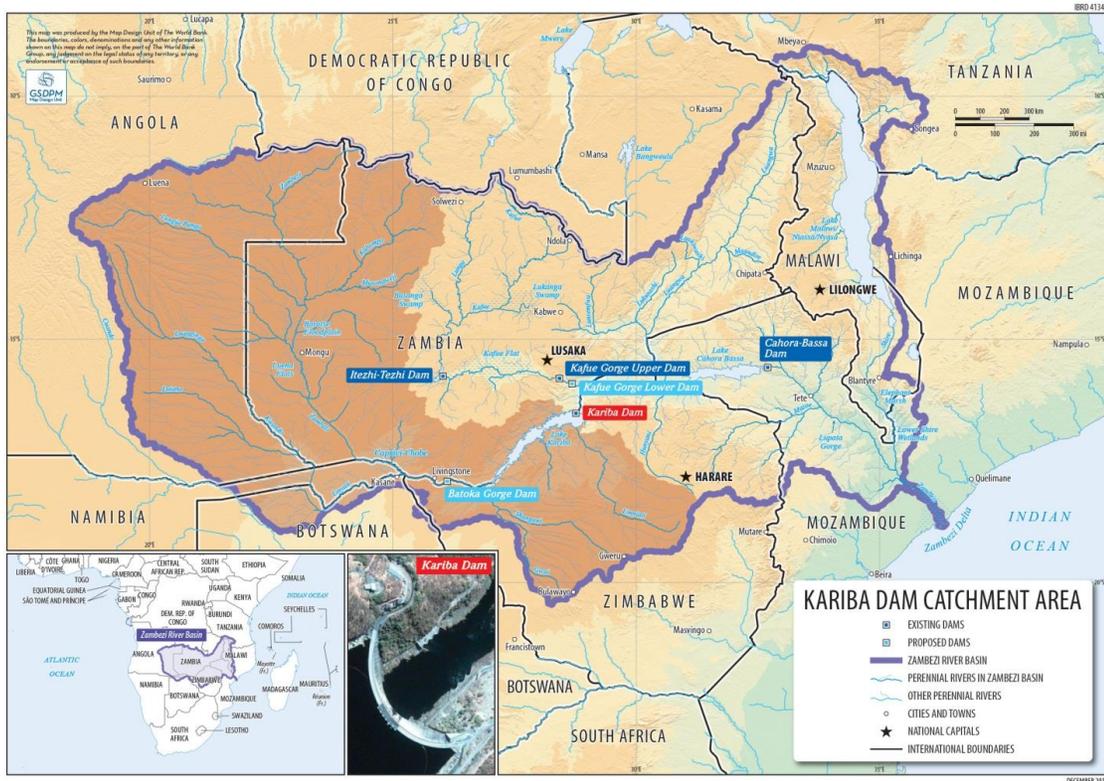
5.2.1 Zambezi River Authority Agreement (ZRA)

ZRA's area of authority based on its physical characteristics includes: - a) the water occurring in the Zambezi River bordering Zambia and Zimbabwe; b) the water occurring

³ See *Abigail v Lapin* [1934] AC 491 at 502

in the Kariba dam reservoir (Lake Kariba); and c) the Kariba dam wall and all its installations. Based on in stream uses, the definition includes the socio-economic activities occurring on Lake Kariba and the Zambezi River within the physical characteristics e.g. fishing, tourism, canoeing, etc.

Figure 3: Kariba Dam Catchment



(Source: (World Bank, 2015)

The boundary line between Zambia and Zimbabwe forms part of the definition of the scheme in so far as it separates in-stream activities, which are undertaken within the confines of each state. Based on abstractive uses the definition includes the uses that require the withdrawal of water from the river and/or lake, for various purposes.

Hydropower generation has been included as an abstractive use even though it is in many respects an in-stream use. The inclusion is on account of the fact that the boundary line between the states is not a factor. In addition, this definition for the purpose of simplicity includes the abstractive uses and discharge return flows. Furthermore, as betrayed by Article 18 of the ZRA Act⁴ and the location of hydro climatic stations outside the defined physical areas the sphere of influence extends to the sources of water of the Kariba dam reservoir. Based on this broadened definition, an analysis of the ZRA agreement was undertaken using the bundle of rights framework for analysis. Three entities; Zambia, Zimbabwe and ZRA were interrogated. These are the three main organs that have ‘authority’ under the agreement. The outcome from the analysis is presented below.

5.2.1.1 Zambia’s Incidents of Ownership in ZRA

The Table 9 is an illustration of Zambia’s incidents of ownership in relation to the Kariba Scheme. Zambia falls under category ‘C1’ where the rights of use and withdrawal, management, exclusion, access, and alienation coupled with the duty to prohibit harmful use, accrue with respect to water resources within the Kariba dam complex and the river bordering Zambia and Zimbabwe. This is based on the following:

- a) The rights of **use and withdrawal** sit with Zambia with respect to water resources within her area of authority as defined above. This position is formalised under Article 3 and is also supported in the preamble of the agreement⁵ (The Zambezi River Authority Act Cap 467, 1987, p. 6). Specific

⁴ Article 18 states that 1. So as to ensure the efficient and equitable use of the waters of the Zambezi River, the Contracting States undertake to- (a) keep each other informed of any proposals approved by them for the abstraction of water from the Kariba Dam or any other dam that may be constructed on the Zambezi River or for the impounding or abstraction of water from the sources of the said dam or other future dams for irrigation or other purposes; (b) consult the Authority on any proposals for the impounding or abstraction of substantial quantities of water from the Kariba Dam or any other dams that may be constructed on the Zambezi River and seek the approval of each other before approving such impounding or abstraction; (c) consult with each other and the Authority, if so requested by the Authority through the Council in regard to any problems arising from the abstraction of water from the Kariba Dam or any other future dams that may be constructed on the Zambezi River, or the impounding or abstraction of water from the sources of the said Dam or other future dams. 2. They further undertake to ensure that the Ministers responsible for energy in their respective territories liaise and co-ordinate with each other on all matters affecting the public interest of their two territories in relation to the ownership, management, control and operation of the Authority.

⁵ Article 3 states that: The Contracting States, recognising that the operation and maintenance of the Zambezi Scheme is an economical and effective means of providing water for the generation of electric power and for other purposes which the Contracting States may decide upon have, accordingly, agreed to utilise, operate and maintain the said Scheme. The Preamble states that The Republic of ZAMBIA and the Republic of ZIMBABWE, desiring to obtain, for the economic industrial and social development of the two countries, the greatest possible benefit from the natural advantages offered by the waters for the Zambezi River and to improve and intensify the utilisation of the waters for

provisions are provided for the use of water for hydropower purposes in Annexure one of the Act. No provisions are provided for use of water for other purposes.

Table 8: Bundle of Rights Framework for Analysis –Zambia

| Zambia - Kariba Scheme | | | | | | | | | |
|--|--------------------|----------------------------|------------------------------------|----|----|----------------------|----|----|--|
| Combinations of incidents of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| Depth in Incidents of Ownership | | | | | | | | | |
| | | Towards Absolute | Intermediate | | | Limited | | | |
| Management | | TAM | IM | | | LM | | | |
| Exclusion | | TAE | IE | | | LE | | | |
| Access | | TAA | IA | | | LA | | | |
| Purposes of Use | | | | | | | | | |
| | | Towards Absolute | Multiple | | | Single purpose | | | |
| Purposes of Use | | TAP | MP | | | SP | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| | | To all States | To a few States | | | To one or two States | | | |
| Benefits | | U1 | U2 | | | U3 | | | |
| Ad –hoc | | B1 | B1 | | | B1 | | | |
| Rational | | B2 | B2 | | | B2 | | | |

the production of energy and for any other purpose beneficial to the two countries, have decided, pursuant to the resolution of the Higher Authority for Power relative to the future operations of the Central African Power Corporation and the provisions of the Inter-Governmental Agreement of 14th February, 1986, to conclude the present Agreement

a) The **rights to manage** tend towards being absolute but only for the water body sitting within the boundary of Zambia. The rights to manage occur on two fronts. Firstly, through the representation and participation in the policy and management organs of ZRA. This is provided for in Articles 4, section 1; Article 8 of the Act⁶. The rights to manage are supported by Article 11 which provides for the appointment of a Chief executive and other officers⁷. Secondly, the rights to manage are based on the countries internal laws. It is worth the mention that this right to manage was not available to Zambia until the repeal of the Water Act Cap 198 which act excluded the Zambezi River. This was particularly so with respect to water abstractions and the water resources management function. Other uses of the scheme and river were available to Zambia through national laws related to its water using sectors. The rights to manage are also limited in the instance of water allocation for energy production. Water allocation for energy is jointly determined by both Zambia and Zimbabwe through the Zambezi River Authority. Article 18 of the ZRA agreement attempts to set limits on the rights of use and withdrawal derived from the activities that might affect the availability of water for hydropower generation⁸. That is, from the sources of water of the Kariba complex. The sources and country contributions have never been quantified. It also includes an attempt to address issues of equitable utilization of the water. Equitable utilization is not defined in the agreement. Equitable utilisation has never been a subject for discussion since the

⁶ Article 4, section 1 states that: 1. The Contracting States undertake to ensure, through their respective laws referred to in paragraph (b) of sub-Article 2 of Article 2, the continued existence of the Higher Authority for Power as the Council of Ministers. Article 8 section 1 states that: There shall be a Board of Directors which, subject to the overall direction of the Council, shall be responsible for the policy, control and management of the Authority

⁷ Article 11 provides that: There shall be a Chief Executive to the Authority who shall, subject to the approval of the Council, be appointed by the Board and shall be a national or resident of the Contracting State other than that in which the Authority's Head Office is situated. The provisions of paragraph (b) of Article 13 shall apply as appropriate in relation to the appointment of the Chief Executive.

⁸ Article 18 states that 1. So as to ensure the efficient and equitable use of the waters of the Zambezi River, the Contracting States undertake to- (a) keep each other informed of any proposals approved by them for the abstraction of water from the Kariba Dam or any other dam that may be constructed on the Zambezi River or for the impounding or abstraction of water from the sources of the said dam or other future dams for irrigation or other purposes; (b) consult the Authority on any proposals for the impounding or abstraction of substantial quantities of water from the Kariba Dam or any other dams that may be constructed on the Zambezi River and seek the approval of each other before approving such impounding or abstraction; (c) consult with each other and the Authority, if so requested by the Authority through the Council in regard to any problems arising from the abstraction of water from the Kariba Dam or any other future dams that may be constructed on the Zambezi River, or the impounding or abstraction of water from the sources of the said Dam or other future dams. 2. They further undertake to ensure that the Ministers responsible for energy in their respective territories liaise and co-ordinate with each other on all matters affecting the public interest of their two territories in relation to the ownership, management, control and operation of the Authority.

commencement of the agreement. Article 18 has never been effected and unilateral action without consultation is the ruling theme.

- b) **Rights of exclusion** tend towards being absolute with respect to the defined water body within the boundary of Zambia. Zimbabwe and all other countries are excluded from using the said waters. This is formalized firstly by virtue of the fact that the Act applies to Zambia and Zimbabwe only, as betrayed in the preamble already highlighted above. Secondly, by the fact that the joint management arrangement between Zambia and Zimbabwe is primarily for the operation and maintenance of the dam wall and installations. There are no provisions for the actual use and management of the said waters. The use and management of water for purposes other than water allocation for the generation of electricity is carried out unilaterally (Zambezi River Authority Legal Review, 2013).
- c) The **rights of alienation** are held by Zambia for the water within its territory since the use of water in its jurisdiction attracts a use and abstraction fee. However, the application of the rights to alienate among states is uncertain as the Act is silent on the matter. However, the fact that the quantum of water contribution does not apply as a factor in the scheme, it can be assumed that the right to alienate does not apply. Otherwise, Zambia would have been in a position to exercise this right within the context of the agreement, it being the major water contributor to the scheme.
- d) By virtue of the purpose and function of the organs under the Act, the **rights of access** tend towards being absolute within her own territorial borders. This is with the exception of the function of water allocation for energy generation and the operation and maintenance of the scheme where ZRA and by implication Zimbabwe, have limited rights of access.
- e) The duty **to prohibit harmful use** is not explicitly provided for in the Act. However, Article 18 could be understood to be a provision meant to address the kind of harm that would compromise energy production. Article 9, Section “d”⁹

⁹Article 9 ‘d’ states that the function of the Authority shall be to collect, accumulate and process hydrological and environmental data of the Zambezi River for the better performance of its functions and for any other purpose beneficial to the Contracting States;

suggests that Zambia and Zimbabwe are in a position to address any aspect that would affect the attainment of benefits from the scheme. This kind of harm is in relation to Zambia and Zimbabwe. It is not in relation to other states in the Watercourse.

- f) The **purposes of use** tend towards being absolute for water situated within Zambia's territory. This is provided for in the preamble and Article 3 of the Act. Since there are no provisions addressing the use of water for other purposes, the limits set are those provided for in domestic legislation.
- g) **Benefits accrue** to Zambia intentionally with no rational estimate of actual benefits accruing. There are no provisions providing for the application of the beneficial use principle. The beneficial use principle does not apply between Zambia and Zimbabwe. It also does not apply with respect to other Zambezi Watercourse states. Any benefits accruing to other nations such as those derived from the Southern Africa Power Pool¹⁰ arrangements that are linked to the energy sector, occur on an impromptu basis. However, the beneficial use principle must be said to apply within Zambia's territory as its returns from the venture directly benefit the Zambian people in totality as a commonwealth.

5.2.1.2 Zimbabwe's Incidents of Ownership in ZRA

The Table 10 is an illustration of Zimbabwe's incidents of ownership in relation to the Kariba Scheme. Zimbabwe like Zambia, falls under category 'C1' where the rights of use and withdrawal, management, exclusion, access, and alienation coupled with the duty to prohibit harmful use, accrue with respect to water resources within the Kariba dam complex and the river bordering Zambia and Zimbabwe. The basis of this position is the same as that of Zambia and so will not be cast again below save for a few deviations:

- a) The **rights of use and withdrawal**, are the same as those of Zambia
- b) The **rights to manage** are the same of those of Zambia except for the position that the fact that the managerial function sits more with Zimbabwe since the

¹⁰The Southern African Power Pool (SAPP) was created with the primary aim to provide reliable and economical electricity supply to the consumers of each of the SAPP members, consistent with the reasonable utilisation of natural resources and the effect on the environment.

position of chief executive must be held by a Zimbabwean official. Zambia hosts the Head Office.

Table 9: Bundle of Rights Framework for Analysis –Zimbabwe

| Zimbabwe - Kariba Scheme | | | | | | | | | |
|--|--------------------|----------------------------|------------------------------------|----|----------------------|----|----|----|--|
| Combinations of incidents of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C 3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| Depth in Incidents of Ownership | | | | | | | | | |
| | Towards Absolute | | Intermediate | | Limited | | | | |
| Management | TAM | | IM | | LM | | | | |
| Exclusion | TAE | | IE | | LE | | | | |
| Access | TAA | | IA | | LA | | | | |
| Purposes of Use | | | | | | | | | |
| | Towards Absolute | | Multiple | | Single purpose | | | | |
| Purposes of Use | TAP | | MP | | SP | | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| | To all States | | To a few States | | To one or two States | | | | |
| Benefits | U1 | | U2 | | U3 | | | | |
| Ad –hoc | B1 | | B1 | | B1 | | | | |
| Rational | B2 | | B2 | | B2 | | | | |

- c) **Rights of exclusion** are the same as those for Zambia
- d) The **rights of access** are the same as those held by Zambia.
- e) The **rights of alienation** are the as those held by Zambia.
- f) The **duty to prohibit harmful use** is as the duties held by Zambia.
- g) The **purposes of use** tend towards being absolute for water situated within Zimbabwe's territory.
- h) **Benefits accrue** to Zimbabwe and Zambia in the same way. The beneficial use principle does not apply in the same way it does not apply for Zambia.

5.2.1.3 Zambezi River Authority's Incidents of Ownership in ZRA

Table 11 is an illustration of Zambezi River Authority's incidents of ownership under the Act. ZRA 'C2' where the rights of use and withdrawal, management, exclusion, access, and alienation accrue to ZRA with respect to water resources within the Kariba dam complex and the river bordering Zambia and Zimbabwe. The basis of this position is as follows;

- a) The rights of **use and withdrawal** are formalized by ZRA's reservoir management and water allocation function as espoused in Annexure two and as per Article 9 of the agreement. The right of use and withdrawal are limited to serving the Hydropower utilities only. The rights of management are limited.
- b) the **rights to manage** is formalized by Articles 8, 9¹¹ and Annexure II spell out the establishment of the administrative arms, functions and reservoir operating mandate of the ZRA. The rights to manage are limited. The scope for ZRA is limited to a few specific issues, primarily reservoir management, allocation of water to energy utilities, planning for new developments and; maintenance of the dam wall. The managerial realm is facilitatory in character and is limited to the extent that it affects limited functions without clear capacity to enforce. ZRA has no mandate to manage any other aspect of the Kariba complex.

¹¹ Article 9 states that: The function of the Authority shall be to- (a) operate, monitor and maintain the Kariba Complex; (b) in consultation with the National Electricity Undertakings investigate the desirability of constructing new dams on the Zambezi River and make recommendations thereon to the Council; (c) subject to the approval of the Council construct, operate, monitor and maintain any other dams on the Zambezi River; (d) collect, accumulate and process hydrological and environmental data of the Zambezi River for the better performance of its functions and for any other purpose beneficial to the Contracting States

- c) The exercise of **exclusion rights** by ZRA is limited as ZRA merely acts as an agent with limited autonomy for the two countries for limited functions. The rights of exclusion are exercised by the contracting states as described above.
- d) The **rights of access** tend towards being absolute in the sense that ZRA has access to every part of the water body, but only with a view to facilitate the administration and execution of its functions as provided for under the ZRA act. This is formalized Article 9 and Annexure 2 which out, functions and reservoir operating mandate of the ZRA.
- e) The **purpose of use** tends towards being limited and is primarily for a single purpose meant for the allocation of water to the energy utilities. This is as provided for in Article 9 and Annexure 2.
- f) The duty **to prohibit harmful use** is not explicitly provided for in the Act. However, Article 18 could be understood to be a provision meant to address the kind of harm that would compromise energy production. Article 9, Section “d¹²” suggests that Zambia and Zimbabwe are in a position to address any aspect that would affect the attainment of benefits from the scheme. ZRA’s role is facilitatory in nature and is mandated to collect and provide information that could be used to address the issue of harm.

¹²Article 9 ‘d’ states that the function of the Authority shall be to collect, accumulate and process hydrological and environmental data of the Zambezi River for the better performance of its functions and for any other purpose beneficial to the Contracting States;

Table 10: Bundle of Rights Framework for Analysis –Zambezi River Authority

| Zambezi River Authority - Kariba Scheme | | | | | | | | | | |
|---|--------------------|----------------------------|------------------------------------|----------------------|----|----|----|----|---------|--|
| Combinations of incidents of ownership | | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | | |
| | | | C1 | C2 | C3 | C4 | C5 | C6 | C (N+1) | |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | | Other possible combinations not considered |
| | | Management | X | X | X | X | | X | | |
| | | Exclusion | X | X | X | X | | | X | |
| | | Alienation | X | X | X | | | | | |
| | | Access | X | X | | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | | X | |
| | | | | | | | | | | |
| Depth in Incidents of Ownership | | | | | | | | | | |
| | | Towards Absolute | Intermediate | Limited | | | | | | |
| Management | | TAM | IM | LM | | | | | | |
| Exclusion | | TAE | IE | LE | | | | | | |
| Access | | TAA | IA | LA | | | | | | |
| Purposes of Use | | | | | | | | | | |
| | | Towards Absolute | Multiple | Single purpose | | | | | | |
| Purposes of Use | | TAP | MP | SP | | | | | | |
| Benefit Sharing Arrangements | | | | | | | | | | |
| | | To all States | To a few States | To one or two States | | | | | | |
| Benefits | | U1 | U2 | U3 | | | | | | |
| Ad –hoc | | B1 | B1 | B1 | | | | | | |
| Rational | | B2 | B2 | B2 | | | | | | |

A Combined table showing the relations between organs under the agreement is presented in Table 12.

Table 11: Combined Incidents of Ownership: Zambezi River Authority Agreement

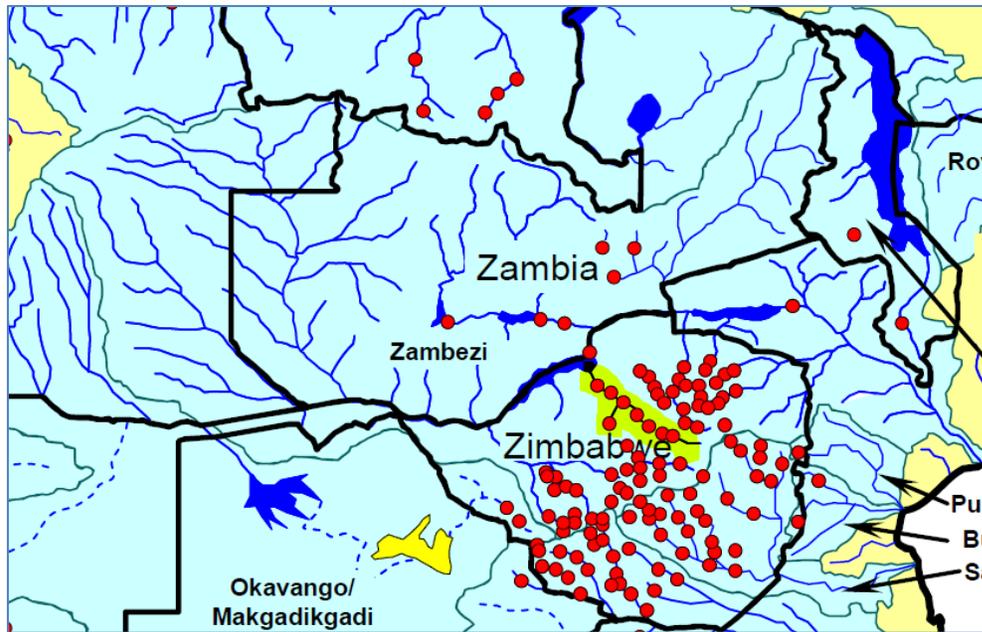
| Zambezi River Authority Agreement | | | | | |
|---|--------------------|----------------------------|----------|----------|---------|
| Incidents of ownership: Zambia; Zimbabwe; Zambezi River Authority | | | | | |
| | | | ZAM | ZIM | ZRA |
| Ownership | Access Use Control | Use/Withdrawal | X | X | X |
| | | Management | X | X | X |
| | | Exclusion | X | X | X |
| | | Alienation | X | X | X |
| | | Access | X | X | X |
| | | Prohibition of Harmful Use | X | X | |
| Depth of incidents of ownership | | | | | |
| Management | | | Absolute | Absolute | Limited |
| Exclusion | | | Absolute | Absolute | Limited |
| Access | | | Absolute | Absolute | Limited |
| Purpose of use | | | | | |
| Purpose | | | Absolute | Absolute | Single |
| Benefit sharing arrangements | | | | | |
| Benefits – a) The beneficial use principle is not applied; b) Benefits accrue to Zambia and Zimbabwe; c) <u>Adhoc</u> , limited benefits accrue to other states; d) Zambia and Angola as major water contributing States lose out on additional benefits when territorial ownership in water is not considered. | | | | | |

Based on the analysis and literature review above, ownership with respect to the water as defined, for Zambia, tends towards having absolute ownership, only for the water body occurring within its own territory. The same position holds true for Zimbabwe. This is to the exclusion of all other states in the basin. Angola is worth specific mention since it contributes a substantial volume of water to the Kariba annually with no benefits accruing to her. Refer to Figure 1 above. Zambia and Angola each contribute more than 400 m³/s of mean annual river flow to the Kariba. Zimbabwe contributes less than 206 m³/s. A substantial amount of this water has been impounded for use within Zimbabwe. See Figure 7 (see highlighted area) further reducing its limited contribution to the Kariba.

This having been said, Zimbabwe has secured ownership of the substantial volumes of water derived from Zambia and Angola sitting within its territory through the impoundment of the Kariba. Thus Zambia and Angola have forgone ownership over these volumes of water and no benefits have accrued to them. Important to note is that, both Zambia and Angola will find it difficult to develop the water resources in a significant way by major in-stream and abstractive uses if such uses will have a negative effect on the Kariba scheme.

The right to manage is also skewed, tilting ownership towards Zimbabwe on account of the observation that the top office is always held by a Zimbabwean Official. The exercise of managerial power as already highlighted in the literature is a powerful instrument of control. Zambia, therefore, has lesser degree of ownership on account of this organizational arrangement.

Figure 4: Distribution of Large Dams across the Mainland in Zambezi River Basin

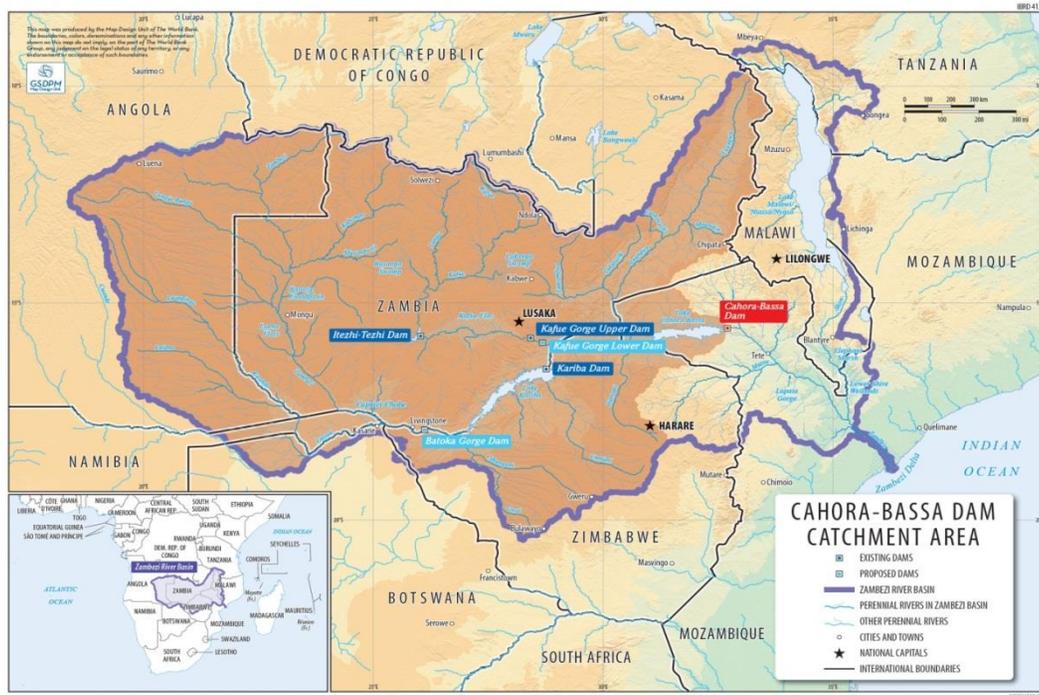


(Source: (Turton, A South African Perspective on a Possible Benefit-Sharing Approach for Transboundary Waters in the SADC Region, 2008, p. 183)

5.2.2 Cahora Bassa Treaty

With reference to Figure 6, the sources of the waters in the Cahora Bassa are derived from the catchment area that covers Angola, Botswana, Namibia, Zambia, Zimbabwe and Mozambique. As with other in stream and abstractive uses, the catchment areas contributing to the Cahora Bassa are not mentioned in the agreement. The catchment area within the context of this paper is deemed to be part of the area of influence of the Treaty. The Cahora Bassa scheme as defined in the Treaty¹³ as applied to this analysis.

Figure 5: Cahora-Bassa Dam Catchment Area



(Source: (World Bank, 2015))

The agreement reveals that there are three main players in the agreement, namely the state of South Africa, the state of Portugal, and the state of Mozambique. For ease of analysis, the other organs created under the treaty namely the Hidroeléctrica de Cahora Bassa (HCB) which is a limited liability joint-stock company duly constituted in

¹³ The Treaty defines the scheme as "Cahora Bassa project" which means: (i) The conservation dam and works erected on the river Zambesi at the site known as Cahora Bassa at 15°35' South and 32°42' East approximately, within the territory of Mozambique; (ii) The hydro-electric power station that has been erected on the south bank of the river and the required ancillary works erected for the purposes of the generation and supply of electricity in terms of the supply contract; (iii) The transmission system erected for the purposes of transmitting electricity from Cahora Bassa and delivering the same to Escom at Apollo distribution station, including the converter equipment, transformers and ancillary equipment installed for this purpose at Cahora Bassa and Apollo.

accordance with the laws of Mozambique on 23 June 1975; The Electricity Supply Commission contemplated in the Electricity Act, 1958 (Southern Africa Record, 1984, p. 4) of the Republic of South Africa (Escom) and the Permanent Joint Committee have been assumed to be an integral part of either Mozambique, Portugal or South Africa or all. In the instance of this work, HCB, notwithstanding its autonomous organisational standing, is an integral part of Portugal and Mozambique based on the shareholding interests therein. Similarly, the Escom is an integral part of South Africa. The Joint Permanent Technical Commission is an integral part of Mozambique, Portugal and South Africa. The construct of the organisational arrangements under the agreement, provide very detailed roles for the created organizations. The roles are firstly, attributable to the interests of each country. Secondly, the roles and associated rules of behaviour are so detailed; they create a detailed technical financial and administrative bureaucracy (like an automated system) to the extent that; there is little room for discretionary action under the organs by the organs themselves. Overarching authority and decision making that require the use of discretion reside mainly with the states. The secondary organs in this instance have been viewed and explained away as an integral part of the principal parties to the agreement.

5.2.2.1 Mozambique's Incidents of Ownership in Cahora Bassa

The Table 13 shows Mozambique's incidents of ownership under the Cahora Bassa treaty. Mozambique falls under category C1 in the framework for analysis. The rights of use and withdrawal, management, exclusion, access, alienation and prohibition of harmful use, apply with respect to water resources within the defined area of authority. This is based on the following:

Table 12: Bundle of Rights Framework for Analysis –Mozambique

| Mozambique – Cahora Bassa Scheme | | | | | | | | | |
|--|--------------------|----------------------------|------------------------------------|----|----------------------|----|----|----|--|
| Combinations of incidents of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C3 | C4 | C5 | C6 | C(N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| Depth in Incidents of Ownership | | | | | | | | | |
| | | Towards Absolute | Intermediate | | Limited | | | | |
| Management | | TAM | IM | | LM | | | | |
| Exclusion | | TAE | IE | | LE | | | | |
| Access | | TAA | IA | | LA | | | | |
| Purposes of Use | | | | | | | | | |
| | | Towards Absolute | Multiple | | Single purpose | | | | |
| Purposes of Use | | TAP | MP | | SP | | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| | | To all States | To a few States | | To one or two States | | | | |
| Benefits | | U1 | U2 | | U3 | | | | |
| Ad-hoc | | B1 | B1 | | B1 | | | | |
| Rational | | B2 | B2 | | B2 | | | | |

- a) The **rights of use and withdrawal** sit with Mozambique with respect to water resources. This position is formalised through Mozambique’s shareholding status

in HCB, the energy utility, as defined in the Treaty under Article 1¹⁴ and the hydro power supply contract with South Africa and the Mozambiquen government as stated in Article 3¹⁵ (The Agreement On Cahora Bassa, 1985, p. 5). It is not clear whether the rights of use and withdrawal extend to other uses of the waters. Indicators are to the effect that the state of Mozambique, through its secretarial ministries, controls the rights of access, use and withdrawal with respect to other sectors (The Fisheries Research Institute of Mozambique, 2006, pp. 5-6).

- b) **The rights to manage** are also present on account of the character of the agreement through Mozambique's shareholding status in HCB as defined in the Treaty under Article 1. The rights to manage are present to an intermediate degree. Certain elements with respect to the right to manage cannot be exercised or do not apply to Mozambique. In this instance Mozambique through its shareholding status has rights to use and manage the water resources solely for the energy sector, for the purpose of generating and transmitting power, primarily to South Africa. The rights are limited to a defined body of water out of a much larger body, which is managed by other authorities or countries. Subject to the nature of the Power Purchase agreement between Mozambique and South Africa, limitations with respect to the rights to manage are at play. That is the existence of the contractual agreements between Mozambique, Portugal and South Africa sets limits on the degree of the rights to manage as a sovereign. The rights to manage are also formalized under Article 14, section 1 of the agreement¹⁶.
- c) HCB being a limited liability company that owns, the dam, power station, inverter station and HVDC transmission line inside Mozambique, exercises **rights of exclusion** with respect to the water in the reservoir, in the very least for the purpose of hydropower generation. Mozambique exercises the rights to

¹⁴ The treaty states that, HCB" means the "Hidroeléctrica de Cahora Bassa", S.A.R.L., a limited liability joint-stock company duly constituted in accordance with the laws of Mozambique on 23 June 1975

¹⁵ Article 3 section 1 has provisions of the supply contract and states: HCB and Escom shall enter into a supply contract regulating the supply of power to Escom for use in the People's Republic of Mozambique and the Republic of South Africa and the said contract shall enter into force upon the same date as does this Agreement.

¹⁶ Article 14, section 1 states that: The Parties shall establish a permanent joint committee which shall furnish them with advice and recommendations on any operational, maintenance or economic aspect of the Cahora Bassa project.

exclude other Watercourse states by virtue of the treaty and possibly as a sovereign. The rights to manage the derivative sources of water for HCB from other states are not supported by any agreement. Its right to exclude or include others is also dependant on Portugal and South Africa based on the current treaty.

- d) Mozambique through the HCB arrangement and the power purchase agreement with South Africa exercises **alienation rights**, through the production and sale of power and as well as the possibility of selling her shares in HCB to a third party.
- e) The **rights of access** tend towards being absolute and are those primarily enjoyed by HCB to manage operations and the rights of access as sovereign.
- f) The duty **Prohibition of harmful use** is not explicitly or implicitly provided for in the Treaty. This duty does not apply under the treaty. However, from a national perspective, Mozambique has a duty to manage harm based on other national provisions. This is also manifested in their engagement with some upstream countries as part of the Joint Operating Technical Committee (JOTC) arrangements for dam operators highlighted in chapter three.
- g) The **purpose of use** tends towards being limited and is primarily for a single purpose meant for generation and transmission of hydro- power to south- Africa. This is provided for under Article 3 of the treaty. Provisions of the whole treaty were meant for this purpose.
- h) **Benefits** accrue to the three countries to the exclusion of all others and the beneficial use principle does not apply. Within the context of the Zambezi Watercourse states, is that the benefits only accrue to one state (Mozambique) to the exclusion of all other Watercourse states. Present day, the beneficiaries; South Africa and Portugal are situated completely outside the Zambezi Watercourse system. The distribution benefits among the three parties are dependent on the shareholding structure and the character of the power purchase agreement.

5.2.2.2 South Africa's Incidents of Ownership in Cahora Bassa

The Table 14 shows South Africa's incidents of ownership under the Cahora Bassa treaty. South Africa falls under category C4 in the framework for analysis. The rights of use and withdrawal, management and exclusion, accrue with respect to water resources within the defined area of authority. This is based on the following:

- a) The **rights of use and withdrawal** sit with South Africa with respect to water resources. This position is formalised under South Africa's power purchase agreement with HCB the energy utility, as defined in the Treaty through the hydro power supply contract as provided in Article 3, section 1¹⁷ (The Agreement On Cahora Bassa, 1985, p. 5). This is also formalized through the Permanent Joint Committee as provided in Article 14.
- b) The **rights to manage** are present but only provide the scope for South Africa to influence managerial decisions and not necessarily such managerial decisions as to water use. The managerial realm is limited but formalized through Article 14, section 1 of the Treaty¹⁸ (Ibid, 1985, p. 6). South Africa limited rights to manage, which are designed to secure their interest in the scheme. The HVDC power transmission lines inside South Africa and the Apollo inverter are owned by the South African electricity utility Eskom. The lines are linked to the power lines owned by HCB running through Mozambique. The agreement provides the secure supply of power through these, thus establishing an interest in the security of the whole system including the water. On account of this situation the rights to manage may only provide the scope for South Africa to influence managerial decisions and not necessarily exact such managerial decisions as to water use.
- c) **Exclusion rights** are similar to those enjoyed by Portugal and Mozambique but limited to the interests in the hydropower sector and with respect to Cahora Bassa. Mozambique could be said to be the 'front' in the exercise of the rights of exclusion.
- d) The **Rights of alienation** of the water resource does not apply to South Africa.

¹⁷ Article 3 section 1 has provisions of the supply contract and states: HCB and Eskom shall enter into a supply contract regulating the supply of power to Eskom for use in the People's Republic of Mozambique and the Republic of South Africa and the said contract shall enter into force upon the same date as does this Agreement.

¹⁸ Article 14 section 1 states that: The Parties shall establish a permanent joint committee which shall furnish them with advice and recommendations on any operational, maintenance or economic aspect of the Cahora Bassa project.

- e) The **rights of access** are limited for South Africa. There is no avenue that suggests the South Africa enjoys rights of access under the Cahora Bassa agreement. Any interests associated with the rights are secured through Mozambique and Portugal as primarily HCB and/or through the Joint permanent committee arrangement under the Treaty.
- f) The duty **Prohibition of harmful use** is not explicitly or implicitly provided for in the Treaty. This duty does not apply to South Africa with respect to water resources. The agreement supports prohibition of harm to the power lines as indicated in Article 8. This does not extend to the water. (Ibid, 1984, p. 7)
- g) The **purpose of use** is primarily for a single purpose meant for generation and transmission of hydro- power to south- Africa. This is as provided for in Article 3 of the treaty.
- h) **Benefits** accrue to South Africa and others who are party to the agreement. This to the exclusion of Watercourse states. The beneficial use principle does not apply.

Table 13: Bundle of Rights Framework for Analysis- South Africa

| South Africa – Cahora Bassa Scheme | | | | | | | | | |
|--|--------------------|----------------------------|------------------------------------|----|----------------------|----|----|----|--|
| Combinations of incidents of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C 3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| Depth in Incidents of Ownership | | | | | | | | | |
| | | Towards Absolute | Intermediate | | Limited | | | | |
| Management | | TAM | IM | | IM | | | | |
| Exclusion | | TAE | IE | | IE | | | | |
| Access | | TAA | IA | | IA | | | | |
| Purposes of Use | | | | | | | | | |
| | | Towards Absolute | Multiple | | Single purpose | | | | |
| Purposes of Use | | TAP | MP | | SP | | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| | | To all States | To a few States | | To one or two States | | | | |
| Benefits | | U1 | U2 | | U3 | | | | |
| Ad –hoc | | B1 | B1 | | B1 | | | | |
| Rational | | B2 | B2 | | B2 | | | | |

5.2.2.3 Portugal's Incidents of Ownership in Cahora Bassa

The Table 15 shows Portugal's incidents of ownership under the Cahora Bassa treaty. Portugal falls under category 'C2' in the framework for analysis. The rights of use and withdrawal, management, exclusion, access and alienation, accrue with respect to water resources within the defined area of authority. This is based on the following:

- a) The **rights of use and withdrawal** sit with Portugal with respect to water resources. This position is formalised through Portugal's shareholding status in the HCB the energy utility, as defined in the Treaty under Article 1¹⁹ and the hydro power supply contract with South Africa and the Mozambiquen government as stated in Article 3²⁰ section 1 (The Agreement On Cahora Bassa, 1985, p. 5).
- b) **The rights to Manage** are present on account of the character of the agreement through Portugal's shareholding status in HCB as defined in the Treaty under Article 1. The rights to manage are present to an intermediate degree. Certain elements with respect to the right to manage cannot be exercised or do not apply to Portugal. In this instance Portugal through its shareholding status has rights to use and manage the water resources solely for the energy sector, for the purpose of generating and transmitting power, primarily to South Africa. The rights are limited to a defined body of water out of a much larger body, which is managed by other authorities.
- c) Portugal exercises **rights of exclusion** with respect to the water in the reservoir, in the very least for the purpose of hydropower generation. This is on account of its shareholding interest in HCB.
- d) Portugal through the HCB arrangement and the power purchase agreement with South Africa exercises **alienation rights**, though the production and sale of power and as well as the possibility of selling her shares in HCB to a third party.
- e) The **rights of access** tend towards being intermediate. Similarly, access rights do not necessarily cover the spectrum of uses or in the alternative there is some

¹⁹ The treaty states that, HCB" means the "Hidroeléctrica de Cahora Bassa", S.A.R.L., a limited liability joint-stock company duly constituted in accordance with the laws of Mozambique on 23 June 1975

²⁰ Article 3 section 1 has provisions of the supply contract and states: HCB and Escom shall enter into a supply contract regulating the supply of power to Escom for use in the People's Republic of Mozambique and the Republic of South Africa and the said contract shall enter into force upon the same date as does this Agreement.

level of uncertainty as to the degree of access available to Portugal. The rights of access may be limited to those acts or omissions associated with hydropower generation. It is not clear whether the rights of access extend to other uses of the waters. The rights of access are formalised through Portugal's shareholding interest in HCB.

- f) The duty **Prohibit of harmful use** is not explicitly or implicitly provided for in the Treaty. This duty does not apply to Portugal.
- g) The **purpose of use** is primarily for a single purpose meant for generation and transmission of hydro- power to south- Africa. This is as provided for in the treaty under Article 3 of the treaty.
- h) **Benefits** accrue to the three countries to the exclusion of all others and the beneficial use principle does not apply. The distribution of benefits among the three parties is dependent on the shareholding structure and the character of the power purchase agreement and the sharing holding arrangements in HCB

Table 14: Bundle of Rights Framework for Analysis- Portugal

| Portugal- Cahora Bassa Scheme | | | | | | | | | |
|--|--------------------|----------------------------|------------------------------------|----|----------------------|----|----|----|--|
| Combinations of incidents of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C 3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| Depth in Incidents of Ownership | | | | | | | | | |
| | | Towards Absolute | Intermediate | | Limited | | | | |
| Management | | TAM | IM | | LM | | | | |
| Exclusion | | TAE | IE | | LE | | | | |
| Access | | TAA | IA | | LA | | | | |
| Purposes of Use | | | | | | | | | |
| | | Towards Absolute | Multiple | | Single purpose | | | | |
| Purposes of Use | | TAP | MP | | SP | | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| | | To all States | To a few States | | To one or two States | | | | |
| Benefits | | U1 | U2 | | U3 | | | | |
| Ad –hoc | | B1 | B1 | | B1 | | | | |
| Rational | | B2 | B2 | | B2 | | | | |

The combined table showing the relations between organs under the agreement is presented in Table 16. Based on the analysis and literature review above, the construct of the agreement and resultant effect from a Watercourse perspective is such that Mozambique, Portugal and South African act as one entity with one common interest with respect to the Cahora Bassa Scheme and the Zambezi Watercourse. Although they may have internal differences, the Zambezi River in the instance of Cahora Bassa and probably on account of the fact that the scheme is situated wholly in Mozambique, is treated as a water resource whose incidents of ownership including the rights of exclusion are exercised by Mozambique. Suffice to say the rights of exclusion accrue to South Africa and Portugal on account of this contractual agreement.

Important to note is that the issue of ownership of the waters are left without clear mention in the agreement. However, HCB based on its legal construct is said to own the dam, power station, inverter station and HVDC transmission line inside Mozambique (The World Bank, 2009). The term dam is sometimes understood to include the reservoir waters.

Table 15: Country Incidents of Ownership- Cahora Bassa Treaty

| The Cahora Bassa Treaty | | | | | |
|--|--------------------|----------------------------|--------------|--------------|--------------|
| Incidents of ownership: Mozambique; South African; Portugal | | | | | |
| | | | MOZ | SA | PORT |
| Ownership | Access Use Control | Use/Withdrawal | X | X | X |
| | | Management | X | X | X |
| | | Exclusion | X | X | X |
| | | Alienation | X | | X |
| | | Access | X | | X |
| | | Prohibition of Harmful Use | X | | |
| Depth of incidents of ownership | | | | | |
| Management | | | Intermediate | Limited | Intermediate |
| Exclusion | | | Intermediate | Intermediate | Intermediate |
| Access | | | Absolute | Limited | Intermediate |
| Purposes of use | | | | | |
| Purpose | | | Multiple | | Single |
| Benefit sharing arrangements | | | | | |
| Benefits – a) The beneficial use principle is not applied; b) Benefits accrue to Mozambique, South Africa and Portugal; c) South Africa Benefits the Most and Mozambique the least. d) Zambia and Angola as major water contributing States lose out on additional benefits when territorial ownership in water is not considered. | | | | | |

It is worthwhile to note that, based on the 1974 peace agreement between Portugal and Mozambique, 82 percent of the shareholding of Cahora Bassa was retained by the state of Portugal, while 18 percent was allocated to the newly independent state of Mozambique. The implication is that Portugal enjoyed controlling interests in the whole scheme including the exercise of the rights of exclusion, until the shareholding structure changed in 2007. The shareholding structure changed to 85 percent for Mozambique

and 15 percent for Portugal (Macau Hub, 2006). An additional important point to note is that, there is uncertainty as to ownership on account of the financing arrangements associated with the scheme. South Africa has been a major financier of the project which financing was guaranteed by Portugal. Depending on whether all financing obligations have been satisfied and; depending on the construct of the power purchase agreement, the implication of South Africa's financing role is that by virtue of it being a major financier, it had secured major interest in the scheme. Suffice to say their interest had, and may still have a bearing on the incidence of ownership of the water resources of the Zambezi.

South Africa's influence on the Cahora Bassa hydroelectric project was ubiquitous. In fact, without its intervention, there arguably would never have been a dam there. Pretoria provided critical start-up capital, and South African investors were instrumental in putting together ZAMCO, the consortium that funded and built the dam. South African overseers supervised the construction of much of the hydroelectric project (Isaacman & Isaacman, 2013).

It is uncertain whether the rights to manage can be exercised with respect to upstream countries where the waters of the Cahora Bassa are derived from. There is no existing agreement in place for the assurance of the security of supply from upstream countries. What appears to exist is a downstream territorial claim of all waters occurring in the river regardless of the derivative sources. With reference to Figure 1 in chapter two of this thesis, more than 2000 m³/s of the mean annual flow is derived from other countries. Mozambique's contribution in terms of mean annual flow to the reservoir is less than 400 m³/s.

All other ancillary activities on the lake are managed by Mozambique's state authorities to the exclusion of those party to the agreements. Indicators are to the effect that the state of Mozambique, through its ministries, controls the rights of access, use and control with respect to other sectors (The Fisheries Research Institute of Mozambique, 2006, pp. 5-6). However, some limitations are established through the contractual agreement to ensure that the primary function and purpose of the scheme is satisfied. Benefits from the use of the waters of Cahora Bassa on account of ancillary activities

such as fishing appear to accrue to Mozambique in an adhoc manner to the exclusion of all others

The HVDC power transmission lines inside South Africa and the Apollo inverter are owned by the South African electricity utility Escom. The lines are linked to the power lines owned by HCB running through Mozambique. The agreement provides for the secure supply of power through these, thus establishing an interest in the security of the whole system including the water.

The states of the Republic of Portugal and the People's Republic of Mozambique jointly guarantee and shall ensure that HCB will comply with the provisions of the supply contract (Food and Agriculture Organisation of the United Nations, 1997).

Benefits accrue to the three countries to the exclusion of all others and the beneficial use principle does not apply. An observation worthy of note, within the context of Watercourse states, is that the benefits only accrue to one state (Mozambique) to the exclusion of all other Watercourse states. Present day, the beneficiaries; South Africa and Portugal are situated completely outside the Zambezi Watercourse system.

5.2.3 Zambezi Watercourse Commission Agreement

To define the actual area of authority under the ZAMCOM agreement, the entire agreement was interrogated. This is as opposed to reviewing the main parts of the agreement that spell out the purpose and functions of organs created under the agreement. This was with a view to ensure all aspects of the agreement are taken into account.

Article 2 refers to the scope of the agreement as that, applying to the Zambezi Watercourse as defined in Article 1. Article 1 of the agreement defines the “Zambezi Watercourse” as:

The system of surface and ground waters of the Zambezi constituting by virtue of their physical relationship a unitary whole flowing normally into a common terminus, the Indian ocean (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004, pp. 1-2)

Figure 6: Zambezi River Basin Catchment Area



(Source: (World Bank, 2015)

In addition, based on other provisions of the agreement, the area of authority also includes the following:

- i. All categories of water use in the Watercourse within respective member state territories and;
- ii. All water infrastructure in associated with the Watercourse within respective member state territories.

The other provisions betraying the agreement as having some level of authority over items ‘i’ and, ‘ii’ above include but not limited to Articles 12, 13, 14, 15, 16, 17, 18, 20 and, 21.

In the case of the ZAMCOM agreement, there are two major categories of organs. The commission on one hand, and each of the eight member states on the other. A review of the agreement based on the bundle of rights framework for analysis yields outputs as outlined below.

5.2.3.1 Member States' Incidents of Ownership under ZAMCOM

Table 17 shows ZAMCOM member states' incidents of ownership in the Zambezi Watercourse. The Member States fall under category **C1** in the framework for analysis. The rights of use and withdrawal, management, exclusion, access and alienation, coupled with the duty to prohibit harmful use, are conferred upon the states with respect to water resources within their respective territories. This is based on the following:

- a) The **rights of use and withdrawal**, are conferred upon the states with respect to water resources within their respective territories. This position is formalized under Article 14, section 1 and it reads as follows:

Member States shall in their respective territories utilize the Zambezi Watercourse in an equitable and reasonable manner with a view to attaining optimal utilization thereof and benefits therefrom consistent with adequate protection of the Zambezi Watercourse (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004, p. 12).

- b) The **rights to manage** are present at an intermediate level. Some of the aspects associated with the rights to manage may not apply. The rights are limited to a defined body of water out of a much larger body which is managed by other authorities. This is true for the Zambezi Watercourse. The rights to manage occur on two fronts. Firstly, through the representation and participation of member states in the organs of ZAMCOM as set out in Articles 6, 8, 9, and 10, which point out the wide-ranging management rights held by the member states involving the functions, operations, data collection and administration of the agreement (Ibid, 2004, pp. 5-10).

The second front is where the rights of use and withdrawal have been secured and the rights of exclusion have been applied. That is, water allocation has occurred through a due process, the rights to manage will accrue to the states, but are or would be based on limits sets by agreed positions prior to water allocations or as set out in

water use agreements. The rights of use may be sector specific or may accrue to multiple sectors.

- c) The **rights of exclusion** are formalized from two fronts. Firstly, under the umbrella of ZAMCOM where states outside the Zambezi Watercourse are excluded from partaking in the use and management of water resources therein. Secondly, based on Article 14, Section 1, which reveals that use and withdrawal rights must be exercised within a country's own territory. Therefore, there is exclusive use of water within a country's own territory. This is particularly true when a water allocation due process has occurred at trans-boundary level.
- d) The **rights of alienation** are held by riparian member states within their territory since the use of water in these jurisdictions attracts a use and abstraction fee. For example, Part XV of Zambia's Water Resources Management Act- Cap 265, provides for water use charges, fees and water development trust fund (Water Resources Management Act No. 21 of 2011, 2011, p. 270). However, the application of the rights to alienate among states is uncertain and is contingent upon an agreed interpretation and application of the doctrine of equitable and reasonable utilization.
- e) The **rights of access** tend towards being absolute within a state's own territory. This is formalised under Article 14, Section 1. There are no provisions in the agreement that provide for rights of access to water by one country in another's. The rights of access with a country's own territory are unilateral and not limited by any third party. This is particularly true after the rights of exclusion have been determined through a trans-boundary water allocation due process.
- f) The duty **to prohibit harmful use** is formalized under Article 14, section 2²¹ and reads as follows (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004, p. 12). In addition, this duty is formalized by the application of the doctrine of equitable and reasonable utilization under Article 13 and principles set out in Article 12 of the agreement.

²¹ Article 14 section 2 states that: Member States shall individually and jointly take all precautionary and preventive measures in the utilization of the resources of the Zambezi Watercourse so as not to cause significant harm to the Watercourse nor to any Member State, including harm to human health and safety

- g) The **purposes of use** will vary will based policy preferences by states within their territories.
- h) **Benefits** and dis-benefits will accrue to the individual state or to Watercourse states as a consequence of the purpose of use and resultant effect of use. A combination of ad-hoc limited benefits and dis-benefits may accrue to all unintentionally, or a few unintentionally and one or two intentionally with no rational estimate of benefits being determined and applied. The agreement does not address the issue of benefits in any strategic manner. Under this agreement, benefits accrue to each individual state, separately. This is formalised under Article 14, Section 1. However, Article 14, Section 3 “d”²², if interpreted benevolently presents an opportunity for member states to engage in partnerships for the effective and efficient use of water resources. There is room to negotiate agreement that could include benefit sharing. Nonetheless, there are no explicit provisions related to benefit sharing and the application of the beneficial use principle in the agreement.

²² Article14 Section 3 states that : Member States shall take all appropriate technical, legislative, administrative and other measures in the utilisation of the Zambezi Watercourse in order to:
(d) promote partnerships in effective and efficient water use; and,

Table 16: Bundle of Rights Framework for Analysis – ZAMCOM Member States

| ZAMCOM member States – Zambezi Water Course | | | | | | | | | |
|---|--------------------|----------------------------|------------------------------------|-----------------|----------------------|----|----|----|--|
| Combinations of incidents of ownership | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | |
| | | | C1 | C2 | C 3 | C4 | C5 | C6 | C (N+1) |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered |
| | | Management | X | X | X | X | X | X | |
| | | Exclusion | X | X | X | X | | X | |
| | | Alienation | X | X | X | | | | |
| | | Access | X | X | | | | X | |
| | | Prohibition of Harmful Use | X | | | | | X | |
| | | | | | | | | | |
| The Depth in Incidents of Ownership | | | | | | | | | |
| | | | Towards Absolute | Intermediate | Limited | | | | |
| Management | | | TAM | IM | LM | | | | |
| Exclusion | | | TAE | IE | LE | | | | |
| Access | | | TAA | IA | LA | | | | |
| Purposes of Use | | | | | | | | | |
| | | | Towards Absolute | Multiple | Single purpose | | | | |
| Purposes of Use | | | TAP | MP | SP | | | | |
| Benefit Sharing Arrangements | | | | | | | | | |
| | | | To all States | To a few States | To one or two States | | | | |
| Benefits | | | U1 | U2 | U3 | | | | |
| Ad –hoc | | | B1 | B1 | B1 | | | | |
| Rational | | | B2 | B2 | B2 | | | | |

5.2.3.2 ZAMCOM's Incidents of Ownership under ZAMCOM

The organization ZAMCOM, falls under category six **C6** in the framework for analysis. The rights of management, exclusion and access, coupled with the duty to prohibit harmful use, are conferred upon the states with respect to water resources within their respective territories. The Table 18 represents the outputs of the analysis of the organ of ZAMCOM.

This is based on the following:

- a. The organs of ZAMCOM²³ do not provide for any **rights of use and withdrawal** under the agreement. That is, there are no Articles in the agreement to give authority to ZAMCOM to use and/or withdraw any water from the Watercourse for any purpose
- b. The **right to manage** accrues to the organs of ZAMCOM in line with all Articles spelling out their various roles and responsibilities. These are set out in Articles 6, 8, 9, and 10. The agreement has sufficient provisions to confirm that some rights to manage are endowed upon the organs of ZAMCOM. Some examples include Articles 8 and 10 that spell out the functions and powers of the Council of Ministers and Technical committee respectively. The rights to manage are limited. This is on account of the role of ZAMCOM as a facilitator. Secondly and more importantly, on account of its role as, an allocator of water in the instance where it has rights to allocate water among states for various purposes as provided for in Article 16.
- c. ZAMCOM exercises the **rights of exclusion** by the declarations and provisions in: the preamble of the agreement; the definitions of member states and Zambezi Watercourse as contained in annex one of the agreement and; Article 2 that defines the scope of the agreement as applying to the Zambezi Watercourse. These provisions exclude all states lying outside the Watercourse. The rights of exclusion are limited in scope on account of the limited scope of the functions of ZAMCOM and possibly the limited capacity to enforce its decisions.
- d. There are no provisions that are endowed for **rights to alienate** by ZAMCOM under the agreement.

²³ The organs of ZAMCOM include: The Council of Ministers; the Technical Committee and the Secretariat as set out in Article 6 of the ZAMCOM agreement.

- e. The **rights of access** to the Watercourse for the discharge of its functions are formalized under Article 4 (II)²⁴ which provides for the granting of a legal status that allows the commission to discharge its functions within each territory. The rights of access are limited in scope on account of the limited scope of the functions of ZAMCOM and possibly the limited capacity to enforce its decisions.
- f. **Prohibition of harmful use** is one of the considerations ZAMCOM is required to take into account before facilitating the provision of authority for water development projects or before water allocation takes place. This is formalized by the application of the doctrine of equitable and reasonable utilization under Article 13. It is also one of the principles to be applied as provided for in Article 12.

²⁴ Article 4 section 2 states that: In the territory of each Member State, the Commission shall, pursuant to paragraph 1 of this Article, have such legal capacity as is necessary for the proper exercise of its functions.

Table 17: Bundle of Rights Framework for Analysis- ZAMCOM

| ZAMCOM – Zambezi Water Course | | | | | | | | | | |
|---|---------------------------|-----------------------------------|---|----|----------------|-----------------------------|----|----|---|--|
| Combinations of incidents of ownership | | | | | | | | | | |
| | | | Category of Incidents of Ownership | | | | | | | |
| | | | C1 | C2 | C3 | C4 | C5 | C6 | C (N+1) | |
| Ownership | Access Use Control | Use and Withdrawal | X | X | X | X | X | | Other possible combinations not considered | |
| | | Management | X | X | X | X | | X | | |
| | | Exclusion | X | X | | X | | X | | |
| | | Alienation | X | | | X | | | | |
| | | Access | X | | | X | | X | | |
| | | Prohibition of Harmful Use | X | | | | | X | | |
| Depth in Incidents of Ownership | | | | | | | | | | |
| | | Towards Absolute | Intermediate | | Limited | | | | | |
| Management | TAM | | IM | | LM | | | | | |
| Exclusion | TAE | | IE | | LE | | | | | |
| Access | TAA | | IA | | LA | | | | | |
| Purposes of Use | | | | | | | | | | |
| | | Towards Absolute | Multiple | | | Single purpose | | | | |
| Purposes of Use | TAP | | MP | | | SP | | | | |
| Benefit Sharing Arrangements | | | | | | | | | | |
| | | To all States | To a few States | | | To one or two States | | | | |
| Benefits | U1 | | U2 | | | U3 | | | | |
| Ad –hoc | B1 | | B1 | | | B1 | | | | |
| Rational | B2 | | B2 | | | B2 | | | | |

A Combined table showing the relations between organs under the agreement is presented in Table 19. Based on the analysis and literature review above, the following observations were made:

1. The member states operate as a collective called ZAMCOM, the commission has the capacity to exercise rights to manage, rights of exclusion, rights of access and a duty to prohibit harmful use. Other rights associated with the bundles of rights cannot be exercised by ZAMCOM. The rights to manage are limited albeit strategic in one particular instance. On the most part, as betrayed by the functions of the commission and its technical and administrative bodies ZAMTEC and ZAMSEC under the agreement, the functions as set out in Articles 5, 8 and 10 are advisory or facilitatory in nature. None of the functions and their related provisions endows the commission with authority to compel a member state or country to carry out an act or omission with respect to the right of use and withdrawal.
2. However, Article 16 of the agreement confers some level of authority that affects the rights of use and withdrawal, thus limiting the depth of some incidents of ownership originally assumed by the states before the agreement. Particularly, the rights of use and withdrawal, the rights of exclusion and the rights to manage, are curtailed to some degree and deferred to the collective ²⁵ (South Africa Development Community-(SADC), 2004, p. 15).

²⁵ The relevant provisions of the ZAMCOM agreement are as set out in Article 16 and state as follows: “1. A member state planning any programme, project or activity with regard to the Zambezi watercourse or which may adversely affect the watercourse or any other member state shall forthwith notify the secretariat thereof and provide the commission with all available data and information with regard thereto.

2. If the commission or any member state has reasonable grounds to believe that another member state is planning a programme, project or activity referred to in paragraph (1) of this Article, the commission or such member state may request the other member state planning the programme, project or activity to comply forthwith with the provisions of paragraph (1) of this Article. The request shall be accompanied by a documented explanation setting forth its reasons.

3. In the event of the member state planning such a programme, project or activity; finding that the programme, project or activity will not adversely affect the Zambezi watercourse or any other member state, it shall so inform the commission and the relevant member state or states, providing a documented explanation setting forth the reasons for such finding.

4. The commission shall study and evaluate the data and information pertaining to the planned programme, project or activity and report to the relevant member state or states on its findings as to the possible effects thereof within a period of six months after having received the relevant data and information.

5. In the event of a dispute arising between member states with regard to the effect of such programme, project or activity, such member states shall, on the request of any one of them and utilising the good offices of the commission, promptly enter into consultations and negotiations with a view to arriving at a settlement of such dispute. During the course of the consultations and negotiations, the member state planning the programme, project or activity shall if so requested by the other member state, refrain from implementing or permitting the implementation of such programme, project or activity for a period agreed upon by the member states involved or, failing such agreement, for a period determined by the commission.

6. If so requested by any member state and subject to the decision of the commission to that effect and the conditions which the commission may impose including the contributions of the relevant member states towards defraying the

Table 18: Combined Table of Countries in the ZAMCOM Agreement

| Zambezi Watercourse Commission Agreement | | | | |
|---|--------------------|----------------------------|---------------|------------|
| Incidents of ownership: Member States; Commission | | | | |
| | | | Member states | Commission |
| Ownership | Access/Use Control | Use/Withdrawal | X | |
| | | Management | X | X |
| | | Exclusion | X | X |
| | | Alienation | X | |
| | | Access | X | X |
| | | Prohibition if Harmful Use | X | X |
| Depth of incidents of ownership | | | | |
| Management | | | Intermediate | Limited |
| Exclusion | | | Intermediate | Limited |
| Access | | | Absolute | Limited |
| Purpose of use | | | | |
| Purpose | | | Absolute | |
| Benefit sharing arrangements | | | | |
| Benefits – a) The beneficial use principle is not applied; b) Since ownership is in a state of flux, benefits will accrue to the member state that secures access use and control or ownership through ERU; c) Adhoc benefits may accrue to other states; d) Major water contributing States lose out on additional benefits when territorial ownership in water is not considered. | | | | |

To protect this authority, in the event that there are disputes regarding the water allocation process, there is embedded within the agreement, a process of adjudication under Article 16 of the SADC treaty,²⁶ where the outcome is binding upon member

costs involved, the commission may undertake a fact finding study with regard to the aspects in dispute between the member states involved and if appropriate, may appoint consultants to assist it in such a study.

7. If agreed to by the member states involved and subject to the decision of the commission, the commission may undertake the co-ordination and harmonisation of programmes, projects or activities planned by two or more member states. Member states shall, where appropriate, make every effort to co-ordinate and harmonise programmes, projects and activities with regard to the Zambezi watercourse”

²⁶Note that the ZAMCOM is an agreement that was established under the SADC framework and in mean to fulfill the over the objective of SADC. It in principle falls under the SADC framework of agreements.

states. The enforcement of these provisions amongst others is effected through Article 20 dealing with issues of non-compliance, and Article 21 dealing with settlement of disputes. Article 16 on the SADC Tribunal renders any advice passed by it, binding (Ibid, 2004, p. 17).

3. The degree of authority over water allocation and appropriation is a function of what prior clearance member states are required to seek from the commission before proceeding in line with the due process under the agreement. The term appropriation has been used in the above sentence to reveal the idea that once there is agreement for a member state to proceed with the development that concerns itself with the rights of use, withdrawal and exclusion, such waters in many respects are permanently appropriated to the country, whereby the incidents of ownership now tend towards being absolute. That once appropriation occurs, absolute ownership accrues to that member state and there is limited scope for review since such provisions for review are not really provided for in the agreement. That even if such measures for review were provided, reallocation of water from one country to another would be a difficult proposition to agree on. For example, it would be difficult to reallocate the waters of the Kariba to Angola or Cahora Bassa to Zambia.
4. The agreement creates an enabling environment for member states to secure water for development within their own territories and does not necessarily promote joint investment. It appears the designers did not really seem to have the application of the beneficial use principle in mind.
5. Another observation is that, ownership of what is to be appropriated is not defined at the start in terms of who the original appropriator is. This leads to the question as to who has rights to appropriate the resource if such rights were not declared at the start. That the basis of the claim of exclusion by member states to the exclusion of other countries, outside the Zambezi river basin, such as South Africa is based on the extent of the land covered by the Watercourse. It is in effect a territorial claim to

The relevant parts of Article 15 state that: The Tribunal shall be constituted to ensure adherence to and the proper interpretation of the provisions of this Treaty and subsidiary instruments and to adjudicate upon such disputes as may be referred to it. 2. The composition, powers, functions, procedures and other related matters governing the Tribunal shall be prescribed in a Protocol, which shall, notwithstanding the provisions of Article 22 of this Treaty, form an integral part of this Treaty, adopted by the Summit. 3. Members of the Tribunal shall be appointed for a specified period. 4. The Tribunal shall give advisory opinions on such matters as the Summit or the Council may refer to it; 5. The decisions of the Tribunal shall be final and binding.

water based on land. The peculiar aspect of this basis for a claim is that, such claims based on territory covered by the Watercourse, do not extend to individual states within the Zambezi Watercourse. It appears that member states based on this agreement have *prima facie* assumed an equal claim to the whole body without explicitly stating it. Further, they have moved to state the principles upon which redistribution will take place (primarily, the ambiguous, ERU).

Once redistributed, it is to a great extent permanently owned by another to the exclusion of all others within the Watercourse. The benefits of the appropriated water accrue primarily to that state in its totality, within its sovereign geographical boundary, beyond the boundaries of the Watercourse system. This is whilst contributing member states are ceaselessly managing and conserving the water resources using their general taxes and revenues through existing national institutions. One could argue positively, that a country that contributes hugely to the waters of the Watercourse, will most probably incur the highest cost in-terms of water resources management with respect to administration and investment in the management of the quantity and quality of the water bodies within its territory. At the same time such a country releases the scarce resource to others without benefit to itself permanently. This is particularly so, where the basis of collective ownership of the water is not the quantum of water contributed, but rather, the mere linkage of sovereign land to the Watercourse. In addition, it could be argued based on the above that, because the benefits derived from the water resources in the basin accrues to the entire territorial landscape of a country, the application of the basin or Watercourse concept to determine parties to an agreement is flawed. This is because the entire country benefits from the use of water. The Watercourse concept may have merit regarding the technical aspects of water resources planning and management. But it has no merit with respect to the application of the beneficial use principle and therefore no merit to stand as a basis for equal country claims in water.

6. ERU requires that key factors of the natural character of the Watercourse be taken into account. The manner in which the natural characteristics should be taken into

account was not considered before agreement was reached. It is to be decided by the collective after agreement. Note, the rules of natural justice do not apply in the case of the Commission on account of the construct of the organisational arrangements. In addition, the basis upon which the rules of natural justice can be effected are yet to be presided over. Since the current agreement stands as a shell that is yet to be filled by clear rules, the collective action is likely to be based on those who will have the capacity to wield and influence managerial power.

The organization design of ZAMCOM is such that the commission cannot be deemed to follow the rules of natural justice. This is especially so since the application guiding of principles as set out under Article 12 of the agreement are not operationalized leaving uncertainty as to what they really mean. The rules of natural justice are set to curb bias (*Nemo iudex in causa sua*) and to provide for the right to a fair hearing (*Audi alteram partem*). *Nemo iudex in causa* is a Latin phrase that means, literally, no one should be a judge in his own cause (Fernando, 2011, p. 47). It is a principle of natural justice that no person can judge a case in which they have an interest. Generally, this rule is very strictly applied to any appearance of a possible bias, even if there is actually none. Justice must not only be done, but must be seen to be done (Slapper, 2013, p. 47).

In the instance of ZAMCOM regarding the hearing and determination of water allocation intervention between states, which is essentially what Article 16 of the ZAMCOM agreement addresses, ZAMCOM and its interested member states, on account of its organizational construct would inevitably sit as judge in its own cause since there is no independent arbiter in place. *Audi alteram partem* is a Latin phrase that means "hear the other side too", or "hear the alternative party too" (Naado, 2014, p. 4). It is the principle that, no person should be judged without a fair hearing in which each party is given the opportunity to respond to the evidence against them (Edmonston, 2013, p. 55).

In ZAMCOM's case, this would be difficult to effect as the rules of equitable and reasonable utilization have not been defined or refined within the context of the Zambezi Watercourse. It is not clear to anyone what they mean and how they should be operationalized. Questions tabled during discussions with the ZAMCOM interim secretariat on determination and operationalization of ERU went unanswered and deferred to a later date. Preference was placed on making operational, the simpler areas of ZAMCOM, such as making advances towards improving information sharing between member states (Mutale, 2014).

To illustrate, a country in the Zambezi basin starts by owning water based on sovereign principles and national laws. She then gives it up by contributing her portion to the collective, but without defining what she has contributed, and without defining any returns or how returns will be secured. The water is then allocated to another permanently to her exclusion based on ERU and/or discretion. The country does not benefit from it. However, the country continues to pay for maintaining the water in terms of quantity, quality, opportunity cost²⁷, generating and sharing all information for others at her cost e.g. Zambia. This is probably because countries have been made to believe, through the international waters discourse, that there is no ownership in water. Yet if there is no ownership in water then no rights of exclusion can come into play by any sovereign. Access to use the waters of the Zambezi Watercourse, it would appear, should then be open to all, including any country whose territory lies outside the Watercourse system, e.g. South Africa. Further, if there is no ownership in water, there should be no rights of exclusion after the resource is appropriated by another. Of course this is not possible. Therefore, there has to be ownership at all levels regarding any claims to water.

7. As mentioned above, the extent to which the collective presides over the Watercourse is also a function of what act or omission the member states are required to seek prior clearance from the commission before proceeding. Article 16, section 1 of the agreement is the main provision for this. Article 16 suggests that

²⁷ Opportunity cost of a choice is the value of the best alternative forgone, in a situation in which a choice needs to be made between several mutually exclusive alternatives given limited resources. Assuming the best choice is made, it is the "cost" incurred by not enjoying the benefit that would be had by taking the second best choice available ((Netherlands Development Assistance , 1998, p. 48),

any planned programme, project or activity is a subject requiring notification. It also suggests that no planned programme, project or activity should proceed without clearance from the commission and other member states. What constitutes an activity or project or programme is not clearly explained or defined in the agreement. Therefore, any water allocation activity ideally could stand as requiring notification. Notification in the instance of ZAMCOM is a process of hearing and determining water allocation between member states.

Where the beneficial use principle does not apply such as is the case for the Zambezi Watercourse, any allocation has an inevitable negative impact²⁸. Any allocation of water secured, used without benefiting the whole, results in the instant and future devaluation of another. This is why the beneficial use principle is so important in its application. In other words, where water is treated as part of a whole, (such as the Watercourse as defined under ZAMCOM) and the beneficial use principle is not applied, the prohibition of harm cannot take place. Harm though not felt immediately, however accrues immediately and its effects are realized in time. Since beneficial use also means the constant generation and accrual of benefits, harm is incremental with time. This is considering that any amount of water secured by a member state will have a negative impact where water scarcity exists. This is especially taking into account the cumulative impacts of both the water forgone, and the lost cumulative benefits accruing on a real-time basis.

The beneficial use principle is in part used to manage scarcity at national level. The management of scarcity must also apply at trans-boundary level. This is, in any case, in part the primary basis of the ZAMCOM agreement. This raises questions as to how this can be done without the application of the beneficial use principle, where benefits should accrue to the commonwealth or the collective. The principle works at national level. It does not work at trans-boundary level unless some kind of equivalence is established. ZAMCOM does not provide for this equivalence.

²⁸ Note that the term 'adverse impact'; is referred to in the Agreement. However it is defined.

Based on the above, ownership of water by ZAMCOM member states is in a state of flux. The incidents of ownership will occur or are occurring based on the water allocation or notification due process established under the ZAMCOM agreement. That is, once water is allocated under ZAMCOM, such waters are more or less permanently appropriated (owned) by the state that has secured such an allocation. Member states have deferred ownership to the collective for redistribution based on ERU.

The commission now controls who should own the waters of the Zambezi river basin. The incidents of ownership secured by the commission are the rights to manage, which rights control the right of use and exclusion. Since the beneficial use principle does not apply, the redistribution of water between states based on ERU will result in agreements that will have negative outcomes accruing to others. The example of Zambia and Angola highlighted above is a demonstration of such a position. This is especially true for countries whose territories contribute more to the Watercourse system unless the consideration of geographic and hydro climatic conditions are interpreted in such a manner as to award greater levels of the incidents of ownership in water to such countries.

There is merit in reviewing all agreements currently on the basis of ownership and the beneficial use principle for more effective water resources management outcomes in the region going forward.

There are some indicators that suggest that the current institutional arrangements are inadequate. Some of these include.

1. The reluctance of the ZAMCOM member states to finance its organs to full operational levels (The World Bank, 2015, p. 11)
2. The reluctance of ZAMCOM to operationalise ERU, whatever form they would like it to take (Ibid, 2005, p. 9)
3. The reluctance of the major water contributing countries such as Zambia and Malawi to join the membership (Ibid, 2005, p. 22). Although Zambia recently acceded to the agreement, key informant discussions suggest that Zambia's hand

may have been forced by the fact that the ZAMCOM agreement, whose Watercourse covers most of Zambia, comes into effect not by unanimous agreement or consent but rather by the agreement of a stipulated majority. Article 26 states that:

This agreement shall enter into force thirty (30) days after the date on which two thirds of the member states listed in the preamble to this agreement have deposited their instruments of ratification with the executive secretary of SADC who shall act as depository for this agreement (Agreement on the Establishment of the Zambezi Watercourse Commission, 2004, p. 19).

In addition, Zambia needed to amend its national water law to include the Zambezi and parts of the Luapula and Luangwa Rivers bordering other countries before acceding (Mpamba, 2014).

4. Note that, the definition of the Zambezi Watercourse in the ZAMCOM agreement includes most of Zambia's major river systems. This has created a situation where regardless of Zambia's position; its *prima facie* had lost some level of sovereign control on account of the construct of the agreement. There is a question as to whether Article 26 of the agreement, the part that stipulates the requirement of two-thirds majority, runs contrary to general rules of international law. This aspect was not explored by Zambia's technocrats. Unanimous consent is a rule that is normally applied by international law as opposed to 'the majority shall govern rule'. This rule is understood to be a corollary of the sovereign principle. No state should be a subject of any limitation against its will (Norman, 1928, p. 319).
5. There are continued interests in the unilateral development (no joint development agendas), of the waters of the Zambezi for unilateral benefits. All developments on the Watercourse bear such characteristics and the proposed developments are carrying on with the same tendencies. For example, the proposed Batoka Hydropower Scheme (Zambia and Zimbabwe), Proposed Mphanda-Nkuwa Hydro-scheme (Mozambique), proposed Botswana water transfer project.

CHAPTER 6: CONCLUSIONS AND RECOMMENDATIONS

6.1 On Ownership in Water

This work posits that concepts of ownership are the primary mode with which aspects of access, use and control of water resources are secured. The results of the thesis confirmed that regardless of the various water sharing arrangements applied, the final outcome is the conferring of degrees of ownership based on the bundle of rights metaphor which finds its origins in the jurisprudence on ‘ownership’ and Lockean theories of property. As demonstrated through the literature review and application of the framework for analysis, it was possible to decipher the country positions from the perspective of ownership. While some literature suggests that there is no ownership in water, this work showed that such a proposition is unattainable in reality. In the very least it demonstrated that there are a number of rights associated with ownership which occur in practice.

The question that needs to be asked is, ‘what is the motive for creating trans-boundary management institutions if there is no ownership in water?’ The formation of water sharing arrangements and water doctrines actually means determining who has and/or who should have certain rights and duties (ownership) over the water resource. These rights and duties, also known as “bundle of rights” are held by governments who share the same trans-boundary Watercourse. The acknowledgement of ownership in water is important because it establishes relationships among participants in any social and economic system sharing a trans-boundary river basin. This is especially important when the water resource is scarce.

6.2 On Legal Doctrines and the Conferring of Ownership

Based on this work, the various doctrines on water are congruent with or were derived from the broad based theories on ownership or original appropriation and in the very least from theories of Locke on property. The water doctrines represent legal approaches that have been devised over time, depending on the circumstances

prevailing, to secure incidents of ownership. In addition, all water doctrines including the riparian doctrine comprise the application of the beneficial use principle.

6.3 On Water Agreements and the Conferring of Ownership

The selected agreements analysed bring to light the various ways in which incidents of ownership materialise based on the construct of the agreements. They show that the resultant outcome in any agreement concerned with the use of water is about a particular country or countries securing some level of ownership of the waters substantially, to the exclusion of others. The analysis also shows that the beneficial use principle is not being applied.

6.4 On Countries Standings in Relation to these Agreements

This work shows that it is possible to determine country standings with respect to ownership by determining the degrees and numbers of incidents of ownership they have secured. As examples, the agreements pertaining to ZRA, Cahora Bassa and ZAMCOM have been developed, prepared and negotiated without taking into account the incidents of ownership to the extent that they should. As a consequence, Zimbabwe, in the case of the Zambezi River Authority agreement, is arguably benefiting more from the agreement to the exclusion of other countries that contribute more water to the scheme. These countries are foregoing potential returns, as well as future developments within their own territories, to satisfy the Kariba scheme or, in part, Zimbabwe's needs. A similar position holds true for the Cahora Bassa scheme in relation to upstream states through a downstream territorial claim. In addition, there is an ownership interest over the Zambezi river basin by South Africa and Portugal established through contract. The beneficial use principle has not been applied in these agreements and implies a level of ownership to the exclusion of other Watercourse State interests.

Turning to examples of notification processes, ZAMCOM and countries are presently not making propositions towards benefit sharing nor are they seeking opportunities to secure benefits from the schemes. The recent establishment of ZAMCOM provides a unique opportunity to promote such an agenda. Establishment of the necessary systems, protocols and capacities to carry out a technical analysis of any notification presented,

within an explicit framework that acknowledges and assesses the levels of ownership, will enable ZAMCOM to facilitate a more cooperative development agenda within the Zambezi Watercourse in line with provisions of the agreement. The pipeline of projects being considered, such as the proposed Batoka Gorge hydroelectric scheme, the proposed Mphanda Nkuwa Dam Hydro Scheme, and various water transfer schemes, present opportunities. The vision of a strategic plan for the Zambezi Watercourse as required under the agreement allows for a more substantive discussion toward joint investments between states, including the application of the beneficial use principle and/or the application of ownership considerations.

6.5 Recommendations

The findings of the research demonstrate the merit in applying an explicit ownership framework to facilitate the review of agreements on the basis of ownership and the beneficial use principle. This will allow for more effective water resources management outcomes in the region going forward and re-enforce the cooperative goals of regional integration within Southern Africa.

The application of the beneficial use principle in ZAMCOM; the systematic consideration of incidents of ownership, including the right to alienate as exemplified by the Cahora Bassa Scheme represent alternative approaches that are worth attention. It is necessary to move towards adopting joint ownership arrangements that would allow many parties to own and benefit from existing and future development schemes.

Within the evolving institutional and operational framework of ZAMCOM, there is an opportunity to review and as appropriate, revise related agreements and to align the same to the principles defined in the ZAMCOM Agreement. This would allow for greater alignment of the national legislative processes and provisions to the regional instruments. A benevolent interpretation of the ZAMCOM agreement and the principles of application should be adopted to encourage joint planning and investments. This would allow an explicit acknowledgement and consideration of the ownership question whilst providing a firm justification of rights of access to water for all states based on the principles of a commonwealth or the management of transaction costs.

The application of the beneficial use principle should be a central point of consideration in the review, redesign and/or establishment of water agreements. The beneficial use principle is a difficult proposition to apply outside a co-dependant community of persons and/or countries. An accelerated movement towards the creation of a commonwealth or a movement towards greater levels of regional integration should ideally create an enabling environment for the application of this principle. The continued and accelerated growth of the institution of SADC is therefore critical to a future that would propose optimised water resources development and management outcomes to the benefit of all basin states.

This work can benefit from additional research to further consolidate the recommendations herein. A few areas of additional research are proposed below:

1. A study to estimate benefits derived from the Zambezi Watercourse system generally; with a focus on existing schemes, benefits forgone based on current arrangements and benefits accruable based on the application of benefit sharing arrangements or the beneficial use principle.
2. A study to record in reasonable detail the historical progression, of trans-boundary water sharing arrangements in the Watercourse and to analyse the same from the perspective of ownership taking into account the proposition that there is an equivalence between sovereignty and property. The above analysis is mostly based on a snapshot of the current situation and leaves out the historical background of the agreements. For example, though not currently in play, there was a convention during the colonial era between the British and the Portuguese with respect to the use of the Zambezi River. This agreement could not have excluded consideration for the Angolan territory which was under the Portuguese sphere of influence. Similarly, the Kariba was developed as a federal scheme during the time of the federation between Southern Rhodesia (Now Zimbabwe), Northern Rhodesia (Now Zambia) and Nyasaland (Now Malawi). There has been a longstanding impasse regarding ownership with particular reference to the sharing of assets of the Kariba scheme between Zambia and Zimbabwe. The

treatment of Malawi as part of the federal scheme or otherwise can provide valuable lessons on how to address issues of ownership.

3. Legal review of existing schemes in the Watercourse and the design of optional arrangements to satisfy the beneficial use principle or benefit sharing.

REFERENCES

- Academia. (2015). *Integrated_Water_Resources_Management_dr_salami: Intergrated Water Resources Management (IWRM): A Critical Review*. Retrieved January 2nd, 2015, from http://www.academia.edu/6774384/Integrated_Water_Resources_Management_dr_salami
- Adams, Levina, E., & Levina, H. (2006). Domestic Policy Frameworks for Adaptation to Climate Change in the Water Sector: Draft for Review | Agenda document 2. *OECD/IEA Project*, 1-45.
- AIM. (2012, February 11). *News*. Retrieved January 10, 2015, from The Zimbabwean: <http://www.thezimbabwean.co/news/africa-news/56208/malawi-retreats-on-navigation-shire.html>
- Anders, J. (2001). *The Jordan River Basin: Explaining Interstate Water Cooperation Through Regime Theory*. London: University of London.
- Arnold, C. A. (2010). "Sustainable Webs of Interests: Property in an Interconnected Environment,"., *Property Rights and Sustainability ;The Evolution of Property Rights to Meet Ecological Challenges*.Pp168. David Grinlinton & Prudence Taylor, eds.
- Ashton, P. J. (2007). Disputes and Conflict over Water In Africa. *CSIR – Natural Resources and the Environment, South Africa*, 1-11.
- Barkved, E. (1996). Zambezi documentation study:A report on water management in the Zambezi River Basin in the 1950s. *University of Bergen*, 51.
- Beck, L. (2010). Trans-boundary Water Allocation in the Zambezi River Basin PhD thesis. 1061-1072. ZURICH: ETH ZURICH.
- Bennett, J. (1960, January 2005). *John Locke's Second Treatises of Government*. Retrieved January 12th, 2015, from [earlymoderntexts.com: http://www.earlymoderntexts.com/pdfs/locke1689a.pdf](http://www.earlymoderntexts.com/pdfs/locke1689a.pdf)
- Black, H. C. (1968). *Black's Law Dictionary-Definitions of Terms and Phrases of American and English Jurisprudence, Ancient and Modern*. St. Paul, Minn. West

Publishing Co. Retrieved from The Law Dictionary:
<http://thelawdictionary.org/publici-juris/>

- Bruns, B., & Ringler, C. (2005). *Water Rights Reform: Lessons for Institutional Design*. Washington DC: International Food Policy Research Institute.
- California Water Plan. (2009). *Water Allocation, Use, and Regulation in California CA Water Plan Update: Vol 4- Reference Guide*. Retrieved March 29th , 2015, from http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v4c01a06_cwp2009.pdf
- Capon Trevor Bench-, Prakken, H., & Giovanni, S. (2009). *Argumentation in legal reasoning*. Retrieved January 17th, 2015, from www.cs.uu.nl/group:
<http://www.cs.uu.nl/groups/IS/archive/henry/argbookbps.pdf>
- Caponera, D. A. (1992). *Principles of Water Law and Administration -National and International-* Rotterdam, Brookfield. 213.
- Chambers, R. (2001). An Introduction To Property Law In Australia. In A. P. Peter Birks, *An Introduction To Property Law In Australia* (pp. (2)1–524). Sydney: LBC Information Services.
- Clark, S. D., & Renard, I. A. (1970). The Riparian Doctrine and Australian Legislation. *Melbourne University Law Review*, 477.
- Commons, J. R. (1893). *The Distribution of Wealth*. London: Macmillan and Co.
- Cooley, H., & Gleick, H. (2011). Climate: Proofing Trans-boundary Water Agreements. *Hydrological Science Journal*, 56(4),771-718.
- Dellapenna, J. W. (2001). The Customary International Law of Trans-boundary Fresh Water. *Int.J. Global Environmental Issues*, 1(3)4:264-305.
- Dias, R. (1976). Ownership. In F. Edition (Ed.), *Jurisprudence* (Fourth Edition ed., pp. 1-709). London: Butterworths.
- Edmonston, P. (2013). *The Art of Complaining*. Dundurn.
- Edwards, G. (2007). *Defining the Public Interest*. Queensland, Australia: Griffith Business School-Department of Politics and Public Policy-Griffith University.
- Elrawady, K. M., & Mohammed, H. (2005). Water Rights and Equity In The Arab Region. *CEDARE*, 1-34.
- Ely, R. T. (1899). *Political Economy, Political Science and Sociology*.

- Epiney, A. (2003). Sustainable Use of Freshwater Resources. *Max-Planck-Institut für ausländisches öffentliches*, 378-396.
- FAO. (1997). Irrigation potential in Africa: A Basin Approach. *FAO LAND AND WATER BULLETIN 4*.
- Fernando, L. w. (2011). *Operational Blizzard*. Australia: Xlibris Corporation.
- Food and Agriculture Organisation of the United Nations (F.A.O). (1997). <http://www.fao.org/docrep>. Retrieved November 19, 2014, from fao.org: <http://www.fao.org/docrep/w7414b/w7414b0i.htm>
- Food and Agriculture Organisation. (2000). Proceedings of the Fish Rights Conference- Part 2. In S. Ross, & R. F. Shotton (Ed.), *Use of Property Rights in Fisheries Management* (pp. 404(2):1-269). Fremantle, West Australia: FAO.
- Food and Agriculture Organization of the United Nations. (1997). *FAO LEGISLATIVE STUDY 61*. FAO Legal Office , Development Law Service.
- Freitas, A. (2013). Water As a Stress Factor in Sub Saharan Africa. *European Union Institute for Security Studies*, 1-4.
- Ganoulis, J., Kolokytha, E., & Mylopoulos, Y. (2007). *Multicriterion Decision Analysis for Conflict Resolution in Transboundary River Basins*. Thessaloniki: Aristotle University of Thessaloniki.
- Garner, B. A. (2001). *Black's Law Dictionary* (2nd ed.). West Publishing Company.
- Gleick, P. (1993). Water and Conflict: Fresh Water Resources and International Security In *International Security*. 18(1), 79-112.
- Government Gazette of the Republic of Namibia. (2004). *Government Gazette of the Republic of Namibia*. Windhoek: Government of the Republic of Namibia.
- Government Gazette of the Republic of Namibia. (2004). *Ibid*. Windhoek: Government of the Republic of Namibia.
- Government of the Republic of Angola. (2010). *The Constitution of the Republic of Angola*. Luanda: The National Assembly- Angola.
- Government of the Republic of Malawi. (1998). *The Constitution of the Republic of Malawi- 38 of 1998*. Lilongwe: Government of the Republic of Malawi.
- Government of the Republic of Malawi. (2007). *Malawi Water Resources Act*.

- Government of the Republic of Mozambique. (1990). *The Constitution of the Republic of Mozambique*. Maputo: Government of the Republic of Mozambique.
- Government of the Republic of Namibia. (2010). *The Constitution of the Republic of Namibia*. Windhoek: Government of the Republic of Namibia.
- Government of the Republic of Zambia. (1987). *The Zambezi River Authority Act- Chapter 467*. Lusaka: Ministry of Legal Affairs.
- Government of the Republic of Zambia. (1996). *The Constitution of the Republic of Zambia*. Lusaka: Government of the Republic of Zambia.
- Government of the Republic of Zimbabwe. (2009). *The Constitution of the Republic of Zimbabwe*. Harare: Government of the Republic of Zimbabwe.
- Government of the United Republic of Tanzania. (1998). *The Constitution of the United Republic of Tanzania*. Dar es Salaam: Government of the United Republic of Tanzania.
- Governments of the Republics of Zambia and Zimbabwe. (1987). *The Zambezi River Authority Act Cap 467*. Governments of the Republics of Zambia and Zimbabwe.
- Gray, K. (1991). Property In Thin Air. *Cambridge*, 50(2) 252-307.
- Guillet, D. (2000b). Reconsidering Institutional Change: Property Rights in Northwestern Spain. *Catholic University of America*, 1-40.
- Hardy, Z. (2008). Unbundling Property in Water. *Alabama Law Review* 59, 59(3):679-745.
- Hay, R. (1823). Locke, John: (1960)Second Treaties of Government- Chapter II. In M. U. Archive, *Two Treatises Of Government* (pp. 1-216). Dublin & Glasgow: McMaster University Archive . Retrieved December 30th, 2014, from <http://oregonstate.edu/instruct/phl302/texts/locke/locke2/locke2nd-a.html>
- Hillbom, E. (2007). Security – A First Priority ;The Strength of Communal Property Rights Systems Governing Water in Contemporary sub-Saharan Africa. *Development Economics*, 1-31.
- Honore, A. (1961). Ownership:. In G. A.G, *Oxford Essays in Jurisprudence* (pp. 107-147). Oxford, United Kingdom: Oxford University Press.
- Howard, M. (2014, November 14). Acting Director of Water Affairs. (N. C. Dulu, Interviewer)

- Hutchins, W., & Steele, H. (nd). Basic Water Rights Doctrines and Their Implication for River Basin Development. 279.
- International Hydropower Association. (n.d.). *Companies*. Retrieved from International Hydropower Association:
<http://www.hydropower.org/companies/hidroel%C3%A9ctrica-de-cahora-bassa>
- International Hydropower Association, (. (1995). *Hidroeléctrica de Cahora Bassa*. Retrieved January 19th, 2015, from
<http://www.hydropower.org/companies/hidroel%C3%A9ctrica-de-cahora-bassa>
- International Law Association. (1967). *The Helsinki Rules on the Uses of the Waters of International Rivers*. London: International Law Association.
- Isaacman, A., & Isaacman, B. (2003). Cahora Bassa: Draft; Extending South Africa's Tentacles of Empire. *Agrarian Seminar, Yale University*, 2-41.
- Isaacman, A., & Isaacman, B. (2013, September 20). *Cahora Bassa: Extending South Africa's Tentacles of Empire*. Retrieved November 15, 2014, from Yale University Web site:
<http://www.yale.edu/agrarianstudies/colloppapers/03isaacman.pdf>
- Kalinoe, L. K. (1998). *The Common Law Riparian Rights Doctrine And Its Applicability In Papua New Guinea*. Wollongong: University Of Wollongong.
- Klein, D. B., & Robinson, J. (2011). Property: A Bundle of Rights? Prologue to the Property. *ECON JOURNAL WATCH* 8(3), 193-204.
- Kliota, N., & Shmuelia, D. (2001). Institutions for Management of Trans-boundary Water Resources: Their Nature, Characteristics and Shortcomings. *Water Resources Policy*, 3: 229–255.
- Kroes. (1997). *The Protection of International Watercourses as Sources of fresh water in the Interest of Future Generations*. London: The Hague, Boston: In Brans Edward H.P et al (eds): *The Scarcity of water: Emerging Legal and Policy Responses*. 5:80-99.
- Lautze, J., & Giordano, M. (2005). Trans-boundary Water Law in Africa: Development Nature and Geography. *Natural Resources Journal*, 1056 - 1072.
- Lazerwitz, D. J. (1999). The Flow of International Water Law: The International Law Commission's Law of the Non-Navigational Uses of International Watercourses. *Indiana Education*, 12(1):247-255.

- Macau Hub. (2006, November 1). *News: President of Mozambique wants Portuguese business owners to invest in the country*. Retrieved from Macau Hub: <http://www.macauhub.com.mo/en/2006/11/01/1984/>
- Matthews, P. (n.d, p. 19-21). *Water is Not "Real" Property*. Oklahoma,USA.: Department of Geography,Oklahoma State University.
- McCaffrey, S. C. (1986). Law of the Non-Navigational Uses of International Watercourses. *United Nations*, 2(1):87-144.
- McCarffrey, S. C. (1997, May 21). *Audiovisual Library on International Law*. Retrieved from United Nations Office of Legal Affairs: <http://legal.un.org/avl/ha/clnuiw/clnuiw.html>
- McIntyre, O. (2013). *Environmental Protection of International Watercourses Under International Law*. Ashgate Publishing, Ltd.
- Meinzen-Dick, R., & Bruns, B. (2000). *Negotiating Water Rights*. New Delhi: Vistaar Publications.
- Ministry of Energy and Water Development- Zambia. (2011). *Water Resources Management Act No. 21 of 2011*. Lusaka: Government of the Republic of Zambia.
- Moise, I. S. (1959). Concept of Beneficial Use in Water Law of Mexico. In *State Water-rights Laws and Related Subjects* (pp. 111-125). Washington DC: US Government Printing Office.
- Muhammad, M. R. (2009). Principles of International Water Law: Creating Effective Trans-boundary Water Resources. *Int. J. Sustainable Society*, 1(3), 207-222.
- Mutale, M. (2014, February 23). World Bank Mission. (C. D. Nundwe, Interviewer)
- Mwiinga, P. C. (2010). Implication of converting Lake kariba to Multipurpose Dam in View of Increase demand for water in Zambia and Zimbabwe. *University of Zambia*, 1-44.
- Naado, H. O. (2014). Peace and Security for Development (PSD) Programme. *The New Dawn*(133), 1-16.
- Naff, T. (n.d). International Riparian Law In The West And Islam. *University of Pennsylvania*, 1-24.
- Netherlands Development Assistance . (1998). *The Management of Shared River Basins*. Netherlands Government.

- Norman, L. H. (1928). Unanimus Consent in International Organisation. *American Journal of International Law*, 219 - 329.
- Nundwe, C. D. (2007). *Measures to Provide for Tradable Water Right In Zambia*. Lusaka: University of Zambia.
- Ostrom, E., & Schlager, E. (1992). Property-Rights Regimes and Natural Resources: A Conceptual Analysis. *Indiana University*, 68(3), 249-262.
- Oxford University Press. (2015). *The Meaning of Land*. Retrieved July 18th, 2015, from www.oup.com.au/__data/assets/pdf_file/0006/177954/Chapter_1_-_The_Meaning_of_Land.pdf
- Paton, G. W. (1972). *A Textbook Of Jurisprudence Edited by G.W.Paton And David P.Derham* (Fourth Edition ed.). London: Oxford Atg the Clarendon Press.
- Pepeteka, T. (2013). *South Africa, Our Land - The 1913 Land Act: One Hundred Years On' Reversing the Legacy of the 1913 Natives Land Act: Progress of Land Reform*. Johannesburg:: Parliament Of the Republic Of South Africa.
- Rahaman, M. M. (2009). Principles of International Water Law: Creating Effective Trans-boundary Water Resources Management. *Int. J. Sustainable Society, Vol. 1, No. 3, 2009*, 1(3):207-223.
- Rahman, R. (1995). The Law of the Non-Navigational Uses of International Watercourses: Dilemma for Lower Riparians. *Fordham International Law Journal*, 19(1), 9-24.
- Ramee, N. (2002). *Logic And Legal Reasoning: A Guide For Law Students*. Retrieved from [www.unc.edu](http://www.unc.edu/~ramckinn/Documents/NealRameeGuide.pdf): <http://www.unc.edu/~ramckinn/Documents/NealRameeGuide.pdf>
- Rene, U. (2006). Sovereignty as Property: rediscovering the economic foundations of sovereignty in International Law. *Revista Colombiana de Derecho Internacional num. junio-noviembre*, 195-229.
- Rosegrant. (1995). Dealing with Water Scarcity in the Next Century. *Vision 2020*, Brief 21 1-2.
- Roth, m., Wiebe, K., & Lawry, S. (1992). Land tenure and agrarian structure: Implications for technology adoption. In Proceedings of a workshop on social science research and the CRSPs. *University of Kentucky*, 1-279.

- Salman, M. S. (2007). The Helsinki Rules: The UN Watercourses Convention and the Berlin Rules Perspectives on International Water Law. *Water Resources Development*, 23(4), 625-640.
- Sawyers, G. W. (n.d). A Primer On California Water Rights. *Gwsma/Primer*, 1-12.
- Saxer, S. R. (2010). The Fluid Nature of Property Rights. *Pepperdine University School of Law*, 21:49-58.
- Schlager, E., & Ostrom, E. (1992). *Property Rights Regimes and Natural Resources: A Conceptual Analysis* (Vol. 68(3)). Wisconsin: JSTOR, University of Wisconsin Press 68(3):pp. 249-262.
- Schroeder, J. L. (1996). Chix Nix Bundle-o-Stix: A Feminist Critique of the Disaggregation of Property, 93 Mich. L. Rev. 239. 93.
- Schroeder-Wildberg, E. (2002). The 1997 International Watercourses Background and Negotiations: Working Paper On Management In Environmental Planning. *Institute for Landscape and Environmental Planning*, 1-15.
- Sheard, M. (1961). *Property Rights In Environmental Resources*. Oxford, United Kingdom: Library The University of Auckland, Te Tumu Herenga; Researchspace@ Auckland.
- Shela, O. N. (2000). Management of shared river basins: the case of the Zambezi River. *Water Policy; Elsevier Science Ltd*(2), 65-81.
- Simmons, A. J. (1989). Locke's State of Nature; Political Theory. *Sage Publications, Inc.*, 17(3), 449-470.
- Slapper, G. (2013). *How the Law Works*. New York, USA: Routledge- Taylor & Francis Group.
- Smead, E. E. (1936). Sic Utere Tuo Ut Alienum Non Laedas: A Basis of the State Police Power. *Cornell Law Review*, 276.
- South Africa Development Community (SADC). (2004, 10 13). *Agreement on the Establishment of the Zambezi Watercourse Commission*. Retrieved January 12, 2015, from <http://www.zambezicommission.org>: <http://www.zambezicommission.org/downloads/ZAMCOM%20agreement.pdf>
- Southern Africa Development Community(SADC). (1992). *Treaty of The Southern African Development Community: As Amended*. Gaborone, Botswana: SADC.

- Southern Africa Record. (1984). South Africa and Mozambique (Cahora Bassa). *The South African Institute Of International Affairs*(37), 3-65.
- Southern African Development Community (SADC). (2000). Revised SADC Protocol on Shared Watercourses. *Revised SADC Protocol on Shared Watercourses*. Southern African Development Community.
- Southern African Development Community (SADC). (2004). *Agreement on the Establishment of the Zambezi Watercourse Commission*. Gaborone: SADC.
- Southern African Development Community -SADC. (1992, August 17). *Documents & Publications*. Retrieved from Southern African Development Community - SADC: <http://www.sadc.int/documents-publications/show/865>
- Spiegel, C. (2005). International Water Law: The Contribution of Western United States Water Law To The United Nations Convention On The Law Of the Non-Navigable Uses Of International Watercourses. *Duke Journal of Comparative & International Law*, 15:340-337.
- Tarlock, D. (2001). Prior Appropriation: Rule, Principle, or Rhetoric? Introduction: First in Time, First Right-Is It a Real Rule. *Chicago Kent Law College*, 67:881-910.
- The Agreement On Cahora Bassa. (1985). Cahora Bassa Dam Agreement between South Africa, Mozambique & Portugal. *The South Institute Of International Affairs*(37), 3-65.
- The Fisheries Research Institute of Mozambique. (2006). Research, Monitoring and Development of the Fisheries in the Cahora Bassa Reservoir-Phase II 2007-2010. *Instituto Nacional de InvestigaçãO Pesqueira (IIP)*, 2-43.
- The Republic of Botswana. (2005). *Botswana Water Act*. Gabarone: The Republic of Botswana.
- The United Republic of Tanzania. (2009). *Water Management Resources Act*. The United Republic of Tanzania.
- The World Bank. (2009, August). *Openknowledge.worldbank.org*. Retrieved August 12, 2014, from worldbank.org:
<https://openknowledge.worldbank.org/bitstream/handle/10986/17518/773070v30ESMAP0ora0Bassa0Generation.txt?sequence=2>
- The World Bank. (2015). *Zambezi River Basin Management Project*. Washington DC: World Bank.

- The World Bank Group. (2009). *World Bank Country Assistance Strategy for Zambia*. Washington DC: The World Bank Group.
- The World Bank Group. (2010). *The Zambezi River Basin- A Multi-Sector Investment Opportunities Analysis- Volume 1*. Washington DC: The International Bank for Reconstruction and Development/The World Bank.
- The World Bank Group. (2013). *Zambezi River Authority Legal Review*. Washington DC: World Bank.
- The World Bank Group. (2015). *Zambezi River Basin Development Project*. Washington: The World Bank Group.
- The World Bank Group. (2015). *Zambezi River Basin Management Project*. Washington DC: World Bank.
- The World Bank Group. (November 24, 2014). *Kariba Dam Rehabilitation Project*. Washington: The World Bank Group.
- Trelease, F. J. (1957). Government Ownership and Trusteeship of Water. *California Law Review*, 45:5(4)638-654.
- Turton, A. (2008). A South African Perspective on a Possible Benefit-Sharing Approach for Transboundary Waters in the SADC Region. *Water Alternatives*, 180-200.
- Turton, A. (2008). The Southern African Hydropolitical Complex. In O. Varis, C. Tortajada, & A. Biswas, *Management of Trans-boundary Rivers and Lakes*.
- U.S. Fish and Wildlife Service. (n.d). *Summary Of California Water Rights : Section 10*. Retrieved January 27th, 2015, from www.fws.gov: www.fws.gov/cno/fisheries/docs/section1summaryofcawaterights.pdf
- United Nations. (1997). *Convention on the Law of the Non-navigational Uses of International Watercourses*. New York,USA: United Nations.
- United Nations Economic Commission for Africa- UNECA. (2000). *Trans-boundary River/Lake Basin Water Development in Africa: Prospects, Problems, and Achievements*. Addis Ababa, Ethiopia: UNECA.
- United Nations. (n.d.). *Frequently Asked Questions: UN Watercourses Convention Online Users Guide*. Retrieved from UN Watercourses Convention Online Users Guide: <http://www.unWatercoursesconvention.org/>
- University of North Dakota Energy & Environmental Research Center (UND EERC). (n.d). *Water Appropriation Systems*. Retrieved February 18th, 2015, from

www.undeerc.org: <http://www.undeerc.org/Water/Decision-Support/Water-Law/pdf/Water-Appr-Systems.pdf>

- Uruena, R. (2006). Sovereignty as Property: Rediscovering the Economic Foundations of Sovereignty in International Law. *Revista Colombiana de Derecho Internacional num. junio-noviembre*, 195-229.
- Utton, A. E., & Teclaff, L. (1978). The Management of a Critical Resource. In *Water in a Developing World* (p. 240). EIC: Westview Press EICN Boulder.
- Van Wyk, J.-A. (1998). *Towards Water Security in Southern Africa Published in African Security Review Vol 7 No 2*. Retrieved January 28th , 2015, from www.issafrica.org: <http://www.issafrica.org/pubs/ASR/7No2/VanWyk.html>
- Water Encyclopedia. (2015). *Law, Water* . Retrieved January 20th, 2015, from [waterencyclopedia.com](http://www.waterencyclopedia.com): <http://www.waterencyclopedia.com/La-Mi/Law-Water.html>
- Water Resources Management Act - Zambia. (2011). *Water Resources Management Act*. Lusaka: Government of the Republic of Zambia.
- Wentworth, L. (n.d). Lesotho Highlands: Water Woes or win-wins. *South African Institute of International Affairs;PERISA Case Study 4 Infrastructure*, 1-8.
- Widerquist, K. (2010). Lockean Theories of Property: Justifications for Unilateral Appropriation. *Public Reason*, 2(1), 3-26.
- Wishart, M., & WorldBank. (Working Paper). *International Waters in Africa: A Strategic Overview*. Washington DC: World Bank.
- Wolf, T. (2004). *The Benefits of Regionalism: Comparative Examples*. Tucson: University of Arizona.
- World Bank. (2013). *Zambezi River Authority Legal Review*. Washington DC: World Bank.
- World Bank. (2015, January). Cahora - Bassa Catchment Area. World Bank.
- World Bank. (2015, January). Kariba Dam Catchment. Washington DC: World Bank.
- World Bank. (2015). *Zambezi River Basin Management Project (ZAMCOM)*. Washington DC: World Bank.
- Wouters, P., & Vinogradov, S. (1998). Current Development in the Law relating to International Course: Implications for Portugal. *NAÇÃO DEFESA*, 98(2) 131-145.

Zambian Watch Dog. (2015, May 22). *News*. Retrieved Jan 10, 2015, from The Zambian Watch Dog: <http://www.zambianwatchdog.com/zambia-refuses-to-share-zambezi-water-with-other-countries/>

Zambezi River Authority (ZRA). (1978). Zambezi River Authority Act. Zambezi River Authority (ZRA).

Zambezi River Authority (ZRA). (1978). Zambezi River Authority Act. Zambezi River Authority (ZRA).

Zambezi River Authority (ZRA). (1987). Zambezi River Authority Act. *Zambezi River Authority Act*. Zambezi River Authority (ZRA).

APPENDICES

Appendix A

Table 19: A Review of the National Legislation in Selected Countries

| Country | Life Span of Law | Ownership | International Provision | Watercourse | Definitions of water | Water Ownership in the Constitution |
|----------|------------------|--|--|-------------|---|-------------------------------------|
| Botswana | 1968 – 2011 | <p>PART 11. <i>Ownership of and Inherent Right to the Use of Public Water</i></p> <p>4. Notwithstanding anything to the contrary in any other written law there shall be no right of property in public water, and the control and use thereof shall be regulated as provided in this Act or in accordance with the provisions of the Waterworks Act.</p> <p>Ownership and or public water and construction or works. Cap. 31:03</p> | (5) In the performance of its functions under this Act the Board shall have regard to any relevant international agreement regulating the use of water to which Botswana is a party. | | <p>"public stream" means a Watercourse of natural origin wherein water flows, whether or not such Watercourse or any portion thereof is dry for any period or whether or not its conformation has been changed by artificial means;</p> <p>"public water" means all water flowing over the surface of the ground or contained in or flowing from any river, spring or stream or natural lake or pan or swamp or in or beneath a Watercourse and all underground water made available by means of works,</p> | No provisions |

| | | | | |
|---------------|--|---|---|--|
| <p>2011 -</p> | <p>PART II- Rights in water</p> <p>4 Vesting of water</p> <p>(1) The water resources of Botswana vest in the Republic.</p> <p>(2) The prime responsibility for the investigation, development, control, allocation, protection, management, conservation and administration of the water resources of Botswana for domestic, stock, irrigation, agricultural, industrial, commercial, mining, hydroelectric, geothermal, navigation, fishing, preservation of flora and fauna and other beneficial purposes in a sustainable and equitable manner for the benefit of all persons shall lie with the Republic and exercised on its behalf by the Minister and the Council in accordance with this Act</p> | <p>Part xiv – Shared Watercourse systems</p> <p>55 International waters and agreements</p> <p>(1) For the purpose of promoting equitable and effective regional co-operation in the management of the shared Watercourse systems of the region, the Minister shall advise Government on its rights and obligations under any bi-lateral or multilateral arrangements with regard to shared Watercourse systems to which it is a party and to ensure appropriate representation and participation by Botswana at any international meetings held for that purpose.</p> <p>(2) In the discharge of his function in terms of subsection (1), the Minister shall take into account international custom and practice and any bi-lateral or multilateral</p> | <p>but does not include any water which is wed solely for the purposes of extracting mineral substances therefrom or water which has been lawfully appropriated for use;</p> <p>(Botswana Water Act- Cap 34:01, page 2-3)</p> <p>“surface water” includes all water found on or below the bed of a river, and a wetland and includes water in any hydraulic works;</p> <p>“Watercourse” means-</p> <ul style="list-style-type: none"> (a) a river or spring, whether or not it flows regularly or intermittently; (b) a wetland, lake or dam into which or from which water | |
|---------------|--|---|---|--|

| | | | | |
|--|--|---|---|--|
| | | <p>arrangements in force from time to time.</p> <p>(3) The Minister shall ensure that appropriate measures as necessary shall be pursued to secure Botswana's rights to the development of its equitable share of water from shared Watercourse systems.</p> <p>(4) The Minister shall keep under review any bi-lateral and multilateral regional agreements for the purpose of promoting Botswana's interests in the mutual co-operation of States on shared waters on an equitable basis and in line with any developing international legal norms.</p> | <p>flows;</p> <p>(c) any collection of water which the Minister may, by notice in the <i>Gazette</i>, declare to be a Watercourse; and includes the bed and banks of any such Watercourse;</p> <p>"groundwater" means all water occurring or obtained from below the surface of the ground including water occurring in or obtained from any borehole or aquifer but excluding water contained in hydraulic works, not being a borehole, for the distribution, reticulation, transportation, storage or treatment of water or waste;</p> <p>"water resource" includes a Watercourse, surface water and groundwater;</p> | |
|--|--|---|---|--|

| | | | | | |
|---------------|------|---|---------------|--|---|
| | | | | (Botswana Water Bill 2005, pg 5,7,8) | |
| Malawi | 2007 | All water resources are hereby vested in the State, subject to any rights of a user granted by or under this act or any other written law | No provisions | “public water” means all water flowing over the surface of the ground or contained in or flowing from any river, spring or stream or natural lake or pan or swamp or in or beneath a Watercourse and all underground water but excluding any stagnant pan or swamp wholly contained within the boundaries of any private land; | The national territory of the Republic of Malawi shall consist of all the territory, including airspace, waters and islands which comprised the territory of Malawi before the commencement of this Constitution, and shall include any territory lawfully acquired thereafter by adjustment of boundaries or otherwise (The Constitution of the Republic of Malawi- 38 of 1998, 1998, p. 1). |
| | 1969 | The ownership of all public water is vested in the president. (2) The control of all public water is vested in the Minister and such control shall be exercised in accordance with the provisions of this Act. (“public water” means all water flowing over the surface of the ground or contained in or flowing from any river, spring or stream or natural lake or pan or swamp or in or beneath a Watercourse and all underground water but | No provisions | “underground water” means water naturally stored or flowing below the surface of the ground and not necessarily apparent on the surface of the ground; “surface water” means water | |

| | | | | |
|--|---|--|---|--|
| | <p>excluding any stagnant pan or swamp wholly contained within the boundaries of any private land;)</p> | | <p>flowing, stored or found on the surface of the ground</p> <p>“ground water” means the water of underground streams, channels, artesian basins, reservoirs, lakes and other bodies of water in the ground and includes water in interstices below the water table</p> <p>“water” includes;</p> <ul style="list-style-type: none"> a. Water flowing or situated upon the surface of any land b. Water flowing or contained in; <ul style="list-style-type: none"> i. Any river, stream, Watercourse or other natural course of water ii. Any lake, pan, | |
|--|---|--|---|--|

| | | | | | |
|--|--|--|--|--|--|
| | | | | <p>swamp, marsh or spring, whether or not it has been altered or artificially improved</p> <p>c. Ground water</p> <p>d. Such other water as the minister may from time to time declare to be water</p> <p>“Water resource” means any lake, pond, swamp, marsh, stream, Watercourse, estuary, aquifer, artesian basin or other body of flowing or standing water, whether above or below ground.</p> <p>(Malawi Water Resources Act, Chapter 72:03; pg 34, 37.)</p> | |
|--|--|--|--|--|--|

| | | | |
|----------------------|--|--|---|
| <p>Angola</p> | <p>The Constitution of Angola stipulates that all water is vested in the State</p> | <p>Angolan Water Laws on Trans boundary Water Resources</p> <p>The 2002 Water Law includes two Articles (19 and 76) that refer specifically to trans-boundary water resources. These clearly state that Angola regards trans-boundary co-operation as being of cardinal importance: Article 76 states that the provisions of the Water Law should not Compromise fulfilment of Angola's obligations in any already ratified international agreement.</p> <p>Article 19 gives Angola's objectives with respect to international cooperation in water management as follows: Adoption of co-ordinated measures for the management of water resources in shared catchment basins, taking into account the interests of all states in the basin; Just and reasonable allocation of common water or its joint use, in conformity with the interests and obligations assumed by the Republic of Angola;</p> | <p>The state shall exercise its sovereignty over all Angolan territory which, under the terms of this Constitution, the law and international law, includes its land, interior and territorial waters, air space, soil and sub-soil, seafloor and associated sea beds (The Constitution of the Republic of Angola, 2010, p. 4).</p> |
|----------------------|--|--|---|

| | | | | | |
|----------------|------|--|---|---|---|
| | | | <p>and Control of water quality and soil erosion.</p> <p>While protecting national interests, the National Water Directorate is empowered to promote international co-operation in order to ensure adequate management of shared hydrological basins.</p> | | |
| Namibia | 2008 | <p>4. The State, in its capacity as owner of the water resources of Namibia by virtue of Article 100 of the Constitution of the Republic of Namibia, has the responsibility to ensure that water resources are managed and used to the benefit of all people in furtherance of the objective of this Act.</p> | <p>PART VII INTERNATIONALLY SHARED WATER RESOURCES - Functions of Minister regarding management of internationally shared water resource 45.</p> <p>The functions of the Minister in relation to the joint management of internationally shared water resources are:</p> <p>(a) to participate with neighbouring and other riparian states in the establishment, development</p> | <p>“Watercourse” means -</p> <p>(a) a river or spring, and includes the base flow of an ephemeral river at the time of no visible surface flow;</p> <p>(b) a natural channel in which water flows regularly or intermittently;</p> <p>(c) an estuary, wetland, lake or dam into which, or from which, water flows;</p> <p>(d) any collection of</p> | <p>The national territory of Namibia shall consist of the whole of the territory recognised by the international community through the organs of the United Nations as Namibia, including the enclave, harbour and port of Walvis Bay, as well as the off-shore islands of Namibia, and its southern boundary shall extend to the middle of the Orange River (The Constitution of the Republic of</p> |

| | | | | |
|--|--|--|--|------------------------------|
| | | <p>and maintenance of a common database system to store and provide data and information for the protection, sustainable use and management of shared water resources;</p> <p>(b) to engage in the joint management, planning and development of projects concerning shared water resources in furtherance of the objectives of the Southern African Development Community Revised Protocol on Shared Watercourses with regard to regional integration, economic growth and poverty alleviation;</p> <p>(c) to establish and promote institutional relationships between river basin organisations within Namibia and international river basin organisations;</p> <p>(d) to encourage the participation of Namibian stakeholders in discussions</p> | <p>water which the Minister declares under section 5(2)(i) to be a Watercourse, and includes, where applicable, its bed and banks;</p> <p>"groundwater" means any water resource found under the surface of the ground;</p> <p>"water resource," includes a Watercourse, an aquifer and the sea and meteoric water;</p> <p>"water source" means water from a Watercourse, an aquifer or the sea, and includes meteoric water;</p> <p>(Government Gazette of the Republic of Namibia – 23 December, 2004, no. 3357 page 8)</p> | <p>Namibia, 2010, p. 6).</p> |
|--|--|--|--|------------------------------|

| | | | | |
|--|--|---|--|--|
| | | <p>concerning the identification and formulation of the interests of Namibia in the development of internationally shared water resources;</p> <p>(e) to protect the international water resource quality, including discussion with upstream states to reduce or prevent the deterioration of water quality resulting from activities in upstream states;</p> <p>(f) to develop and improve human resource capacity to participate in the management of shared water resources, including negotiations, consultations and conflict resolution; and</p> <p>(g) to establish mechanisms, or negotiate the revision of mechanisms, for the management, prevention and resolution of disputes relating to internationally shared water resources</p> | | |
|--|--|---|--|--|

| | | | | |
|--|---|---|--|--|
| | ownership of water resources in Namibia below and above | <p>Establishment of international water management institution 46.</p> <p>(1) For the purpose of ensuring compliance with Namibia's obligations under an international agreement relating to the protection, use and management of a shared water resource, the Minister may establish, by notice in the <i>Gazette</i>, and under the name stated in the notice, an international water management institution to be responsible for implementing the international agreement.</p> <p>(2)An international water management institution -</p> <p>(a) is a body corporate;</p> <p>(b) may sue and be sued in its corporate name;</p> <p>(c) may purchase or</p> | | |
|--|---|---|--|--|

| | | | | |
|------|---|---|--|--|
| 2004 | the surface of the land belongs to the State; and | <p>otherwise acquire, hold, and dispose of movable and immovable property; and</p> <p>(d) may do and suffer all acts and things that a body corporate may by law do and suffer.</p> <p>(3) The Minister may by regulation make provision for –</p> <p>(a) the constitution of the governing body of an international water management institution and the term and conditions of office of its members;</p> <p>(b) the funding,</p> | | |
|------|---|---|--|--|

| | | | | | |
|--|--|--|---|--|--|
| | | | <p>financial system management and auditing of the financial statements, of the international water management institution;</p> <p>(c) the functions of the international water management institution and the provision of technical and administrative support required for effectively performing its functions; and</p> <p>(d) any other measures necessary for enabling the international water management</p> | | |
|--|--|--|---|--|--|

| | | | | | |
|--|--|--|--|--|--|
| | | | <p>institution to give effect to Namibia's obligations under the international agreement.</p> <p>Powers and functions of international water management institution 47.</p> <p>(1) The primary role of an international water management institution is to implement the international water agreement.</p> <p>(2) An international water management institution has the duty to -</p> <p>(a) manage, develop, monitor and protect internationally shared water resources;</p> <p>(b) effect regional</p> | | |
|--|--|--|--|--|--|

| | | | | | |
|--|--|--|---|--|--|
| | | | <p>cooperation in matters concerning water resources;</p> <p>(c) acquire, construct, operate and maintain a water work; and</p> <p>(d) determine the allocation, use and supply of water from a shared water resource.</p> <p>(3) Unless the relevant international agreement provides otherwise, the international water management institution must provide a report on the performance of its functions to the Minister within three months after the end of its financial year, which must -</p> <p>(a) contain sufficient information to allow the Minister to assess the performance of</p> | | |
|--|--|--|---|--|--|

| | | | | | |
|--|--|--|---|--|--|
| | | | <p>the institution in respect of all its functions against the objectives set out in the relevant agreement;</p> <p>(b) be accompanied by the audited financial statements of the institution for the financial year; and</p> <p>(c) must be submitted to the Minister and such other parties as may be required by the international agreement.</p> <p>(4) An international water management institution may perform any of its functions outside Namibia.</p> | | |
|--|--|--|---|--|--|

| | | | | |
|--|--|--|--|--|
| | | <p>INTERNATIONALLY SHARED WATER RESOURCES</p> <p>53.</p> <p>In its dealings with neighboring states and other riparian states in relation to internationally shared water resources, the Republic of Namibia:</p> <p>(a) exercises its rights, and observes and complies with all its duties as conferred and imposed upon it by any international treaty, convention or agreement to which it is a signatory; and</p> <p>(b) must uphold such principles and rules of customary international law as are accepted and observed by all nations and as are reflected in - No.3357 Government Gazette 23 December 2004 31 Act No. 24, 2004 WATER RESOURCES MANAGEMENT ACT, 2004</p> <p>(i) the United Nations Convention on the Law of the Non-Navigational</p> | | |
|--|--|--|--|--|

| | | | | |
|--|--|--|--|--|
| | | <p>Uses of International Watercourses; and (ii) the Southern African Development Community Protocol on Shared</p> <p>Watercourses. Powers and functions of Minister in relation to internationally shared water resources</p> <p>54. The powers and functions of the Minister in relation to internationally shared water resources are -</p> <p>(a) to participate with riparian states in the establishment and continuous development of a common database regarding the description and use of shared water resources;</p> <p>(b) to engage in the joint management, planning and development of joint projects with other basin states within the Southern Africa Development Community for the purpose of promoting economic growth, environmental integrity and common understanding;</p> <p>(c) to establish and promote institutional relationships between</p> | | |
|--|--|--|--|--|

| | | | | |
|--|--|--|--|--|
| | | <p>river basin organisations within Namibia and international river basin organisations;</p> <p>d) to ensure the participation of interested persons in the development of Namibia's position concerning internationally shared water resources;</p> <p>(e) to develop and improve Namibia's capacity for participation in shared water resource consultations and international river basin organisations; and</p> <p>(f) to establish mechanisms, or participate in the re-establishment of mechanisms, for the prevention, management and resolution of disputes relating to internationally shared water resources. Collection of data concerning internationally shared Watercourses</p> <p>55. In performing his or her functions with respect to internationally shared Watercourses, the Minister must collect and analyse data including,</p> | | |
|--|--|--|--|--|

| | | | | |
|--|--|---|--|--|
| | | <p>among others</p> <p>(a) the volume of water abstracted and beneficially used within Namibia from each shared Watercourse;</p> <p>(b) the nature of the beneficial uses within Namibia supported by each shared Watercourse, including the economic value of the uses;</p> <p>(c) the number of persons within Namibia who rely upon each shared Watercourse for domestic, agricultural or industrial purposes;</p> <p>(d) the relevant date or dates upon which the abstraction of water from each shared Watercourse for beneficial use within Namibia commenced;</p> <p>(e) the availability and reliability of alternative sources of water to support existing beneficial uses within Namibia if abstractions from a shared Watercourse are curtailed; (f) the increases in demand for water from each shared Watercourse reasonably expected to occur within Namibia in the foreseeable future;</p> | | |
|--|--|---|--|--|

| | | | | | |
|---------------|------|---|---|--|---|
| | | | <p>Act No. 24, 2004 WATER RESOURCES MANAGEMENT ACT, 2004</p> <p>(g) the volume and composition of waste discharged from within Namibia into each shared Watercourse;</p> <p>(h) the relevant date or dates upon which the discharge into each shared Watercourse commenced; (i) the estimated waste load capacity of each shared Watercourse;</p> <p>(j) the availability and reliability of alternative means of waste disposal within Namibia if discharges into a shared Watercourse are curtailed; and</p> <p>(k) the increases in demand for the waste load carrying capacity of each shared Watercourse reasonably</p> | | |
| Zambia | 2011 | 3. Subject to this Act and notwithstanding any other law, instrument or document, | <p>PART VII</p> <p>MANAGEMENT OF SHARED</p> | “ ground water ” means any water resource found under the surface of the ground; | the State shall promote sustenance, development and public awareness of |

| | | | | |
|--|--|--|---|---|
| | <p>all water, in its natural state, in Zambia vests in the President and is held by the President on behalf and benefit of the people of Zambia.</p> | <p>WATERCOURSES AND WATER RESOURCES 55.</p> <p>(1) Notwithstanding subsection (2), the Government shall protect Zambia’s territorial sovereignty over its water resources. (2) Without prejudice to the rights and obligations arising from any other treaty, convention, agreement or declaration relating to shared water resources to which Zambia is a State Party, the Government shall uphold such basic principles and rules of international law as are reflected in the treaties, conventions, declarations and agreements listed in Part 1 of the Third Schedule and as provided under this Part.</p> <p>56. (1) Subject to the Constitution and this Act and notwithstanding any other law, the Ministry responsible for water resources may, on behalf of the Government— (a) enter into bilateral or multilateral agreements with any foreign State or government relating to any shared water resource; (b) in cooperation with other riparian</p> | <p>“ surface water ” means all water found on or below the bed of a water resource and includes water in storage works, drainage works or permanent pools;</p> <p>“ water ” means water in its natural state, including—</p> <p>(a) surface water;</p> <p>(b) water which rises naturally on any land or drains or falls naturally on to any land, even if it does not visibly join any Watercourse; or</p> <p>(c) ground water;</p> <p>“ Watercourse ” means a system of surface waters and ground waters constituting, by</p> | <p>the need to manage the land, air and water resources in a balanced and suitable manner for the present and future generation (The Constitution of the Republic of Zambia, 1996, p. 53)</p> |
|--|--|--|---|---|

| | | | | |
|--|--|---|---|--|
| | | <p>States, develop legal instruments, on the advice of the Authority and any appropriate authority, that may be required to protect and conserve the water resource and for the— (i) use of water; (ii) monitoring and control of pollution and its effects in any shared water resource; (iii) the putting into place of adaptation measures to deal with climate change; and</p> <p>(iv) control of long range transport of pollution; (c) on the advice of the Director— (i) establish or strengthen research and development programmes at sub-regional, regional and international levels in support of water resource assessment activities and climate change and monitor such research and development to ensure that they are appropriate for the needs of Zambia; and (ii) set up mechanisms for the sharing of appropriate knowledge and technology for the collection of data and the implementation of planned development; and <i>Water Resources Management Strategy</i> on management of shared water resources Cooperation over shared</p> | <p>virtue of their physical relationship, a unitary whole and normally flowing into a common terminus;</p> <p>“water resource ” includes water, any river, spring, hot spring, pan, lake, pond, swamp, marsh, stream, Watercourse, estuary, aquifer, artesian basin or other body of naturally flowing or standing water;</p> <p>(The Republic of Zambia- WATER RESOURCES MANAGEMENT ACT, 2011. No. 11 of 2011; pg 276, 279,280)</p> | |
|--|--|---|---|--|

| | | | | |
|--|--|--|--|--|
| | | <p>water resources (d) in cooperation with other riparian States, and in consultation with the Authority, formulate water resources strategies, prepare joint water resources management plans and, where appropriate, harmonise their strategies and plans with national strategies and plans.</p> <p>57. (1) The Minister may, on the advice of the Director, do any of the following in relation to the management of shared water resources: (a) establish national mechanisms for dispute resolution regarding shared water resources; (b) promote and ensure stakeholder participation, as part of Government's decision support system, in the management of shared water resources; and</p> <p>(c) facilitate the building of appropriate capacity for negotiations of shared water resources agreements as well as participation in institutions established under section <i>fifty eight</i> to</p> | | |
|--|--|--|--|--|

| | | | | |
|--|--|---|--|--|
| | | <p>deal with shared water resources.</p> <p>(2) The Minister shall ensure that any agreement entered into, under section <i>fifty six</i>, protects Zambia's sovereignty and adequately operationalises the principles of equitable, reasonable and sustainable utilisation of shared water resources by taking into account the following:</p> <p>(a) geographical, hydrographic, hydrological, hydro-geological, climatic and climate change, ecological and other factors</p> <p>of a natural character; (b) the social and economic needs of Zambia; (c) the people who are dependent on the water resources, including their health and safety; (d) existing and potential uses of the water resource; (e) economy of use of the water resource; (f) the prevention, reduction and control of pollution of the water resource; (g) the protection and preservation of the aquatic environment;</p> <p>(h) the regulation of the flows and levels of the waters of the Watercourses and other water</p> | | |
|--|--|---|--|--|

| | | | | |
|--|--|---|--|--|
| | | <p>resources; and (i) the protection, preservation, conservation and development of the water resource and its ecosystems. (3) The Minister may delegate any of the functions, specified under subsection (2), in writing, to the Authority. 312 No. 21 of 2011] <i>Water Resources Management</i> Powers and duties of Minister on management of shared water resources</p> <p>58. Any agreement entered into by the Government, under section <i>fifty-six</i>, may establish an institution to implement the agreement in collaboration with the Authority and in particular to— (a) investigate, manage, monitor and protect the Watercourse; (b) foster regional cooperation over the Watercourse;</p> <p>(c) acquire, construct, alter, operate or maintain any water works; or (d) allocate, use and supply water from the Watercourse. 59. The institutions listed in Part II of the Third Schedule shall be institutions contemplated under section <i>fifty eight</i>, except that</p> | | |
|--|--|---|--|--|

| | | | | |
|------|---|--|--|--|
| 1949 | 5. Ownership of all water vested in President | <p>they shall continue to function as provided under existing agreements until such time as the State Parties revise their functions and operations to comply with this Act.</p> <p>18. (1) Subject to this Act, a catchment council shall, for the purposes of the water resources in that catchment: (p) monitor implementation of international and regional agreements at catchment level;</p> <p>PART IV WATER RESOURCES PLANNING</p> <p>26. The Minister shall, for purposes of this Act— (c) give effect to any international or regional agreement or declaration, to which Zambia is a party, on, or which</p> <p>mentions, shared water resources and Watercourses, in a spirit of mutual co-operation;</p> | | |
|------|---|--|--|--|

| | | | | |
|--|--|--|--|--|
| | | <p>PART VIII WATER USE 61(4) The Board shall, subject to the national water resources strategy and plan and this Act, on receipt of a catchment management plan submitted under subsection (1), determine the— (a) quantity of water to be allocated for the various uses of</p> <p>water; or (b) purpose for, or manner in which, the water shall be used; taking into account the recommendations made, and factors specified, in the allocation plan and the water available in the resource that is required for (ii) any regional and international obligation; and</p> <p><i>74. Subject to this Act, in particular to the priorities for the use of water in an allocation plan and a catchment management plan, the Board shall, on receipt of applications for permits from a catchment council, before granting a permit— (i) take into account the quantity of water in the water resource which may be required</i></p> | | |
|--|--|--|--|--|

| | | | | | |
|-------------------|--|--|--|--|--|
| | | | <p>for meeting the reserve and any international obligation;</p> <p>3. This Act shall not apply to- (a) the Western Province; (b) the Zambezi River; (c) the Luapula River; (d) that portion of the Luangwa River which constitutes the boundary between Zambia and Mozambique. (As amended by S.I. No. 55 of 1964) Exclusion of Western Province, Zambezi and Luapula Rivers and portion of Luangwa River</p> | | |
| Mozambique | | <p>Water Act, approved as Lei no 16/91</p> <p>Constituição (1990): Art 35: All Natural Resources, including water are owned by</p> | <p>Art 14 Water management in the same basin should benefit all states involved: Investigation, projects or construction of infrastructure should be prepared and realised in a joint effort as well as exchange of</p> | | <p>The territory of the Republic of Mozambique is a single whole, indivisible and inalienable, comprising the entire land surface,</p> |

| | | | | | |
|-----------------|------|---|---|---|--|
| | | <p>the state and Art 36: The state is in charge to the knowledge, inventory and valuing of the natural resources and determines the conditions for use, in order to serve the national interests.</p> <p>Art 2,3: All water is state owned, for public use</p> | <p>information, water quality, pollution and erosion control.</p> <p>(© 2000/1 Water Policy International Ltd - Materials may be used with consent and acknowledgement.)</p> | | <p>maritime zone and air space delimited by the national boundaries (The Constitution of the Republic of Mozambique, 1990, p. 4).</p> |
| Tanzania | 2009 | <p>10. (1)All water resources in Mainland Tanzania shall continue to be public water and vested in the President as trustee for and on behalf of citizens. Without prejudice to subsection (1) the President shall, through various designated institutions, manage the water resources for the benefit of the people</p> | <p>PART XII TRANS-BOUNDARY WATERS 98. (1). The Minister may develop policies and strategies for the, purpose of ensuring sustainable, equitable utilisation and management of strategies trans-boundary waters. (2) Where, the United Republic is a party to international or regional agreement concerning the management of trans-boundary waters the Minister shall—(a) initiate and prepare legislative proposals for purposes of implementing those</p> | <p>“ground water” means water naturally stored or flowing below the surface of the ground and not apparent on the surface of the ground;</p> <p>“stream” means the water contained in a Watercourse and includes a river;</p> <p>“surface water” means all water flowing over the surface</p> | <p>The territory of the United Republic consists of the whole of the area of Mainland Tanzania and the whole of the area of Tanzania Zanzibar, and includes the territorial waters (The Constitution of the United Republic of Tanzania, 1998, p. 14).</p> |

| | | | | |
|--|-----------------------------|---|---|--|
| | <p>of Mainland Tanzania</p> | <p>agreements; and. (b) identify appropriate measures necessary for the implementation of those agreements. (3) The Director of Water Resources shall keep a register of all international and regional agreements concerning the utilisation and management of trans-boundary waters to which the United Republic is a party.</p> <p>99. The Minister may, in relation to trans-boundary waters-(a) participate with neighbouring riparian states in the establishment and continuing development of a common database regarding the use of trans-boundary waters; (b) engage in the joint management planning and development of waters joint projects including but not limited to inter-basin transfers with other riparian states within the trans-boundary waters for the purpose of promoting economic growth, equitable utilisation of water resources, environmental integrity and common understanding; (c) establish and promote cooperation and institutional relationships between river basin</p> | <p>of the ground, or contained in a spring or natural lake or reservoir or swamp and all water contained directly underneath a river bed;</p> <p>“water” means all water flowing over the surface of the ground, or contained in or flowing in or from, a spring or stream or natural lake or reservoir or swamp, or beneath a Watercourse and all water from underground strata;</p> <p>“water resources” means a Watercourse, surface water, ground water and estuary water;</p> <p>“water source” means-</p> <p>a. A river, tributary, estuary, lake, swamp, marsh or other wetland;</p> | |
|--|-----------------------------|---|---|--|

| | | | | |
|--|--|--|---|--|
| | | <p>organisations within Mainland Tanzania and international river basin organisations; (d) ensure stakeholder participation as part of the development of the Government's position concerning trans-boundary waters; (e) develop and improve capacity of Mainland Tanzania for participation in shared water resource consultations and international river basin organizations; (f) establish or participate in the establishment of mechanisms for the prevention, management and resolution of disputes relating to trans-boundary waters; and (g) undertake any other activity in relation to trans-boundary beneficial to Mainland Tanzania.</p> <p>100. The Minister, in performing his functions in respect to trans-boundary waters, shall cause to be collected and analysed all the relevant data and information including, inter alia:- (a) the water balance for each trans-boundary water that compares forecasted water demand with data and information regarding water availability (b) the volume of water abstracted and beneficially used</p> | <p>b. An aquifer or a spring;</p> <p>c. Sea waters and interface between sea water and fresh water</p> <p>d. A dam, pond or reservoir;</p> <p>(The United Republic of Tanzania-The Water Resources Management Act 2009; pg 361-363)</p> | |
|--|--|--|---|--|

| | | | | |
|--|--|---|--|--|
| | | <p>within Mainland Tanzania and other riparian states from each transboundary waters; (c) the nature of the beneficial uses within Mainland Tanzania supported by each transboundary waters, including the economic value of the uses; (d) the number of persons within Mainland Tanzania who rely upon each transboundary waters for domestic, agricultural, commercial or industrial purposes; (e) the relevant date or dates upon which the abstraction of water from each transboundary waters for beneficial use within Tanzania commenced; (f) the availability and reliability of alternative sources of water to support existing beneficial uses within Mainland Tanzania in the event abstractions from a transboundary waters are curtailed; (g) anticipated increases in demand for water from each transboundary waters reasonably expected to occur within Mainland Tanzania in the foreseeable future; (h) the volume and composition of waste discharged from within Mainland Tanzania into each transboundary waters; (i) the relevant</p> | | |
|--|--|---|--|--|

| | | | | | |
|-----------------|------|--|--|---|--|
| | | | <p>date or dates upon which the discharge into each trans-boundary waters commenced; (j) the environmental integrity of trans-boundary waters and likely environmental threats including water pollution in the foreseeable future; and (k) the availability and reliability of alternative means of waste disposal within Mainland Tanzania in the event discharges into trans-boundary waters are curtailed.</p> | | |
| | | | | | |
| Zimbabwe | 2002 | Subject to this Act, all water is vested in the President. | <p>The functions of the Minister f) to give effect to any international agreement, to which Zimbabwe is a party, on shared Watercourse systems in a spirit of mutual co-operation;</p> <p>97 Minister may grant exemptions</p> | <p>“waters” means any river, stream, Watercourse, lake, swamp, pond, dam, reservoir, pan, furrow or other collection of water, whether natural or artificial, together with</p> | <p>for the purposes of, or in connection with, the exploitation of underground water or public water which is vested in the President on terms which provide for the</p> |

| | | | | |
|--|--|---|--|---|
| | | <p>(1) The Minister may, in consultation with the catchment council and the National Water Authority, may, by notice in writing and subject to such conditions as he may impose, exempt any person from compliance with all or any of the provisions of this part in respect of any large dam, small dam, dam works or appurtenant works proposed to be constructed in respect of any public stream which forms any part of the international boundary of Zimbabwe.</p> | <p>the foreshores or banks thereof, but does not include—</p> <p>(a) water in aquaria or ornamental ponds unconnected with any natural water; or</p> <p>(b) water the sole and exclusive use of which under any law belongs to any person;</p> <p>(The Republic of Zimbabwe: Parks and Wildlife Act 20-14)</p> <p>“water” includes—</p> <p>(a) surface water; and</p> <p>(b) all water which rises naturally on any private land or drains or falls naturally on to any private land, even if it does not visibly join any public stream; and</p> <p>(c) all ground water;</p> | <p>respective interests of the persons affected (The Constitution of the Republic of Zimbabwe, 2009, p. 18)</p> |
|--|--|---|--|---|

| | | | | |
|--|--|--|--|--|
| | | | (The Republic of Zimbabwe- ENVIRONMENTAL MANAGEMENT ACT 20-27) | |
|--|--|--|--|--|

Appendix B

Lockean tables

Table 20: Lockean Tables

| | |
|--|--|
| <p>1. <i>In a state of nature, individuals have equal claim, or equal lack of claim, to unused natural resources (particularly land), meaning that resources are one of the following:</i></p> | <p>a. <i>Un-owned, or</i></p> |
| | <p>b. <i>Owned in common, for the use of everyone but the property of no one, or</i></p> |
| | <p>c. <i>Collectively owned as if by a corporation in which everyone owns a share.</i></p> |
| <p>2. <i>In the state of nature, a natural resource may be unilaterally appropriated, all three of the following:</i></p> | <p>a. <i>by the first person(s) [one or more of the following]:</i></p> <ul style="list-style-type: none"> i. <i>to alter it significantly through work,</i> ii. <i>to use, claim, possess, or discover it,</i> |
| | <p>b. <i>because [any combination of the following]:</i></p> <ul style="list-style-type: none"> i. <i>the first appropriator has an unconditional right to take what s/he needs or wants to pursue her projects without interference;</i> ii. <i>the first labourer deserves the benefit of his or her efforts;</i> iii. <i>the modified asset embodies the appropriator's labor;</i> iv. <i>labour improves and accounts for most of a good's value;</i> v. <i>improving land effectively makes more resources available for others;</i> vi. <i>property can help overcome the tragedy of the commons;</i> vii. <i>a stable property rights system creates benefits for everyone; and/or</i> viii. <i>property takes a pivotal role in a person's life;</i> |
| | <p>c. <i>providing [any combination of the following]:</i></p> |

| | |
|--|--|
| | <ul style="list-style-type: none"> i. none of the resource is wasted (the no-waste proviso), ii. everyone has access to subsistence (the charity proviso) , and/or iii. a sufficient amount is left for others to use (the enough-and-as-good proviso). |
|--|--|

| | |
|---|--|
| <p>3. The (combined) proviso(s) can be fulfilled [all of the following]</p> | <p>a. either [one of the following]:</p> <ul style="list-style-type: none"> i. in kind: in the same resources taken by the appropriator, or ii. by replacement, through <ul style="list-style-type: none"> ▪ market opportunities, ▪ statestate services, or ▪ cash; |
| | <p>b. in terms of [either]:</p> <ul style="list-style-type: none"> i. standard of living or ii. independent functioning, and |
| | <p>c. at the following level [one of the following]:</p> <ul style="list-style-type: none"> i. weak, ii. strong, or iii. maximum strength. |

| | |
|--|---|
| <p>4. Civil society is established, at which time [both of the following]:</p> | <p>a. property rights [one of the following]:</p> <ul style="list-style-type: none"> i. become partially or entirely subject to (and contingent upon) social agreement, or ii. are carried over into civil society, because [all of the following]: |
|--|---|

| | |
|--|--|
| | <ul style="list-style-type: none"> ▪ <i>the property less tacitly agree to unequal property,</i> ▪ <i>the protection of property is the reason civil society exists, and</i> ▪ <i>a statute of limitations protects current property holders from the responsibility for past injustices;</i> |
| | <p><i>b. the proviso(s) [one of the following]:</i></p> <ul style="list-style-type: none"> <i>i. are partially or entirely obviated by agreement,</i> <i>ii. remain in effect but are fulfilled by an unregulated market, or</i> <i>iii. remain in effect and justify state regulation of property.</i> |

| | |
|---|---|
| <p><i>5. In civil society, statestate may not arbitrarily seize property. It may tax and regulate property, [one of the following]:</i></p> | <ul style="list-style-type: none"> <i>a. only with the consent of the majority of the governed [any combination of the following]:</i> <i>i. to protect self-ownership and property rights,</i> <i>ii. to maintain necessary state expenditure (such as public roads and services), and/or</i> <i>iii. to enforce whatever provisos remain in effect (if necessary); or</i> |
|---|---|

| | |
|--|--|
| | |
| | <i>b. only with the individual consent of each specific owner.</i> |