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Groundwater policy and law in South Africa and mainland Tanzania: A comparative study

Mini-thesis submitted in partial fulfilment of the requirements for the MPhil degree in the Faculty of Law of the University of the Western Cape

By

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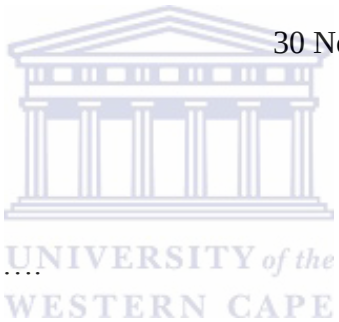
Declaration

I declare that *Groundwater Policy and Law in South Africa and Mainland Tanzania: A Comparative Study* is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete references.

Abdikadir Hussein Ali 30 November 2012



Signed……

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Dedication

This work is dedicated to my parents whom I love so dearly: my mother Khadija Mohammed Abdi and late Father Sheikh Hussein Ali Muse, who passed away on the 8th of October 2005. May the Almighty Allah grant him Jannatul Firdaw. Amen

Key Words

1. Comparative Analysis
2. Development
3. Groundwater
4. Law
5. Mainland Tanzania
6. Policy
7. Relevance
8. South Africa
9. State
10. Sustainability

List of Abbreviations and Acronyms

CMA:	Catchment Management Agency
DANIDA:	Danish International Development Agency
DEADP:	Department of Environmental Affairs and Development Planning,
DWAF:	Department of Water Affairs and Forestry
EAC:	East African Community
EIA:	Environmental Impact Assessment
GMP:	Groundwater Management Program
ICJ:	International Court of Justice
ILA:	International Law Association
ILC:	International Law Commission
ILI:	Institute of International Law
IMF:	International Monetary Fund
IWRM:	Integrated Water Resource Management
NEMA:	National Environmental Management Act
NSGRP:	National Strategy for Growth and Reduction of Poverty
NWA:	National Water Act
NWP:	National Water Policy
NWRS:	National Water Resources Strategy
NWSDS:	National water Sector Development Strategy
RBO:	River Basin Organisations
RDP:	Reconstruction and Development Program
RWP:	Regional Water Policy
RWS:	Regional Water Strategy
SADC:	Southern African Development Community
SAFLII:	South African Legal Information Institute
SAJELP:	South African Journal of Environmental Law and Policy
SWAP:	Sector Wide Approach to Planning
UN:	United Nations

UNCED:	United Nations Conference on Environment and Development
UNCHE:	United Nations Conference on Human Environment
UNECE:	United Nations Economic Commission for Europe
UNEP:	United Nations Environmental Program
UNMDG:	United Nations Millennium Development Goals
WMA:	Water Management Areas
WMI:	Water Management Institutions
WSP:	Water Service Providers
WUA:	Water User Associations

Contents

Abstract

Groundwater is a truly hidden resource that millions of lives depend on for survival. The importance of this resource cannot be accentuated enough, yet for generations it has been abused and misused. Groundwater forms an integral part of the hydrological cycle and, therefore, holistic management, conservation, protection and efficient use is of paramount importance. In the past, regulation of this resource at international, regional and national level was minimal. Little progress has been made to accommodate groundwater in international and regional legal instruments.

Both South Africa and Tanzania are prone to prolonged periods of drought and water resources are unevenly distributed in time and space. Groundwater law and policy of the two countries developed at a very slow pace in the past due to, among other factors, prevailing legal systems of colonial authorities. Although, currently both countries have incorporated groundwater in their respective legal systems, there is room for improvement. The issues of enforcement of and compliance with legal and policy provisions pose challenges for South Africa and mainland Tanzania. A blend of command and control, administrative and incentive based methods are needed to ensure that compliance is encouraged and enforcement established. Courts play a pivotal role in this regard by ensuring compliance of the state and legal subjects with the law.

Chapter 1: Introduction

1. Background

Chapter one is an entry point to this desktop study of groundwater policy and law in South Africa and mainland Tanzania. It gives a brief overview and definitions of the key hydrogeological and legal terms and phrases used in the study and highlights the socio-economic importance of groundwater in South Africa and mainland Tanzania. It succinctly presents the problem statement, rationale of the study, postulated hypothesis and underlying assumptions. The chapter charts out the methodology followed to conduct this research, introduces the key question that the research will attempt to answer and summarises relevant work that has been done before in South African and mainland Tanzanian water policy and law. It concludes by giving structural overview of the thesis

1.1 Socio-economic importance and challenges of groundwater

Groundwater is a crucial natural resource for the livelihoods and food security of millions of people around the world. Groundwater is also crucial for sustaining environmental flow and dependant ecosystems. For centuries groundwater has provided reliable water supply, with excellent quality, to social and economic needs of humans and environmental services. Groundwater continues to provide such services to modernized economic and social activities.[1] In Africa groundwater is the most precious natural resource providing reliable water supplies to more than 100 million people and potentially millions more[2]. Demand for domestic, agricultural and industrial groundwater use has increased in the last 50 years due the economic expansion, climate change effects on hydrological cycle and high quality of groundwater resources.[3] In many African countries, including South Africa and mainland Tanzania, groundwater resources

[1]Burke, J.J., Sauveplane, C. & Moench President, M. 1999, 'Groundwater management and socio-economic responses', *Natural Resources ForumWiley Online Library*.
[2]Mukherji, A. & Shah, T. 'Groundwater Socio-Ecology and Governance: A Review of Institutions and Policies in Selected Countries', (2005*) Hydrogeology Journal*, vol. 13, no. 1 pp 328-345.
3 Ibid.

constitute the only realistic water supply option for meeting rural water demand, where alternative water resources prove unreliable, expensive or difficult to develop. Surface water, on the other hand, is prone to contamination and seasonal variability.[4] The exponential growth in world population, industrial development and expansion of irrigated agricultural land has led to overexploitation and pollution of groundwater resources.[5]

1.2 Groundwater terminology used in this study

Hydrogeology is a branch of Earth Sciences that studies the occurrence, distribution, movement and chemistry of groundwater its interaction with geology and surface water. Hydrogeology has strong link with numerous other science and engineering subjects such as Mathematics, Physics, Chemistry, and Environmental Engineering. More specifically understanding groundwater requires a solid background of geology. [6]

Groundwater spelled as one word or two hyphenated terms, has no one generally accepted definition. However, hydrogeologists define groundwater as "water in the saturated zone that is under a pressure equal to or greater than atmospheric pressure."[7] The South African National Water Act of 1998 refers to groundwater as "*water found underground*", [8]but does not give a definition of what groundwater is. The Tanzanian Water Resources Management Act of 2009, on the other hand, defines groundwater as "water naturally stored or flowing below the surface of the ground and not apparent on the surface of the ground.[9] The terms *underground water and subterranean water* are used in some legal instruments instead of groundwater.[10]

[4] MacDonald, A., Davies, J., Calow, R. & Chilton, J. 2005, 'Developing groundwater: a guide for rural water supply', *ITDG publishing.*

[5]Eckstein, G., 'Application of International Water Law to Transboundary Groundwater Resources, and The Slovak-Hungarian Dispute over Gabcikovo-Nagymaros', (1995) *Suffolk Transnational Law Review*, vol. 19, no. 1, pp. 67-116.

[6] Nonner, J. '*Introduction to hydrogeology*': IHE delft lecture note series (2009), UNESCO-IHE delft lecture note series.

[7] Sharp, John M. Jr. '*A Glossary of Hydrogeological Terms*' (2007) University of Texas, Austin,

[8]The South African National Water Act 36 of 1998.

[9] S 3 of Tanzanian National Water Resources Management Act 11 of 2009 available at http://www.maji.go.tz/modules/documents/index.php?&direction=0&order=&directory=Water%20Legislation [accessed on 5th of October 2012].

[10]For instance the repealed South African Water Act 54 of 1956 used these two terms and defined Subterranean water as (a) water which exist naturally underground; (b) water other than public water which is derived in any

Saturated zone or *Saturation zone* is the subsurface area where spaces or openings between rock and soil particles are filled with water.[11]

Water table is another term closely associated with groundwater and is defined as the surface at or near the top of the *saturated zone* where the fluid pressure (pressure of the water) is equal to atmospheric pressure.[12]

Surface water is the water found on the surface of the earth including streams, rivers, lakes, wetlands, and reservoirs.[13] The Tanzanian Water Resource Management Act defines surface water as "all water flowing over the surface of the ground or contained in a spring or natural lake or reservoir, or swamp and all water contained directly underneath of a river bed",[14] no definition was found for surface water in the National Water Act of South Africa.

Aquifer is water-bearing layer of rock or unconsolidated sediment that contains sufficient useable quantity of water to a well. Groundwater movement is much slower than surface water and is influenced by many factors of which size of the voids (spaces) between rock particles, interconnectedness of the voids and gradient (slope, gravity) are the most important ones. The South African National Water Act of 1998 defines aquifer as:
"a geological formation which has structures or textures that hold water or permit appreciable water movement through them."[15] The Tanzanian Water Resources Management Act does not refer the tern aquifer.

Watercourses,[16] article 2 (a) of the UN Convention on the Law of the Non Navigational Uses of International Watercourse 1997 defines 'watercourse' as '*a system of surface waters and*

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manner whatsoever from natural underground sources, and which is contained in an area declared to be a subterranean water control area under section 28 to be groundwater.
[11] Heath, R.C, '*Ground-water regions of the United States', (*1984), US Government Printing Office.
[12] Ibid.
[13] Sharp, John M. Jr. '*A Glossary of Hydrogeological Terms'* (2007), University of Texas, Austin, Texas.
[14] S 3 of Tanzanian National Water Resources Management Act 11 of 2009.
[15] S 1 of the South African National Water Act 36 of 1998.
[16] The term is also defined in the 'Southern African Revised Protocol on Shared Watercourse Systems' as "'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."

groundwater constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus'.[17]

Overexploitation of groundwater resources happens when 'abstraction exceeds groundwater recharge for extensive areas and long-time.' This can have a detrimental effect on surface water, wetlands and relating ecosystems.[18]

1.3 Legal aspects of groundwater

The incorporation of groundwater law and policy in national legal systems is relatively a recent development.[19] Among the reasons for the slow development of this area of law is the inadequate understanding on the part of decision makers and legislators of the holistic regulation of the hydrological cycle and the physical interrelationship between surface and groundwater resources. As a result surface water has been dealt with in numerous international and regional agreements and other instruments, while groundwater is nominally included in the scope of these instruments, primarily if it is ''related'' to surface water or forms part of a ''system of surface and groundwater''.[20]

In developed countries an excessive increase of groundwater use necessitated the development and adoption of stricter policy and law implemented through licensing, registration of wells and aggressive pricing. Fairly similar challenges, or worse, exist in developing countries, especially in the African continent, but there is a marginal development of appropriate policy and law for protecting groundwater resources. Recurring international disputes[21] over water resources and poor water management practices[22], therefore, propelled the use of the best available management practices for groundwater to the forefront of legal discussions. The above

[17] Art 2 (b) UN Convention on the Law of the Non Navigational Uses of International Watercourse 1997.
[18] Wada, Y., van Beek, L.P.H., van Kempen, C.M., Reckman, J.W.T.M., Vasak, S. & Bierkens, M.F.P. 2010. 'Global depletion of groundwater resources', *Geophysical Research Letters*, vol. 37, no. 20.
[19] Dellapenna, J.W. 2001, 'The customary international law of transboundary fresh waters', *International Journal of Global Environmental Issues*, vol. 1, no. 3, pp. 264-305.
[20] Mechlem, K. 2003, 'International groundwater law: towards closing the gaps', *Yearbook of International Environmental Law*, vol. 14, no. 1, pp. 47.
[21] See chapter two of this study for examples of international disputes over water resources..
[22] Utton, A.E., 'Development of International Groundwater Law, the', (1982) *Natural Resources Journal*, vol. 22, no. 1, pp. 95-118.

challenges paved the way for the realization that water is an indispensable but finite resource that requires relevant and sound legislation and effective policies in place.

International groundwater policy is not yet in reach with the exception of few international treaties and conventions that faintly included groundwater in the ambit of water law. The Convention on the Law of Non-Navigational Uses of International Watercourses is one of the few instruments that received international attention.[23] However, as of 2012 the Convention is not legally binding as it does not have a sufficient number of ratifications to enter into force. The Helsinki Rules on the Uses of the Waters of International Rivers have long been incorporated in regional and national laws.

At regional level inadequate legal and policy documents containing groundwater provisions were developed after 1972 Stockholm conference. In Southern Africa for example the Revised Protocol on Shared Watercourses is the main binding agreement amongst Southern African Development Community (SADC) member states for managing shared water resources. In East Africa the Protocol on Environment & Natural Resource Management is the main agreement between the five East African Community (ECA) states that provides for the management and protection of the environment and water in the region. These international and regional agreements and more are further elaborated in chapter two.[24]

Both South Africa and Tanzania has adopted progressive water laws and policies for surface and groundwater protection, management and sustainable use. Chapter 3 and 4 are dedicated to elaborate groundwater policies and laws of South Africa and Tanzania respectively.

[23]'Law of Non-Navigational Uses of International Watercourses', *International Law Commission* 30 June 2005 *available* at http://untreaty.un.org/ilc/summaries/8_3.htm [Accessed 10th of Feb 2011].
[24]See for instance chapter two which deals with international and regional groundwater policies and law.

2. Problem statement

Groundwater plays a vital role in societies by covering their water needs for economic development, better human health, social welfare and environmental sustainability. In the African continent about 300 million people (one third of the total population) still lack access to adequate water supplies and about 313 million to adequate sanitation.[25]
Groundwater is particularly important as a source of drinking water for rural and dispersed populations.

"*To ensure environmental sustainability* is the seventh goal of the United Nations' Millennium Development Goals (MDG) and one of the targets of MDG is to "halve, by 2015, the proportion of people without sustainable access to safe drinking water".[26]
Although groundwater quality, quantity, use, misuse and management issues are discussed and debated, its legal protection is seldom considered. Hence unlike surface water, groundwater regulation is less present in international and national law, more often so, in developing countries. In many countries groundwater is still regulated as a separate entity from surface water.

Lack of proper groundwater regulation will contribute to the depletion, degradation and mismanagement already seen in many communities in Africa who are dependent on groundwater for their water needs. The extent of groundwater protecting policy and law in South Africa and mainland Tanzania is unknown and therefore in depth research is required. With regard to the above considerations, it will be argued that a framework of groundwater policy and law should be put in place to ensure the long term sustainability of groundwater and adequate access to safe drinking water.

[25]Braune, E. & Xu, Y. 2010, 'The Role of Ground Water in Sub-Saharan Africa', *Ground Water*, vol. 48, no. 2, pp. 229-238.
[26]Millennium Development Goals, available at *http://www.alliance2015.org/fileadmin/user_upload/MDGs.pdf* [accessed on 26th of November, 2012].

3. Rationale of the study

This desktop study will focus on the development, effectiveness and relevance of groundwater policies and laws of South Africa and mainland Tanzania. The need for such a study has been identified through a survey in literature. This has revealed that while there are number of studies on groundwater, inadequate attentions has been paid to the legal protection and regulatory regime of groundwater in South Africa and mainland Tanzania. The approach taken is to examine the topic by providing an overview and assessment of the groundwater policies and legal instruments of South Africa and Tanzania as a case study of comparative nature.

These counties are selected on the bases of data availability, geopolitical, socio-economic development, environmental status and legal system differences. On completion of this research, a contribution to the groundwater comparative law study is expected with specific reference to the protection and development of groundwater resources in national and local policy and law of South Africa and mainland Tanzania. This comparative study will outline the status quo of these countries in terms of adopting, implementing, enforcing and monitoring groundwater policy and law. It will also make recommendations to improve the current state of affairs.

4. Hypothesis

Groundwater overexploitation and pollution are reported in Africa and different parts of the world, therefore, it is assumed that adopting, enforcing and implementing groundwater policy and law will not only improve groundwater management, but also will discourage, to some extent, abusers and misuses. A point of departure is that the underlying factors of slow groundwater policy and law development are not fully understood.

Integration of groundwater and surface water policy and law is needed in many African countries that have not yet fully incorporated groundwater regulation in their legal systems. This knowledge gap needs to be filled by enacting effective and reasonable legal instrument, encouraging research, allocating enough funding and inculcating the subject in the curriculum of tertiary institutions.

5. Research methodology

This research followed the standard desk top study approach pertinent to comparative public law by collecting and analysing both primary (treaties, judgments, resolutions) and secondary (i.e. Literature) data. Preliminary survey of literature revealed the existence of such information but their extent and effectiveness are unknown as yet. International and national groundwater principles/concepts will also be considered to guide the research. The study is divided into different but interlinked chapters that are all connected to the research question. After introducing the general outline of the study, international and regional groundwater law and policy are critically analysed followed by an appraisal of national groundwater policy and legislation analysis. Upon comparing, contrasting and analysing groundwater law and policy in South Africa and mainland Tanzania, a conclusion will be dawn and recommendations made.

6. Theoretical assumptions

The nature of groundwater and its position in the hydrological cycle in the African continent is not well understood. As a result its protection through legal measures is severely compromised by policy makers. Furthermore its interaction with surface water is poorly addressed and regulated. Old international and national groundwater instruments existing today are not suitable for the growing demand of water supply and sound management needs. Therefore adoption, implementation and enforcement of effective and relevant policy and law governing integrated water resource management are top priority especially in drier countries of Africa. Environmental awareness, political will, financial and human resources capacity play a major role in the development and enforcement of water policy and law.

7. Research question

This thesis outlines and assesses the development, effectiveness and relevance of policies and laws applicable to South African and mainland Tanzanian groundwater resources protection and makes recommendations for improvement.

8. Literature review

Groundwater is the sole water resource available in many arid and semiarid areas of the world where communities depend on it for survival and development.[27] Groundwater is also crucial for economic development, environmental protection and social wellbeing.[28] Without effective planning and management, groundwater and other natural resources might be negatively impacted. In many parts of the world, where surface water is scarce, groundwater use has exceeded its carrying capacity as a result of overexploitation and pollution of the resources.[29] There is an insufficient body of work for the legal protection of groundwater resources in national, regional and international levels.[30] The Development of water management institutions to ensure efficient use and equitable allocation of water resources is crucial. This is even more important for groundwater "where the development of laws and institutions has been much slower than that for surface water."[31]

In view of the above considerations, the development, effectiveness and relevance of groundwater protection in the policies and laws of South Africa and mainland Tanzania will be reviewed and assessed. The surveyed literature also indicated that groundwater transboundary law is given more attention than its regional and local counterparts, but more in depth investigation is required to ascertain this. Below is a brief discussion of water law and policy in South Africa and mainland Tanzania.

South Africa

South Africa has adopted a progressive law and policy framework for water, which is based upon the constitutional recognition of the right of access to water and right to an environment not harmful to the health and wellbeing of the people in sections 27 and 24 of the Bill of Rights

[27]Anayah, F. & Kaluarachchi, J.J. 2009, 'Groundwater resources of northern Ghana: initial assessment of data availability.' Available at http://gw-africa.iwmi.org. [accessed on 20th of December 2012.
[28]Gupta. A. Das, 'Socio-Economic and Environmental Impacts of Unplanned Groundwater Use – Case Studies from Asia.' Asian Institute of Technology, Bangkok, Thailand, available at http://www.ehs.unu.edu/file/get/3689 [accessed on 21/11/2012].
[29]Caponera, D.A., '*Principles of Water Law and Administration: National and International'*, (1992) Taylor & Francis.
[30]Utton, A.E. 1982, 'Development of International Groundwater Law' *The Nat.Resources J*., vol. 22, pp. 95.
[31]Ibid.

respectively. Groundwater has historically been granted limited attention as a central water resource in South Africa.[32] A comprehensive overhaul of water law and institutions has taken place in South Africa since the dawn of democracy in 1994. These reforms were undertaken with the backdrop of some major political and economic reforms. The product of the reform process was the adoption of number of policy and legal documents including, a National Water Policy[33], a National Water Act, [34] a National Water Resources Strategy,[35] and National Groundwater Resource Strategy. Substantial organisational changes have also occurred with a focus on management decentralization, user participation and license-based allocation of water. These policy and legal documents and other framework environmental legislation incorporating clauses pertinent to groundwater will be elaborated further in chapter three.

Mainland Tanzania

Mainland Tanzania is a country with legal pluralistic system composed of statutory as well as customary law.[36] There are several sources of the law coexisting in mainland Tanzania, and which inter-play and affect the utilization and management of water resources. These legal regimes are:

- Written law, consisting of the Constitution, law made by the Legislative Council before independence (known as Ordinances) and law made by the post-independence parliament (known as Acts of Parliament). Under these written laws there are hundreds of pieces of subsidiary legislation for various purposes.
- Received Law from England, a body of law used to fill-in any gaps existing in the written law of mainland Tanzania. This source of law opens an avenue for the incorporation of English law and principles into the law of mainland Tanzania by filling any gap existing in the body of written law.
- Islamic Law and

[32] Freeternity Rusinga. 2004. 'Groundwater protection - guidelines for protecting springs'. Department of Water Affairs and Forestry.
[33] The National Water Policy of 1997 .
[34] The National Water Act, 36 of 1998.
[35] The National Water Resource Strategy of 2004.
[36] Sokile, C.S., Mwaruvanda, W. & Van Koppen, B., 'Integrated Water Resource Management in Tanzania: Interface between formal and informal institutions', (2005) *International workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa, pp. 26.*

- Customary Law, covering a broader terrain than that contained in court precedents.[37]

Progressive development of mainland Tanzanian water law can be linked to different political and socio-economic circumstances in the history of the country. Groundwater policy and law of the country will be discussed in chapter four of this study looking into pre-colonial, colonial and post-independence context.

Structure of the thesis

This research will be divided into six interrelated chapters. Chapter one is a general outline introducing the research question, its objectives, hypothesis, theoretical assumptions and what methods will be applied to address and resolve the problem. Chapter two will discuss in brief the historical background of groundwater law development in the context of international and regional water policy and law. It will emphasise the importance of groundwater as a significant component of hydrological cycle which does not respect political boundaries. Key international and regional conventions and treaties relevant to transboundary groundwater will be presented in chronological order and succinctly commented on. Chapter three will give detailed discussion about South African water law reforms, in general, and its groundwater policy and law, in particular. It will also analyse some of the issues posing challenges in the sustainable utilisation of groundwater that could be prevented by effective and relevant policies and laws. Chapter four will briefly discuss groundwater protecting policies and laws in mainland Tanzania and efforts of the current and previous governments to reform water sector. Furthermore it will highlight both formal and informal water management institutions in the country. Chapter five will serve as a critical review and comparative analysis of groundwater law and policy in South Africa and mainland Tanzania. It will sum up common similarities and differences and will review enforcement mechanisms in place. And finally chapter six will summarize, in a nutshell, core points of the research and will make recommendations for future course of action.

[37] Maganga, F.P., Kiwasila, H.L., Juma, I.H. & Butterworth, J.A., 'Implications of customary norms and laws for implementing IWRM: Findings from Pangani and Rufiji basins, Tanzania'(2004), *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 29, no. 15-18

Chapter 2: International and regional groundwater law and policy

1. Introduction

Other than polar ice cap and glaciers, groundwater is the largest accessible pool of freshwater on earth, accounting for one third of the world's freshwater.[38] About two third of the world's population depend on groundwater for its basic water use.[39] Generally groundwater is of a better quality than surface water. However, it is difficult, If not impossible or economically impractical, to clean up once contaminated. Degradation of groundwater quality and quantity through depletion, salinization and aquifer vulnerability to pollution are direct result of both natural processes and anthropogenic activities of point and point sources.[40]

As Garrett Hardin so precisely elucidated in his influential well publicized article 'Tragedy of the Commons',

> 'The tragedy of the commons as a food basket is averted by private property, or something formally like it. But the air and waters surrounding us cannot readily be fenced, and so the tragedy of the commons as a cesspool must be prevented by different means, by coercive laws or taxing devices that make it cheaper for the polluter to treat his pollutants than to discharge them untreated',[41]

widespread degradation, over extraction and deterioration of dependent ecosystems as well as potential regional instability will be the end result.[42] In addition, groundwater has surpassed surface water in its different uses (domestic, agriculture and industry) due to the exponential

[38] Shiklomanov, I.A. 'World water resources: a new appraisal and assessment for the 21st century'1998. Available at http://www.ce.utexas.edu/prof/mckinney/ce385d/Papers/Shiklomanov.pdf [Accessed on 15/05/2011].
[39] Jousma, G. & Roelofsen, F. 'World-wide inventory on groundwater monitoring'(2004), *International Groundwater Resources Assessment Centre (IGRAC).Utrecht.*
[40] Foster, S. & Chilton, P. 'Groundwater: the processes and global significance of aquifer degradation' 2003, *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, vol. 358, no. 1440, pp.* 1957.
[41] Hardin, G. 'The Tragedy of the Commons' 1968, *Science, Vol. 162 no. 3859 pp. 1243-1248*.
[41] Giordano, M.A. & Wolf, A.T. 'Sharing waters: Post-Rio international water management'2003, *Natural Resources Forum Wiley Online Library* pp163.
[41] Villholth, K.G. & Giordano, M. 'Groundwater Use in a Global Perspective–Can It Be Managed?' 2007*The agricultural groundwater revolution: opportunities and threats to development,* , pp. 393.

increase of water resources demand, and the inherent properties of groundwater in terms of its quality, quantity and accessibility to rural and urban communities alike[43]

Transboundary legal regime has often, intentionally or unintentionally, neglected to properly accommodate groundwater regulation. Physical and hydrological relationship between groundwater and surface water was not well understood, hence, given less attention by law and policy makers. The American hydrologist Raymond Nace had called this attitude "hydroschizophrenia".[44]

2. Development of international groundwater law

International groundwater law is a recent development compared to that of surface water. More than 400 international transboundary agreements are concluded for shared rivers and lakes. On the contrary only few agreements and arrangements exclusively regulating international aquifers are concluded, most of which include groundwater in their scope but inadequately deal with the subject matter.[45]

The incorporation of groundwater in international water law has been very sluggish process owing to number of reasons, including the multifaceted nature of aquifers, absence of proper integration of scientific findings and legal practices, invisible nature of physiochemical processes of groundwater, the existence of realistic uncertainties, and lack of legal and scientific data, to mention a few.[46] ,Notwithstanding the world's considerable reliance on this resource, ground water resources have only received secondary treatment as compared to surface water'.[47]

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[44] Llamas, M.R. & Martínez-Santos, P. 'Intensive groundwater use: Silent revolution and potential source of social conflicts',2005, *Journal of Water Resources Planning and Management*, vol. 131.
[45] Mechlem, K. 'Moving Ahead in Protecting Freshwater Resources: The International Law Commission's Draft Articles on Transboundary Aquifers'2009, *Leiden Journal of International Law*, vol. 22, no. 04, pp. 801-821.
[46]Krishna, R. & Salman, S.M.A. 'International groundwater law and the World Bank policy for projects on transboundary groundwater'(1999) *Groundwater: Legal and Policy Perspectives: Proceedings of a World Bank Seminar*. World Bank Publications.
[47] Eckstein, Y. & Eckstein, G.E. 'Transboundary aquifers: Conceptual models for development of international law' (2005), *Ground Water*, vol. 43, no. 5.

Political tensions driven by demand for equitable and safe access to water resources have existed since time immemorial, but the period following the Second World War has witnessed an increase in disputes between a number of riparian states pertinent to water utilization, such as the disputes between India and Pakistan over Indus River System, Egypt and Sudan over Nile River, Israel and neighbours over Jordan River and United States and Canada over Columbia River basin. These disagreements and others encouraged the International Law Association (ILA) to initiate work on the law governing development and utilization of internationally shared fresh waters in 1954. International watercourses treaties are packed with provisions, confirming the will of international community to positively cooperate on water matters, but adoption of treaties is one thing and implantation and enforcement of meaningful legislation is another. [48]

2.1 The Helsinki Rules on the Uses of Water of International Rivers of 1966

The work of the International Law Association, after ten year of deliberations and meetings, culminated into codification and development of the famous 1966 'Helsinki Rules on the Uses of Water of International Rivers'. The Rules are developed and adopted to work in harmony with existing and potential multilateral and bilateral treaties of basin states. Article II defines 'International drainage basin' as 'a geographical area extending over two or more states determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.'[49] This definition, for the first time in the history of international water law, included transboundary groundwater connected to surface water in its provisions. [50] In the preceding negotiations and input of states, much debate has gone into the formulation of the above definition and inclusion/exclusion of certain legal terms.51

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[48] Wolf, A.T. 'Conflict and cooperation along international waterways'1998, *Water Policy*, vol. 1, no. 2.
[49] The Helsinki Rules on the Uses of the Waters of International Rivers, August 1966, *International Law Association*, available at http://www.internationalwaterlaw.org/documents/intldocs/helsinki_rules.html, [Accessed on 07/04/2011].
[50] Salman, S.M.A. 'The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: perspectives on international water law' 2007, *Water Resources*, vol. 23, no. 4.
[51] Daibes-Murad, F. '*A new legal framework for managing the world's shared groundwaters: a case study from the Middle East*,' (2005) Intl Water Assn.

The Rules are widely acknowledged and cited for the use and protection of international watercourse and dispute resolutions before the adoption of the 1997 United Nations Convention on the Law of the Non-navigational Uses of International Watercourses.[52] The Convention used the term 'watercourse', which was highly contested in the negotiation process.[53] The Helsinki Rules are applicable to the 'use' of internationally shared water resources. The Convention is wider in scope than the Helsinki Rules as it applicable to measures of protection, preservation and management related to the uses of watercourses and their waters.[54]

The work of the International Law Association (ILA) on shared water resources emphasises the reasonable and equitable utilization. This is evident in the Dubrovnik statement of 1956,[55] the New York Resolutions,[56] of 1958 and the Tokyo meeting of 1964,[57] as well as the Helsinki Rules of 1966 which limits absolute territorial sovereignty and absolute territorial integrity. While, on the other hand, work of the Institute of International Law (IIL) puts more weight behind 'no harm principle'.[58]

One of the core principles that the Rules are based on is the principle of reasonable and equitable utilization of shared resources. Article IV states that: 'each Basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin'.[59] Beneficial use is an established principle in the Rules that require treatment of water as an economic good with values. Protection of groundwater from harmful effects of anthropogenic activities forms a major part of the beneficial use of water.

The Rules provide in article V, a number of non-exhaustive physical, social and economic guiding factors,[60] to be considered by states when deciding reasonableness and equitability in the

[52] Salman, (2007) 6.
[53] Daibes-Murad, F (2005) 77
[54] Art 1 (1) UN Convention on the Law of the Non Navigational Uses of International Watercourse 1997.
[55]Statement of Principles Resolution of Dubrovnik, 1956, available at http://www.fao.org/docrep/005/W9549E/w9549e08.htm [accessed on 21/11/2012].
[56] Resolution on the Use on the Waters of International Rivers[145] - New York, 1958,available at http://www.fao.org/docrep/005/W9549E/w9549e08.htm [accessed on 21/11/2012].
57 Bourne, C.B. 1996, 'International Law Association's Contribution to International Water Resources Law, The', *Nat.Resources J.*, vol. 36, pp. 155.
[58] Salman (2007) 5.
[59] Art IV of the Helsinki Rules of 1966.
[60] See Art V (I) and (II) the Helsinki Rules of 1966.

utilization of transboundary waters.[61] They also encourage states to establish joint agencies/commissions for conflict resolution and proper management of shared waters. Transboundary groundwater joint agencies/commissions are less visible than its surface water counterpart.

As groundwater pollution makes water unfit for its intended uses and may cause unrest between riparian states Article IX carries very significant implication for shared water use. It defines the concept of water pollution and obliges riparian state to not only prevent further degradation of water quality but to abate existing water pollution through reasonable measures so that substantial injury may not be unfairly suffered by any state.

Although the Helsinki Rules are not binding 'per se', they have pioneered and contributed immensely to the protection of transboundary groundwater by, first, highlighting that groundwater is an essential component of 'international drainage basin', second by dedicating a whole chapter on 'pollution', and third, by prioritizing the prevention of pollution of internationally shared water resources.

2.2 Seoul Rules of International Groundwater of 1986

The International Law Association (ILA), in its Sixty-Second Conference held at Seoul, Korea, in 1986, adopted four complementary articles meant to expand and reinforce the restrictive definition of 'international basin' in the Helsinki Rules. Article 1 of the Seoul Rules 'extends the application of the Helsinki Rules to all type of aquifers … and removes "flowing into a common terminus" requirement.'[62] This means aquifers intersected by international boundaries that are hydrologically not linked to surface water body fall under the ambit of international drainage basin.

Article III requires basin states to 'prevent or abate pollution of international groundwater in accordance with international law applicable to existing, new, increased and highly dangerous

[61] Sergent, M.R. 'Comparison of the Helsinki Rules to the 1994 UN draft articles: will the progression of International Watercourse Law be dammed'1997, *Vill.Envtl.LJ*, vol. 8.

[62] Hall, R.E. & Rogers, J.E. 'Transboundary Groundwater Management: Opportunities Under International Law for Groundwater Management in the United States-Mexico Border Region'2004, *Ariz.J.Int'l & Comp.L.*, vol. 21.

pollution'.[63] Confined aquifers are highly susceptible to pollution and require preventive measures as subsequent remediation and clean-up efforts could be futile or impossible[64]. The Rules also provide for number of significant principles such as the unity and interdependence of hydrological system[65], long term groundwater protection, exchange of information and integrated management of water resources.[66] Seoul Rules lack binding effect as they are developed by a nongovernmental origination (ILA).[67] There is also inadequate reference to the Rules in state practices and treaty development.[68]

2.3 Bellagio Draft Treaty of 1989

Despite the fact that few bilateral and multilateral groundwater agreements exist, Bellagio Draft Treaty of 1989 sticks out for political, historical and strategic reason. Groundwater aquifers that straddle the border between United States of America and Mexico have been the cause of numerous controversies between the two countries with their economic and social disparities. The Treaty serves as a paradigm for countries with dissimilar legal systems as the case is between US and Mexico.[69]

As the groundwater in the region is very vital for subsisting farmers, coastal communities and borderline metropolitan cities, a multidisciplinary group of wide range of experts was jointly proposed and convened by Professor Albert E. Utton of University of New Mexico and Mexican ambassador César Sepúlveda in 1977. The group assembled several times in different venues and, over the subsequent twelve years, prepared Ixtapa Treaty in Mexico in 1985, a draft agreement for the allocation and management of transboundary groundwater. Although this draft was designed to regulate management of groundwater shared between Mexico and United States,

[63] Art iii (1) of Seoul Rules on international groundwater of 1986.
[64] Eckstein, Y. & Eckstein, G.E. 'Transboundary aquifers: Conceptual models for development of international law'2005, *Ground Water*, vol. 43, no. 5.
[65] Art II Para 3 titled 'hydraulic interdependence' of Seoul Rules of 1986.
[66] Matsumoto, K. 'Transboundary groundwater and international law: past practices and current implications', 2002 available at http://tbw.geo.orst.edu/publications/abst_docs/Matsumoto.pdf [accessed on 10th September 2012].
[67] Eckstein, Y. & Eckstein, G.E. 2005.
[68] Hall, R.E. & Rogers, J.E 2004.
[69] Hayton, R.D. & Utton, A.E. 'Transboundary groundwaters: the Bellagio draft treaty'1989, *Nat.Resources J.*, vol. 29, pp. 663.

it could serve as a model, with modifications, for other internationally shared water resources. [70] Two years after the treaty, a follow up conference organized by the expert group was convened in Bellagio, Italy, which was well attended. The end result of the conference and ensuing expert revisions culminated into what became known as Bellagio Treaty of 1989.[71] The objectives of the treaty include the attainment of 'optimum utilization and conservation of transboundary groundwater and to protect the underground environment.'[72] Articles VI and VII regulate water quality protection and transboundary groundwater conservation areas respectively,[73] instead of following the traditional path of international agreements Bellagio Treaty attempts to device a way, in which other states can adopt treaties for their transboundary water resources.[74] The importance of joint management commission for the shared water resources was highlighted in article III of the Treaty.[75]

2.4 Agenda 21 of 1992

When more than 178 countries joined forces in an unprecedented conference (Earth Summit) in Rio de Janeiro in 1992 to discuss environmental concerns, agenda 21 was one of the documents adopted. In the Agenda 21, groundwater is included in the realm of freshwater resources and afforded the same rank as surface water.[76] Chapter 18 of the agenda 21 briefly introduces transboundary waters and urges riparian states to cooperate on shared water resource.[77] Some commentators observed that agenda 21 doesn't; however, deal with groundwater issues in details but provides credible references that suggest groundwater to be part of the freshwater body.[78] The issues of resources protection, pollution prevention and control, and groundwater protection were referred to in the agenda 21. [79] Although Chapter 18 of agenda 21 is dedicated for the 'Protection of The Quality and Supply of Freshwater Resources: Application of Integrated

[70] Hayton, R.D. & Utton, A.E. 1989.
[71] Hayton, R.D. & Utton, A.E. 'Transboundary groundwaters: the Bellagio draft treaty'1989, *Nat.Resources J*., vol. 29.
[72] Art II (2) of Bellagio Draft Treaty of 1989.
[73] Arts VI and VII of Bellagio Draft Treaty of 1989.
[74] McCaffrey, S. 'International groundwater law: evolution and context', Groundwater: Legal and Policy Perspectives, *Proceedings of a World Bank Seminar* (1999).
[75] Art III of Bellagio Draft Treaty of 1989.
[76] Matsumoto, K. 2002.
[77] Matsumoto, K. 2002.
[78] Matsumoto, K. 2002.
[79] 18.40 (A-D) of agenda 21 of 1992.

Approaches to the Development, Management and Use of Water Resources'[80],the agenda 21 has been criticized for falling short of adequately dealing with transboundary aspects of the protection and management of fresh water.[81]

2.5 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses of 1997

United Nations General Assembly adopted a resolution on October 8, 1970 on "Progressive Development and Codification of the Rules of International Law Relating to International Watercourses",[82]which acknowledged the efforts of international governmental and nongovernmental organizations, and recommended International Law Commission to engage in a study of the law of the non-navigational uses of international water.[83] The Commission initiated its work in 1974 and after many years of meetings and careful deliberations adopted in 1991, the first Draft Articles on the Law of Non Navigational Uses of International Watercourses, submitted to the general assembly and requested UN member states to submit their comments and observations.[84] At this stage, whether or not to include confined groundwater in the scope of the Articles was still undecided. Drafting Committee members agreed upon the replacement of the term 'appreciable' by 'significant' throughout the articles.[85]

The Commission continued its endeavours towards 'progressive development and codification' of watercourses rules and, in 1994, adopted second draft articles. At the same time the Commission adopted "Resolution on Confined Transboundary Groundwater of 1994," supplementing the Draft Articles. On submission of the final draft articles and resolution to the

[80] Section II of Agenda 21 of 1992 'Conservation & Management of Resources for Development Chapter 18'. Available at http://www.earthsummit2002.org/ic/freshwater/reschapt18.html [accessed on 10th of December 2012]
[81] Matsumoto, K. 2002.
[82] 'General Assembly resolution 2669 (XXV) on progressive development and codification of the rules of international law relating to international watercourses'. Available at http://untreaty.un.org/ilc/documentation/english/a_cn4_244.pdf [accessed on 16/05/2011)].
[83] 'UN General Assembly resolutions adopted on the reports of the sixth committee'. Available at http://daccess-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/349/34/IMG/NR034934.pdf?OpenElement [accessed on 03/10/2011].
[84] Bourne, C.B. & Wouters, P. 'International water law: selected writings of Professor Charles B. Bourne,' 1997, *Martinus Nijhoff Publishers.*
[85] United Nations Publications '*Report of the International Law Commission, Fifty-sixth Session*'(2004), pp 127 United Nations Publications.

General Assembly, the Commission recommended a convention be elaborated based on these articles.[86]

The General Assembly then assigned a Working Group of the Whole to deliberate on a framework convention based on International Law Commission's draft articles. On May 21st 1997, the Convention on the Law of the Non-Navigational Uses of International Watercourses was adopted.

The Convention is framework agreement that draws heavily from the works of ILA and IIL. It outlines few procedural and substantive rules and leaves the details for member states.[87] It is structured in such a way that it consists of 33 articles grouped under seven parts. The Convention includes an annex for the procedure to be followed when states agree to submit a dispute for arbitration.[88]

The Convention incorporates numerous principles that are acknowledged in state practices and judicial decisions such as the principle of equitable and reasonable utilization of international watercourse. Before the Convention came into existence, the principle was rooted in the Helsinki Rules. It is worth noting, though, that equitable use does not mean allocating equal shares of water proportionate to the piece of land of each riparian state.[89]The determination of equality and reasonable utilization requires consideration of all relevant factors included in the Helsinki Rules, the UN Convention and the Berlin Rules.[90] The realisation of equitable and reasonable utilization principle requires an effort from riparian states to employ cooperation, exchange of relevant information and prior notice principles.[91]

[86] McCaffrey, S.C. 'The International Law Commission adopts draft articles on international watercourses'1995, *The American Journal of International Law*, vol. 89, no. 2.
[87] Salman, (2007) 6.
[88] 'United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 21, MAY 1997, Audio visual library of international law. New York'. Available at file:///E:/international%20water%20law/the%20convention%20history.htm [accessed on 14/04/2011].
[89] Mechlem, K. 'international groundwater law: towards closing the gaps'2003, *Yearbook of International Environmental Law*, vol. 14, no. 1, pp. 47.
[90] See art V (II) of the Helsinki Rules, Arts 6 of the UN Convention; and art 13 of Berlin Rules.
[91] McCaffrey, S. 1998.

This Convention also includes the obligation not to cause significant harm principle which limits sovereignty of states in the sense that they can freely use their water resources in such a manner as not to cause harm to other states. The principle is the English translation of the Maxim '*sic utere tuo ut alienum non laedas'* (so use your own as not to harm that of another). Harm should be of a certain degree or gravity to be considered as invoking international action. Some of the frequently cited terms in international conventions for limiting 'harm' include 'significant harm'[92], 'appreciable harm',[93]and 'substantial injury.'[94] Inflicting significant harm on a co-riparian state can take the form of water quantity being reduced, for instance, diverting a river or impermeablizing (impermeable materials don't allow water or fluid to go through its pores) of recharge area through siltation process. It could also be that water quality (surface or groundwater) may be impaired by introducing harmful substances into watercourse. The harm can also be caused on geological structure or the environment in general through nuclear testing, introducing alien species, and excessive withdrawal of groundwater, which can cause lowering of water level, land subsidy, ecological damage and groundwater mining.[95]

It is interesting to note that the relationship between reasonable and equitable utilization principle and obligation not to cause harm is complicated and controversial one, where debate revolves around which of the two principles should be given preference in the case of conflict. Some authors tried to reconcile the two principles by applying equitable utilization on matters related to water quantity and no harm principle on water quality matters.[96] Principle 2 of Rio declarations combines both principles in one paragraph to signify their interdependence.

An important point that has been raised regarding the cause of harm or pollution to shared water recourse is the question if a state is obliged under international law to undertake an activity to modify or remedy natural state of affairs or not. On the case between Länder Wurttemberg and Prussia versus Baden (both former states of Germany), concerning natural infiltration of Danube

[92]See Art 7 of UN convention, and Art 42 of Berlin Rules
[93] Dellapenna, J.W. 'The customary international law of transboundary fresh waters'2001, *International Journal of Global Environmental Issues*, vol. 1, no. 3, pp. 264-305.
[94] See Art X (a) of the Helsinki Rules
[95] Barberis, J. 'Development of International Law of Transboundary Groundwater, '1991 The, *Nat.Resources J*., vol. 31,
96 Utton, A.E. 'Which rule should prevail in international water disputes: That of reasonableness or that of no harm'1996, *Nat.Resources J*., vol. 36, pp. 635.

water in upper riparian states of Baden, Reich state tribunal decided, in 1927, that international law prohibits states to cause human induced harm and therefore states are not obliged to prevent or remedy naturally induced conditions.[97] Both known and potential appreciable harms are included in the obligation not to cause harm.

Duties to cooperate and exchange information[98], regularly are yet other principles embedded in the Convention. International and common law obliges riparian states to cooperate in good faith and good neighbourly manner. This requires exchange of data and information needed for decision making and complying with equitable and reasonable utilization of shared water and not to cause significant harm principles. States should adopt national policy and law to collect and share relevant information with other riparian states through joint commissions/agencies.

Duties to negotiate consult and settle disputes in a peaceful manner are also included in the Convention. These principles are interdependent. For instance, the duty to negotiate involves consultation of different parts of a basin and it may culminate in multilevel cooperation and peaceful settlement of disputes and avoidance of looming wars between riparian states. Arguably the duty to negotiate in good faith is one of the most important principles in international law. Direct negotiation between states opens the door for further cooperation in terms of information exchange, and communication of potential or actual harmful activities undertaken by a state. Negotiation yields, in most of the cases, better results than arbitration and/or litigation by third parties and helps parties to establish better relationship, in the long run, in other areas of mutual interest.[99]

The Convention calls for water preservation and protection of watercourse which includes groundwater by definition. Article 5 of the Convention which is considered one of the most contested and important provisions of the convention requires states to takes into consideration both sustainable utilization and protection of watercourse.[100] McCaffrey observed that article 20

[97] Barberis, J. 'Development of International Law of Transboundary Groundwater'1991, The *Nat.Resources J.*, vol. 31, pp. 167.
98 Art 11 and 21 (2) of UN Convention of 1997.
99 Benvenisti, E. 'Collective action in the utilization of shared freshwater: The challenges of international water resources law'1996, *Am.J.Int'l L., vol. 90, pp. 384.*
[100] Art 5 of the UN Convention of 1997.

of the Convention is an exercise of due diligence and although not an absolute obligation. He further notes that the Article is not 'qualified', meaning that states are obliged to protect and preserve natural environment even if significant harm of their activities is not established.[101] Article 21 defines Pollution of international watercourse as 'any detrimental alteration in the composition or quality of the waters of an international watercourse, which results, directly or indirectly, from human conduct'.[102] Article 21 is applied when the activities of a riparian state have "significant" harm on the watercourse or environment of another riparian state.[103]

Since surface water contamination can have a negative impact on groundwater quality and overexploitation of groundwater, on the other hand, can affect surface water quantity and quality, conjunctive use and management of international water resources is required from riparian states.[104]

Provisions of the Convention under part V are applicable to protection of marine environment and sensitive ecosystems, including estuaries and coastal aquifers from land based activities using internationally accepted rules and standards. In emergency situations, resulting from natural causes or human conducts, states are required, 'without delay and by the most expeditious means available, notify other potentially affected States and competent international organizations of any emergency originating within its territory.'[105]

2.6 Berlin Rules on Water Resources of 2004

Water Resources Law Committee of the International Law Association met several times and deliberated whether or not to undertake a revision process for the Helsinki Rules and

[101] McCaffrey, S. 'The UN Convention on the Law of the Non-Navigational Uses of International Watercourses: prospects and pitfalls'1998, *World Bank Technical Paper*.
[102] United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 21, MAY 1997, Audio visual library of international law. New York. Available at file:///E:/international%20water%20law/the%20convention%20history.htm [accessed on 14/04/2011].
[103] McCaffrey, S. 1998.
[104] McCaffrey, S. 1998.
[105] Art 28 (2.A) of the UN Convention of 1997.

supplementing rules. In 1997, it reached a decision to go ahead with the revision process.[106] Berlin Rules are comprehensive set of articles adopted by the International Law Association in 2004. They consist of 73 articles arranged in 14 chapters.[107] These are considered to be summary and most up to date international customary rules concerning the law of national and transboundary waters.

In 2004, members of the Water Resources Committee met, discussed and finally presented their report to the International Law Association in its 71st conference in Berlin, Germany, where the association approved and adopted the Rules. These Rules are more comprehensive than the preceding rules and the UN Convention. They embrace more contemporary general environmental and water management principles applicable to national and international water management, inter alia, public participation, conjunctive use, integrated management, sustainability and minimization of environmental harm. Chapter 8 of the Rules is devoted to groundwater management and protection at national and transboundary level.

3. International law principles

International law principles pertinent to environmental protection have long been embedded in 'treaties, state practices, binding acts of international organizations, and soft law commitments.'[108] However, water law principles of international nature have not crystallized in full but, there is a trend towards a positive application of International Customary Law principles through state practices. These International rules/principles are applicable to all shared aquifers, except where specific provisions are made for individual cases. Article I of the Helsinki Rules 1966 states that

[106] Dellapenna, J.W. 'The Berlin Rules on water resources: The new paradigm for international water law',2006, *Proceedings of the ASCE Conference: Examining the Confluence of Environmental and Water Concerns Proceedings of the World Environmental and Water Resources Congress*.
[107] Salman, S.M.A. 'The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: perspectives on international water law'2007, *Water Resources*, vol. 23, no. 4, pp. 625-640.

[108] Sands, P. '*Principles of International Environmental Law'*, 2ed (2003) 231 Manchester University Press.

"The general rules of International Law as set forth in these chapters are applicable to the use of the waters of an international drainage basin except as may be provided otherwise by convention, agreement or binding custom among the basin States."[109]

Likewise, the Declarations and Resolutions of the United Nations Water Conference in Mar del Plata1977 approved a recommendation 93(b)), stating, "[i]n the absence of bilateral or multilateral agreements, member states continue to apply generally accepted principles of international law in the use, development and management of shared water resources".[110] Out of these principles, the absolute territorial sovereignty (Harmon doctrine), the absolute territorial integrity, and the community of interest are the three main principles/theories underpinning the use, protection and management of transboundary water resources.

Harmon doctrine was coined from the opinion of US Attorney General Judson Harmon on the matter of Rio Grande water use between Mexico and United States in 1895. It holds that states have absolute freedom to use the part of international watercourse that falls within their jurisdiction regardless if that use has/had or will have a significant impact on the use of other riparian states.[111] On the other hand, absolute territorial integrity is a theory mostly held by lower riparian states and corresponds to the theory of natural flow, where by a state is entitled to expect the same volume of water uninterrupted in quantity and unimpaired in quality by flow into its territory. These two theories are in direct conflict with each other and can only be reconciled by making use of the third theory which holds that a co riparian state is free to use its watercourse in such a manner that its activities does not cause a significant harm to other states or does not allow its territory to be used in such a manner as to cause harm

Some of the other less applied, but very important, principles of international environmental law on shared water resources are precautionary principle, polluter pays, sustainability and integrated

[109] The Helsinki Rules on the Uses of the Waters of International Rivers, 1966, available at http://www.unece.org/env/water/meetings/legal_board/2010/annexes_groundwater_paper/Annex_II_Helsinki_Rules_ILA.pdf [accessed on 19/04/2011].
[110] Declarations and Resolutions of the United Nations Water Conference, 1977, Mar del plata available at http://www.cawater-info.net/bk/water_law/pdf/mardelplata_1977_e.pdf [accessed on 19/04/2011].
[111] McCaffrey, S.C. 'Harmon Doctrine One Hundred Years Later: Buried, Not Praised,' The 1996 *Nat.Resources J.*, vol. 36.

water resources management principles. These principles are introduced and dealt with great depth in contemporary environmental law text books.

4. Role of courts in groundwater jurisprudence

Transboundary water law was mostly applied on surface water disputes and groundwater conflicts were decided on ad hoc bases or according to local or regional customs. A number of international and regional water instruments provided for prevention and amicable settlement of dispute and litigation measures as a last resort.[112] In literature, there are many water related court cases decided internationally between countries and federal state. Two of such cases, with relevance to transboundary groundwater, are summarized below to exemplify court application of the law to groundwater.

4.1 Cases

4.1.1 Hungary vs. Slovakia

The case involves Hungary and Slovakia (successor of Czechoslovakia) who signed a treaty in 1977 concerning the construction and operation of Gabcikovo - Nagymoras system of locks as joint investment constituting single and indivisible operational system of works meant to provide for the development of water resources, energy, agriculture and transport for both nations. In 1989, Hungary suspended and, in the same year abandoned operation of the project at Nagymoras. It also tried to terminate the treaty in 1992 due to public and political pressure from environmental groups and local people. Hungary argued that the project will cause ecological problems, including groundwater quantity reduction, quality impairment, river bank erosion and destruction of *Szigetköz* wetland. In support of its case, Hungarian government cited several scientific studies, presenting potential ecological dangers of the project. Slovakia, as an inheritor of the project after becoming independent in 1993, carried on the operation and introduced new program termed Variant C, consisting of unilateral diversion of the Danube River and construction of dams which commenced on 1991. Slovakia challenged Hungarian claims about

[112] See for instance the United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses and Helsinki Rules.

ecological dangers based on the grounds that it is exaggerated and also referred to scientific studies refuting Hungarian claims. Furthermore, Slovakia stated that monitoring systems and technical study can be used to avoid potential ecological dangers.

The case was presented to the International Court of Justice (ICJ) in Hague in 1993. The court was requested to decide first on, whether or not Hungarian suspension and subsequent abandonment of the Nagymoras project constituted a breach of Budapest treaty, and second, whether or not Slovakia's launch of Variant C was a wrongful act depriving Hungary of its equitable and reasonable share of Danube River and thirdly, whether or not Hungary was entitled to terminate the 1977 Treaty. The court began hearing in 1997 and, after a site visit, handed down its judgment in which the court found,[113]

1. "that Hungary was not entitled to suspend and subsequently abandon, in 1989, its part of the works in the dam project, as laid down in the treaty signed in 1977 by Hungary and Czechoslovakia and related instruments;
2. that Czechoslovakia was entitled to start, in November 1991, preparation of an alternative provisional solution (called "Variant C"), but not to put that solution into operation in October 1992 as a unilateral measure;
3. that Hungary's notification of termination of the 1977 Treaty and related instruments on 19 May 1992 did not legally terminate them (and that they are consequently still in force and govern the relationship between the Parties);"
4. and that Slovakia, as successor to Czechoslovakia, became a party to the Treaty of 1977"[114]

For future cause of action for both parties, the Court held:

1- "that Hungary and Slovakia are obliged to come to the negotiation table in good faith in light of the prevailing situation, and must take all necessary measures to ensure the achievement of the objectives of the 1977 Treaty;

[113] Bekker, P.H.F., 'Gabcikovo-Nagymaros Project (Hungary/Slovakia), Judgement'1998, *American Journal of International Law*, , pp. 273-278.
[114] Gabčíkovo-Nagymaros Project (Hungary/Slovakia) available at http://www.icj-cij.org/docket/index.php?sum=483&code=hs&p1=3&p2=3&case=92&k=8d&p3=5 [Accessed on 28, November 2012].

2- that, unless the Parties agree otherwise, a joint operational regime for the dam on Slovak territory must be established in accordance with the Treaty of 1977;
3- that each Party must compensate the other Party for the damage caused by its conduct;
4- And that the accounts for the construction and operation of the works must be settled in accordance with the relevant provisions of the 1977 Treaty and its related instruments."[115]

4.1.2 Württemberg and Prussia v. Baden (Donauersingkung case)

Inter-state water governance in federal countries such as Australia, German and United States of America has developed over many years. Württemberg and Baden are two former German riparian states of upper Danube River.[116] The River originates from Black Forest in German, passes Swabian Jura Mountain range between Baden (upstream state) and Württemberg, seeps through a limestone riverbed and finally resurfaces in Aach River in Baden (part of Rhine River system). Percolation is, sometimes, very large causing the River to dry up. In 1927 Württemberg brought a lawsuit against Baden in German constitutional court (Staatsgerichtshof) and, later Prussia (downstream to Württemberg) joined the proceedings. Württemberg and Prussia accused Baden of taking unilateral detrimental actions that increases seepage of river water and, therefore, requested for a court order prohibiting Baden to undertake certain activities that might increase seepage of water and to implement other activities that should slow down natural seepage. On its part, Baden alleged that Württemberg is involved or intends to get involved in operations that might affect natural flow of water.

As the matter was not covered in German law, the Court relied on International Customary Law to reach a decision. Several international principles, which were later incorporated in the UN Convention on the Law of Non-Navigational Uses of International Watercourses appeared in the court's judgment. The court ruled that Baden must refrain from using artificial works to interfere

[115] Case concerning Gabcíkovo-Nagymaros Project (Hungary/Slovakia) Judgment available at http://www.icj-cij.org/docket/index.php [accessed at 08/05/2011].
[116] When German federal Republic came into existence in 1949, the two states were fused in to one state known as Baden-Württemberg.

with the natural flow of water or increase infiltration capacity of the riverbed. Baden was not required to alter natural flow for the benefit of other states. The court also held that Württemberg must refrain from undertaking certain activities (such as damming of the river) that might reduce natural flow of water.[117]

5. Regional groundwater policy and law

5.1 Southern and East African groundwater policy and law

The idea behind African sub-regional economic blocs first emerged in 1960s as many new African independent states surfaced and many more were still in struggle against colonial powers. The Organisation for African Unity, OAU, (forerunner of African Union, AU), realised the need for economic, social and political cooperation and integration in the continent. United Nations Economic Commission for Africa (UNECA) has also played a supportive role in the establishment of such sub-regional blocs. Ever since, several African regional organizations came into existence with their own water policy and law.[118] Mainland Tanzanian and South African groundwater policy and law within the regional context is included in this study as an attempt to understand the general picture of groundwater protection in the region.

Southern African Development Community (SADC) is an intergovernmental organisation and one of the major African economic regional blocs. It was formally established in 1992, preceded by Southern African Development Co-ordination Conference (SADCC) of 1980. Currently it has 15 members. The organisation aims, among other things, to "achieve sustainable utilisation of natural resources and effective protection of the environment" and to enhance the standard and quality of life of the people of Southern Africa.

Southern African Development Community (SADC) Protocol on Shared Watercourse Systems was drafted in 1995.it was mainly based on the Helsinki Rules on the Uses of the Waters of International Rivers. The required two third majorities of SADC member states ratified the protocol and it came into effect in 1998. In the year 2000, the Protocol was revised and amended

[117] McCaffrey, S. 'International groundwater law: evolution and context'1999, Groundwater: Legal and Policy *Perspectives, Proceedings of a World Bank Seminar.*
[118] Ruppel, O.C. 2009, 'Regional economic communities and human rights in East and southern Africa', Human rights in Africa–Legal perspectives on their protection and promotion. *Windhoek: Macmillan Education Namibia*.

to recognise UN Convention on the law of non-navigational uses of watercourse and it came to effect in 2003. [119]

Article 1 of the Revised Protocol contains a number of key definitions including, "watercourse", which, it defines as "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". This is comparable to the definition of UN Convention of 1997.[120] "Pollution of a shared watercourse" is also defined in the Protocol as "any detrimental alteration in the composition or quality of the waters of a shared watercourse which results, directly or indirectly, from human conduct". The definitions cited above are restricted to man induced pollution and natural source of pollutions are not included. The Protocol is one of the few legal documents on shared water resources that defined "Significant harm" as "non-trivial harm capable of being established by objective evidence without necessarily rising to the level of being substantial".

"The general objective of the Protocol is to foster closer cooperation for judicious, sustainable and co-ordinate management, protection and utilization of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation".[121]

Southern African Development Community's (SADC) Regional Water Policy of 2005 was developed to serve as a framework policy for sustainable utilization of the resources, integrated development, protection and control of national and shared waters in the region. One year later, on 2006 SADC, regional water strategy was developed for the implementation of the policy and protocol. Regional Groundwater Management Program (GMP) of 1998 is a significant program developed for the protection, monitoring and management of transboundary aquifers in the region. There are number of River Basin Organizations (RBO) and Commissions established in the region to give effect to article 5 (3) (a) of the revised protocol. These institutions manage

[119] Dellapenna, J.W. & Gupta, J. (eds)'*The evolution of the law and politics of water*,' (2009), Springer Verlag.
[120] ibid
[121] 'Revised Protocol on Shared Watercourses'. Available at http://www.sadc.int/index/browse/page/159[accessed on 30/04/2011].

shared surface water resources and envisage including groundwater management in their agenda as groundwater is part of the watercourse defined by the protocol.[122]

East African Community (EAC) is also an intergovernmental organisation of 5 members that was founded by Kenya, Uganda and Tanzania in 1967. The organisation was dissolved in 1977, due to "lack of strong political will, lack of strong participation of the private sector and civil society in the co-operation activities, the continued disproportionate sharing of benefits of the Community among the Partner States due to their differences in their levels of development and lack of adequate policies to address this situation".[123] After several initiatives, the organisation was revived on July 2000. Burundi and Rwanda joined the organisation on July 2009.

The Treaty for the Establishment of East African Community is the legal instrument of the organisation which provides for institutions of EAC including East African Court of Justice as the judicial arm of the organisation and East African Legislative Assembly as its law making organ. One of the objectives of the Treaty, as captured in article 5, is promoting sustainable utilization of natural resources of the Partner States and taking measures that would effectively protect the natural environment of the Partner States.[124]

Chapter 19 of the Treaty deals with the "Co-operation in Environment and Natural Resources Management". It recognises that development activities might have negative impacts on the environment and that sustainable development is unachievable without access to clean and healthy environment.[125] Although the Treaty does not explicitly guarantee right to clean environment, it obliges on states to abide by universally accepted human rights and recognition, promotion and protection of human rights in accordance with the provisions of the African

[122] Beetlestone, P. 'Challenges to Transboundary Aquifer Management in The SADC Region' SADC Infrastructure and Services Directorate - *Water Division, Gaborone, Botswana* .

[123] ' Preamble of the Treaty Establishing East African Community'. Available at http://www.eac.int/treaty/index.php?option=com_content&view=article&id=75&Itemid=156 [accessed on 1/11/2012].

[124] Art 5(3) (b) of the Treaty for the Establishment of the East African Community (As amended on 14th December, 2006 and 20th August, 2007). Available at http://www.kituochakatiba.org/index.php?option=com_docman&task=cat_view&gid=23&Itemid=36 [accessed on 6th of July, 2012].

[125] Chapter 19 of EAC Establishing Treaty.

Charter on Human and People's rights,[126] which guarantees right to " general satisfactory environment". It is worth noting that East African Community Bill of Rights which contains civil and political rights as well as socioeconomic and cultural rights including right to clean and health environment and right to life has been in draft form since 2010. The East African Legislative Assembly debated and passed the Bill on 25th of April 2012 in its fourth session and, upon signature of heads of state, the Bill will become a "Community Act."[127]

To operationalize the provisions of the Treaty that require joint development and adoption of harmonized common policies and strategies for sustainable management of transboundary natural resources within the Community, the East African Council of Ministers ,as the policy organ of the EAC organization, established under chapter 5 the Treaty, has developed and adopted numerous regional policies and strategies. The Protocol on Environment and Natural Resources Management, East African Community Development Strategy (2011/12 – 2015/16) and Transboundary Environmental Impact Assessment Guidelines for Shared Ecosystems in East Africa are few of the environmental policy documents EAC has adopted.[128]

[126] Art 6 of the EAC Establishing Treaty .
[127] Art 24 of the African Charter on Human and People's Rights, available at http://www.africa-union.org/official_documents/treaties_%20conventions_%20protocols/banjul%20charter.pdf [accessed on 2/11/2012].
[128] 'Legal Instruments with regard to EAC Watershed Governance Structure', available at http://www.eac.int/environment/index.php?option=com_content&view=article&id=155&Itemid=139 [accessed on 3/11/2012].

Chapter 3: South African groundwater policy and law

'South Africa is a relatively dry and drought prone country. The rainfall is generally low and erratic with a mean annual precipitation in the order of 500mm compared to the world average of 860mm. Some 21% of South Africa receives less than 200 mm/a. The country has limited water resources and is ranked globally amongst the twenty most water-scarce countries.' [129]

1. Introduction

Water is unevenly distributed in the country putting constraint on social and economic development and applying an increased pressure on supply/demand balance. Demand for water use has increased and still intensifying alongside with population growth, industrialization and urbanization.[130] Irrigation is the largest freshwater user in South Africa causing, significant problems to water quality and also affecting water quantity. On the other hand, irrigated land is mostly found on the receiving end of the watercourse and, therefore, upstream polluting activities affect the productivity, quality of crops and suitability of the soil. Irrigation water use has considerably decreased for allocating more of the scarce water resources to other similarly important sectors such as industries, mining and municipal uses.[131] Mining is another industry that heavily depends on and highly pollutes water resources.[132]

Contamination of groundwater might be detected after a long period of time because groundwater flows very slowly compared to surface water and, therefore, has a limited capacity of self-purification. Invisible nature of groundwater also contributes to its long term contamination from point and non-point sources.[133]

[129] Woodford, A. & Rosewarne, P. 'How much groundwater does South Africa have'? 2006, available at http://scholar.google.co.za/scholar?cluster=5927367258927654111&hl=en&as_sdt=0,5 [accessed 03/March/2011].
[130] Francis, R. 'Water Justice in South Africa: Natural Resources Policy at the Intersection of Human Rights, Economics, & Political Power'2005, *bepress Legal Series*.
[131] S Holmes, (Ed) 'South African water quality guidelines volume 4 agricultural Use: irrigation,' Department of Water Affairs and Forestry 2nd edition (1996).
[132] Oelofse, S. 'Mine water pollution-acid mine decant, effluent and treatment: a consideration of key emerging issues that may impact the State of the Environment'2009. Available at http://researchspace.csir.co.za/dspace/handle/10204/5025 [accessed on 5th September 2012].
[133] Policy and Strategy for Groundwater Quality Management in South Africa, Department Of Water Affairs And Forestry' (2000). Available at http://www.info.gov.za/view/DownloadFileAction?id=70330 [accessed on 3rd of September 2012].

2. Groundwater

Proper protection and management of groundwater is not feasible without accompanying effective and relevant policy and reasonable law. Pursuant to the constitutional mandate, groundwater in South Africa (as elaborated in section 2.2 below) is regulated alongside with surface water in number of acts and policies that are reviewed and briefly deliberated below. The legislature and executive are mandated to develop and implement policies and laws for the protection and management of water resource (including groundwater) to comply with the progressive realisation of the rights enshrined in the Bill of Rights especially the right to sufficient water and the right to have the environment protected for the benefit of present and future generations. These rights are linked to other socio economic rights entrenched in the Constitution.[134]

2.1 Development of groundwater policy and law in South Africa

2.1.1 Customary law

In the years preceding the arrival of colonialist and codification of South African water law, water resources were governed by non-written customary rules. As there was less economic development and high mortality rate, water resource use was very much less than the current consumption rates. Traditional leaders had supervisory power to administer and resolve any potential disputes in their communities. They were responsible for the overall allocation and protection of water resources.[135] At present, traditional water governance is still practiced in rural and remote communities. Malzbender et al suggested that the role of customary law in water resource governance should be fully acknowledged.[136] Democratic governments elected after 1994 are obliged to take customary law into consideration in accordance with their constitutional mandate Section 211 (3) of the Constitution of South Africa states that *'[t]he courts must apply customary law when that law is applicable, subject to the Constitution and any legislation that*

[134] Stein, R. 'Water Law in a Democratic South Africa: A County Case Study Examining the Introduction of a Public Rights System'2004, *Tex L.Rev*., vol. 83.
[135] Thompson, H. Water *Law: 'A Practical Approach to resource Management and the Provision of Services,*' 2006, Juta & Company.
[136] Malzbender, D., Goldin, J., Turton, A. & Earle, A. 'Traditional Water Governance and South Africa's "National Water Act"–Tension or Cooperation'2005, *International Workshop on African.*

specifically deals with customary law.'[137] Customary African law plays a major role in local or community level dispute resolution where elders of disputing parties come together, discuss the matter (s) at hand in great details and make a unified decision to keep communities live in harmony and avert potential bloodshed.

2.1.2 Roman Dutch law

Roman Dutch law, as the name suggests, is an ancient Roman law that is entrenched in Netherlands national law. In 1652, Dutch East India Company (Vereenigde Oost Indiese Companje, VOC), led by Jan Van Riebeeck, arrived in the Cape of Good Hope, establish its colony and introduced Roman Dutch law with the company acting as *dominus fluminis.* This altered and intervened with the existing, but not written, African customary law where water as well as other natural resources were commonly shared and absolute private ownership not practiced.[138]

In classical Roman law, water was classified as *res extra commercium*, or non-negotiable things, which could not be privately owned. The Romans distinguished between perennial rivers and the temporary flow of water after rain, which were respectively, classified as *res publicae* and *res communes omniums.'*[139] Roman Dutch law was transferred, and at times imposed upon, those countries colonized by Netherlands as the only civilized legal system acceptable regardless of other pre-existing legal systems. As the company expanded its radius of land and water resources control, application of stringent government controls were necessary because of socio economic and climatological differences between Netherlands and South Africa.[140]

Groundwater position under Roman Dutch law and specifically in Netherlands is not very clear since groundwater exploitation has received less attention. Roman Dutch writers barely discussed groundwater in details. Groundwater protection and management was even less obvious and hardly presented in Roman Dutch literature.[141]However, groundwater was

[137] Section 211 (3) of the Constitution of South Africa 1996.
[138] Hall, C.G. '*The Origin and development of water rights in South Africa*,' 1939, Printed for the author at the University press.
[139] Pienaar, G. & van der Schyff, E. 'The Reform of Water Rights in South Africa' 2007, *LEAD: Law, Environment & Development Journal*, vol. 3, no. 2.
[140] Thompson, H. 2006.
[141] Thompson, H. 2006.

considered private property under Roman law.[142] It is worth noting that Netherlands abandoned Roman Dutch law in the early 19th century but until recently its usage continued to existed in number of former Dutch colonies such as Indonesia, East Timor, and South Africa.[143]

2.1.3 English common law

When British settlers came to the shores of the Cape of Good Hope with their troops and established their rule virtually in the whole of the country, they also brought with them their legal system. Regardless of the agreements between British colony and the defeated Dutch to keep common law intact, significant 'administrative and organizational reforms' have resulted. Under British rules, judicial system of water governance has been changed by substituting *landdroste* and *heemraden* with magistrates trained under English and Scottish law and rendering Cape Supreme Court the only court with the authority to handle water disputes.[144] Because British legal system was at odds with Roman Dutch law, divergent water resource governance and change of management approaches were felt in the water sector. The main underpinning principle of the new system was the riparian doctrine which grants ownership and control of water resources to property owners adjacent to rivers and/or streams. Also water above or underneath a piece of land belonged to the owner of that land.[145]The owners of property next to water resources had the right to use water for their benefit as long as their use doesn't have a negative impact on similar rights.[146]The government control or custodianship of water resources was minimal as opposed to the Roman Dutch law under which the state was *dominus fluminis.*[147] Because of the poor understanding of groundwater and lack of sophisticated pumping devices, groundwater was treated as a separate entity with no connection with surface water under English common law. Instead, the link between groundwater and land use was better established.[148]

[142] Thompson, H., Stimie, C., Richters, E. & Perret, S. 2001.
[143] Williams, J. 'Roman-Dutch Law', 1910 *The Yale law journal*, vol. 19, no. 3.
[144]Thompson, H. 2006.
[145] Thompson, H., Stimie, C., Richters, E. & Perret, S. 'Policies, legislation and organizations related to water in South Africa, with special reference to the Olifants river basin,' 2001 *Iwmi.*
[146] Thompson, H. 2006.
[147] Pienaar, G. & van der Schyff, E. 2007.
[148] Thompson, H. 2006.

2.2 Post-1994 groundwater policy and law reforms in South Africa

South Africa has undergone significant political, economic and social transformations since the advent of now fully fledged democratic government based on constitutional supremacy and judicial independence.[149] With the dawn of democracy in the country, the new government was faced with daunting social, economic and environmental challenges that required immediate attention and regulation. A long overdue water law reform, envisaged in 1955 Freedom Charter[150] of South Africa, was to be implemented by the new government.[151] Reconstruction and Development Program (RDP) was introduced as the overarching policy framework of the government to address past disparities, present challenges and future course of action. Assessment of basic needs was declared to be one of the important pillars of the RDP programs and specifically "Meeting basic Needs" was considered one of the four pillars of the RDP. The program made, "access to basic water supply and sanitation services as well as protection of the environment for all citizen" a priority.'[152]

2.2.1 Constitutional mandate

South Africa has adopted a constitutional democracy in 1996 that is determined to move people away from the past discriminatory life style to ''[153] Chapter two of the Constitution is the Bill of establish a society based on democratic values, social justice and fundamental human rights'[154]. The Constitution is also adopted to 'improve the quality of life of all citizens….Rights which is the cornerstone of democracy in the country. It enshrines fundamental human rights such as the right to equality[155]; human dignity[156], life[157], property[158] and environment[159]. Groundwater being

[149] Herrfahrdt-Pähle, E. 'South African water governance between administrative and hydrological boundaries,' *Climate and Development, 2010*, vol. 2, no. 2, pp. 111-127.
[150] The Freedom Charter of 26, June 1955 states that 'all apartheid laws and practices shall be set aside.' Available at [27, November, 2012].
[151] Stein, R. 'Water Law in a Democratic South Africa: A County Case Study Examining the Introduction of a Public Rights System'2004, *Tex L.Rev*., vol. 83.
[152] 'A history of the first decade of Water Services delivery in South Africa 1994 to 2004, meeting the millennium development goals', Department of Water Affairs and Forestry. Available at http://www.dwa.gov.za/documents/Publications/firstdecade.pdf [accessed on 10th of October 2012] .
[153] Preamble of the 1996 constitution.
[154] Preamble of the 1996 constitution .
[155] Sec 9.
[156] Sec 10.

an integral part of the environment is implicitly protected under the constitution in section 24 which reads:

Everyone has the right

a. to an environment that is not harmful to their health or well-being; and
b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
    i. prevent pollution and ecological degradation;
    ii. promote conservation; and
    iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.[160]

The constitutional right to environment that is not harmful to human health or wellbeing is applicable to the whole of the environment as it is applicable to any component thereof (groundwater in this case). Commentators and interpreters of the Constitution addressed numerous issues during and beyond negotiation process of the interim and final constitutions. Few of those issues germane to water are revisited in a nutshell.

- from ecocentric point of view, protection of the environment, including groundwater, for its intrinsic value, humans, animals and inanimate objects falls under the constitutional term of" Everyone". This is in sharp contrast to the anthropocentric viewpoint that environmental rights are primarily concerned with humans and their needs. However, in South Africa, anthropocentric approach was adopted,[161] as section 2 (2) of the National Environmental Management Act (NEMA) stated that "[E]environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably."[162] 'Health and wellbeing' used by the Constitution are two generic terms that are capable of multiple

[157] Sec11.
[158] Sec25.
[159] sec24.
[160] Sec 24 of The constitution of Republic of South Africa, of 1996.
[161] Glazewski, J. *Environmental law in South Africa* (2005) 2ed. Durban: LexisNexis Butterworths.
[162] Section 2(2) of the National Environmental Management Act 107 of 1998.

interpretations. Moreover, NEMA's definition of the term 'environment' should be utilized to decipher its meaning and demarcate its boundaries.[163]

- The environmental clause imposes constitutional obligation on the state not only to enact reasonable legislation, but to also take other reasonable measures (including measures of 'administrative, technical, financial and educational nature'),[164] to prevent pollution and ecological degradation. This means that the state and individual activities that impair or render the environment unhealthy are considered unconstitutional and, therefore, must be phased out, abandoned or remedied to be consistent with constitutional requirement. The state is also required to 'respect, protect, promote and fulfil the rights in the Bills of Rights.[165]

- Departing from past practice where environmental rights were considered 'third generation rights' exercised only on group bases, section 38[166], read with section 8,[167] of 1996 Constitution, adopted a new approach that made environmental rights an individual as well as group rights that are justiciable and enforceable against the state, juristic and

[163] Section 1 of the National Environmental Management Act of 107 of 998 defines 'Environment' as "the surroundings within which humans exist and that
are made up of—
(i) The land, water and atmosphere of the earth:
(ii) micro-organisms, plant and animal life:
(iii) any part or combination of (i) and (ii) and the interrelationships among and between them: and
(iv) the physical. chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being: (xix)."

[164] Davis, D., Cheadle, H. & Haysom, N. 'Fundamental Rights in the Constitution: Commentary and Cases: a Commentary on Chapter 3 on Fundamental Rights of the 1993 Constitution and Chapter 2 of the 1996 Constitution,' 1997, Centre for Applied Legal Studies.

[165] Sec 2 of the constitution of South Africa of 1996.

[166] Sec 38 states that 'anyone listed in this section has the right to approach a competent court, alleging that a right in the Bill of Rights has been infringed or threatened, and the court may grant appropriate relief, including a declaration of rights. The persons who may approach a court are -
anyone acting in their own interest;
anyone acting on behalf of another person who cannot act in their own name;
anyone acting as a member of, or in the interest of, a group or class of persons;
anyone acting in the public interest; and
an association acting in the interest of its members'

[167] sec 8 is the application of the rights and states that,'
[t]he Bill of Rights applies to all law, and binds the legislature, the executive, the judiciary and all organs of state. A provision of the Bill of Rights binds a natural or a juristic person if, and to the extent that, it is applicable, taking into account the nature of the right and the nature of any duty imposed by the right…
A juristic person is entitled to the rights in the Bill of Rights to the extent required by the nature of the rights and the nature of that juristic person.

natural persons.[168]Disputes related to groundwater can, therefore, be litigated by, individuals, groups and organs of the state by approaching a competent court to protect groundwater from pollution or degradation provided that they fall under five categories enlisted in section 38 of the Constitution .[169]

- An extremely important principle/concept included in the environmental clause of the final constitution is sustainable development. It is defined in Brundtland Report as development that '*meets the needs of the present without compromising the ability of future generations to meet their own needs*.'[170] For groundwater this means to be utilized at a rate that will not exceed natural replenishment of groundwater resources. This also requires protection of water and other environmental resources for present and future generations (intra-generational and inter-generational equity).[171]

- All the above constitutional rights are not absolute as they '*may be limited only in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality, and freedom, taking into account all relevant factors.*'[172]

- Although water management is national competence, certain aspects of water management (such as pollution control and environmental management) require cooperative governance entrenched in chapter 3 of the Constitution and chapter 3 of National Environmental Management Act (NEMA).

- Finally the rights to have access to information and just administrative action contained in s32 and s 33 of the Constitution respectively are closely linked to the right to an environment that is not harmful to human health or wellbeing. Promotion of Access to

[168] Currie, I. & De Waal, J. '*The Bill of Rights Handbook*', (2005). Juta & Company.
[169] The persons who may approach a court are-
(a) anyone acting in their own interest;
(6) anyone acting on behalf of another person who cannot act in their own name;
(c) anyone acting as a member of, or in the interest of, a group or class of persons;
(d) anyone acting in the public interest; and
(e) an association acting in the interest of its members.
[170] Brundtland, G.H. 'Brundtland report. Our common future', 1987,*comissão mundial,* .
[171] Devenish, G.E. '*A commentary on the South African Bill of Rights*,' 1999, Butterworth-Heinemann.
[172] Sec 36 of the Constitution of South Africa of 1996.

Information Act 2 of 2000 and Promotion of Administrative Justice Act, 3 of 2000 were enacted to give effect to those rights.[173]

Section 27 of the Constitution grants everyone the right of access to sufficient water. [174] The term "everyone" includes citizens and non-citizens because '*South Africa belongs to all who live in it*.'[175] To give effect to this constitutional right of access to sufficient water the National Water Act (NWA) of 1998 and the National Water Services Act (WSA) of 1997 were promulgated. The sufficient quantity of basic water supply was not defined in the WSA, however, section 9 of the Act authorized the Minister to prescribe Compulsory National Standards and, when doing so should take into consideration a host of factors including equal access to water and reasonable quality of life.

In April 2002, the Department of Water Affairs and Forestry developed the Compulsory National Standards Regulations, under section 9 (1) of WSA. The regulations were adopted under the assumption that 25 litres per person per day or 6 kiloliter per household per month within 200 meters distance from their residence is sufficient.[176] However, poor residents of Phiri, Soweto, led by Mrs Mazibuko, challenged the City of Johannesburg's Free Basic Water policy and lawfulness of installing pre-paid water meters in Phiri. The three respondents were the City of Johannesburg (the City), Johannesburg Water and the national Minister for Water Affairs and Forestry.

The applicants won in the South Gauteng High Court where the Court held that the installation of pre-paid water meters in Phiri was unlawful and unfair, that the City's Free Basic Water policy was unreasonable and, therefore, unlawful and that the City should provide 50 litres of free basic water daily to the applicants and "similarly placed" residents of Phiri. The case was appealed to the Supreme Court of Appeals by both parties. This Court held that 42 litres of water per day would be "sufficient water" within the meaning of the Constitution, and directed the City to

[173] Currie, I. & De Waal, J. '*The Bill of Rights Handbook*,'(2005) Juta & Company.
[174] S 27 (1) (b) of the constitution of South Africa *'everyone has the right to have access to … (b) sufficient food and water….'*
[175] Preamble of the Constitution .
[176] *Strydom HA,* and *King,* ND (*eds*) '*Fuggle and Rabie's environmental management in South Africa*' 2 ed,(2009), Juta.
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reformulate its policy in light of this conclusion. The Court also held that installation of the pre-paid water meters was unlawful on the ground that the City's by-laws did not make provision for them in these circumstances. The Court gave the City two years to rectify its basic water supply by-laws.

The matter was brought to the Constitutional Court which held that the government acted reasonably 'within its available resources' to fulfil the obligations contained in section 27 of the Constitution. The Court also noted that it is implicit in the concept of progressive realisation that it will take time before everyone has access to sufficient water. The Court concluded, in contrast to the High Court and the Supreme Court of Appeals, that it is not appropriate for a court to give a quantified content to what constitutes "sufficient water" because this is a matter best addressed in the first place by the government. The national government has adopted regulations which stipulate that a basic water supply constitutes 25 litres per person daily; or 6 kilolitres per household monthly (upon which the City's Free Basic Water policy is based).

On the pre-paid water meters, the Court held (contrary to the High Court and the Supreme Court of Appeal) that the national legislation and the City's own by-laws authorise the latter to introduce pre-paid water meters as part of Operation Gcin'Amanzi. The Court concluded that the installation of the meters was neither unfair nor discriminatory.[177]

2.2.2 Policy

2.2.2.1 The White Paper On National Water Resource Policy of 1997

In 1997, the new government developed white paper on National Water Resources Policy because of the new challenges and changes that necessitated water policy and law reform. An attempt to redress the twisted development of water policy and law where majority of the people in the country suffered unjustifiable inequality in access to water resources. A change of policy was also necessary because the government had 'to exercise management control over water

[177] *Mazibuko and Others v City of Johannesburg and Others* (CCT 39/09) [2009] ZACC 28; 2010 (3) BCLR 239 (CC) ; 2010 (4) SA 1 (CC) (8 October 2009) available at http://www.saflii.org.za/za/cases/ZACC/2009/28.pdf [accessed on 30th of October 2012].

resources.'[178] The policy resulted from wide consultation with interested and affected parties. "Fundamental Principles and Objectives for a New Water Law in South Africa" was the first product of water policy development, which was approved by the cabinet in 1996. The overall objective of the White Paper was to set out the policy of the government for the management of both quality and quantity of the country's scarce water resources.[179]

The core objectives of the new policy were:

- The principle of equity is central to the water law reform process. It pays special attention to addressing the needs of those who were historically denied access to water. The White paper seeks to identify the Policy, institutions and practices that will support the principle of equity and equitable access.

- To achieve optimum, long-term, environmentally sustainable social and economic benefit for society, National Government must ensure that the country's limited water resources are used to improve the quality of life for all South Africans.[180]

The policy demolished old management system of water resources and adopted new ones in which protection of existing water sources from polluting activities is equally valued as developing of new ones achievable only through systematic evaluation and monitoring of information.[181] Section 6.3 of the White Paper (Protection of Water Resources) discusses a number of important concepts required for the management and protection of water resources that include:

- "Resource quality", a "term used to include the health of all water resource parts which together make up an ecosystem, including plant and animal communities and their habitats.
- "Resource-directed Measures", which sets clear objectives for the desired level of protection for each resource

[178] Kidd, M. *Environmental law*, (2011), Juta and Company Ltd.
[179] National Water Policy White Paper of 1997.
[180] National Water Policy White Paper of 1997.
[181] National Water Policy White Paper of 1997.

- And "Source-Directed Controls", which aims to control what is done to the water resources so that the resource protection objectives are achieved. These include source reduction measures, which aim to reduce or eliminate the production of potential pollutants which could harm water resources" Planning at catchment level, proper land use, behavioural change and technological advancement are prerequisite for source reduction measures to be successful. [182]

The policy of the new government towards water conservation is to develop sector specific policy (e.g. agriculture, mining, industry for long term water security. Conservation and proper utilization of water resources requires reliable information for managers and users. Effective institutional framework, which manages resources and makes sure that regulatory requirements are adhered to and appropriate tools, that facilitate efficient, effective and sustainable utilization of water resources, are also properly considered.[183]

2.2.2.2 The National Water Resource Strategy of 2004

Department of Water Affairs and Forestry published the first edition of the National Water Resource Strategy (NWRS) in 2004. The strategy is a comprehensive document that covers nearly all necessary water resource management tools required in South Africa.[184] NWRS was developed and released to give effect to s 5 (1) of the National Water Act of 1998. The Act obliges the Minister to 'as soon as reasonably practical, by notice in the Gazette, establish a National Water Resource Strategy. [185]

The strategy is a dynamic document that can be established in a "phased and progressive manner and in a separate components over time'.[186] The strategy is to be reviewed in a period that does not exceed five years to provide for re-evaluation and monitoring of progress and to keep abreast with changing circumstances.[187] The strategy must be consulted and implemented when making water management decisions or carrying out obligations under the Act. It is binding on all organs

[182] National Water Policy White Paper of 1997.
[183] National Water Policy White Paper of 1997.
[184] M. Kidd, '*Environmental Law*,' (2011), Juta & Company Ltd, South Africa .
[185] S5 of the National Water Act,36 of 1998.
[186] Ss (4) (a) Ibid 52.
[187] ss (4) (b) Ibid.

of state and institutions performing a duty or exercising a power,[188] in accordance with Section 7 of the Act that states:

'The Minister, the Director General, an organ of state and water management institutions must give effect to the National Water Resource Strategy when exercising any power or performing any duty in terms of this Act.'[189]

Integrated water resources management (IWRM) is the foundation on which the strategy is based as is declared in the introductory chapter of the strategy. IWRM is a vital and contemporary concept introduced to South African water law that is defined clearly and concisely as a 'process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystem'.[190]

The contents of the Strategy are stipulated in section 6 of the Act, which requires the strategy to 'must set out the strategies, objectives , plans, guidelines and procedures for the Minister and institutional arrangement relating to the protection, use, development, conservation, management and control of water resources within the framework of existing relevant government policy.'[191]

In a nutshell the strategy revolves around the three crucial objectives of managing water resources in South Africa:

1. To achieve equitable access to water resource use, services and benefits thereof
2. To achieve sustainable use of water resources where demand and supply are balanced and water sources and resources are protected
3. And to achieve effective and efficient water use for optimum socio-economic benefits.[192]

Capacity building is required because to understand groundwater behaviour, monitor its quality and quantity trends and interaction with other environmental components, requires expertise and

[188] Van der Linde, M. 'Compendium of South African environmental legislation,' 2006, Pulp.
[189] S 7 Ibid.
[190] 'What is IWRM, Global Water Partnership'. Available at http://www.gwp.org/The-Challenge/What-is-IWRM/ [accessed on 28/02/2012].
[191] S 6 of the National Water Act 36 of 1998.
[192] *Strydom HA,* and *King,* ND (*eds*) '*Fuggle and Rabie's environmental management in South Africa*' 2 ed,(2009), Juta.

skills. Although integrated approach of water management is desired, groundwater has to be given special significance due to the nature of groundwater invisibility, difficulty to detected human and natural impacts and its slow movement in time and space. Sustainable use of groundwater and overall management can be achieved by employing Resource Directed Measures, while, on the other hand, Source Directed Controls should be utilized for protecting groundwater quality. [193]

National water resources classification system (including groundwater) is introduced to provide a framework under which protection levels of water resources are determined by designating different classes of water. Furthermore protection of aquatic and terrestrial ecosystems that are dependent on groundwater and their integrity also form the core objectives of water classification systems.[194] Stakeholder's participation in the decision making process for determining classes of water is encouraged but the final say is for the Minister of Environmental Affairs, who will take into consideration any stakeholders recommendation or comments.[195]

A class is determined with reference to the degree of deviation from natural conditions. When a class is being determined for surface water resources, numerous other factors will have to be taken into consideration, including chemical and physico-chemical, biological and hydro-geomorphological attributes. Groundwater classification system will be similar to that of surface water with due consideration of its unique characteristics. There are six classes of water resources namely: A, B, C, D, E, and F. The first four classes fall within the sustainable range while the last two classes fall under unsustainable range. The classification system should be employed to determine present ecological state for classes A-F and ecological management state for A-D.[196]

[193] National Water Resource Strategy of 2004 pp 56.
[194] National Water Resource Strategy of 2004 pp59.
[195] S12(1) of the National Water Act 36 of 1998.
[196] Thompson, H. water Law: 'A Practical Approach to resource Management and the Provision of Services,' 2006, *Juta & Company*, pp. 126-129.

2.2.2.3 The Groundwater Strategy of 2010

The strategy is a result of three year consultative processes where stakeholders are represented and affected and interested parts are engaged through different media, including workshops and interviews. Series of detailed studies, conducted by professionals in their respective fields, form the basis on which the strategy is built. It is designed to make sure that groundwater is recognised, utilised and protected as an integral part of the nation's water resources. The strategy is a follow up document for a program funded by Danish International Development Agency (DANIDA) headed 'Strategies for Inclusion of Groundwater in the National Water Resource Strategy', (NWRS). In 2007, the Department of Water Affairs (DWA) published a document, headed 'A Framework for a National Groundwater Strategy' which was an internal DWA directive. The Groundwater Strategy is meant to feed into delayed second edition of the generic National Water Resource Strategy envisaged to be published in the near future.[197]

The strategy promotes proper inclusion of groundwater in revisions of National Water Resource Strategy (NWRS), Water for Growth and Development (WfGD) framework, Catchment Management Strategy (CMS), and Water Services Development Plans. The strategy proposes numerous activities to be introduced, updated or improved in the National Water Resource Strategy, such as groundwater quality management; finalize the policy for rehabilitating abandoned mines, and implementation of stricter groundwater regulations.[198]

The strategy is subdivided into a series of chapters under which recommendations, actions and strategies that need to be incorporated in the second edition of the National Water Resource strategy are discussed in details under the following headings:

- Policy, legislation and regulation
- Water resource planning
- Human capacity building
- Sustainable groundwater management
- Institutional capacity building

[197] Ground water Strategy, 2010, DWAF.
[198] Ground water Strategy, 2010, DWAF.

- Information management
- Groundwater research
- And communication and awareness. [199]

2.2.3 Statutory law

2.2.3.1 Brief history of the repealed National Water Act of 1956

"The Water Act of 1956 has been hailed as representing a very important piece of legislation in the history of water regulation in South Africa. This Act managed to harmonize water regulation in the interests of the economic heavyweights, agriculture, mining and industry."[200]

Although the Act has been repealed by the National Water Act of 1998 (discussed on section 2.2.3.2 below), valuable lessons relating to groundwater can be learned from it. However, the prevailing socio economic conditions of the South Africa in the early 20th century called for a change in legislation of water due to the increase in water demand for purposes other than agriculture such as industries mining and population growth. Moreover, the Irrigation and Conservation of Waters Act 1912 (Act 8 of 1912), which was later partially replaced by the Water Act of 1956, could not cope with the rapid development of water demand and, therefore, in 1950, a Commission of inquiry into Water Matters led by C.G Hall was established and after few years the Water Act of 1956 was promulgated.[201]

The Water Act of 1956 was repealed because it was not an ideal piece of legislation for the water condition of the country for several reasons including that it was based on centralized and undemocratic water management system where the public was not involved in decision making. The provisions of the Act were based on legal systems of more affluent countries that are

[199] Ground water Strategy, 2010, DWAF.
[200] Tewari, D. A 2009.
[201] Tewari, D. 'A detailed analysis of evolution of water rights in South Africa: an account of three and a half centuries from 1652 AD to present'2009, *Water SA (Online),* vol. 35, no. 5, pp. 693-710.

different to South Africa in terms of water resource availability, socioeconomic conditions and political landscape. At the time when the Act was promulgated, the population of the country were smaller in number and living conditions were less prosperous and, therefore, environmental impact was less visible. Water resources and sources were not properly protected, conserved, managed and used under the Act and focus was on development of new water resources instead of managing available ones in a sustainable manner.[202] The Water Act of 1956 empowered the minister to overrule riparian water allocation to some degree where the minister could declare Government Water Control Areas and grant water to non-riparians.

The division of water into public and private was first introduced in the country by the Irrigation and Conservation of Waters Act 1912, based on the principle that spring water and water flowing on land were capable of ownership by landowners provided that their availability is ensured for downstream riparians if water flowed over their land. The distinction between private and public water was also maintain in the 1956 Water Act.[203] The Act and all preceding water legislation have neglected to recognise the interaction and interdependence between groundwater and surface water resources. Pollution was not defined in the Act and pollution abatement provisions are ambiguous. The important concept of cooperative governance is also missing from the Act.[204] Although certain pollution abatement principles were incorporated in the provisions of the Act, it favoured more surface water protection. Moreover, implementation and enforcement of the Act was unresolved issue.[205]

2.2.3.2 The National Water Act of 1998

The National Water Act of 1998 is widely hailed as one of the most progressive pieces of water resources management legislation in the world.[206] The Act is the national legal framework for

[202] Guide to the National Water Act ,DWA.
[203] Pienaar, G. & van der Schyff, E. 'The Reform of Water Rights in South Africa' 2007, *LEAD: Law, Environment & Development Journal*, vol. 3, no. 2.
[204] Allan, A. 'Comparison between the Water Law Reforms in South Africa and Scotland: Can a Generic National.Water Law Model Be Developed from These Examples,' 2003, *Nat.Resources J.*, vol. 43, pp. 419.
[205] *Strydom HA,* and *King,* ND (*eds*) '*Fuggle and Rabie's environmental management in South Africa*' 2 ed,(2009), Juta.
[206] Quibell, G. & Stein, R.'Can payments be used to manage South African watersheds sustainably and fairly? A legal review', 2005 *Center for Scientific and Industrial Research (CSIR).*

effective and sustainable management of water resources in the country.[207] Contemporary water management principles/concepts are enlisted in the preamble of the Act including the unitary and interdependence of hydrological cycle components, sustainable use of water resources, protection of quality and quantity of water, integrated water resource management and catchment management approach.[208]

These generic principles have been embedded in the Act and are directly derived from the 'Fundamental Principles and Objectives for a New South African Water Law' and proposals of the national water policy. They are 28 principles in total and are categorized under six categories. They range from legal aspects of the water, interdependence of water cycle components, water resources management priority and approaches and institutional reforms to water services provisions.

The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed, and controlled in order to, inter alia:

- Provide for water needs now and into the future;
- Promote equitable access to water resources;
- redressing the results of past racial and gender discrimination;
- Promote efficient, sustainable and beneficial use of water;
- Protect aquatic and associated ecosystems; and
- Reduce and prevent pollution.[209]

The importance of water resources for socioeconomic and environmental development of the country was captured in the Act by rendering water, wherever it occurs, an exclusive national

[207] Stein, R., Turton, A. & R Henwood, R. 2002, 'Water sector reforms in Southern Africa: Some case studies', Hydropolitics in the developing world: A Southern African perspective. *African Water Issues Research Unit, Pretoria.*
[208] Preamble of the National Water 36 of 1998.
[209] S2 of the National Water Act 36 of 1998. Available at http://www.info.gov.za/view/DownloadFileAction?id=70693 [accessed on 26/09/2012].

competence. This importance is reflected also in the Act by effecting number of changes to the management of water resources. Groundwater, in particular, was transformed from being a privately owned property to public resource under the trusteeship of national government. The Act recognises the schedule one use and the Reserve as the only two basic rights to water resources. The Reserve consists of basic human needs to water and environmental or ecological requirement.[210]

The Act repealed and replaced a multitude of ineffective and undemocratic water legislation inherited from apartheid government. The Act gave a chance to the national government to redress the past and provide equitable access to water resources to all. Under the apartheid system, access and distribution of water resources and holding water rights were based on racially discriminatory law and water rights were intimately linked to land ownership.[211]

The Act, in section 21 of chapter 4, defines water use to include several categories, amongst which is "…removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people[212]…." The concept of water use is extrapolated to include the actual water use and rendering water not fit for certain uses. All forms of water use required a permit or a license unless it:

- is in schedule 1 of the Act
- is an existing lawful use which permits relatively small amounts of water for domestic purposes.
- is permissible under general authorization, or
- If a responsible authority waives the need for a license

[210] Webb, B. *Sustainability of groundwater resources and its indicators*, 2006, IAHS Press.
[211] Stein, R. 'South Africa's New Democratic Water Legislation: National Government's Role as Public Trustee in Dam Building and Management Activities'2000, *J. Energy & Nat.Resources L.*, vol. 18.
[212] Section 21 (j) of the National Water Act 36 of 1998.

2.2.3.3 The National Environmental Management Act of 1998

The above water legislation should be read and studied in conjunction with the complementary and supportive environmental protection legislation of which the most comprehensive one is the National Environmental Management Act (NEMA) of 1998. NEMA is an overarching environmental legislation framework that allows complementary sectoral law to be adopted such as The National Water Act which also contains elements of framework legislation.[213] The Act recognises water as an integral component of the "Environment" that needs to be protected through environmental framework legislation. Furthermore, the Act provides for establishment of Committee for Environmental Coordination which included, among others, a Director General of Water Affairs and Forestry. NEMA empowers the minister and MEC, in concurrence with each other, to develop regulations to give effect to the general objectives of integrated environmental management. These regulations require either Basic Assessment or full scope report be submitted to competent authority before certain listed activities are commenced. Last set of such regulations were introduced by the Ministry of Water and Environmental Affairs in 2010 and replaced the Environmental Impact Assessment (EIA) Regulations of 2006.[214]

2.2.4 Water management institutions

To achieve progressive decentralization of water resource management, fair allocation, use, development, protection and conservation of national water resources, institutional framework should be put in place. Water resource management and water supply provision institutions were complex in nature and, many times overlapping, leaving a huge number of South African population un-served. "There were eleven "governments" (ten of which were homeland administrations) in addition to provincial structures, regional service providers, water boards, local governments and a large number of NGOs."[215] In the new democratic dispensation, an overhaul of institutional framework reform has taken place where the national government is given the ultimate responsibility to act as the national trustees of the nation's water resources.

[213] *Strydom HA,* and *King,* ND (*eds*) '*Fuggle and Rabie's environmental management in South Africa*' 2 ed,(2009), Juta.
[214] Environmental Impact Assessment, available at .http://www.westerncape.gov.za/eng/directories/services/11537/10199. Accessed on 10th of May, 2012
[215] Chapter Two Overview of the National Water Act and the Effects of Past Legislation Department of water affairs and forestry, governing body induction manual.

The institutional reform was created by restructuring the Department Of Water Affairs and Forestry to coordinate its diverse operations into manageable interdependent and interrelated set of institutions in line with the constitutional requirement of cooperative governance.[216] Moreover, water management institutions were created for regional water management under the National Water Act to facilitate public participation in decision making and democratization of water management processes. Finally, the backlock of water service provision inherited from apartheid government system necessitated to create effective, equitable and sustainable water service institutions to improve water supply and sanitation services.

Implementing water supply and sanitation services is the responsibility of the local government in accordance with the National Water Services Act, where the national government is charged with the responsibility to oversee this to materialize and make sure that nation's water resources are protected, used, developed, conserved, managed and controlled. The institutions outlined in the Act must implement water management principles and allocate water resources to both existing and prospective users.

2.2.4.1 Catchment management agencies (CMA)

In October 1999, 19 water management areas (WMA) were identified after wide public consultation. These WMA will all have a Catchment Management Agency (CMA). According to the Department of Water Affairs and Forestry currently, in 2012, six CMAs are administratively gazetted and two others are fully operational.[217] Chapter 7 of the National Water Act provides for the establishment/disestablishment powers and functions of Catchment Management Agencies. The main reason of establishing CMAs is to decentralize and delegate water resource management to the local levels. Their principal objectives are to ensure equitable allocation and sustainable use of water resources. In the transitional period, the minister acts as the CMA.

[216] Chapter 3 of the constitution of the Republic of South Africa.
[217] Progress on establishment of Catchment Management Agencies (CMAs) in South Africa, Presentation to the Select Committee: Land & Environmental Affairs, Department Of Water Affairs And Forestry available at http://www.pmg.org.za/report/20120306-department-agriculture-forestry-and-fisheries-their-strategic-plan-an [accesses on 08th of May, 2012]

Powers and functions of Catchment Management Agencies increase incrementally from establishment to fully functional levels.[218] Inter- catchment groundwater management and surface-groundwater interaction are very important issues that need to be taken seriously when contemplating conjunctive use of water resources Department of Water Affairs and Forestry minimally referred to the issues in its policy documents for groundwater quality management.[219]

2.2.4.2 Water user associations (WUA)

Chapter 8 of The National Water Act provides for establishment/disestablishment, powers and functions of Water User Associations. WUAs are co-operative individual water users governed by management committee, who wish to undertake water-related activities for their mutual benefit. Although they are water management institutions, their primary purpose, unlike Catchment Management Agencies, is not water management". WUA establishment and disestablishment procedures and content of their constitutions are detailed in the Act. Water management institutions established under Water Act of 1956 such as "Irrigation Boards, Subterranean Water Control Boards and Water Boards established for stock watering purposes will continue in operation until they are restructured as Water User Associations."[220]

The Act also provides for a number of other water management institutions by empowering the minister to establish management institutions such as an advisory committee and [221]bodies to implement international agreements.[222] In terms of water service and sanitation provision, the National Water Services Act provides for the establishment functions and powers of numerous institutions including Water Services Authorities, Water Services Providers, Water Services Intermediary, Water Boards, and Water Services Committee.[223]

[218] Chapter 7 of the National Water Act 36 of 1998.
[219] See for instance Policy And Strategy For Groundwater Quality Management In South Africa, available at http://www.info.gov.za/view/DownloadFileAction?id=70330 [access on 26th , November,2012].
[220] Chapter 8 of the National Water Act 36 of 1998.
[221] S 99 (I), chapter 9 of the National Water Act 36 of 1998.
[222] S 102, chapter 10 of the National Water Act 36 of 1998.
[223] Dellapenna, J.W. & Gupta, J. (eds) '*The evolution of the law and politics of water,*' (2009), Springer Verlag..

Chapter 4: Groundwater policy and law in mainland Tanzania

1. Introduction

Tanzania is endowed with water resources that are unevenly distributed in time and space. Many areas in the country suffer from water scarcity as a result of water demand increase, population growth, water pollution from point and non-point sources, overexploitation and illegal uses. Urbanization is also one of the leading contributors to water pollution in urban dwellings. Historically, water was regulated by African Customary law before German and English settlers came into the country. The colonial powers introduced different legal systems that favoured and furthered their interests. After independence, the new government has brought some dramatic political changes, but land and water situation of the country and relevant policy and law did not change much. However, Tanzanian government has recently adopted policies and enacted laws designed to effectively and efficiently manage water resources. Ineffective management and protection of water resources in the country is partially due to the lack of adequate human and financial capacity. Implementation, enforcement and compliance are some of the challenges that government is grappling with. Furthermore the need for integrated, multi-sectoral, multidisciplinary approach of water management is recognised in the new government policies and legislation.

2. Groundwater

Groundwater plays a major role in Tanzanian water needs, especially in the arid and semiarid central and northern parts of the country. For rural communities, it could be the only source of water supply as surface water availability is, at times, hampered by prolonged droughts and spatial and temporal variability. Tanzania has a large potential groundwater reserves that are not exploited yet, mainly, due to economic limitations and lack of information.[224] The Ministry of Water and Irrigation is responsible for the control and management of water affairs. Water

[224] Kashaigili, J.J., Kadigi, R.M.J., Sokile, C.S. & Mahoo, H.F. 2003, 'Constraints and potential for efficient inter-sectoral water allocations in Tanzania', *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 28, no. 20-27.

Resource Management Act of 2009 provides for the institutional framework and sustainable development of surface water and groundwater resources.[225]

2.1 Progressive development of groundwater policy and law in mainland Tanzania

Tanzanian water law and regulatory framework is a mixture of pre-independence set of regulations, known as ordinances, and contemporary statutory law. Pre-colonial era water regulation in mainland Tanzania was mainly dominated by customs, norms and traditions while, in the colonial period, European settlers have imposed foreign law that was ideal for their vested interests and finally after independence some change was introduced to the legal system of the country in general and water law reform, in particular. Some scholars questioned the validity of categorising water law development into pre-colonial, colonial and post-colonial periods arguing that water law might continue to exist during two or all of those periods. [226]

2.1.1 Customary law

Prior to the arrival of European settlers in mainland Tanzania and much of Africa, customary rules and norms were the dominant legal practice governing water resources. These practices are still upheld in some rural and remote areas of Tanzania. Under this system water is treated as a communal resources and every member of the community is entitled to use these resources for domestic use. In rural areas of the country groundwater is available to everyone and people are not obliged to apply for water rights if they use water for domestic purposes, livestock watering and small scale irrigation.[227] However, certain water rights and entitlements were granted to individuals and groups due to their labour and capital input into the development and maintenance of water resources. The main water management institution under customary law is the traditional governance system of chiefdom control and allocation of water. [228] The 1961

[225] Kashaigili, J.J., Kadigi, R.M.J., Sokile, C.S. & Mahoo, H.F. 2003, 'Constraints and potential for efficient inter-sectoral water allocations in Tanzania', *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 28, no. 20-27,.

[226] Dellapenna, J.W. & Gupta, J. (eds) '*The evolution of the law and politics of water*, (2009),' Springer Verlag.
[227] Nkonya, L.K. '*Rural water management in Africa: the impact of customary institutions in Tanzania*,' (2008), Cambria Press.
[228] Dellapenna, J.W. & Gupta, J. (eds) '*The evolution of the law and politics of water*,' (2009), Springer Verlag.

Judicature and Application of Law Ordnance recognised Customary Law as equal to the written law.[229]

2.1.2 Mainland Tanzanian water law under German rule

From 1880s during the European 'scramble for Africa', mainland Tanzania was placed under German protectorate, known as German East Africa (Deutsch-*Ostafrika*.) This was led by Karl Peters who managed to secure series of agreements with unlettered tribal chieftains. These treaties were later used by German authority as a legal land tenure and exploitation of its resources, including water.[230] A draft water ordinance was prepared by German East African Company[231], which required registration of water use by obtaining paper water right.[232] The aim of water regulation was to supply water to areas settled by colonialists, including irrigated land, government offices, residential areas, missions, large estates, cities and trading centres, excluding the majority of the population especially the rural communities.[233]

2.1.3 Mainland Tanzanian water law under British rule

After German regime was defeated in the First World Ward, German colonies in East Africa were ceded to number of countries and Tanganyika (as Tanzania was known at the time) was surrendered to Britain as a protectorate under the League of Nations.[234] The British authority imposed foreign legal system and practice into the country by adopting several water ordinances. It was under the British rule that the first statutory water control was approved by adopting

[229] Lein, H. & Tagseth, M. 'Tanzanian water policy reforms-between principles and practical applications.' 2009, *Water Policy*, vol. 11, no. 2.
[230] Hamilton, A.C. & Bensted-Smith, R. '*Forest conservation in the East Usambara mountains*,' Tanzania, (1989), Iucn.
[231] Calas, B. (ed) 'Shared *Waters, Shared Opportunities. Hydropolitics in East Africa*,' (2010), Mkuki na Nyota Publishers.
[232] van Koppen, B.S., Hatibu, C., Lankford, N., Mahoo, B. & H Yanda, P. 'Formal water rights in rural Tanzania: Deepening the dichotomy' 2004, *Iwmi.*
[233] Nkonya, L.K. '*Rural water management in Africa: the impact of customary institutions in Tanzania*,' (2008), *Cambria Press.*
[234] Lawrence, D. '*Tanzania and Its People*,' (2009), Godfrey Mwakikagile.

Water Ordinance of 1923.[235] This ordinance required registration of water users to secure water rights which was "open only to white settlers".[236]

The next Water Ordinance came into existence after 25 years in 1948. It was nationwide in scope and vested absolute power of water control on the colonial settlers.[237] Section 4 of Chapter 275 of the Ordinance stipulated that "the entire property in water within the territory is hereby vested in the Governor, in trust for His Majesty as administrating authority for Tanganyika".[238] However, to certain extent, the Ordinance acknowledged the native's rights to divert or abstract water in accordance with their law and customs.[239] In 1959, yet another Ordinance was enacted to repeal or amend number of Ordinances and to apply to government departments and water authorities established under the Water Works Ordinance of 1959. Institutions for water supply to urban and rural communities were created by that Ordinance.[240] Under British rule, the Department of Water Development was establish in 1945, and later renamed to Water Development and Irrigation Division by extending its mandate to include irrigation water management.

2.2 Post-independence mainland Tanzanian groundwater policy and law reforms

The country became independent in 1961. After few years, the mainland and Island territories of Tanganyika and Zanzibar merged to become the United Republic of Tanzania. The new government has brought some dramatic political changes, but land and water situation of the country and relevant policy and law did not change much. New legislation had little impact on reforming the prevailing legal practices inherited from colonial rulers. Instead it continued in the

[235] Lein, H. & Tagseth, M. 'Tanzanian water policy reforms-between principles and practical applications.' 2009, *Water Policy*, vol. 11, no. 2.
[236] Van Koppen, B., Koppen, B.C.P., Giordano, M. & Butterworth, J. 'Community-based water law and water resource management reform in developing countries,' 2007, *CAB Intl.*
[237] van Koppen, B.S., Hatibu, C., Lankford, N., Mahoo, B. & H Yanda, P. 'Formal water rights in rural Tanzania: Deepening the dichotomy' 2004, *Iwmi*.
[238] Van Koppen, B., Koppen, B.C.P., Giordano, M. & Butterworth, J. 'Community-based water law and water resource management reform in developing countries,' 2007, *CAB Intl.*
[239] Maganga, F.P., Kiwasila, H.L., Juma, I.H. & Butterworth, J.A. 'Implications of customary norms and laws for implementing IWRM: findings from Pangani and Rufiji basins, Tanzania',2004, *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 29, no. 15-18.
[240] Maganga, F.P., Kiwasila, H.L., Juma, I.H. & Butterworth, J.A. 'Implications of customary norms and laws for implementing IWRM: findings from Pangani and Rufiji basins, Tanzania,'2004, *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 29, no. 15-18.

same direction, with inadequate amendments.[241] Although the enactment of the Water Utilization (Control and Regulation) Act of 1974[242], was much anticipated, the results were not close to expectations. Section 8 of the Act vested all water in Tanzania on the United Republic, leaving no room for public participation in decision making.[243]

Water policy and law reforms took long time to kick start and it remained dormant up until transformation path was initiated with the assistance of World Bank and Danish International Development Agency (DANIDA) by undertaking Rapid Water Resource Assessment Project in 1990s.[244] The reform was triggered by the need to fill the regulatory void created by the existing legislation inherited from colonial rulers. Furthermore, it was deemed necessary to democratize and decentralize water management institutions to encourage public participation and include provisions in national legislation that require government authorities in charge of water resources to consult with stakeholders before any water management decisions are taken. Existing water regulatory regime also failed to cope with the increasing operational and maintenance costs and, therefore, new economic fee charges were required.[245] At national level, water management is chiefly administered by formal institutions that are created in conformity with statutory provisions. At the basin level, there is a combination of formal and informal arrangements.[246]

2.2.1 The constitutional mandate

The fourth and final constitution of the United Republic of Tanzania was enacted in 1977 with several amendments. The fifth Constitutional amendment of 1984 incorporated Bill of Rights referred to as 'Basic Rights and Duties' in to the Constitution.[247] Environmental rights were not explicitly entrenched in the Constitution. However, article 14 of the Constitution states that

[241] Chaytor, B. & Gray, K.R. 'International environmental law and policy in Africa,' 2003, Springer
[242] McCartney, M.P., Lankford, B.A. & Mahoo, H. 'Agricultural water management in a water stressed catchment: Lessons from the RIPARWIN project, '2007, *Iwmi*.
[243] van Koppen, B.S., Hatibu, C., Lankford, N., Mahoo, B. & H Yanda, P. 'Formal water rights in rural Tanzania: Deepening the dichotomy' 2004, *Iwmi*.
[244] Van Koppen, B., Koppen, B.C.P., Giordano, M. & Butterworth, J. 'Community-based water law and water resource management reform in developing countries,' 2007, *CAB Intl.*
[245] Molle, F. & Berkoff, J. 'Irrigation water pricing: the gap between theory and practice,' 2007, CABI Publishing.
[246] Sokile, C.S., Mwaruvanda, W. & Van Koppen, B. 'Integrated Water Resource Management in Tanzania: Interface between formal and informal institutions', *International workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa*, 2005.
[247] Wambali, M.K.B. '*Democracy and human rights in Tanzania Mainland: the Bill of Rights in the context of constitutional developments and the history of institutions of governance*,' (1997). University of Warwick

'Every person has the right to live and to the protection of his life by the society in accordance with the law.'[248] Tanzanian Supreme Court, in a landmark case of Kessy v. Dar Es Salaam City Council, interpreted the 'right to life' to implicitly include the right to healthy environment. The court ordered the government to close a landfill site, polluting the environment and causing nuisance and health hazard to a nearby residents. In similar case Festo Balegele & 749 Others v Dar Es Salaam City Council Tanzanian Supreme Court, found that the constitutional 'right to life' granted people the right to live in a clean environment. In the case of Mtikila v. Attorney General, the Supreme Court also afforded Christopher Mtikila and every citizen locus standi (legal standing) to bring environmental matters before the court.[249] It is noted that the expression "in accordance with the law' grants the state permission to derogate the right to life if that is in accordance with the law.[250]

Tanzania is signatory to several international and continental human rights instruments such as the African Charter on Human and Peoples' Rights (Banjul Charter) of 1981 which stipulates in article 4:'Human beings are inviolable. Every human being shall be entitled to respect for his life and the integrity of his person. No one may be arbitrarily deprived of this right.'[251] And International Covenant on Civil and Political Rights of 1966 which states in article 6 'Every human being has the inherent right to life. This right shall be protected by law. No one shall be arbitrarily deprived of his life….'[252]

According to article 9 (c) of the Tanzanian Constitution:

'state authorities and all its agencies are obliged to direct their policy and programs towards ensuring:(c) that public affairs are conducted in such a way as to ensure that the national

[248] Art 14 of the constitution of United Republic of Tanzania of 1977.
[249] Goldstein, G. 'Legal System and Wildlife Conservation: History and the Law's Effect on Indigenous People and Community Conservation in Tanzania, The' 2004, *Geo.Int'l Envtl.L.Rev*., vol. 17, pp. 481.
[250] Kipobota C. & Lalonde. C. 'Tanzania Human Rights Report 2006, Legal and Human Rights Centre'. Available at http://www.humanrights.or.tz/wp-content/uploads/2010/09/human_rights_report_2006.pdf [accessed on May 30, 2012].
[251] African Charter on Human and Peoples' Rights (Banjul Charter) of 1981 available at http://www.africa-union.org/official_documents/treaties_%20conventions_%20protocols/banjul%20charter.pdf [Accessed on May 30, 2012].
[252] Art 6 of International Covenant on Civil and Political Rights of 1966, available at http://www2.ohchr.org/english/law/ccpr.htm [accessed on May 30, 2012].

resources and heritage are harnessed, preserved and applied for the common good and also to prevent the exploitation of one person by another.'[253]

Article 9 falls under Part Two of the Constitution that should be read with article 7 (2) which states that provisions of Part Two are not enforceable in a court of law.[254] However, article 9 shows that the level of commitment of the state to protect and preserve natural resources.[255] Article 7 (1) obliges the Union government to apply these fundamental objectives and directive principles in their policies, programs and decisions. Thus these principles have played a major role in the development of environmental jurisprudence and human rights in Tanzania.[256]

Article 27 of the Constitution, on the other hand, obliges juristic and natural persons to protect natural resources and states that:

(1)Every person has the duty to protect the natural resources of the United Republic, the property of the state authority, all property collectively owned by the people, and also to respect another person' property.

(2) All persons shall be required by law to safeguard the property of the state authority and all property collectively owned by the people, to combat all forms of waste and squander, and to manage the national economy assiduously with the attitude of people who are masters of the destiny of their nation.[257]

Horizontal application of duty of care for the environment is deduced from article 27 where the public is required to respect 'other person's property'. Although Article 27 falls in Part Three of the Constitution and is enforceable it does not clearly state that the duty to protect the environment includes the ability to invoke the provision as a substantive environmental right.[258]

[253]Article 9 of the Constitution of Tanzania.
[254] Art 7 (2) of the Consitution of the United Republic of Tanzania of 1977.
[255] Pallangyo, D.M. "Environmental Law in Tanzania; How Far Have We Gone?" 2007, *Law Environment and Development Journal*, vol. 3, no. 1, pp. 28-39.
[256] Kotzé, L.J. & Paterson, A.R. 'The role of the judiciary in environmental governance: comparative perspectives,' 2009, *Kluwer Law Intl.*
[257] Article 27 of the Constitution of Tanzania.
[258] Brunch, C., Coker, W. & VanArsdale, C. 'Constitutional Environmental Law: Giving Force to Fundamental Principles in Africa'2001, *Colum.J.Envtl.L.*, vol. 26, pp. 131.

One of the most important issues needed for the realisation of human rights to clean environment and for the protection and management of the environment, including groundwater, is the right to have access to environmental information. Articles 18 of the Constitution provides citizens the 'right to be informed at all times of various important events of life and activities of the people and also of issues of importance to the society.'[259]

Currently the country is undergoing constitutional review. The parliament of Tanzania published the Constitutional Review Act, in the Gazette of the United Republic of Tanzania No.1 Volume 2. Among other things the Act is passed to 'provide for the coordination and collection of public opinions on the constitution.'[260] The Department of Geography at the University of Dar es Salaam and number of environmental and natural resource protection groups are lobbying for the inclusion of a right to clear environmental and natural resources management clauses in the new Constitution.[261]

2.2.2 Policy

Increasing demand for water by multiple users of irrigated agriculture, industry, hydropower generation, mining, domestic and water needs for environmental integrity as well as degradation of water quality due to natural and anthropogenic activities and transboundary water management demands, necessitated complete water policy overhaul in Tanzanian. Without effective water policy, food security, energy production and environmental integrity might be threatened.[262] From early 1995 onwards, Tanzanian water sector has undergone major policy makeover jointly carried out by the government, World Bank, and DANIDA.[263] The driving force behind transformation of water policy is attributed to the international donor agencies such as the World Bank and International Monetary Fund (IMF) making sure that water privatization

[259] Article 18 (2) of the Constitution of Tanzania.
[260] The Constitutional Review Act 2011 available at http://www.policyforum-tz.org/node/7806 accessed on May 30, 2012.
[261] The National Dialogue on the Place of Environment and Natural Resources in the New Constitution of Tanzania available at http://www.policyforum-tz.org/node/7856 accessed on 26/09/2012.
[262] Adar, K.G. & Check, N.A. 'Cooperative Diplomacy, Regional Stability and National Interests. the Nile River and the Riparian States,' 2011, Africa Institute of South Africa.
[263] Sokile, C.S., Mwaruvanda, W. & Van Koppen, B. '*Integrated Water Resource Management in Tanzania: Interface between formal and informal institutions'2005, International workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa*, pp. 26.

policy prevails in Tanzania.[264] The Ministry of Water prepared new Water Policy in 2002 meant to replace the first National Water Policy of 1991.[265] At the heart of 1991 water policy was to uproot free water and introduce government cost sharing with rural areas and cost recovery in urban areas.[266]

2.2.2.1 The National Water Policy of 2002

Eleven years after the adoption of 1991 water policy an overhaul revision and review process was necessitated by the need of policy change in line with international environmental management requirements. The 1991 water policy centralized water management and failed to provide for effective environmental management plan. "The main objective of this revised policy is to develop a comprehensive framework for sustainable development and management of the Nation's water resources, in which an effective legal and institutional framework for its implementation will be put in place",[267] for the realisation of water resources management objectives 'all water uses, especially water use for economic purposes will be charged for.'[268] In 1992, the country became signatory to Agenda 21 which required signatory countries to manage their natural resources in a sustainable manner. In 1997, yet another National Environmental Policy was introduced by Tanzanian government which aimed at playing a role in coordinating sectorally fragmented environmental legislation and implementing environmental regime.[269]

However, it was in July, 2002 that the comprehensive Tanzania National Water Policy was adopted. It is a framework policy that embraced river basin as the administrative unit of water resources management in the country and emphasised on integrated water resource management approach. Basic Human need for water is identified as the first priority of water allocation before

[264] Huitema, D. & Meijerink, S.V. '*Water policy entrepreneurs: a research companion to water transitions around the globe*,' (2009), Edward Elgar Publishing.
[265] Lein, H. & Tagseth, M. 'Tanzanian water policy reforms-between principles and practical applications.' 2009, *Water Policy*, vol. 11, no. 2, pp. 203-220.
[266] Maganga, F.P., Butterworth, J.A. & Moriarty, P. 'Domestic water supply, competition for water resources and IWRM in Tanzania: a review and discussion paper' 2002, *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 27, no. 11-22, pp. 919-926.
[267] National Water Policy of 2002 available at http://www.maji.go.tz/userfiles/Maji%20Policy%20Book%20pdf.pdf accessed at June 11, 2012.
[268] Ibid.
[269] Kotzé, L.J. & Paterson, A.R. 2009, 'The role of the judiciary in environmental governance: comparative perspectives,' *Kluwer Law Intl.*

environmental flow.[270] The policy recognises THE inadequate regulation of groundwater resulting underutilization and in some cases over exploitation of the resources. In urban areas effluents may affect both surface and groundwater qualities if not properly treated and lack of adequate information also impedes appropriate management of groundwater resources. In order to manage groundwater sustainably the policy envisages number of actions to be taken, including:

- Conjunctive use of surface and groundwater resources
- Development of effective pollution control mechanisms
- Identification and delineation of pollution potential areas
- Strengthen groundwater research
- Reviewing groundwater exploration and procedural guidelines.[271]

The policy recognises water user charges for the operation and maintenance of water resources and encourages decentralization of water resource management and stakeholder participation in decision making.

2.2.2.2 The National Water Sector Development Strategy of 2006

The National Water Sector Development Strategy (NWSDS) was adopted in 2006 and the implementation life span of the strategy is from 2005 to 2015 with comprehensive review in 2010.

The strategy works in tandem with the country's socio economic policy such as the Development Vision 2025 which aims, among many other things, "universal access to safe water" and the National Strategy for Growth and Reduction of Poverty (NSGRP). NWSDS deals with implementation challenges outlined in water sector policy and programs by including National Water Sector Strategic Implementation Plan. It works against the backdrop of the Sector Wide Approach to Planning (SWAP). The strategy also established framework institutions and defined their roles and responsibilities.[272] Furthermore in 2006 the government developed and approved,

[270] Calas, B. (ed) 2010, '*Shared Waters, Shared Opportunities. Hydropolitics in East Africa*,' Mkuki na Nyota Publishers.
[271] Tanzanian National Water Policy of 2002.
[272] Water Sector Status Report 2011, Ministry of Water, United Republic of Tanzania, available at http://www.maji.go.tz/userfiles/Water%20Sector%20Status%20Report%202011_final.pdf, [accessed on 28th of August 2012].

alongside with the strategy, another comprehensive policy documents titled National Water Sector Development Program (WSDP). This program is meant to harmonize fragmented sub-sectoral policy documents into a single manageable development program.[273]

"The main objective of the NWSDS is to develop a coherent, holistic and integrated strategy for the Water Sector in order to implement the National Water Policy"[274] It is noted that the strategy did not provide for the management of groundwater sources (despite being the major sources of domestic rural water supply of the country) on its basin level water management.[275]

2.2.3 Statutory law

2.2.3.1 The Water Utilization (Control And Regulation) Act of 1974

The Water Utilization (Control and Regulation) Act of 1974 was known as the principal act. The Act replaced and repealed all Water Ordinances enacted during British and German colonial eras and early parts of the Union Government.[276] The Act prohibited private ownership of water resources and declared that national government has the mandate to oversee the nation's water resources. The Act obliges the minister responsible for water to establish Principle Water Officer, Regional Water Officers and Central Water Advisory Board. These Water Officers were granted almost absolute power over water resources. However, Water Utilization (General) Regulations of 1997 obliged Water Officers to consult and considered corresponding Water Boards. The powers and control given to the national government enabled them to exercise best management practices on equitable distribution and prevention and control of water pollution. [277]

[273] 'United Republic of Tanzania: Poverty Reduction Strategy Paper – Annual implementation report of 2006/07' . Available at http://www.imf.org/external/pubs/ft/scr/2008/cr0822.pdf [accessed on 28/08/2012].
[274] Tanzanian National Water Sector Development Strategy of 2005 available at http://www.maji.go.tz/modules/documents/index.php?&direction=0&order=&directory=Strategies [accessed on 27/09/2012].
[275] Nkonya, L.K. '*Rural water management in Africa: the impact of customary institutions in Tanzania,' (*2008,) Cambria Press.
[276] s39 of the Water Utilization (Control And Regulation) Act 42 of 1974 available at http://www.ielrc.org/content/e7401.pdf [accessed on 27/09/2012].

[277] Maganga, F.P. 'Incorporating customary laws in implementation of IWRM: some insights from Rufiji River Basin, Tanzania', 2003, *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 28, no. 20.

The Act was amended in 1981, and subsequently replaced and repealed by the Water Resource Management Act of 2009.

Section 11 (1) of the Act provides right of the owner or occupier of any land to

(a) sink or enlarge any well or borehole thereon and abstract water therefrom, not exceeding 22,700 litres in any one day
(b) Provided that this section shall not authorize the sinking of any well or borehole within 230 meters of any other well or borehole or within 90 meters of any body of surface water or enlargement of any well or borehole which is within those distances from any other well or borehole or body of surface water, as the case may be. [278]

However, according to the Utilization (General) Regulations of 1997 water officers should prepare a notice setting particulars of the applicant. It is required from the applicant to submit groundwater data such as place, quantity, quality and purpose for which water is being used. Section 17 of the Act enlists the conditions required from all water rights granted for mining, industries, forestry or for the generation of power. These conditions included the following:

- to return used water to stream or from the body of water it was taken or to any other body of water as authorized by Water Officer and that
- "water shall be substantially undiminished in quality and shall not be polluted with any matter derived from such use to such extent as to be likely to cause injury either directly or indirectly to public health, to livestock or fish, to crops, orchards or gardens which are irrigated by such water or to any product in the processing of which such water is used…" [279]

2.2.3.2 The Water Resources Management Act of 2009

The Water Resource Management Act, no, 11 of 2009 is the main act governing water resources in Tanzania. It was passed by Tanzanian National Assembly on 28th of April 2009, assented to

[278] ibid s 11 (1) of the Water Utilization (Control And Regulation) Act 42 of 1974.

[279] Ibid s 17 of the Water Utilization (Control And Regulation) Act 42 of 1974.

by the president on 17th of May 2009 and came into effect on the 1st of August 2009.The Act is framework legislation in the sector that provides for the implementation of 2002 National Water Policy. The Act repeals Water Utilization (Control and Regulation) Act of 1974 and all its amendments and regulations. However, s112 of the Act states that "orders, notices, directions, appointment and acts or things lawfully made, issued or done under the repealed Act shall continue to have effect."[280] Institutional and legal framework for sustainable development and management of river basin is provided for in this Act.

The main objectives of the Act are to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled to meet the basic human needs of present and future generations'',[281] s 4 (2) of the Act requires the government to establish suitable institution with appropriate stakeholder and gender representation in order to realise the objectives of the Act.[282]

Water managers of all level are required to be guided by the widely acknowledged international environmental law principles outlined in s 5 of the Act. These principles form the bedrock for sustainable and integrated water resource management and include the following:

- Precautionary principle
- Polluter pays principle
- The principle of ecosystem integrity
- The principle of public participation in the development policy, plans and processes for the management of water resources.
- The principle of international cooperation in management of environmental resources shared by two or more states and
- The principle of common but differentiated responsibilities. [283]

[280] Ibid s 112 of the Water Resources Management Act 11 of 2009 available at http://www.maji.go.tz/modules/documents/index.php?&direction=0&order=&directory=Water%20Legislation [accessed on 05/09/2012].
[281] Ibid s 4 (1) of the Water Resources Management Act 11 of 2009.
[282] Ibid s 4 (2) of the Water Resources Management Act 11 of 2009.
[283] Ibid s 5 of the Water Resources Management Act 11 of 2009 .

All water resources in the country are public property and the government of Tanzania led by the president is trustee over the resources. Therefore, it is the duty of the national minister responsible for water to protect, allocate, manage and develop water resources through reasonable legislation, strategies, Policies, programs and effective institutions. However, 'every person residing in mainland Tanzania shall have a stake and duty to safeguard and protect water resources.'[284]

The minister responsible for water is granted the power to produce regulations for the classification of water resources and the establishment of class determination procedures. A reserve for basic human needs and protection of aquatic ecosystems should be set for each water class determined. When water management institutions exercise powers or perform duties shall take into account and give effect to the requirement of the reserve. [285] Protected Zones and Groundwater Controlled Areas are dealt with in s37 and s38 respectively. In these sections:
The minister after consultation with other institutions responsible for land management may, by notice published in the Gazette, for the protection of water resource from pollution, erosion or any other adverse effects establish a Protected Zone[286] and on recommendation of Basin Water Board the Minister may, by notice published in the Gazette declare any area of mainland Tanzania to be a Groundwater Controlled Area.[287]

To protect water resources from pollution, overexploitation and illegal construction of water works the Act provided for administrative, criminal and civil procedures to deal with non-compliance. Administrative measures are used by government departments or agencies while civil and criminal measures are used by civil and criminal courts.[288] Various sections outlined penalties for violating provisions of the Act or any other regulations adopted under the Act. For instance, use of water in excess to water use permit (s44), failure to obtain groundwater permit (s55) water pollution (s64) and (s103), and refusing or hindering an authorized person to

[284] Ibid s 7 of the Water Resources Management Act 11 of 2009.
[285] Ibid s 32 -33 of the Water Resources Management Act 11 of 2009.
[286] Ibid s 37 of the Water Resources Management Act 11 of 2009.
[287] Ibid s 38 of the Water Resources Management Act 11 of 2009.
[288] 'Ensuring Environmental Compliance: trends and good practices'. Available at http://www.iadb.org/intal/intalcdi/PE/2009/03570.pdf [accessed on 2nd of October 2012].
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perform his or her duties (s101). All these offences attract penalties for noncompliance or partial compliance.

2.2.3.3 The National Environmental Act of 2004

Water legislation, policies, strategies and programs fall under the ambit of the broader environmental regulation and management as the Environmental Management No 20 of 2004 defines "Environment" to include air, land, and water resources.[289] With the promulgation of the Act Tanzanian environmental management regulation has entered a new era. Before the Act came in to effect in 2004 the country had several pieces of legislation with some environmental issues aimed at regulating specific environmental media such as water, air, fisheries, land and wildlife. However, unlike the repealed Environmental Management Act of 1983 the new Act provided for comprehensive legal and institutional environmental management framework, streamlined environmental coordination, and adopted contemporary environmental management tools and economic instruments such as the environmental impact assessment and strategic environmental assessments. The Act provided for the implementation of the National Environmental Management Policy and international environmental instruments. The Act retained the National Environmental Management Council created under 1983 Act and established new institutions such as the National Environmental Advisor Committee, the Regional Environmental Management Expert, the Municipality and District level Environmental Officers and the Township or Ward level Environmental Officers.[290]

According to s 60 of the Act every person applying for water use permit from relevant authority "shall be required to make a statement on the likely impact on the environment due to the use of the water requested". Some of the things required from water permit and Basin Water Board include:

- Returning of used water to where it was taken from
- Treatment of used water before return to specific water body

[289] S3 of Environmental Management Act 20 of 2004 available at http://www.ilo.org/dyn/natlex/docs/ELECTRONIC/82138/89615/F107783568/TZA82138.pdf accessed on [06/09/2012].

[290] "State Of The Environment Report – 2006 Vice President's Office-Division of Environment" available at http://www.tzdpg.or.tz/uploads/media/State_of_Environment_Report_final_PDF_2006.pdf [accessed on 06/09/2012].

- Exercising precaution to the satisfaction of Water Officer to prevent siltation, sedimentation and accumulation of any substance likely to affect injuriously the use of such water by human and other components of the environment
- And to ensure that adequate water is made available for environmental purposes through prioritization of water uses. [291]

Water pollution penalties especially for streams are provided for in s 109 of the Act while development of water quality standards for various uses of water and establishment of standards for the discharge of any effluent into waters of Tanzania is required from the National Environmental Standards Committee. [292]

2.2.4 Water resource management institutions in mainland Tanzania

Water Management Institutional has evolved for a long time from pre-colonial, colonial and contemporary post-independence era. However, the water management initiatives in Tanzania are characterized by an institutional gap. They are loosely connected and lack basic coordination and are often at the periphery of the water management agenda divorced from the water management programs". [293] Numerous government departments and agencies deal with diverse facets of water following their own legislative provisions and mandates with little consideration of sector wide approach management. What makes matters worse is the lack of human, technical and financial capacities in the sector.[294]

The Water Resources Management Act of 2009 provides for three water management levels namely: National Water Board (replacing Central Water Board), Basin Water Board and Catchment and Sub-catchment Water Committee.[295] However, The National Water Policy

[291] Ibid s 109 and s143 of Environmental Management Act 20 of 2004.
[292] Ibid s 60 of Environmental Management Act 20 of 2004.
[293] Sokile, C.S., Kashaigili, J.J. & Kadigi, R.M.J. 'Towards an integrated water resource management in Tanzania: the role of appropriate institutional framework in Rufiji Basin' 2003, *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 28, no. 20.
[294] Doering, E. 'The Reform of the Water Sector in Tanzania',2005, DAAD Alumni Summer School, 2005 Topics of Integrated Watershed Management, , pp. 35.
[295] IUCN Eastern Africa Programme, IUCN Water, Nature Initiative, Tanzania. Pangani Basin Water Office & Kenya. Coast Development Authority 2003, Pangani basin: a situation analysis, Iucn..

provided for five main levels "for management of water resources: National level, Basin level, catchment level, District level, and Community or Water User Association level". [296] Under the Water Utilization (Control and Regulation) Act 42 of 1974 the country was divided into nine water management basins that don't necessarily correspond to administrative regional boundaries. [297] This was reiterated in the new Water Resource Management Act. Each of these management institutions has its own powers, functions and mandates elaborated in s 20 -30 of the Act.

[296] Tanzanian National Water Policy of 2002 available at http://www.maji.go.tz/modules/documents/index.php?&direction=0&order=&directory=Policies [accessed on 05/09 2012].
[297] Ibid Tanzanian National Water Policy of 2002.

Chapter 5: Critical review and comparative analysis

This chapter is a critical review and comparative analysis of environmental legislation pertinent to groundwater discussed in chapter 3 and 4. In both South Africa and Tanzania multiple legal systems coexist which might have an impact on water resource governance and thereafter protection and management of groundwater resources. The chapter briefly compares and analyses the impacts of these pluralistic legal systems on groundwater protection in South Africa and mainland Tanzania. Then common similarities and difference between the two countries in terms of adopting best available management practices in their respective constitutional dispensation, framework water legislation and policies is discussed. The chapter concludes with a brief discuss of Institutional arrangements, compliance and enforcement mechanism in place for the protection and management of groundwater resources in South Africa and mainland Tanzania.

1. Introduction

Comparative water law studies are very important to improve harmonization of water governance in country, regional and international level. This study makes use of the example of South Africa and mainland Tanzania while taking cognizance of socio economic, geopolitical and environmental difference and challenges between the two countries. It is possible, through comparative water law studies, to isolate and recognised where national laws have been poorly drafted and sometimes out-dated as many of these laws are promulgated in a period when water resources were considered infinite and citizens had free access to water resource. [298] Governments can also learn from one another how to regulate and managed similar natural resources and share successful stories and failed attempts through technological advances to combat common environmental externalities. [299] Globalization plays a major role in shaping and sharing international law in general and environmental law in particular as the impacts of environmental externalities are felt beyond political boundaries. This ,sometimes, triggers citizens of one state to demand better environmental and resource management regulations from

[298] David, R. & Brierley, J.E.C. '*Major legal systems in the world today: an introduction to the comparative study of law,'* (1968), Taylor & Francis.
[299] Robinson, N.A. 1988, 'Comparative Environmental Law Perspectives on Legal Regimes for Sustainable Development', *Widener Law Symposium Journal*, pp. 247.

their government in-line with their experience of rules, customs and regulations of another state.[300]

2. Impacts of pluralistic legal systems on water governance

Water governance in legal pluralistic countries is complex as different legal systems conceive heterogeneous approaches to regulate and manage water resources. Mixture of legal systems such as Statutory Law, Customary Law, Common Law and International Law co-exist in South Africa and mainland Tanzania. These legal systems were ushered-in by various socio economic and political circumstances. Customary and religious laws may themselves be pluralistic in nature adding further complication to the intricate water governance issues.[301]

Long before the arrival of colonialists in South Africa, the African Customary Law prevailed and governed water resources. Overall social responsibility and authority to protect and manage water resources and to resolve water related conflicts in indigenous communities were vested on traditional leaders. [302] Roman Dutch law was introduced into the country in 1652 by Dutch East India Company which declared water as a public good and assumed *dominus fluminis* (overall control) of water resources.[303] When the Cape of Good Hope fell in the hands of British control in 1806 English Common Law gradually gained influence in the country and strong linkage between water rights and land tenure was established. The result was introduction of riparian rights system of water allocation in to the country.[304] Although water governance has improved under democratic government and customary law is recognised, "the state has not provided adequate mechanisms for the consideration of traditional governance systems" in practice.[305] Groundwater was negatively affected by these different legal systems, for instance, groundwater

[300] Ibid Robinson, N.A. 1988.
[301] Meinzen-Dick, R. & Nkonya, L'Understanding legal pluralism in water rights: Lessons from Africa and Asia.' *African Water Laws Workshop: Plural Legislative Frameworks for Rural Water Management in Africa*. 2005.
[302] Malzbender, D., Goldin, J., Turton, A. & Earle, A. 2005, 'Traditional Water Governance and South Africa's "National Water Act"–Tension or Cooperation', *International Workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa*, pp. 26.
[303] Tewari, D.D. 2001, 'An analysis of evolution of water rights in South African society: An account of three hundred years', *Proc.The Role of Water in History and Development, ,* pp. 10-12.
[304] Kidd, M 'South Africa: The Development of Water Law', (2009), *The Evolution of the Law and Politics of Water, ,* pp. 87-104.
[305] Kapfudzaruwa, F. & Sowman, M. 2009, 'Is there a role for traditional governance systems in South Africa's new water management regime?', *Water SA*, vol. 35, no. 5, pp. 683-692.

was treated as a private property under English Common Law and it featured in Roman Dutch law as both common and private property. On the other hand, African Customary law/norm treated water as a common good not capable of private ownership. National water law after independence made all water in South Africa a public property that belongs to the people of South Africa and national government is only a custodian of the resources. Therefore, the legal status of groundwater has changed from time to time pursuant to the prevailing legal system (s) in the country.

In Tanzania informal water governance and maintenance system based on African customary law has existed well before the arrival of colonialists.[306] Both German and Britain settlers brought along their foreign legal systems and developed ordinances that favoured their interests at the cost of indigenous people's rights to water.[307] During colonial era traditional governance system of water resources was relegated to a "secondary legal status." [308] Independent and union government did not change much until1984s when the Constitution of the country was amended and socio economic and cultural rights and other fundamental human rights were introduced to the Constitution

3. Constitutional provisions and environmental protection

Constitutions are considered the supreme law of the land,[309]and inclusion of environmental rights and protection provisions in national constitutions is an indicative of the importance of environmental rights.[310] Majority of African constitutions contain substantive and procedural provisions that ensure either a "right to a healthy environment" or a "right to life," but these are underutilized. All substantive and procedural human rights are somehow interdependent and

[306] Nilsson, D. & Nyanchaga, E.N. 2009, 'East African Water Regimes: The Case of Kenya', *The Evolution of the Law and Politics of Water*, , pp. 105-120.
[307] Calas, B. 2010, 'Shared Waters, Shared Opportunities. Hydropolitics in East Africa,' Mkuki na Nyota Publishers.
[308] Van Koppen, B.S., Hatibu, C., Lankford, N., Mahoo, B. & H Yanda, P. 'Formal water rights in rural Tanzania: Deepening the dichotomy' 2004, *Iwmi.*
[309] The Annual State of Constitutionalism in East Africa 2009 Available at http://www.kituochakatiba.org/index2.php?option=com_docman&task=doc_view&gid=1441&Itemid=27[accessed on 29th of October 2012].
[310] Feris, L. 'Constitutional environmental rights: an under-utilised resource', 2008, S.Afr.J.on *Hum.Rts.*, vol. 24, pp. 29.

indivisible for instance right to life and right to healthy environment have been linked in numerous judicial decisions as discussed in chapter 3 and 4 and outlined below.

Courts play pivotal role in the enforcement of environmental rights either defensively by protecting citizens' rights against government infringement or affirmatively by compelling the state to take action by fulfilling and honouring its constitutional environmental mandate.[311] Courts are an arm of the government which is very crucial in the separation of power doctrine. They give effect to the intentions and statements of legislative and executive branches of governments and solve disputes between the state and its subjects and between subjects themselves. Courts also grant *locus standi* (legal standing*)* to state agencies; environmental lobby groups and even individuals to protect the environment and to enforce the right to healthy environment. [312]Highest courts in South Africa and Tanzania have decided few cases pertinent to the environment.[313]

Groundwater falls under section 24 of the constitution which guarantees everyone in the country a right to an environment which is not harmful to their health or wellbeing. It might be argued that environmental pollution can't be constitutionally prevented if it does not negatively affect the health and wellbeing of the people. However, environmental pollution will ultimately impact negatively on the people, biotic and abiotic ecosystems in some way or another in the short or long-term. This section places a positive obligation on the state to protect groundwater resources, as part of the environment, for the benefit of present and future generations by enacting reasonable legislative and adopting other measures. Subsection (b) places a negative obligation on the state to abstain from measures that might cause environmental degradation or impairment of the guaranteed right thus verifying vertical application of the right. The extent to which socioeconomic rights are applicable horizontally is a contentious issue but common law of nuisance and parliamentary law are infavour of horizontal application of the right. The state should also promote conservation and ensuring that its developmental policy and projects are

[311] Brunch, C., Coker, W. & VanArsdale, C. 2001, 'Constitutional environmental law: Giving force to fundamental principles in Africa', *Colum.J.Envtl.L.*, vol. 26, pp. 131.
[312] Kameri-Mbote, P. & Odote, C. 2009, 'Courts as Champions of Sustainable Development: Lessons from East Africa', *Sustainable Dev.L.& Pol'y*, vol. 10, pp. 31.
[313] See chapters 3 and 4.

geared towards sustainability.[314] Section 7 (2) also imposes an important obligation on the state to respect, protect, promote and fulfil the rights in the Bill of Rights. Socioeconomic rights are subject to the limitation clause contained in section 36. However, it is noted that the Constitutional Court seldom made use of section 36 in many of its decisions and instead applied "internal modifiers" or "claw back clauses" such as the one contained in sections 26 (2) and 27(2).[315]

In Tanzania the preamble of the Constitution of 1977 as amended from time to time clearly entrenches separation of power doctrine and in order to protect and preserve human rights there has to be an independent judicial system that "dispenses justice without fear or favour".

The Tanzania Constitution is under review in accordance with the new Constitutional Review Act of 2011. As the current Constitution of Tanzania does not contain explicit provisions for the environmental protection, right to water or healthy environment, some comments have been submitted to add unambiguous environmental protection provisions to the new constitution.

In 1998, Tanzanian Court of Appeals interpreted expansively human right to life in section 14 of the Constitution to embrace right to safe, clean and healthy environment in the landmark case of *Joseph D. Kessy and Others Vs. The City Council.* In this case Dar Es Salaam City Council was dumping waste in Atbara residential area and in 1988, the High Court of Tanzania in Arusha ordered the Council to cease its dumping operation and find an alternative dumping facility in two years. After the expiry of the period the Council sought several extensions which were granted. In 1991, the Council pursued another extension but the court noted that pollution was intensifying and endangering the lives and health of Tabara residents and, therefore, amounted to a violation of section 14 of the Constitution which provided for right to life. The court denied petition of the Council and in his ruling justice Rukangira stated:

"I will say at once that I have never heard it anywhere for a public authority, or even an individual to go to court and confidently seek for permission to pollute the environment and

[314] Brand, D. & Heyns, C.H. (eds) '*Socio-economic rights in South Africa'*, (2005), Pulp.
[315] section 26(2) and section 27(2) of South African Constitution '*[t]he state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of this right"*.

endanger peoples' lives regardless of their number, Such wonders appear to be peculiarly Tanzanian, but I regret to say that it is not given to any court to grant such a prayer. Article 14 of our Constitution provides that every person has a right to live and to protection of his life by the society. It is, therefore, a contradiction in terms and a denial of this basic right deliberately to expose anybody's life to danger or what is eminently monstrous to enlist the assistance of the Court in this infringement." [316]

The court also granted a legal standing to the residents of Kunduchi Mtongani in the Festo Balegele and 749 Others v Dar es Salaam City Council where residents of Kunduchi Mtongani sought a restraining order against City Council to stop dumping waste in their neighbourhood which was zoned as residential area. They further requested a mandamus be issued directing the Council to establish appropriate dumping ground.[317] The court repeated its earlier decision on Abdi Athumani and 9 others v. The District Commissioner of Tunduru District and others and granted applicants legal standing. In that case judge Rubana, writing for the Court, said that:

"Every citizen has a right to seek redress in courts of law when the citizen feels that the Government has not functioned within the orbit or limits dictated by justice that the Government had set for itself."[318]

4. Water sector policies and laws

The National Water Acts and policies of South Africa and mainland Tanzania are described to be progressive in nature and contain some elements of framework legislation[319].They differ from old acts and policies in more than one way, for instance, they streamline water governances and

[316] *Joseph D. Kessy and Others Vs. The City Council.* available at http://greenwatch.or.ug/pdf/news/publications/Environmental_Law_Case_Book_2.pdf [accessed on 06/11/2012].
[317] Compendium of judicial decisions in matters related to environment national decisions. Available at http://www.unep.org/padelia/publications/jud.dec.nat.pre.pdf [accessed on 4th of November, 2012].
[318] Kameri-Mbote, P. & Odote, C. 2009, "Courts as Champions of Sustainable Development: Lessons from East Africa", *Sustainable Dev.L.& Pol'y*, vol. 10, pp. 31.
[319] Malzbender, D., Goldin, J., Turton, A. & Earle, A. "Traditional Water Governance and South Africa's "National Water Act"–Tension or Cooperation", 2005, *International Workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa*, pp. 26.

nationalise water resources. They are developed through democratic processes of stakeholder participation and input and they contain clearer environmental and water management provisions, emphasis sustainable utilization of water resources, decentralization of management and include internationally accepted principles/concepts.

Many of the old water law and policy of South Africa and mainland Tanzania were promulgated under colonial authorities and were subjected to state bureaucracies pursuant to the vested interests in the development of certain economic sectors such as agricultural, mining and stock watering needs. Colonial authorities also model water governance of South Africa and mainland Tanzania on the legal practices imported from their countries with different socio economic and political settings.

The preamble of the National Water Act of South Africa contains a number of key internationally acknowledged principles/concepts. The Act entrusts the national government with the responsibility for and authority over the nation's water resources to apply sustainability, equality and efficiency as management principles. The Act also empowers the Minister of Water Affairs and Forestry after consulting with the public to issue and enforce regulations under the Act.[320] Sustainable management of groundwater might be impeded by depletion due to overexploitation or pollution by agricultural practices, industrial effluents and many other human induced activities. To break away from past discriminatory practices equal access to water resources and benefits thereof must be ensured by water allocating authority. Efficient use of groundwater resources will be realised when water users and state work together to balance water demand, supply and conservation.

In Tanzania National Water Resource Management Act of 2009 provides for Groundwater Protected Areas, and Groundwater Permit defined as '*an area declared to be a Groundwater Controlled Area under section 38'* and *'any permit to construct, sink, enlarge, or deepen a well or borehole, registered in the Water Register under the provisions of this Act'* respectively. [321] Water acts of South Africa and Tanzania protect groundwater through the adoption of innovative

[320] Salman, S.M.A. & Bradlow, D.D. (2006), '*Regulatory frameworks for water resources management: a comparative study*,' World Bank Publications.
[321] S3 Tanzanian National Water Resources Management Act 11 of 2009.

classification system of water resources, and determination of water reserve for basic human needs and environmental/ecological water needs and the adoption of accompanying water quality objectives.

5. Water management institutions

Water management institutions,[322] are very important for the implementation of substantive and procedural environmental rights. They fulfil management functions, conduct scientific research and enforce compliance to regulations. Water management institutions exist in national provincial and local levels. The South African Department of Water Affairs and Forestry is the national organ of state responsible for water management in the country. It is required, through its minister; to develop progressive National Water Resources Strategy. Catchment Management Agencies (CMA) are the second tier of water management institutions with functions to progressively develop Catchment Management Strategy and to "investigate and advise interested persons on the protection, use, development, conservation, management and control of the water resources in its water management area."[323] Water User Associations (WUA) is a co-operative group of individual water users undertaking water related activities for their mutual benefits. They operate at localized level and may only exercise powers and duties as assigned or delegated to them.[324] WUA Functions depends on their approved constitution. They are established to replace irrigation Boards and accommodate Historically Disadvantaged Individuals (HDI) however, transformation is a slow process.[325]

In mainland Tanzania the Water Resources Management Act provides for a number of ranked yet interdependent water management institutions, including

[322] The South African National Water Act defines Water Management Institutions (WRMI) as "a Catchment Management Agency a Water User Association, a body responsible of international water management or any person who fulfils the functions of a water management institution in terms of this Act. The Tanzania Water Resources Management Act defines WRMI as " The National Water Board, a Basin Water Board or a Catchment or sub- catchment Water Committee as the case may be."

[323] Section 80 of the South African National Water Act.

[324] Perret, S.R, 'Water policies and smallholding irrigation schemes in South Africa: a history and new institutional challenges', 2002 *Water Policy*, vol. 4, no. 3, pp. 283-300.

[325] Faysse, N, 'An assessment of small-scale users' inclusion in large-scale water user associations of South Africa,' 2004 *Iwmi*.

- The Ministry responsible for water as the highest authority entrusted with the responsibility for coordination, policy and guidelines formulation for water resources of the country.
- The National Water Board (NWB) which is a an advisory board to the minister on matters related to integrated planning and management of water resources and resolution of local and international water disputes.[326] They shall consist of 10 members appointed by the minister from a list of governmental, non-governmental organizations and private sector representatives included in schedule 4 of the Act. At least one third of NWB members should be women[327].
- Basin Water Boards are an autonomous body funded by water user charges. Their functions include collecting, processing and analysing of data for water resources management monitoring and resource assessment.[328]
- Catchment and Sub-catchment Water Committee composed of representatives from the public and private sector and from Water User Associations in a particular basin. Their role is to prepare and implement catchment plans and to resolve conflicts within the catchment.[329]
- Water User Associations (WUA) are the lowest tier of water management instructions which are expected to manage water at village and ward levels. WUA are an initiative from water users of a particular area with a constitution as described in the fourth schedule of the Water Resources Management Act and approved by Basin Water Board.[330]

6. Compliance and enforcement mechanisms

Compliance with and enforcement of groundwater law and regulations is crucial for the protection, efficiency, equality and sustainability of groundwater for the present and future generations. Encouraging compliance through effective regulations, participatory institutions and incentive based measures perhaps is the best way to protect groundwater resources from

[326] Ibid.
[327] First Schedule of the Water Resources Management Act of Tanzania.
[328] National Water Sector Development Strategy.
[329] National Water Policy of 2002.
[330] Ibid Section 80-8.1

pollution and overexploitation. One of the main obstacles standing on the way of law enforcement is lack of human and financial capacity and poor management practices. From their part, states must demonstrate administrative competence, good governance, and fair procedures to build the trust and confidence of their subjects. Non-compliance with the rule of law attracts penalties or imprisonment that, if effectively executed, may deter notorious violators of groundwater law and regulations from disregarding the law. However, a combination of coercive, corrective and administrative actions, including civil and criminal procedures, should be taken into consideration. The brunt to monitor compliance with groundwater law, policy and strategy rests with the responsible authority for water, but water users have a significant role to play. In rural and remote areas formal institutions should work hand in hand with the traditional informal water management institutions in order to ensure compliance with both statutory and customary laws.[331]

Article 151 (1) of the South African National Water Act enumerates offences for noncompliance with the directives and requirements of the Act including:

1. The use of water in a manner not permitted by the Act, or failure to honour conditions attached to a permit issued under the Act
2. Failure to grant access to assets or refuse required information or provide misleading information to authorised person.
3. Unlawfully and intentionally or negligently commit any act or omission which pollutes or is likely to pollute a water resource:
4. commit contempt of the Water Tribunal

Subsection 2 of article 151 elaborates further what the offence will be when provisions of subsection 1 are contravened setting maximum jail time of five years for first offenders and ten years for more than one time offenders. The Act does not specify the amount of fine payable by offenders, however, affected persons and minister responsible for the environment may apply to a court to claim damages and the court might enquire into to the claims of harm and extent thereof. This must be cross referenced with section 28 of The National Environmental Management Act (NEMA) which provides detailed steps to prevent, remedy and manage

[331] Kabudi, P.J. 2005, 'Challenges of legislating for water utilisation in rural Tanzania: drafting new. laws', *International Workshop on African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa', Johannesburg, South Africa*.

environmental pollutions, including groundwater pollution, by responsible environmental authorities land owners and users.[332]

In mainland Tanzania to ensure compliance with environmental impact assessment is the mandate of the National Environmental Management Council which falls under the Vice President's Office. The National Water Resources Management Act of 2009 requires groundwater users to apply for a permit issued by the Basin Water Boards. It is an offence under the Act to use groundwater without a valid permit. The Act states:

'[a]ny person who, contrary to the provisions of the Act, constructs, sinks or enlarges a well or borehole without a Groundwater permit duly granted by the Basin Water Board commits an offence. (2) Any person guilty of an offence under subsection (1) shall, on conviction be liable to a fine of not less than five hundred thousand shillings or imprisonment for a term not exceeding six months, or to both such fine and imprisonment, and in every case where the offence is a continuing one to an additional fine of not less than fifty thousand shillings in respect of every case.'[333]

This must be read with the provisions of the Environmental Management Act of 2004 and accompanying regulations for compliance with and enforcement of environmental and water resources law and regulations.[334]

7. Summary of similarities and differences

There are many common water policy and legal issues between South Africa and mainland Tanzania. Southern African Development community brings together the two countries in many fronts including cooperation in social, economic and political issues in the region. South Africa and mainland Tanzania have been affected by colonial marginalization of African natives in their respective countries. Additionally South Africa has been subjected to the cruel discriminatory apartheid policies and laws.

[332] Section 28 of NEMA is the duty of care and remediation of environmental damage.
[333] Section 55 of the Tanzanian Water Resources Management Act 11 of 2009.
[334] See for instance part xvi 'compliance and enforcement' of the Environmental Management Act 20 of 2004.

Infrastructural development of mainland Tanzania and its GPD are below the levels of its South African counterpart. In practice the two countries are at different levels in the development, implementation and enforcement of groundwater management and protection. For instance South Africa has developed National Groundwater Strategy that will be incorporated into the second edition of the National Water Resource Strategy currently,[335] under review. The author did not find mainland Tanzanian equivalent strategy in the literature. On the other hand, the mainland Tanzanian National Water Resources Management Act provides for separate headings and more detailed groundwater provisions than the South African National Water Act.

Environmental provisions are included in South African and mainland Tanzanian constitutions. However, South African constitution entrenched a right to sufficient water and right to environment not harmful to health and well-being of its people, provisions which are absent from the mainland Tanzanian constitution.[336] Both countries differentiate water management legislation and instructional machineries from water supply and sanitation services. Compliance and enforcement pose challenges to both South Africa and mainland Tanzania with some differences in methodologies and human and financial resources. Both countries are signatories to multitude of international and regional treaties related to the environment and water.

[335] 2012.
[336] See chapter 3 and 4 for more details.

Chapter 6: Conclusions and Recommendations

1. Overview of this chapter

As stated in chapter one, the aim of this study is to outline and assess the development, effectiveness and relevance of groundwater policies and laws of South Africa and mainland Tanzania. It has been shown that the international and regional development of policies and laws protecting groundwater and their incorporation into national legal systems is a slow process. Effectiveness and relevance of groundwater policies and laws of South Africa and mainland Tanzania has been outlined and assessed in the above chapters. This chapter summarizes key findings of the study, makes some concluding remarks and suggests recommendations.

2. Conclusions of the Study

2.1 Introduction

The importance of groundwater in the lives of millions around the world and, more specifically, in dispersed rural communities of developing countries in Africa, cannot be overemphasised. Although Africa is the world's second-largest and second most-populous continent after Asia, it is the least developed continent of the world with billion people (as of 2009). The level of under-development of the continent especially in terms of water resources is overwhelming. Legal protection of Africa's most precious resource is very minimal due to either lack of understanding from the legislators and policy makers or due to lack of scientific, technical, financial and proper infrastructural development. Furthermore, minimal community engagement and public participation in matters relating to groundwater resources is one of the contributing factors of groundwater pollution and over exploitation.

Surface and groundwater resources need to be holistically and jointly managed to achieve sustainable water supply and demand management. Without effective and relevant laws, policy and strategies in place, groundwater protection, monitoring and sustainability is not possible. Institutions that mange, supply, regulate water resources and monitor compliance are also very important for the realisation of the rights to water and healthy environment.

States have obligations towards their citizens to make sure that adequate, safe and clean water resources are supplied to everyone within a convenient walking distance from their homes. States also have moral and legal obligations to protect the environment of its own and hold it in trust for future generations. Citizens, on the other hand, have a duty to conserve and use natural resources, including groundwater, in an efficient and effective manner. Judicial organs of states play a fundamental role in the enforcement of water law. They do not only protect constitutionally granted rights of citizens from state interventions but also enforce those rights between legal subjects

The unity of hydrological cycle and the role of groundwater was not taken into consideration by lawyers and policy makers until recent technological bloom and improved understanding of the climate change impacts on water resources. Increased demand for water resources and wide spread environmental pollution also encouraged regulatory authorities to look for alternative groundwater management practices. These phenomena are evident from early treaties and conventions which fell short to adequately address the interrelationship between surface and groundwater shared resources. For instance, copious shared surface water oriented treaties of international, multilateral and bilateral nature are negotiated and concluded as compared to few agreements for transboundary groundwater resources.

International customary law principles/concepts have emerged, including the principle of equitable and reasonable utilization or apportionment of shared water resources, the obligation not to cause significant harm, the duty to cooperate and regular exchange of information; duty to negotiate, consult and settle disputes in a peaceful manner, precautionary principle, polluter pays principle, sustainability and integrated management of water resources. However, universally accepted enforceable groundwater law is yet to be-born.

Currently some international and regional treaties and conventions provide for groundwater in the definition of "International Watercourses" and incorporate groundwater in their provisions.[337]

[337] These include Helsinki Rules on the Uses of Water of International Rivers (1966), Seoul Rules of international groundwater (1986), Bellagio Draft Treaty (1989) ,Agenda 21 (1992) United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses (1997), Berlin Rules on Water Resources (2004), UNECE Convention on the Protection and Use of Transboundary

Perhaps, working together in good spirit and good neighbourliness fashion might one day yield harmonized global and regional groundwater policy and law.

2.2 South Africa

South Africa is a country with scarce water resources, which is unevenly distributed and undemocratically allocated in the past. Pollution by human induced activities and contamination of natural processes of water resources, both surface and groundwater, are reported in literature, making water unfit for best intended uses such as human consumption, industrial, agricultural and ecological uses. Environmental, economic and developmental repercussions of groundwater pollution are felt more by poor segments of the society.

Before colonial era, water resources of South Africa were governed by African customary law. Dutch and English colonialist brought with them Roman Dutch Law and English Common Laws respectively. Under Roman Dutch law, the government had more control over water resources, but, groundwater regulation and protection was less evident. On the contrary, the riparian doctrine, which granted ownership and control of water resources to property owners adjacent to rivers and/or streams, was the dominant groundwater allocation system under English Common Law. The condition was that activities of riparian land owners should not negatively impact on similar rights.

Water law reform was first proposed in 1955 Freedom Charter of South Africa but only materialized after 1994. Since then, a plethora of policies are developed and legislation adopted in an attempt to redress past discriminatory policies and laws of apartheid government and to reform out-dated water law. Perhaps, the most important step taken towards reformation of water law and policy of the country is entrenching the Bill of Rights in the Constitution of 1996 and making provisions for everyone's right to an environment not harmful to the health and wellbeing of the people of South Africa and their right to sufficient water.

Watercourses and International Lakes (Helsinki Convention of 1992) and SADC Revised Protocol on Shared Watercourses.

Alongside with the statutory and policy reform, water management institutions were transformed to enforce compliance, promote democracy, decentralize management and build human capacity. The country is divided into 19 Water Management Areas which will be governed by Catchment Management Agencies. At a localized level Water User Associations are created and empowered to accommodate historically disadvantaged individuals and communities.

2.3 Mainland Tanzania

Tanzania is endowed with plenty of surface water resources where several international rivers and lakes are found. Groundwater resources are mainly used in rural areas for irrigation, livestock watering and domestic purposes. Its quality is compromised in many parts of the country due to both natural and anthropogenic activities. Groundwater regulation in the country came through different eras with political and socioeconomic challenges.

Before the arrival of colonial powers in mainland Tanzania, the African Customary Law was used to allocate, manage and protect water resources. When German settlers came in the 18th century, they established their legal system which was partial and designed to accommodate water needs of colonizers. After the First World War, German settlers were defeated and the country was placed under Britain rule as a protectorate, which again introduced a new legal system into the country. Some of the first codified pieces of water legislation known, as Ordinances, were developed and adopted under German and British rules. Water within the territory was vested in the Governor, in trust for His Majesty as administrating authority for the country.

Although dramatic political changes took place in the country after independence land and water situation of the country and relevant policy and law did not change much. Initiation of water law reform processes in the country was assisted and facilitated by international donors. Groundwater was implicitly and explicitly included in numerous pieces of legislation such as the Constitution of the country, the National Water Policy, the National Water Sector Development Strategy, the Water Resource Management Act and National Environment Management Act.

Stakeholder participation and decentralization of management through effective institutions were emphasised in those policy and legal frameworks.

3. Summary of key findings of the study

The study has proven the existence of groundwater policies and laws in South Africa and mainland Tanzania with some differences between the two countries. It has also shown that reasonable groundwater regulation is prerequisite for the sustainable management and protection of groundwater resources in order to meet constitutionally guaranteed rights to sufficient water and the right to life in South Africa and mainland Tanzania respectively.

It has been demonstrated that groundwater policies and laws of both countries are influenced by international practices and include accepted principles and concepts for the management of national and shared water resources. They adopt environmental and water regulatory frameworks that accommodate groundwater resources. These frameworks contain contemporary water management principles such as the precautionary principle; the polluter pays principle and the integrated water resource management principle, to mention a few.

State interests in groundwater regulation have increased due to intensified demand and dependence on groundwater resources for economic, social and environmental services. It is believed that this trend will grow as climate change effects on hydrological cycle, in general, and surface water resources, in particular, become more evident. Effects of urbanization on surface water resources and requirement for water of high quality will also make groundwater a perfect candidate for meeting the increased demand.

Democratization and decentralization of water management through institutional arrangements and public participation are advocated in water policies and laws of both countries. However, implementation, enforcement and compliance are some of the thorny issues still posing challenges for South Africa and mainland Tanzania. These challenges can only be overcome if states and citizens work together. Although African Customary Law in water management is recognised in South African and mainland Tanzanian statutory law, government engagement with traditional rural communities is less visible. This can be partially attributed to the influence of donor countries on the development and implementation of water policies and laws South

Africa and mainland Tanzania. Home grown water management practices, compatible with the unique customs and traditions of every community in South Africa and mainland Tanzania is, therefore, required to give effect to the statutory provisions for Customary Law.

4. Recommendations

- Direct groundwater regulation and incorporating African customary norms and traditions into water management practices will contribute to the sustainable utilization, equitable allocation and efficient use of groundwater resources in both South Africa and mainland Tanzania. Therefore, governments should engage with rural communities through their traditional leadership, using best home growing environmental options and management initiatives and avoiding to import unrealistic and distinct foreign management models to attempt to apply same rules everywhere and disregard the uniqueness of every community. Instead operationalize sound scientifically tested methods and models to protect recharge zone, monitor abstraction consider ecological water need, and use sector wide management approach
- Both South Africa and mainland Tanzania shall take grater cognizance of the unity of the hydrological cycle and integrated management of water resources with the recognition of increasing dependence on groundwater resources.
- Inter-catchment and inter basin groundwater management should be taken seriously as groundwater has no boundaries. This might cross political and administrative boundaries between states and provinces. It is also important to study in details the interaction between surface water bodies and groundwater resources as the effects of one on the other can be huge.
- As countries prone to extended drought periods South African and Tanzanian governments should step up their groundwater monitoring (quantity, quality and data collection) underlining the needs of rural and poor communities and educating them about their rights and duties towards water conservation, protection and efficient use.
- Step up enforcement issues through combination of incentives and coercive measures that deter noncompliance encourage voluntary compliance with statutory provisions and

sector regulations. Governments should enhance human and financial capacity by allocating sufficient funds to research projects and training of more groundwater professionals who can handle resource management in contemporary context.

- Groundwater pollution prevention or mitigation programs should be tailored to eradication of poverty as there is a strong link established between environmental degradation and poverty,

Bibliography

1. Books

Bourne, C.B. & Wouters, P. '*International water law: selected writings of Professor Charles B. Bourne'*, (1997), *Martinus* Nijhoff Publishers.

Brand, D. & Heyns, C.H. (eds) 'Socio-economic rights in South Africa', (2005), Pulp.

Burchi S. & Mechlem C. 'Groundwater in International Law: Compilation of Treaties and Other Legal Instrument's, (2005) Rome: UN FAO & UNESCO.

Calas, B. (ed) '*Shared Waters, Shared Opportunities: Hydropolitics in East Africa'*, (2010), Mkuki na Nyota Publishers.

Currie, I. & De Waal, J. '*The Bill of Rights Handbook'*, (*2005*), Juta & Company.

Daibes-Murad, F. '*A new legal framework for managing the world's shared groundwater : a case study from the Middle East'*, (2005) Intl Water Assn.

David, R. & Brierley, J.E.C. '*Major legal systems in the world today: an introduction to the comparative study of law'*, (1968), Taylor & Francis.

Dellapenna, J.W. & Gupta, J. (eds) '*The Evolution of the Law and Politics of Water'*, (2009) Springer Verlag.

Devenish, G.E. *'A commentary on the South African Bill of Rights'*, (1999), Butterworth-Heinemann.

Faysse, N. '*An assessment of small-scale users' inclusion in large-scale water user associations of South Africa'*, (2004), Iwmi.

Glazewski, J. *'Environmental law in South Africa'* (2005) 2ed. Durban: LexisNexis Butterworths.

Hall, C.G. '*The Origin and development of water rights in South Africa'*, (1939), Printed for the author at the University press.

Hamilton, A.C. & Bensted-Smith, R. '*Forest conservation in the East Usambara mountains, Tanzania'*, (1989), Iucn.

Heath, R.C. '*Ground-water regions of the United States'*, (1984), US Government Printing Office.

Huitema, D. & Meijerink, S.V. 'Water *policy entrepreneurs: a research companion to water transitions around the globe*,' (2009), Edward Elgar Publishing.

Kashaigili, J.J., Kadigi, R.M.J., Sokile, C.S. & Mahoo, H.F., '*Constraints and potential for efficient inter-sectoral water allocations in Tanzania*',(2003), *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 28, no. 20-27, pp. 839-851.

Krishna, R. & Salman, S.M.A. *'International groundwater law and the World Bank policy for projects on transboundary groundwater'*(1999), Groundwater: Legal and Policy Perspectives: Proceedings of a World Bank Seminar. World Bank Publications, pp. 183.

Lawrence, D. '*Tanzania and Its People', (*2009), Godfrey Mwakikagile.

M. Kidd, '*Environmental Law'*, (2011), Juta & Company Ltd, South Africa.

McCaffrey, S. '*International groundwater law: evolution and context* '(1999), Groundwater: *Legal and Policy Perspectives, Proceedings of a World Bank Seminar*.

McCaffrey, S.C. '*The law of international watercourses: Non-navigational uses'* (2001), Oxford University Press, USA.

Nkonya, L.K. *'Rural water management in Africa: the impact of customary institutions in Tanzania'*, (2008), Cambria Press.

Nonner, J. '*Introduction to hydrogeology*: IHE delft lecture note series'(2009), (paperback) (series: UNESCO-IHE delft lecture note series).

Salman, S.M.A. & Bradlow, D.D. (2006), 'Regulatory frameworks for water resources management: a comparative study,' World Bank Publications.

Salman, S.M.A., '*Groundwater: legal and policy perspectives: proceedings of a World Bank seminar'*, (1999) World Bank Publications.

Sands, P. '*Principles of international environmental law'*, (2003) Cambridge University Press.

Sharp, J.M. *'A glossary of hydrogeological terms'*, (2003), Department of Geological Sciences, the University of Texas.

Sharp, John M. Jr. *'A Glossary of Hydrogeological Terms'*, (2007). University of Texas, Austin, Texas.

Strydom HA, and King, ND (eds) '*Fuggle and Rabie's environmental management in South Africa*' 2 ed,(2009), Juta.

Thompson, H. *water Law: 'A Practical Approach to resource Management and the Provision of Services'*, 2006, Juta & Company, pp. 126-129.

United Nations Publications 'Report Of The International Law Commission, Fifty-sixth Session' (2004), pp 127 United Nations Publications.

Van der Linde, M. '*Compendium of South African environmental legislation'*, 2006, Pulp.

Van Koppen, B., Koppen, B.C.P., Giordano, M. & Butterworth, J. '*Community-based water law and water resource management reform in developing countries'*, 2007, CAB Intl.

Van Koppen, B.S., Hatibu, C., Lankford, N., Mahoo, B. & H Yanda, P. *'Formal water rights in rural Tanzania: Deepening the dichotomy'*? 2004, Iwmi.

Wambali, M.K.B. '*Democracy and human rights in Tanzania Mainland: the Bill of Rights in the context of constitutional developments and the history of institutions of governance*,' (1997). University of Warwick.

Webb, B. '*Sustainability of groundwater resources and its indicators'*, 2006, IAHS Press.

2. Articles in journals and chapters in books

Backeberg, G. R. 'Water Institutional Reforms in South Africa'. *Water policy*, 2005. 7(1).

Barberis, J. 'Development of International Law of Transboundary Groundwater' 1991, The *Nat.Resources J.*, vol. 31.

Beetlestone, P. 'Challenges to Transboundary Aquifer Management in The SADC Region *SADC Infrastructure and Services Directorate - Water Division*, Gaborone, Botswana.

Bekker, P.H.F., 'Gabcikovo-Nagymaros Project (Hungary/Slovakia), Judgement'1998, *American Journal of International Law.*

Benvenisti, E. 'Collective action in the utilization of shared freshwater: The challenges of international water resources law'1996, *Am.J.Int'l L.*, vol. 90.

Bourne, C.B. 1996, 'International Law Association's Contribution to International Water Resources Law'.

Brunch, C., Coker, W. & VanArsdale, C. 2001, 'Constitutional environmental law: Giving force to fundamental principles in Africa', *Colum.J.Envtl.L.*, vol. 26, pp. 131.

Burchi S & Mechlem K '*Groundwater in International Law: Compilation of Treaties and Other Legal Instruments'*. 2005 Rome.

Burke, J.J. & Moench, M., 'Groundwater and Society: Resources, Tensions and Opportunities: Themes in Groundwater Management for the Twenty-First Century' 2000, *United Nations Publications.*

Calas, B. 'Shared Waters, Shared Opportunities. Hydropolitics in East Africa', 2010, Mkuki na Nyota Publishers.

Caponera, D.A. & Alheritiere, D. 'Principles for International Ground-Water Law (II)' 1978, *Natural Resources Forum* John Wiley & Sons.

Caponera, D.A., '*Principles of Water Law and Administration: National and International'*. (1992) Taylor & Francis.

Dellapenna, J W & Gupta J eds '*The Evolution of Law and Politics of Water'* (2008) Jupiter Images Corporation.

Dellapenna, J.W. 'The customary international law of transboundary fresh waters' 2001, *International Journal of Global Environmental Issues,* vol. 1, no. 3.

Dinar, A., Dinar, S. & McCaffrey, and S. *Bridges Over Water: 'Understanding Transboundary Water Conflict, Negotiation and Cooperation'*, 2007, World Scientific Pub Co Inc.

Doering, E. 'The Reform of the Water Sector in Tanzania',2005, DAAD Alumni Summer School 2005 Topics of Integrated Watershed Management, , pp. 35.

Eckstein, G. 'Application of international water law to transboundary groundwater resources, and the Slovak-Hungarian dispute over Gabcikovo-Nagymaros' 1995, *Suffolk Transnat'l L.Rev.,* vol. 19.

Eckstein, Y. & Eckstein, G.E. 'Transboundary aquifers: Conceptual models for development of international law'2005, *Ground Water,* vol. 43, no. 5, pp. 679-690

Feris, L. 2008, 'Constitutional environmental rights: an under-utilised resource', *S.Afr.J.on Hum.Rts.,* vol. 24, pp. 29.

Foster, S. & Chilton, P. 'Groundwater: the processes and global significance of aquifer degradation' 2003, Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, vol. 358, no. 1440, pp 1957.

Freeternity Rusinga. 'Groundwater Protection - Guidelines for Protecting Springs'. (March 2004). *Department of Water Affairs and Forestry.*

Giordano, M.A. & Wolf, A.T. 'Sharing waters: Post-Rio international water management'2003, Natural Resources Forum Wiley Online Library, pp. 163.

Glazewski, J. 2011, 'Environmental Compliance and Enforcement in South Africa: Legal Perspectives', Transactions of the Royal Society of South Africa, vol. 66, no. 1, pp. 56-57.

Hall, R.E. & Rogers, J.E. 'Transboundary Groundwater Management: Opportunities Under International Law for Groundwater Management in the United States-Mexico Border Region' 2004, *Ariz.J.Int'l & Comp.L.*, vol. 21, pp. 873.

Hardin, G. 'The Tragedy of the Commons' 1968, *Science*, Vol. 162 no. 3859 pp. 1243-1248.

Hayton, R.D. & Utton, A.E. 'Transboundary groundwaters: the Bellagio draft treaty'1989, *Nat.Resources J.*, vol. 29, pp. 663.

Jousma, G. & Roelofsen, F. 'World-wide inventory on groundwater monitoring' 2004, *International Groundwater Resources Assessment Centre (IGRAC).Utrecht,*

Kabudi, P.J. 'Challenges of Legislating for Water Utilization in Rural Tanzania: Drafting New Law', *African Water Law: Plural Legislative Frameworks for Rural Water Management in Africa*.

Kabudi, P.J. 2005, 'Challenges of legislating for water utilisation in rural Tanzania: drafting new laws', *International Workshop on African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa', Johannesburg, South Africa*.

Kameri-Mbote, P. & Odote, C. 2009, 'Courts as Champions of Sustainable Development: Lessons from East Africa', *Sustainable Dev.L.& Pol'y*, vol. 10, pp. 31.

Kapfudzaruwa, F. & Sowman, M. 2009, 'Is there a role for traditional governance systems in South Africa's new water management regime?', *Water SA*, vol. 35, no. 5, pp. 683-692.

Kashaigili, J. 'Assessment of groundwater availability and its current and potential use and impacts in Tanzania', 2010: Report prepared for the International Water Management Institute *(IWMI).Sokoine University of Agriculture, Morogoro, Tanzania*.

Kashaigili, J.J., Kadigi, R.M.J., Sokile, C.S. & Mahoo, H.F. 2003, 'Constraints and Potential for Efficient Inter-Sectoral Water Allocations in Tanzania', *Physics and Chemistry of the Earth, Parts A/B/C*, vol. 28, no. 20-27, pp. 839-851.

Kidd, M 'South Africa: The Development of Water Law'. In *The Evolution of the Law and Politics of Water*. (2009). Retrieved February 16, 2011, from http://dx.doi.org/10.1007/978-1-4020-9867-3_6.

Kidd, M. *Environmental Law.* (2011). Cape Town: Juta.

Kidd, M., 'Environmental Justice-A South African Perspective', (1999) *Acta Juridica,* ,

Kiss, A.C. & Shelton, D. '*Guide to international environmental law',* (2007), Martinus Nijhoff Publishers .

Lein, H. & Tagseth, M. 'Tanzanian water policy reforms-between principles and practical applications.' 2009, *Water Policy,* vol. 11, no. 2, pp. 203-220.

Llamas, M.R. & Martínez-Santos, P. 'Intensive groundwater use: Silent revolution and potential source of social conflicts',2005, *Journal of Water Resources Planning and Management,* vol. 131, pp. 337.

Lynch, S., Reynders, A. & Schulze, R. 'A Drastic Approach to Groundwater Vulnerability in South Africa', 1997, *South African Journal of Science,* vol. 93, no. 2.

Maganga, F.P. 'Incorporating customary law in implementation of IWRM: some insights from Rufiji River Basin, Tanzania', 2003, *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 28, no. 20, pp. 995-1000.

Maganga, F.P., Kiwasila, H.L., Juma, I.H. & Butterworth, J.A. 'Implications of customary norms and law for implementing IWRM: findings from Pangani and Rufiji basins, Tanzania',2004, *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 29, no. 15-18, pp. 1335-1342

Maganga, F.P., Kiwasila, H.L., Juma, I.H. & Butterworth, J.A., 'Implications of Customary Norms and Law for Implementing IWRM: Findings from Pangani and Rufiji Basins, Tanzania', (2004) *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 29, no. 15-18.

Malzbender, D., Goldin, J., Turton, A. & Earle, A. 'Traditional Water Governance and South Africa's "National Water Act"–Tension or Cooperation', 2005, *International Workshop on*

'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa, pp. 26.

McCaffrey, S. 'The UN Convention on the Law of the Non-Navigational Uses of International Watercourses: prospects and pitfalls'1998, *World Bank Technical Paper, ,* pp. 17-28.

McCaffrey, S.C. 'Harmon Doctrine One Hundred Years Later: Buried, Not Praised, The'1996, *Nat.Resources J.,* vol. 36.

McCaffrey, S.C. 'The International Law Commission adopts draft articles on international watercourses' 1995, *The American Journal of International Law,* vol. 89, no. 2, pp. 395-404.

McCaffrey, S.C., 'The Law of International Watercourses: Non-Navigational Uses', *(*2001) *Oxford University Press, USA.*

Mechlem, K. 'International groundwater law: towards closing the gaps' 2003, *Yearbook of International Environmental Law,* vol. 14, no. 1, pp. 47.

Mechlem, K. 'Moving Ahead in Protecting Freshwater Resources: The International Law Commission's Draft Articles on Transboundary Aquifers' 2009, *Leiden Journal of International Law,* vol. 22, no. 04, pp. 801-821.

Meinzen-Dick, R. & Nkonya, L 'Understanding legal pluralism in water rights: Lessons from Africa and Asia.' African Water Laws Workshop: Plural Legislative Frameworks for Rural Water Management in Africa. 2005.

Nel J, Xu Y, Batelaan O, & Brendonck, L. 'Benefit and Implementation of Groundwater Protection Zoning in South Africa'. 2009. Water Resources Management, 23(14).

Nilsson, D. & Nyanchaga, E.N. 'East African Water Regimes: The Case of Kenya', 2009, *The Evolution of the Law and Politics of Water, ,* pp. 105-120.

Pallangyo, D.M. 'Environmental Law in Tanzania; How Far Have We Gone?' 2007, *Law Environment and Development Journal,* vol. 3, no. 1, pp. 28-39.

Perret, S.R. 2002, 'Water policies and smallholding irrigation schemes in South Africa: a history and new institutional challenges', Water Policy, vol. 4, no. 3, pp. 283-300.

Quibell, G. & Stein, R.'Can payments be used to manage South African watersheds sustainably and fairly? A legal review', 2005 *Center for Scientific and Industrial Research* (CSIR), .

Robinson, N.A. 1988, 'Comparative Environmental Law Perspectives on Legal Regimes for Sustainable Development', *Widener Law Symposium Journal*, pp. 247

Rodgers, A.B. & Utton, A.E. 'Ixtapa Draft Agreement Relating to the Use of Transboundary Groundwaters,' 1985, *Nat.Resources J.,* vol. 25, pp. 713.

Ruppel, O.C. 2009, 'Regional economic communities and human rights in East and southern Africa', Human rights in Africa–Legal perspectives on their protection and promotion. Windhoek: Macmillan Education Namibia.

Salman, S.M.A. 'The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: perspectives on international water law' 2007, *Water Resources,* vol. 23, no. 4.

Sergent, M.R. 'Comparison of the Helsinki Rules to the 1994 UN draft articles: will the rogression of International Watercourse Law be dammed' 1997, *Vill.Envtl.LJ,* vol. 8, pp. 435.

Sokile, C.S. & Koppen, B. 'Local Water Rights and Local Water User Entities: the Unsung Heroines of Water Resource Management in Tanzania' 2004, *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 29, no. 15-18, pp. 1349-1356.

Sokile, C.S., Kashaigili, J.J. & Kadigi, R.M.J. 'Towards an integrated water resource management in Tanzania: the role of appropriate institutional framework in Rufiji Basin' 2003, *Physics and Chemistry of the Earth, Parts A/B/C,* vol. 28, no. 20, pp. 1015-1023.

Sokile, C.S., Mwaruvanda, W. & Van Koppen, B., 'Integrated Water Resource Management in Tanzania: Interface between formal and informal institutions', International workshop on ‘African Water Law: (2005) *Plural Legislative Frameworks for Rural Water Management in Africa.*

Teclaff, L.A & Utton A E. 'International Groundwater Law' (1981) Oceana publications USA.

Tewari, D.D. 2001, 'An analysis of evolution of water rights in South African society: An account of three hundred years', *Proc.The Role of Water in History and Development,* , pp. 10-12.

Thompson, H., '*water Law: A Practical Approach to Resource Management and the Provision of Services', (*2006) Juta & Company.

Utton, A.E. 'Which rule should prevail in international water disputes: That of reasonableness or that of no harm'1996, *Nat.Resources J.,* vol. 36.

Utton, A.E., 'Development of International Groundwater Law', 1982 *the Natural Resources Journal,* vol. 22, no. 1.

Villholth, K. & Giordano, M. 'Groundwater use in a global perspective-Can it be managed', *The Agricultural Groundwater Revolution: Opportunities and Threats to Development.International Water Management Institute,* 2007, *Colombo, Sri Lanka,* , pp. 393-402.

Wada, Y., van Beek, L.P.H., van Kempen, C.M., Reckman, J.W.T.M., Vasak, S. & Bierkens, M.F.P. 2010, 'Global depletion of groundwater resources', *Geophysical Research Letters,* vol. 37, no. 20, pp. L20402.

Winter, T.C., Harvey, J.W., Franke, O.L. & Alley, W.M. 'Ground water and surface water', *A single resource:* 1998, *US Geological Survey Circular,* vol. 1139.

Wolf, A.T. 'Conflict and cooperation along international waterways' 1998, *Water Policy,* vol. 1, no. 2, pp. 251-265

Xu, Y., & Usher, B. 'Groundwater Pollution in Africa', (2006). Taylor & Francis.

3. International and regional instruments

Agenda 21 (1992)

Bellagio Draft Treaty (1989)

Berlin rules on water resources of (2004)

The Helsinki Rules on the Uses of Water of International Rivers (1966)

Revised Protocol on Shared Watercourses (2000)

Seoul Rules of international groundwater (1986)

UN Convention on the Law of the Non-navigational Uses of International Watercourses of (1997)

UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki Convention of (1992)

4. National legislation

4.1South Africa

Constitution of the Republic of South Africa of 996

National Environment Management Act, 107 of 1998 (NEMA)

National Ground Water Strategy of 2010,

National Water Act, 36 of 1998

National Water Act, 54 of 1956

National Water Policy White Paper of 1997

National Water Resource Strategy of 2004

4.2Tanzania

National Environmental Management Act (2004)

National Water Policy (2002)

The Constitution of the United Republic of Tanzania of (1977)

Water Resource Development Strategy

Water Resource Management Act of (2009)

Water Utilization (Control and Regulation) Act, (1974)

5. Internet sources

'A history of the first decade of Water Services delivery in South Africa 1994 to 2004, meeting the millennium development goals', Department of Water Affairs and Forestry. Available at http://www.dwa.gov.za/documents/Publications/firstdecade.pdf [accessed on 10th of October 2012].

'*Africa Water Atlas'*, United Nations Environmental Program 2010 available at http://na.unep.net/atlas/africaWater/downloads/africa_water_atlas.pdf . [Accessed 07th of March 2011].

Anayah, F. & Kaluarachchi, J.J. 2009, 'Groundwater resources of northern Ghana: initial assessment of data availability.' Available at http://gw-africa.iwmi.org. [accessed on 20th of December 2012].

Berlin Rules on Water Resources, 2004, available at http://www.internationalwaterlaw.org/documents/intldocs/ILA_Berlin_Rules-2004.pdf [Accessed on 19/04/2011].

'Case concerning Gabcíkovo-Nagymaros Project (Hungary/Slovakia) Judgment' available at http://www.icj-cij.org/docket/index.php?pr=267&p1=3&p2=1&case=92&p3=6&PHPSESSID=4d8cd84d23aa1a82b44c6a9857ed08b5 [accessed at 08/05/2011].

6. Case law

'Compendium of judicial decisions in matters related to environment national decisions'. Available at http://www.unep.org/padelia/publications/jud.dec.nat.pre.pdf [Accessed on 4th of November, 2012].

'Declarations and Resolutions of the United Nations Water Conference, 1977, Mar del plata'. Available at http://www.cawater-info.net/bk/water_law/pdf/mardelplata_1977_e.pdf [accessed on 19/04/2011].

'Ensuring Environmental Compliance: trends and good practices'. Available at http://www.iadb.org/intal/intalcdi/PE/2009/03570.pdf [accessed on 2nd of October 2012].

Festo Balegele & 749 Others v Dar Es Salaam City Council available at http://web1.unep.org/Padelia/publications/Jud.Dec.Nat.pre.pdf accessed on 18th of October 2012

'Gabčíkovo-Nagymaros Project (Hungary/Slovakia)'. Available at http://www.icj-cij.org/docket/index.php?sum=483&code=hs&p1=3&p2=3&case=92&k=8d&p3=5 [Accessed on 28, November 2012].

'General Assembly resolution 2669 (XXV) on progressive development and codification of the rules of international law relating to international watercourses'. Available at http://untreaty.un.org/ilc/documentation/english/a_cn4_244.pdf [accessed on 16/05/2011].

'Groundwater Strategy', Department of water affairs 2010 available at http://www.dwa.gov.za/Groundwater/Default.aspx [Accessed 07th of March 2011].

Gupta. A. Das, 'Socio-Economic and Environmental Impacts of Unplanned Groundwater Use – Case Studies from Asia' Asian Institute of Technology, Bangkok, Thailand. Available at http://www.ehs.unu.edu/file/get/3689 [accessed on 21/11/2012]

Hungary vs. Slovakia available at http://internationalwaterlaw.org/bibliography/IJGEI/06ijgenvl2001v1n34fuyane.pdf [accessed on 27/09/2012].

IUCN Eastern Africa Programme, IUCN Water, Nature Initiative, Tanzania. Pangani Basin Water Office & Kenya. Coast Development Authority 2003, *Pangani basin: a situation analysis*, Iucn. Available at http://cmsdata.iucn.org/downloads/state_of_the_basin_report_1.pdf [accessed on 4th of October 2012].

Joseph D. Kessy v. Dar Es Salaam City Council available at http://greenwatch.or.ug/pdf/news/publications/Environmental_Law_Case_Book_2.pdf [accessed on 18th of October 2012].

Kebble and others v Minister of Water Affairs and Forestry available at http://www.saflii.org/za/cases/ZASCA/2007/111.html, [accessed on 27/09/2012].

'Law of Non-Navigational Uses of International Watercourses', International Law Commission 30 June 2005 available at http://untreaty.un.org/ilc/summaries/8_3.htm [Accessed 10th of Feb 2011].

'Legal Instruments with regard to EAC Watershed Governance Structure'. Available at http://www.eac.int/environment/index.php?option=com_content&view=article&id=155&Itemid=139 [accessed on 3/11/2012].

'Margaret Levi, Tom Tyler, Audrey Sacks, The reasons for compliance with law'. Available at http://www.yale.edu/macmillan/ruleoflaw/papers/ReasonsforCompliance.pdf [accessed on 10/11/2012].

Matsumoto, K. 'Transboundary groundwater and international law: past practices and current implications', 2002. Available at http://tbw.geo.orst.edu/publications/abst_docs/Matsumoto.pdf [accessed on 10th September 2012].

Mazibuko and Others v City of Johannesburg and Others (CCT 39/09) [2009] ZACC 28; 2010 (3) BCLR 239 (CC) ; 2010 (4) SA 1 (CC) (8 October 2009) available at http://www.saflii.org.za/za/cases/ZACC/2009/28.pdf accessed on 30th of October 2012

'Millennium Development Goals (MDGS)' available at http://www.worldforworld.org/millennium_goals.asp [Accessed 19/01/2011.],

'Millennium Development Goals'. Available at http://www.alliance2015.org/fileadmin/user_upload/MDGs.pdf [accessed on 26th of November, 2012].

Mtikila v.Attorney General available at http://www.saflii.org/tz/cases/TZHC/2006/5.html accessed on 18th of October 2012.

'National Water Policy of 2002'. Available at http://www.maji.go.tz/userfiles/Maji%20Policy%20Book%20pdf.pdf [accessed at June 11, 2012]

Oelofse, S ‘Mine water pollution-acid mine decant, effluent and treatment: a consideration of key emerging issues that may impact the State of the Environment’2009. Available at http://researchspace.csir.co.za/dspace/handle/10204/5025 [accessed on 5th September 2012]

'Policy and Strategy for Groundwater Quality Management in South Africa, Department Of Water Affairs And Forestry' (2000). Available at http://www.info.gov.za/view/DownloadFileAction?id=70330 [accessed on 3rd of September 2012].

'Preamble of the Treaty Establishing East African Community'. Available at http://www.eac.int/treaty/index.php?option=com_content&view=article&id=75&Itemid=156 [Accessed on 1/11/2012].

'Resolution on the Use on the Waters of International Rivers[145] - New York, 1958. Available at http://www.fao.org/docrep/005/W9549E/w9549e08.htm [accessed on 21/11/2012].

'Revised Protocol on Shared Watercourses'. Available at http://www.sadc.int/index/browse/page/159 accessed on 30/04/2011

Shiklomanov, I.A. 'World water resources: a new appraisal and assessment for the 21st century'1998. Available at http://www.ce.utexas.edu/prof/mckinney/ce385d/Papers/Shiklomanov.pdf [Accessed on 15/05/2011].

'Statement of Principles Resolution of Dubrovnik', 1956. Available at http://www.fao.org/docrep/005/W9549E/w9549e08.htm [Accessed on 21/11/2012]

'Strategy for Groundwater Quality Management in South Africa'. Available at http://www.info.gov.za/view/DownloadFileAction?id=70330 [access on 26th, November, 2012]

'Tanzanian National Water Policy of 2002'. available at http://www.maji.go.tz/modules/documents/index.php?&direction=0&order=&directory=Policy [Accessed on 25, November, 2012.].

'The African Charter on Human and People’s Rights'. Available at http://www.africa-union.org/official_documents/treaties_%20conventions_%20protocols/banjul%20charter.pdf [Accessed on 2/11/2012.].

'The Annual State of Constitutionalism in East Africa 2009'. Available at http://www.kituochakatiba.org/index2.php?option=com_docman&task=doc_view&gid=1441&Itemid=27 [Accessed on 29th of October 2012].

'The Helsinki Rules on the Uses of the Waters of International Rivers', 1966. Available at http://www.unece.org/env/water/meetings/legal_board/2010/annexes_groundwater_paper/Annex_II_Helsinki_Rules_ILA.pdf [Accessed on 19/04/2011].

'The National Water Act No 36 of 1998'. Aviallable at http://www.info.gov.za/view/DownloadFileAction?id=70693 [Accessed on 26/09/2012]

'The Treaty for the Establishment of the East African Community (As amended on 14th December, 2006 and 20th August, 2007)'. Available at http://www.kituochakatiba.org/index.php?option=com_docman&task=cat_view&gid=23&Itemid=36 [accessed on 26, November, 2012].

'The UNECE Water Convention Helsinki, 17 March 1992'. Available at *http://www.unece.org/env/water* [Accessed on 28/04/2011]

'The Water Convention'. Available at http://www.unece.org/env/water/publications/brochure/Water_Convention_e.pdf [Accessed on 26/04/2011].

'The Water Resources Management Act No11 of 2009'. Available at http://www.maji.go.tz/modules/documents/index.php?&direction=0&order=&directory=Water%20Legislation [Accessed on 05/09/2012].

'UN General Assembly resolutions adopted on the reports of the sixth committee'. Available at http://daccess-dds-ny.un.org/doc/RESOLUTION/GEN/NR0/349/34/IMG/NR034934.pdf?OpenElement [Accessed on 03/10/2011].

'UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki Convention of 1992)'. Available at http://www.unece.org/env/water/pdf/watercon.pdf [Accessed on 26/04/2011].

'United Nations Conference on Environment & Development (UNCED) Rio de Janerio, Brazil, 3 to 14 June 1992. Agenda 21, United Nations Sustainable Development'. Available at http://www.un.org/esa/sustdev/documents/agenda21/english/Agenda21.pdf. [Accessed at 13/04/2011].

'United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses 21, MAY 1997, Audio visual library of international law. New York'. Available at file:///E:/international%20water%20law/the%20convention%20history.htm [Accessed on 14/04/2011].

'United Republic of Tanzania: Poverty Reduction Strategy Paper – Annual implementation report of 2006/07'. Available at http://www.imf.org/external/pubs/ft/scr/2008/cr0822.pdf [Accessed on 28/08/2012].

'Water Sector Status Report 2011, Ministry of Water, United Republic of Tanzania. Available at http://www.maji.go.tz/userfiles/Water%20Sector%20Status%20Report%202011_final.pdf, [Accessed on 28th of August 2012.].

Württemberg and Prussia v. Baden (Donauersingkung case) McCaffrey, S. 1999, "International groundwater law: evolution and context", *World Bank Technical Paper*, , pp. 139-162.