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Transboundary water governance and water conflicts in the Lake Victoria Basin: an adaptive and integrative management approach

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ABSTRACT

Lake Victoria Basin is a transboundary natural resource shared by five East African Community countries. The Basin experiences unsustainable water resource utilization and management which creates conflicts among the users. This objective of this study was to examine the contribution of transboundary water governance systems in managing the water conflicts in the Basin. Qualitative data were collected through interviews and focused group discussions where respondents were clustered and purposively selected while quantitative data were collected through questionnaires and analyzed using SPSS. Lake Victoria Basin Governance Performance Composite Index was also used to assess the effectiveness of governance systems in the Basin. The study findings revealed that: transboundary water governance systems with participation, integration, legal frameworks, collaboration, equity and adaptability, all with $P < 0.05$ negatively and significantly influence the causes of conflicts and water management challenges; integration (20%) and equity (19%) contribute highly to the model; and both adaptive and integrative water governance systems are less effective with a score of 34% and 35% respectively. The study concludes that the current management systems require an adaptive and integrative governance system. The study recommends harmonization of regional laws and policies governing the Basin and involvement of local communities in decision making.

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Keywords: Adaptive governance, collaboration, integrative governance, mechanisms, water conflicts.

INTRODUCTION

Transboundary watersheds are the water resources which cross two or more countries and they include rivers, lakes and aquifers. Over 276 international watersheds worldwide transcend through different national boundaries covering almost half of the earth's land surface (UN Water, 2013; Choudhury and Islam, 2015; UNESCO, 2013; and UNECE, 2015). The transboundary water resources are essential for socio-economic developments for the riparian countries however; they have

continued to be endangered by a multiplicity of complexities and crises (Earle and Neal, 2017; Paisley and Henshaw, 2013). A large number of authors and international organizations point out that "the water crisis of the 21st century is, in many ways, a crisis of governance". They argue that the crisis is rooted in power, poverty, poor resource utilization and management and unequitable distribution but not the physical water resources availability (UN-Water, 2013; Jacobsen et al., 2013; World Bank, 2013; De-

Stefano et al., 2014; OECD, 2015; Akhmouch et al., 2017).

The rich ecosystems in the watersheds have attracted a diversity of people who live and derive their livelihood in the shared water Basins. Over 40% of the world's population depends on these international watersheds for agriculture, fishing, transport, hydropower generation, wildlife, and mining and among others (Jägerskog, 2013; OECD, 2015). The significance of the water resources, notwithstanding, the rapid population growth accompanied by unregulated human activities on the transboundary water resources have threatened the sustainability of the resources. A combination of social, economic and ecological issues have continued to be a major challenge in the management of shared water resources causing high demand for water resources leading to an increased competition resulting into conflicts over the utilization of the scarce resources (Munia et al., 2016; Moore, 2013). Rojas and Iza (2011) argue that to mitigate the consequences of human activities on the water resources requires an effective and efficient management system for sustainable and equitable utilization of the water resources.

Despite the Lake Victoria Basin's economic potential, the Basin is under threat by a host of social, economic, political and environmental challenges which affect the sustainable utilization and management of the water resources in the Basin. Among the major issues are: half of its population is living in absolute poverty (living on income less than a dollar per day) and mainly relies on subsistence production. Poverty is further aggravated by the rapid population growth and the high level of illiteracy in the Basin (LVBC, 2015). Again due to the high population, the land is highly fragmented and the women, who are the productive group, have less access to productive land for cultivating. Relatedly, there is a lot of migration to the Basin which has seen high rate of refugees' influx to the Basin and this has exacerbated insecurity and unemployment (Were, 2016; LVBC, 2015; Ogello et al., 2013).

Similarly, the rapid population growth has intensely put pressure on these natural resources through human activities such as over fishing, pollution, poor methods of agriculture which is the main cause of degradation. In the Basin, there are poor and inadequate healthy services where HIV/AIDS is rampant and the mortality rate is too high where mostly a big number of people die due to water borne diseases such as Bilharzia, Tuberculosis, Cholera and Malaria (LVBC, 2011; LVBC, 2015). In addition, according to GWP-EAC (2015) and AU-IBAR (2016), the Basin is faced with governance challenges that need immediate intervention and they include un-harmonized laws and regulatory standards; low compliance to joint water resource laws and regulations and inadequate enforcement.

The other management issues that threaten the Basin are: inadequate institutional and human capacities to formulate and implement programs; limited effective involvement of stakeholders in the management process; inadequate governance mechanisms that have limited provisions for enforcement; lack of awareness and ownership at community level and limited information about transboundary ecosystem management among others (UNECA, 2016; Were et al., 2013; Lalika et al., 2015). In addition, the pollution from the unplanned urbanization in form of chemicals, waste water, sewage and rubbish discharge into the lake especially from the major towns of Jinja, Mwanza, Kisumu and Kampala-Entebbe has continuously affected the lake (Ogello et al., 2013; LVBC, 2011). Furthermore, the high level of degradation in the Basin both in the lake and the catchment has caused conflicts over the water resource usage (UNECA, 2016; AU-IBAR, 2016; GWP-EAC, 2015).

As observed by Bigas (2012), the poor state of the shared transboundary ecosystems is a manifestation of the lack of effective governance for the sustainable utilisation and management of the world's water resources. To address these challenges and to ensure equitable and sustainable utilization and management of transboundary water resources, there is a need for good governance and

management across all levels of governing institutions and engagement of all stakeholders in riparian countries (Akamani and Wilson, 2011).

Despite the establishment of LVBC and LVFO as EAC institutions by the EAC treaty through the LVB Protocol to manage the resources of Lake Victoria, the Basin has continued to experience water conflicts and other social, economic and political challenges which many scholars have attributed to poor governance system in the Basin (AU-IBAR, 2016; De- Stefano et al., 2014; OECD, 2015; Akhmouch et al., 2017).

The management challenges notwithstanding, Atieno (2014); LVBC (2011); Were, (2016) note that the Lake Victoria transboundary waters are susceptible to both intra and inter-conflicts arising from poor utilization and competition for the scarce water resources. Okurut and Weggoro (2011) suggest that water conflicts which emanate from management challenges could be addressed by effective water governance through institutional frameworks which can ensure proper utilization and management of resources. The objective of this study was to examine the effectiveness of transboundary water governance practices in managing the water conflicts and other social, economic and political challenges in the Lake Victoria Basin.

MATERIALS AND METHODS

Lake Victoria Basin

Lake Victoria Basin has a catchment area of 194,200 km (Table 1) that stretches further to two additional countries (Figure 1); Rwanda and Burundi in various proportions: Tanzania (44%), Kenya (22%), Uganda (16%), Rwanda (11%) and Burundi (7%) (Mwiturubani, 2010; UNECA, 2016). The dimensions of Lake Victoria stretch 400 km from North to South and 240 km from West to East. It strides the equator between latitude 00^o, 30'N and 3, 12'S and from West to East between longitude 31o37' and 34o53E (Ogello et al., 2013; Mabikke, 2014). It is situated on an altitude of 1,134 meters above sea level which gives it unique features that are different from other similar lakes.

The study applied mixed methods approach where a combination of both qualitative and quantitative approaches to examine the governance and management systems of the Lake Victoria Basin were used. The researcher opted to use mixed method because of its usefulness as highlighted by Strauss and Corbin (1990), which includes the validation of findings through triangulation and a deeper, broader and more illustrative description of phenomena. This approach enables the use of both qualitative and quantitative data collection and analysis techniques in answering research questions. Each approach synergizes the other to be more effective and it provides a full understanding of the research problem. Creswell and Clark (2011) observe that: "The major premise behind the use of mixed methods is that a combination of quantitative and qualitative approaches provides added perspective and a more comprehensive understanding of the research problem being studied than either approach alone can provide." Furthermore, mixed methods helped during data collection to close the gaps of illiterate respondents who could not work well with questionnaires but instead with interviews.

This study examines the governance of Lake Victoria transboundary water resources to conflicts management and since the lake crosses different countries, Cluster random sampling and purposive were used. Cluster random sampling was opted because the population under this study is dispersed across a wide geographical region that involves crossing the borders. This technique allows for the division of the study population into clusters such as regions and provinces (Saunders et al., 2009). The population under the study included the local community leaders of the villages within the Lake Victoria basin. These villages were clustered basing on the geographical location into small groups for the purposes of easy collection of data and interviewing the participants. The researcher also used purposive sampling; a technique that involves a process of selecting a sample based on experience or knowledge of the group (Saha, 2008). By this procedure, only the organizations that are involved in the

management of Lake Victoria Basin and the communities within the Basin were considered. Also, only the respondents who were more knowledgeable in the area of study were contacted to fill the questionnaires.

Statistical analysis

The Quantitative raw data collected, particularly in surveys, was processed before subjected to any useful analysis. This process included correcting errors in the data (editing), coding the data and storing it in appropriate form. Data was first entered into SPSS and thereafter cleaned. SPSS was used for filling

missing values, data aggregation, factor analysis and also testing parametric assumptions. SPSS was also used to run the descriptive statistics, analyze sample characteristics and run the coefficients and the regressions. The regression models were run to identify the variables that have an impact on the topic of interest and how they influence each other. The hypotheses were tested using regression analysis. The Lake Victoria Basin Governance Performance Composite Index (LVBGCI) was also used to assess the performance and effectiveness of governance systems in the basin.

Table 1: Morphometric Data for Lake Victoria Basin.

Country	Lake surface area		Catchment area		Lake shoreline length	
	Km2	%	Km2	%	Km2	%
Kenya	4,128	6	42,724	22	550	16
Uganda	29,584	43	31,072	16	1,750	51
Tanzania	35,088	51	85,448	44	1,150	33
Burundi	0	0	13,594	7	0	0
Rwanda	0	0	21,362	11	0	0
Total	68,870	100	194,200	100	3,450	100

Source: Lake Victoria Basin, Adopted from LVBC, 2007.



Figure 1: Lake Victoria Basin.

RESULTS

Effectiveness of integrative water governance systems in the LVB

To this end, integrative water governance indicators of stakeholder participation and engagement, integration and legal frameworks/rule of law were examined as suggested by Cooley et al. (2016) in their study on the assessment of water governance performance of Songkhla Lake Basin in Thailand. The quantitative approach using the Lake Victoria Basin Governance Performance Composite Index (LVBGPI) was used to assess the status performance or effectiveness of governance mechanisms.

Results depicted in Figure 2 reveal that the aggregated score of IWG systems on the LVB based on the three indicators of stakeholder participation and engagement, integration and legal frameworks/rule of law was 35% which is below the average mark of 50%. Individually, all the performance indicators of IWG performed below 50% where integration scored 38.0% indicating low levels of integration in the LVB, stakeholder participation and engagement scored 32.0% indicating low levels of stakeholders' involvement and participation either directly or through legitimate representatives in the activities and management of the LVB while rule of law/ legal frameworks scored 35.0%

indicating poor performance or inadequate application of the rule of law and other legal frameworks.

Effectiveness of adaptive water governance mechanisms in the LVB

As advised by Cooley et al. (2016), the adaptive water governance as second arm of water governance was assessed using the LVBGPI based on three indicators of adaptability, equity and ethical and collaboration. Each of the indicators was assessed separately to establish the level of its effectiveness in the governance of LVB and later all the three were aggregated together to find the overall score in regard to the level of adaptiveness in the governance of LVB as shown in portrayed in Figure 3.

The aggregated score of the AWG systems in the LVB based on the indicators of adaptability, equity and ethical and collaboration was 34%. All the three indicators scored below the average score of 50% where adaptability scored 33.0% indicating low degree of institutional response, openness to socio-ecological changes and to incidence of a disaster, equity and ethical had the lowest mark of 32% signifying poor performance of equity and ethical principles in the governance of LVB and collaboration scored 36% indicating low levels of collaboration.

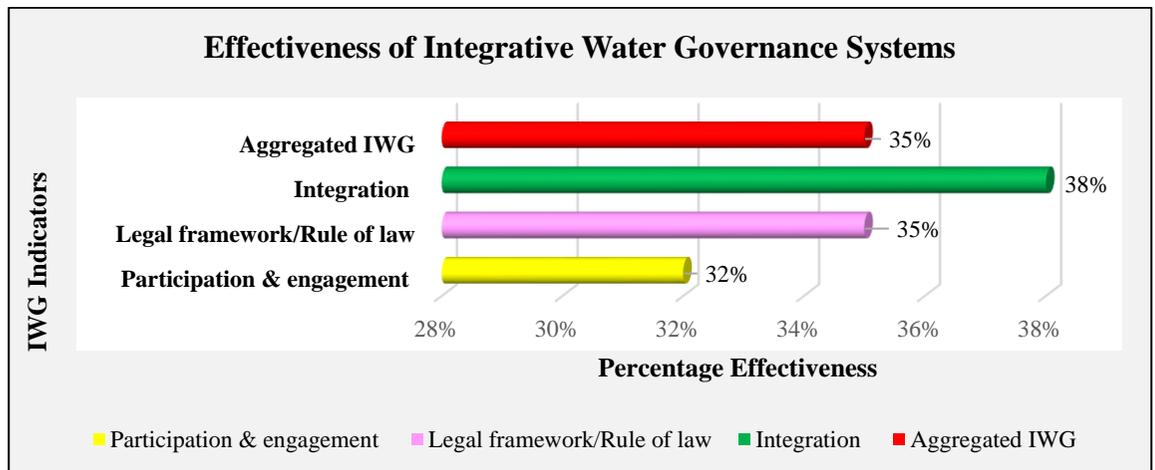


Figure 2: LVB Governance Performance Composite Index for IWG.

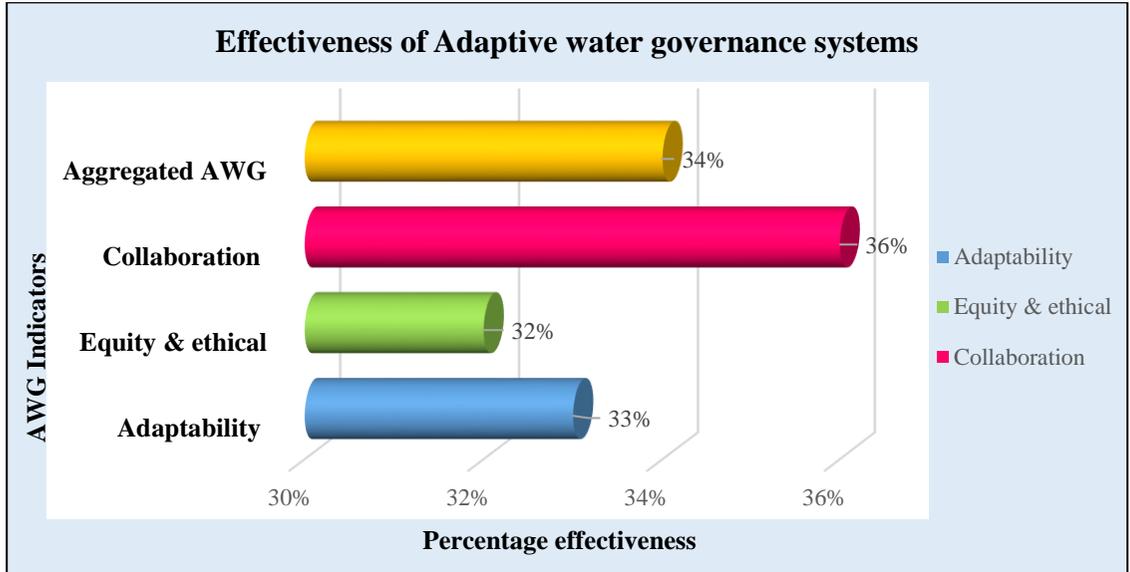


Figure 3: LVB Governance Performance Composite Index of AWG.

DISCUSSION

The results revealed that the integrative water governance systems on the LVB based on the three indicators of stakeholder participation and engagement, integration and legal frameworks/rule of law were found to be ineffective with an aggregated score of 35% which is below the average score of 50%.

Regarding integration, the results mean that there is poor policy coherency and consistency between the riparian countries, the different governing organizations, agencies and other organizations involved in the basin which are not satisfactorily interacting and working together for the sustainability of the resources. Lack of policy and development plan harmonisation and coherency between the sectors' ministries and agencies in the management of the Basin may be responsible for low level of integration which is causing management challenges. Lalika et al. (2015) concur with the findings where they recognized that lack of harmonization and integration of management systems of different institutions related to water-shed management, normally results in unsustainable use of water resources and resource use conflicts. Secondly, this result portrays the inadequacy of vertical and horizontal interaction, coordination and communication between the stakeholders and

organizations both within the partner states and across other riparian countries. For this, there is a need for strengthening vertical and horizontal integration among the national governing institutions (Resource Management Systems) and between human and natural systems. The national governing institutions are structurally and policy wise fragmented and they administer and enforce their individual sector policies, laws and regulations differently which affects the coordination that leads to water use conflicts. Our finding is in line with the finding of Vasquez (2017) which found that managing natural resources such as soils, fauna, plants and human beings in a fragmented way leads to resource conflicts. Therefore, the study recommends the integration, coordination and interaction of both formal and informal institutions for the harmonisation of sector policies, provisions and development plans.

The poor performance on participation and stakeholder engagement reveals that stakeholders are not effectively participating throughout the water policy chain from decision making to the implementation process which may lead to misunderstanding between water user interest parties. This finding is in agreement with AU-IBAR (2016) which noted that inadequate involvement of stakeholders in

the activities and programmes undertaken in the Basin creates a governance gap that can cause conflicts; the stakeholders are merely consulted to rubberstamp decisions instead of participating. The results portray the inability of stakeholders to influence and share control over the development initiatives and management decisions that affect them in the LVB. It further means that probably stakeholders have limited freedom to express their concerns and that; the governance institutions put little effort to communicate to all stakeholders at all the levels from community level to regional levels and give feedback in time. In this case, the Basin managers miss out to capture valuable information from indigenous local inhabitants who probably would help them in decision making and resolving water conflicts.

This position was also echoed by Megdal et al. (2017) who argued that the inefficiencies in the communication and coordination among the governing institutions is a manifestation of lack of stakeholder participation in the governance of water resources. Given the realisation that human systems (cultures, preferences, norms, beliefs) affect the natural systems (the resources functions and services such as fishing, agriculture and forestry among others) and the resource management systems (institutions, management instruments and policies among others), the study further suggests that the Basin managers should understand the human dimensions and ensure the integration of the stakeholders especially the water resources users and local communities in the management of the LVB and more especially in decisions making process.

The low performance on the rule of law in the governance of water resources implies that there is low compliance and adherence to different aspects of regulatory procedures in the governance processes of the LVB. Once the laws and regulations are not complied with, this leads to confrontations between water resource users and managers. This finding is consistent with Cookey et al. (2016) which established that poor adherence to legal instruments exposes the risks of inadequate protection against the effects of wrong actions in the Basin which is a source of water use conflicts. This result further indicates the low

capacity of the governing institutions to produce and share relevant information in time, the ineffective implementation and enforcement of laws, policies and regulations in the LVB. Secondly this score below average mark could be the manifestation that the governing institutions have low capacity to monitor, evaluate and supervise sufficiently the basin's projects, programs and actions of the riparian countries. The study finding is further supported by GWP-EAC (2015) which reported that although the Lake Victoria Partner States put in place the required policies and legal framework, the level of implementation and compliance is still very low.

The study observed that although, the protocol for sustainable development of the LVB mandates the LVBC to facilitate, harmonise and coordinate all activities and oversee the LVB on behalf of the partner states, the LVBC is not legally empowered to enforce any law. This is because at its birth, it was established through the protocol which is weak and it is like gentleman's agreement with policy statements which are silent on how to enforce the laws and guidelines and it does not guide on what to do to the defaulters of the laws and guidelines. For this, and as it was provided for in the 1999 EAC treaty, the study recommends that EAC through EALA should empower LVBC by coming up with an act of parliament giving the LVBC powers and authority to monitor, supervise and enforce laws and regulations for effective governance of the LVB.

The results of Adaptive Water Governance mechanisms in LVB which indicated an aggregated score of 34%, just slightly below the IWG systems, mean that the level of adaptiveness in the governance of LVB was very low. Regarding adaptability, the result implies that the social actors in the LVB have low ability to work together to enhance the capacity of the socio-ecological systems to cope with intermittent shocks. They also indicate that LVB has low capacity to absorb disturbance and still maintain the functioning of the ecosystem which signals that the LVB management systems are not robust enough to manage the changing pressures, threats, opportunities and risks. This implies that the low level of adaptiveness in the management of

Lake Victoria is partially responsible for the causes of water conflicts and the prevalence of other socio-economic, political and institutional challenges. Adaptive governance integrates information from stakeholders such as from local communities which normally have relevant information that can help to address the uncertainties however, in the Lake Victoria Basin, the capturing and sharing of information and synergistic linkages between stakeholders and organisation is inadequate which may be the explanation for the poor performance of adaptiveness in the governance of LVB. This is in line with Green et al. (2013) and Fenemor et al. (2011) which found that the system which integrates collaborative learning is responsive to changing pressures and becomes easy to mitigate uncertainties such as floods and droughts whose effects may result into conflicts. In a bid to adaptability in the LVB, the study recommends that governing institutions should endeavour to learn and better understand the outcomes from implemented strategies and actions and other events and promote flexible decision making that is adjustable in the face of uncertainties.

As regards to equity and ethical, the results imply that the stakeholders and the governing organizations do not adequately follow ethical principles of the societies they operate in and the LVB resources could be unethically utilized. More so, this result means that LVB governing organizations may not be providing their stakeholders with equal opportunities to improve their wellbeing and take part in decision making, and that they may not be consulting all stake holders in the riparian countries in order to agree on the best means of the basin's resource management respectively. In a similar view, this result implies that the LVB resources are not equitably shared among the various water interest groups as well as sharing the benefits and opportunities which can be a great source of disagreements between interest groups. The finding is consistent with the finding of Sadoff and Grey, (2005; 2002); Sadoff et al., (2002, 2008); Dombroksy (2009) which hold that lack of benefits- sharing mechanism within the watersheds is a challenges and contributes to water conflicts among the partner states. Furthermore, the result is in line with Iza and Stein (2009)'s finding which noted that,

equitable sharing of benefits across the relevant stakeholders encourages the sense of ownership which is vital for stakeholders to safeguard and manage jointly the shared resources

Since collaboration entails an arrangement of involving a wide range of stakeholders often voluntarily in decision making, planning processes and implementation of projects and programmes, score of 36% indicates poor performance in respect to the level of collaboration among stakeholders in the basin. The results imply that the level of inclusive involvement of water users (stakeholders) and those affected by the water use in the management of LVB is very low and it requires immediate improvement for sustainable utilization and management of the LVB. To promote a better informed decision and implementation of activities and programs, it is important to decentralize decision making and involving all parties in order to achieve consensus which helps to mitigate disagreements on the implementation approaches. This result is in agreement with the Burnley et al. (2014); LVBC (2012) who noted that once the stakeholders' involvement in the management of the water resources in the Basin is insufficient, it can lead to water conflicts. They further opined that water conflicts can be worsened by the centralization of decision making and planning in the relevant ministries. Secondly, the Basin regulators and managers ought to capture and integrate new knowledge and experiences about Lake Victoria into the management of LVB through collaborative learning and partnership with the formal organisations such as government ministries and agencies and informal organisations like public and private sector, local communities and water users. In addition, the LVB managers should utilise the lowest government and non-government structures such as local councils, Beach Management Units and create Lake Victoria Resources Management Unit to generate and acquire information that should be continuously incorporated in the basin management systems through bottom-up and top-bottom planning and decision making approaches. The LVB according to GWP-EAC, (2015) confirms that LVB is faced with conflicts as the result of poor relationship with the local communities. The

poor connectedness of the Basin managers and the stakeholders may also explain the finding of poor stakeholders' collaboration.

Conclusion

With regard to the objective of the study which sought to assess the effectiveness of integrative and adaptive water governance systems on water conflicts management, the study concludes that their level of effectiveness in the governance of LVB towards conflict management is very low and lacking. It was further noted that AWG indicators are less effective compared to IWG indicators in the management of water conflicts. However, among all the six indicators of integration, rule of law, stakeholder engagement and participation, adaptability, equity and collaboration assessed in this study, it was equity, adaptability and stakeholder engagement that were found less effective to the management of water conflict in the LVB as compared to other indicators. This also leads to the conclusion that the water conflicts have persisted in the LVB due to the ineffectiveness and poor implementation of integrative and adaptive water governance systems.

COMPETING INTERESTS

The author declares that he has no competing interests.

AUTHORS' CONTRIBUTIONS

The author (NMM) carried out the various aspects of this work, from the design, data collection and analysis to the preparation of the manuscript.

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REFERENCES

Akamani K, Wilson P I. 2011. Toward the adaptive governance of transboundary water resources. *Conservation Letters*, **4**(6): 409-416.

- Akhmouch A, Clavreul D, Glas P. 2017. Introducing the OECD principles on water governance. *Water International*, **1**: 1-8. DOI: 10.1080/02508060.2017.1407561
- Atieno OE. 2014. Environmental Scarcity and Trans-Boundary Conflicts: The Case of Lake Victoria, 1994 – 2011. PhD thesis, Jomo Kenyatta University of Agriculture and Technology, Nairobi.
- AU-IBAR. 2016. Fisheries Management and Development Processes in Lake Victoria - Enhancing Regional Fisheries Management Plan. AU-IBAR Reports, Nairobi.
- AU-IBAR. 2016. Fisheries Management and Development Processes in Lake Victoria - Enhancing Regional Fisheries Management Plan. Nairobi: AU-IBAR Reports
- Bigas H. 2012. The global water crisis: Addressing an urgent security issue. Papers for the Inter-Action Council, 2011–2012. UNU-INWEH: Hamilton, Canada.
- Burnley C, Adriázola P, Comardicea I, Mugisha S, Mushabe N. 2014. Strengthening community roles in aquatic resource governance in Uganda. Program Report. Collaborating for Resilience
- Choudhury E, Islam S. 2015. Nature of Transboundary Water Conflicts: Issues of Complexity and the Enabling Conditions for Negotiated Cooperation. *Journal of Contemporary Water Research & Education*, **155**: 43-52.
- Cookey PE, Darnsawadi R, Ratanachai C. 2016. A conceptual Framework for Assessment of Governance Performance of Lake Basins: Towards Transformation to Adaptive and Integrative Governance, Thailand. *Journal. Water Resource. Hydrology*, **3**(12). DOI: 10.3390/hydrology3010012
- Cookey PE. 2016. Water Governance Performance Assessment of Songkhla Lake Basin, Thailand. PhD thesis, Faculty of Environmental Management, Prince of Songkla University, Hat Yai, Songkhla, Thailand.

- Creswell JW, Clark PVL. 2011. *Designing and Conducting Mixed Methods Research* (2nd edn). Sage Publication: Oaks.
- De Stefano L, Svendsen M, Giordanoc M, Steeld BS, Browne B, Wolff AT. 2014. Water governance benchmarking: Concepts and approach framework as applied to Middle East and North Africa countries. *Water Policy*, **16**: 1121–1139. DOI: 10.2166/wp.2014.305
- Dombrowsky I. 2009. Revisiting the potential for benefit sharing in the management of trans-boundary rivers. *Water Policy*, **11**: 125-140.
- Earle A, Neal MJ. 2017. *Inclusive Transboundary Water Governance*. SIWI Africa Regional Centre, Stockholm International Water Institute (SIWI): Pretoria.
- Fenemor A, Neilan D, Allen W, Rusell S. 2011. Integrated catchment management: interweaving social process and science knowledge. *New Zealand Journal of Marine and Freshwater Research*, **45**(3): 313-331.
- Green O. O, Cosens B. A, Garmestani A. S. 2013. Resilience in transboundary water governance: The Okavango River Basin. *Ecology and Society* 18(2). DOI: 10.5751/ES-05453-180223
- GWP-EAC. 2015. Strategy and Guidelines for Integrating Climate Change Adaptation Approaches in Trans-boundary Ecosystem Management in East Africa. Retrieved from cmsdata.iucn.org/downloads.
- GWP-EAC. 2015. Strategy and Guidelines for Integrating Climate Change Adaptation Approaches in Trans-boundary Ecosystem Management in East Africa. (PDF file). Retrieved from cmsdata.iucn.org/downloads.
- Iza, A, Stein R. 2009. *RULE – Reforming Water Governance*. Gland: IUCN.
- Jacobsen M, Webster M, Vairavamoorthy K. 2013. *The Future of Water in African Cities: Why Waste Water?* The World Bank: Washington, DC.
- Jagerskog A. 2013. *Transboundary Water Management – Why it is Important and why it Needs to be Developed in Free Flow: Reaching Water Security through Cooperation*. UNESCO Publishing: Paris.
- Lalika MCS, Meirea P, Ngaga YM. 2015. Exploring watershed conservation and water governance along Pangani River Basin, Tanzania. *Land Use Policy*, **2**(2). DOI: 10.1016/j.landusepol.2015.06.010
- Lalika MCS, Meirea P, Ngaga YM. 2015. Exploring watershed conservation and water governance along Pangani River Basin, Tanzania. *Land Use Policy*, **2**(2). DOI: 10.1016/j.landusepol.2015.06.010
- LVBC. 2007. *Regional Transboundary Diagnostic Analysis (RTDA) of Lake Victoria Basin*. Lake Victoria Basin Commission Publication: Kisumu.
- LVBC. 2011. *Lake Victoria Basin Commission Strategic Plan (2011-2016)*. Lake Victoria Basin Commission: Kisumu.
- LVBC. 2015. *Population, Health and Environment (PHE) Operational Plan for Lake Victoria Basin (2015-2020)*. Lake Victoria Basin Commission: Kisumu.
- Mabikke S. 2014. Improving Land and Water Governance in Uganda: The Role of Institutions in Securing Land and Water Rights in Lake Victoria Basin. PhD thesis, Technische Universität München.
- Megdal SB, Eden S, Shamir E. 2017. Water Governance, Stakeholder Engagement, and Sustainable Water Resources Management. *Water* 2017, **9**: 190. DOI: 10.3390/w9030190. www.mdpi.com/journal/water
- Moore ML. 2013. Perspectives of complexity in water governance: Local experiences of global trends. *Water Alternatives*, **6**(3): 487-505.
- Munia H, Guillaume JHA, Mirumachi N, Porkka M, Wada Y, Kummu M. 2016. Water stress in global transboundary river Basins: Significance of upstream water use on downstream stress. *Environ. Res. Lett.*, **11**: 014002. DOI: 10.1088/1748-9326/11/1/014002
- Mwiturubani DA. 2010. Climate change and access to water resources in Lake Victoria Basin. In *Climate Change and Natural Resources Conflicts in Africa*, AD Mwiturubani, Jo, A Van Wyk (ed). Institute for Security Studies: Pretoria.

- OECD. 2015. *Water Resources Allocation: Shared Water, Shared Risks*. OECD Publishing: Paris.
- Ogello EO, Obiero K, Munguti JM. 2013. Lake Victoria and the common property debate: Is the tragedy of the commons a threat to its future? *Lakes, Reservoirs and Ponds*, **7**(2): 101–126.
- Okurut OO, Weggoro CN. 2011. *Lake Victoria Basin: A New Frontier for Development of East Africa*. Twaweza Communications Ltd: Nairobi.
- Paisley RK, Henshawn WT. 2013. Transboundary governance of the Nile River Basin: Past, present and future. *Environmental Development*, **7**: 59-71. DOI: <http://dx.doi.org/10.1016/j.envdev.2013.05.003>
- Rojas GA, Iza A. 2011. *Governance of Shared Waters: Legal and Institutional Issues*. Gland: IUCN, Retrieved from <http://www.iucn.org/knowledge/publications/doc/8629>
- Sadoff C, Greiber T, Smith M, Bergkamp G. 2008. *Share: Managing water across boundaries*, Gland: IUCN. Retrieved from <http://data.iucn.org/dbtw-wpd/edocs/2008-016.pdf>
- Sadoff C, Grey D. 2002. Beyond the river: The benefits of cooperation on international rivers. *Water Policy*, **4**: 389–403. DOI: 10.1016/S1366-7017(02)00035-1
- Sadoff CW, Whittington D, Grey D. 2002. *Africa's International Rivers – An Economic Perspective*. World Bank: Washington, DC.
- Sadoff CW, Grey D. 2005. Cooperation on International Rivers: A Continuum for Securing and Sharing Benefits. *Water International*, **30**(4): 420–427.
- Saha P. 2008. Government e-Service Delivery: Identification of Success Factors from Citizens' Perspective. PhD Thesis, Luleå University of Technology.
- Saunders M, Lewis P, Thornhill A. 2009. *Research Methods for Business Students* (5th edn). FT Prentice Hall: London.
- Strauss A, Corbin J. 1990. *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. Sage: Newbury Park.
- UNECA. 2016. *Enhancing Water Resources Management through Inclusive Green Economy: The Case of Lake Victoria Basin*. ECA Publishing and Distribution Unit: Addis Ababa.
- UNECE. 2015. *Policy Guidance Note on the Benefits of Transboundary Water Cooperation Identification*. Assessment and Communication Geneva: Switzerland
- UNESCO. 2013. *Free Flow: Reaching Water Security through Cooperation*. UNESCO Publishing: Paris.
- UN-Water. 2013. *Water Security and the Global Water Agenda*. A UN-Water Analytical Brief-UNU-INWEH.
- Vasquez JA. 2017. Integrated water resources management: from a complexity theory perspective. *Ecology and the Environment*, **216**. DOI: 10.2495/wsl70011
- Were AN, Isabirye M, Poesen J, Maertens M, Deckers J, Mathijs E. 2013. Decentralized Governance of Wetland Resources in the Lake Victoria Basin of Uganda: *Natural Resources*, **4**: 55-64. DOI: doi.org/10.4236/nr.2013.41006
- Were EM. 2016. Conflict of Interest in Exploitation and Utilization of Transboundary Natural Resources on Lake Victoria. *Journal of African Conflicts and Peace Studies*: **3**(1). DOI: <http://dx.doi.org/10.5038/2325-484X.3.1.1078>
- World Bank. 2013. *Water Resources Management: Sector results profile*. <http://www.worldbank.org/en/results/2018/07/10>.