

**INFLUENCE OF INTEGRATED WATER RESOURCE  
MANAGEMENT APPROACH ON THE CONSERVATION OF  
LAKE VICTORIA, RACHUONYO-NORTH, HOMABAY  
COUNTY, KENYA**

**Mumma E.A Opiyo.\***

**Lilyane Togogo.\***

---

**Abstract**

Water is a vital natural resource throughout the world, a source of life, the backbone of growth and prosperity. Only 3% of the world's water is fresh water and Lake Victoria is the second largest fresh water Lake in the world. It is estimated that more than three billion people worldwide will be suffering from water stress by 2050 according to a UNEP report 2008. Lake Victoria is crucial to the livelihoods of many people in Rachuonyo North Sub-County who have been prone to water shortages since 1980s. The situation is worsened by inadequate and divergent sectoral policies and legislation. Despite the investments made in the water sector by governments, non-governmental organizations, bilateral and multilateral agencies and the private sector, water shortages have persisted. Therefore the research will be based in Lake Victoria in Rachuonyo North, Homa bay County, Kenya. The objective of the research was to assess the challenges involved in implementing integrated water resource management approach in the conservation of Lake Victoria. Data was analyzed with help of SPSS version 20 and presented in graphs, charts, and tables. From the data presented, IWRM approach did not influence the conservation of water resources in Lake Victoria Rachuonyo North Homa-bay County because of major challenges still being faced in the conservation of water resources in Lake Victoria like the lack of technical know-how in water resource conservation, different policies and poor funding among other challenges. The study recommends that stakeholders need to engage more closely with each other and with community members, advocacy training and awareness need to be taken more seriously and government officials need to be more present on the ground to ensure implementation and monitoring of the IWRM approach for its success.

**Keywords:** Integrated water resource management approach, Conservation of Lake Victoria, Cross Sectoral Integration Ecological sustainability.

---

\* M.A Dev. Studies Catholic University of Eastern Africa

## Introduction

It is estimated that more than a billion people cannot get safe drinking water and over three billion will be suffering from water stress by 2050 according to a UNEP report 2008. Water crisis is deepening and intensifying and key trends can be bent towards sustainable management of water resources which depend on many interacting trends. Real solutions require an integrated approach to water resource management and while much has been achieved, today's water crisis is widespread, continuing current policies for managing water will only widen and deepen that crisis (Cosgrove & Rijsberman, 2014). With the world over populated, the current generations are looking for any available means of getting livelihoods. Population growth, rapid urbanisation and industrialisation, and climate change all put water under increasing stress. 'There is water crisis today, but the crisis is not about having too little water to satisfy our needs, it is a crisis of managing water that billions of people and the environment suffer badly' (World water vision report 1996). In the world, only 3 percent of fresh water exists and Lake Victoria is the second largest freshwater body in the world.

Water resource issues cannot be addressed in isolation of forest destruction, ecosystems, population growth and demand for land, sustainable livelihoods and depletion of water towers as key factors. While the IWRM approach offers a unique opportunity to sustainably manage and conserve water, public education and awareness on the benefits of water conservation is still low. In the public sector, water activities are split among several ministries and departments at the national level and this fragmentation of responsibilities among sectoral ministries and administrative agencies hinders coordination and impedes attempts to integrate water management activities.

## Challenges to Implementation

Integrated water resource management is proposed to create a clearer link between human and ecosystem requirements and the interactions between them, and to also manage people's activities in a manner that promotes sustainable development. The cross-sector approach advocated by IWRM creates significant challenges that need to be met including, ambiguous boundaries, complex links and multiple stakeholder conflict (Medema, 2008) agrees that IWRM provides a holistic framework to combine the contributions of users, planners, and policy makers but is not holistic as it considers water to be very important. He however warns that managing all

resources and activities in an integrated and holistic manner would seem to be a recipe for large, unmanageable, and counterproductive governance systems. The aim should not be to institutionally integrate the management of multiple resources but, to create collaboration, cooperation and coordination between the existing institutions. The author is worried that the concept of IWRM has not structurally demonstrated its ability to increase the sustainability of water resources management because of lack of empirical evidence which is either missing or poorly reported. The article brings out how IWRM considers relationships and dynamic interactions between human, water systems, key stakeholder agencies and its interconnectedness on different scales and levels that makes it very complex to translate this integrated approach into practice. In my opinion, we must not, however, fall into the trap of thinking that a lack of extensive evidence for success is indicative of failure. This approach shows the importance of integrated water resources management and helps to manage and develop water resources in a sustainable and balanced way, taking account of social, economic and environmental interests. The authors also show us the efforts that have been made in trying to address the multi-faceted nature of water management, with many countries now introducing an integrated approach to water resources management. Water is vital because it supports productive activities. Insufficient water or prolonged drought can result in widespread death and economic decline.

Nyangeri & Nyanchaga, (2011) outline that the challenges that have been faced are because of lack of effective water resources management practices which are not simultaneously supported by purposeful management of the underlying water resource base. The authors note that the role of the Ministry of Water and Irrigation in developing a co-ordinated approach to water resources management across all the relevant sectors and communities is important because, a co-ordinated approach can lead to effective, efficient and equitable water resources management. They point out that one major challenge is the lack of capacity building among institutional staff who do not accept the integrated nature of managing water resources and the lack of inter-sectoral collaboration and coordination.

In their article Dickson, Pearl, Gang, Kahinju, & Wandibba (2004), show that water resource offers ecological, social and economic benefits. They also discovered that these water ecosystems were experiencing environmental problems such as dumping of solid waste, over abstraction of water, wetland agriculture etc. After the pilot, a follow-up series of public awareness and education campaigns to sensitize the local communities on the importance of the

two ecosystems helped change attitudes and perceptions. They recommended that future conservation and management efforts can achieve more with well-informed stakeholders. Public education and awareness of the benefits of water conservation, adoption of wetland user-friendly alternatives offer a unique opportunity to sustainably manage and conserve water. The authors in this article must be applauded for realizing the importance of awareness as well as working with other stakeholders in ensuring sustainability in conserving water sources. They only came short of telling the beneficiaries the importance of engaging various stakeholders and the linkages between water and other pillars for future ecological balance and sustainability. The beneficiaries need to be aware that water is interlinked to other sectors.

### **Research Method (10pt)**

According to Kothari (1990), a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. The different research designs include exploratory, descriptive and experimental. The research used descriptive design defined by Mugenda, Mugenda and Kombo, (2005) as a way of describing the status of affairs as it exists. This design was relevant to this study because the research sought to know the challenges faced in the use of integrated water management approach in conserving Lake Victoria. The research was conducted in Rachuonyo North Sub County, Homa-Bay County Kenya.

The study population was 375 according to the (Lake Victoria fisheries survey, National report 2014). The target population consisted of 210 participants drawn from beach management units. According (Kothari, 1990) a sample size refers to the number of items to be selected from the universe to constitute a sample. Krejcie & Morgan 1970 recommends a sample size table to compute the sample; based on that, the sample size was 210 BMU members for a population of 375. For the sample to be representative, the sample method used probability sampling for key informants to get the main unit of analysis. These sampling techniques were applied because Rachuonyo north is extensive in coverage. In some instances, the most practical way of sampling is to select every *n*th item on a list. An element of randomness was introduced into this kind of sampling by using random numbers to pick up the unit with which to start. This gave every item of the population inclusion. From the sampling frame of 35 BMU's and from a list of each BMU

the 3<sup>rd</sup> item was picked from the membership list to get the required target population of 210 participants. The instruments used

The questionnaires were divided into two sections including socio demographic information, section two focused on the challenges faced by all stakeholders in the implementation of integrated water management approach. The questionnaire was cheap and covered a wider and more representative sample. Data collection guides were developed and data translated. Research assistant (RA's) were recruited trained and involved in the collection of data. The RA's went through mock interviews and pre-testing of all the data collection instruments. Data tools were piloted. To ensure good quality data, DQA was done consistently. Questionnaires had a detailed, clear and logical flow to ensure quality and on point data. To ensure that the procedures met the required set standards, the researcher provided overall supervision and got other supervisors to help supervise the process. Qualitative data was collected by the researcher using open unstructured guides for instruction. The researcher wrote letters to the KIs prior to inform them of the scheduled interviews.

Quantitative and qualitative data was analyzed separately. qualitative data was analyzed and data summarized according to thematic areas to identify and draw patterns along perceptions and opinions. In analyzing quantitative data, the data was cleaned and exported to excel. SPSS version 20 was used for further data analysis. SPSS was used to run general frequencies and use that to get descriptive statistics. According to Mvumbi (2015), research requires a dependable measurement which is reliable and consistent. Reliability is a measure of precision and the rigor of the methodology, if the design and methodology are systematic and representative then it can be said to be reliable. In this study, pilot testing was conducted to detect any deficiencies and effectiveness of the data collection tools. Validation was used to measure the tests accuracy using internal validity and external validity from other studies to compare and triangulate, to cross reference and cross check the instruments of research i.e. questionnaire. Face validity is the application of subjective assessment of whether your test measures what it is supposed to measure.

### **Respondents' demographic characteristics by sex**

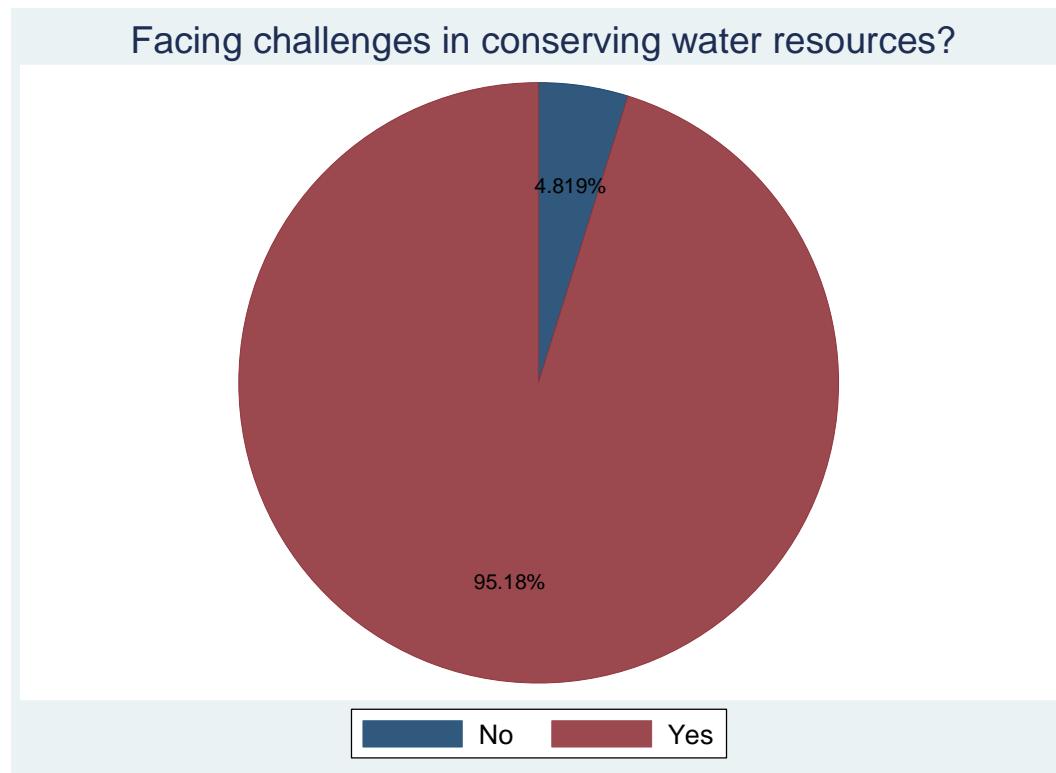
Table 1 shows the demographic distribution of the respondents sampled and surveyed.

There were more male respondents than the females, 76.44% and 23.56% respectively. Only 3 male respondents were older than 70 years; no female respondent was above 70 years. A majority 46 % of the respondents were married; 93.84% among the males, 91.11 among the females. 66.44% of the female respondents did not study beyond primary school, 31.51% had

	<b>Male, n=146 (76.44)</b>	<b>Female, n=45 (23.56)</b>	<b>Total, n=191</b>
<b>Demographics</b>			
<b>Age in years</b>			
18 to 30	<b>44 (30.14)</b>	<b>12 (26.67)</b>	<b>56 (29.32)</b>
31 to 50	<b>80 (54.79)</b>	<b>26 (57.78)</b>	<b>106 (55.50)</b>
51 to 70	<b>19 (13.01)</b>	<b>7 (15.56)</b>	<b>26 (13.61)</b>
Above 70	<b>3 (2.05)</b>	<b>0 (0.00)</b>	<b>3 (1.57)</b>
<b>Marital Status</b>			
Married	<b>137 (93.84)</b>	<b>41 (91.11)</b>	<b>178 (93.19)</b>
Single	<b>9 (6.16)</b>	<b>4 (8.89)</b>	<b>13 (6.81)</b>
<b>Level of Education</b>			
Primary	<b>97 (66.44)</b>	<b>32 (71.11)</b>	<b>129 (67.54)</b>
Secondary	<b>46 (31.51)</b>	<b>10 (22.22)</b>	<b>56 (29.32)</b>

secondary school education and only 2.05% had tertiary education. Among the male respondents 71.11% had primary education, 22.22% had secondary education whereas only 6.67% had tertiary education. Overall, two thirds (67.54%) of the respondents had primary education, 29.32% secondary and 3.14% tertiary education.

Challenges in Implementationexperienced in the implementation of integrated water resource management approach in the conservation of Lake Victoria in Rachuonyo North Homa-bay County.Figure 1.1 shows the proportion of respondents with or without challenges in conserving the water resources in Lake Victoria.

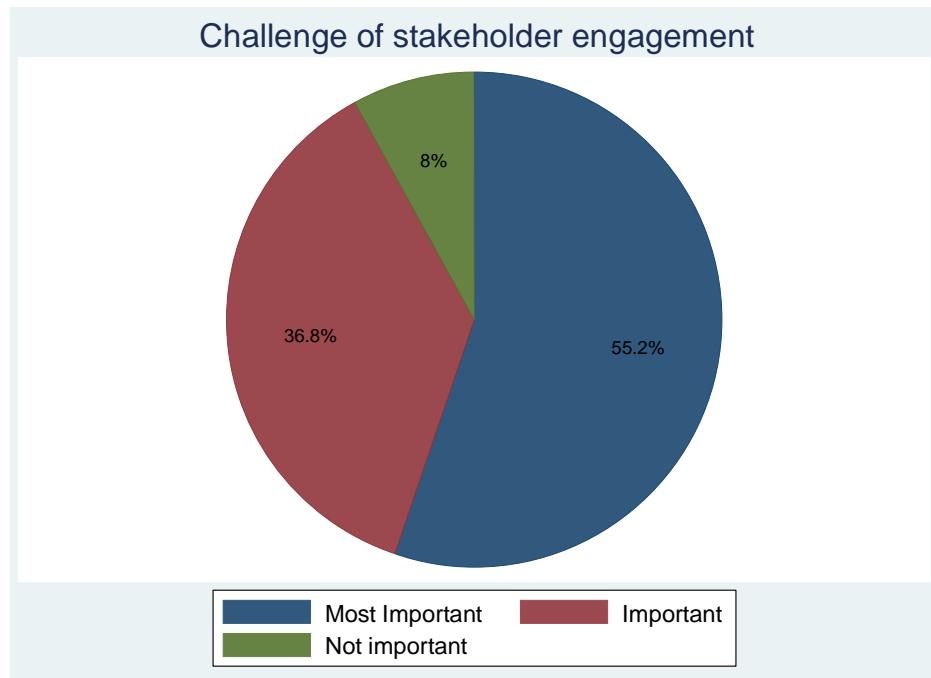


Majority of the respondents (95.18%) reported that they faced challenges in conserving water resources in Lake Victoria. Only 4.82% respondents reported they do not face challenges in water conservation in Lake Victoria.

### **Challenge with stakeholder engagement**

Figure 1.2 shows how the respondents thought that stakeholder engagement in conservation of water resources in Lake Victoria was a challenge.

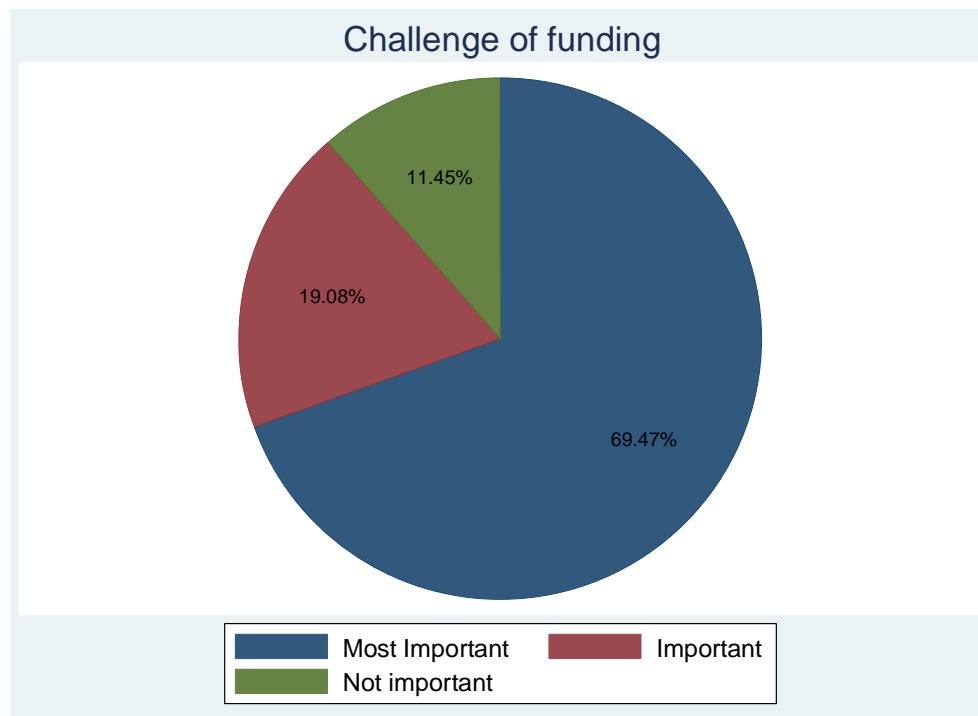
Challenge with stakeholder engagement, Figure 1.2 shows how the respondents thought that stakeholder engagement in conservation of water resources in Lake Victoria was a challenge.



(55.2%) of the respondents said lack of stakeholder involvement was the most important challenge. (36.8%) of the respondents thought of it as important whereas only (8%) of the respondents thought of stakeholder engagement as not an important challenge.

### **Challenge of funding**

Figure 1.3 shows funding of water conservation activities as a challenge to conservation of water resources in Lake Victoria.

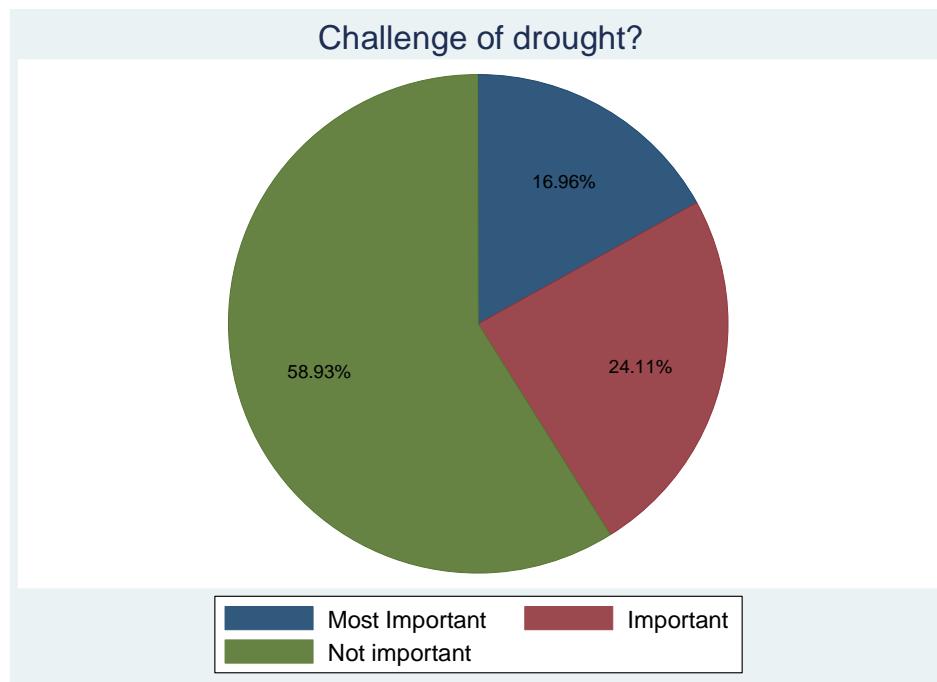


From the chart in figure 1.3, (69.47%) of the respondents said that funding was the most important challenge; (19.08%) of the respondents saw it as important and 11.45% saw this as not an important challenge.

Figure 1.4 below shows the respondents reacted to the importance of technical know-how as a challenge to water resources conservation in Lake Victoria.

### **Challenge of drought**

Figure 1.6 shows the distribution of the respondent's thoughts about the challenge of drought in the conservation of the water resources in Lake Victoria.



From figure 1.6, we find that (58.93%) of the clients, reported that drought was not an important challenge in the conservation of water resources in Lake Victoria. Only 16.96% of the respondents said that drought was the most important challenge in conservation of water resources, whereas (24.11%) said that drought was an important challenge.

Other challenges faced in the conservation of water resources included negative attitude and behavior of the community, lack of cooperation by community, corruption and poor enforcement of the law, ignorance and poverty, diverse culture, fishermen use poison in catching fish and presence of hyacinth and hippopotamus in the lake. Reasons for experiencing these challenges included Lack of government support, Lack of community support, Lack of funding or inadequate funding, No enforcement of laws, Poverty in the community, Lack of skills.

The researcher then sought to find out the most common way used by community to address the challenges faced in conservation of water resources in Lake Victoria.

Figure below shows the common ways used by the BMUs to address the challenges experienced in the conservation of water resources in Lake Victoria.

## Interpretation of Results

95% of the respondents agreed that they were facing challenges in conserving water resources in the Lake Victoria Rachuonyo North. The most common challenge faced by the respondents was the lack of technical knowhow at 86.96% followed by lack of funding, drought, diverse and different policies at and lack of stakeholder engagement. Other challenges in the conservation of water resources in Lake Victoria included poor attitude and behavior of community members towards water conservation activities in the Lake Victoria, corruption by government officials who did not enforce the law as they should e.g. not apprehending fishermen for the use of poison that risks water conservation in Lake Victoria, poverty was a barrier to water conservation because the community members were not able to comply to set rules because they had to make shortcuts to survive i.e. farming along the riparian areas, using poison to fish and recurrence of hyacinth as supported by Nyangeri & Nyanchaga, (2011) who outlines that a co-ordinated approach can lead to effective, efficient and equitable water resources management. They point out that a major challenge is the lack of capacity building among institutional staffs who do not accept the integrated nature of managing water resources and the lack of Inter-sectoral collaboration and coordination.

The most common ways the BMU's used in addressing the above challenges were; awareness creation at 72%, engaging many stakeholders, giving alternative sources of water, sourcing for funds and construction of sanitary facilities i.e. bathrooms, toilets and waste disposal places to improve the conservation of water in Lake Victoria. Recommendations from the respondents on the conservation of water resources in Lake Victoria included the provision and use of alternative sources of water, involving more stakeholders, eradicating hyacinth and the cooperation and working together of upstream and downstream users.

## Conclusion

The data presented therefore behooves us to look to take a more critical look at the IWRM approach as an integrated approach that if given time and effort by stakeholders would help improve the conservation of water resources because of the complex relationship involved in conserving water resources in Lake Victoria. The data also shows that the use of IWRM approach still faces a myriad of challenges in its implementation and for the future success of the IWRM approach, stakeholders need to engage more closely and especially with the community, engage in advocacy training and awareness which need to be taken more seriously and government officials need to be more present on the ground to ensure implementation and monitoring of the IWRM approach is successfully achieved.

The study therefore recommends that the Homa- bay devolution government should properly plan for water conservation activities at the Rachuonyo sub-county and allocate adequate funding for water conservation activities with the relevant public departments having their offices on the ground so that their presence is more felt and coordination and planning is easier e.g. WARMA, NEMA offices need to exist on the ground.

The study also recommends that the government of Kenya needs to prioritize water conservation as one of the key components of development in line with other priority areas like wildlife conservation because water is a vital resource, this could be done through government officials being retrained on the use of IWRM approach and its importance and they should also be facilitated to implement and monitor the IWRM approach on the ground, these efforts would greatly improve water conservation in Lake Victoria.

The study also recommends for the government needs to deal decisively with the impact of hyacinth because it is affecting the quality and quantity of water resources in the Lake Victoria.

## References

- [1] Adams, W. M. Science. *Biodiversity conservation and the eradication of poverty*, 1146-1149. (2004).
- [2] Atieno, O. A. Poverty and food security. *In the Geo Journal*, 311-331. (2008).
- [3] Authority, W. R. *Strengthening regulations for sustainable water resources management in Kenya*. Nairobi. (March 2015).
- [4] Balirwa, J. S. *The Lake Victoria environment: its fisheries and wetlands—a review. Wetlands Ecology and Management*. Nairobi. (1995).
- [5] Board, L. V. *Lake Victoria South Water Services Board Strategic plan*. Nairobi: Real One concepts. (2014).
- [6] Brown, K. The geographical journal. *Innovations for conservation and development.* , 6-17.(2002)
- [7] Brown, K. Frontiers in Ecology and the Environment. *Integrating conservation and development: a case of institutional misfit*, 479-487.(2003)
- [8] Charles Twseigye, S. O. The impact of land use activities on vegetarian cover and water quality in the Lake Victoria watershed. *The open Environmental engineering journal*, 66-77.(March 29,2011)
- [9] Cosgrove, W. J. (2014). *World water vision: making water everybody's business*. New York: Routledge.
- [10] Dickson, D. B., Pearl, F. B., Gang, G.-Y., Kahinju, S., & Wandibba, S. (Site reconnaissance in the Kipsing and Tol River watersheds of Central Kenya: *Implications for Middle and Later Stone Age land-use patterns*, 153-191.(2004)
- [11] Duda, A. M.-A. Addressing the global water and environment crises through integrated approaches to the management of land, water and ecological resources. *Water International*, 25(1), 115-126.(2000)
- [12] Dudgeon, D. A. Freshwater biodiversity: importance, threats, status and conservation challenges. *Biological reviews*, 81(02), 163-182.(2006)
- [13] EAC STRATEGIC REPORT. *Integrated Population, Health and Environment Strategic plan. 2016-2021*. Nairobi Kenya: EAC STRATEGIC REPORT. (March 2015)

- [14] Folke, C. e. (2002). Resilience and sustainable development: building adaptive capacity in a world of transformations. *AMBIO: A journal of the human environment* 31.5: 437-440, 437-440. (2002)
- [15] Government of Kenya, G. (2014). *THE WATER BILL 2014*. NAIROBI: KENYA GAZETTE.(2014)
- [16] Geheb, K. 'Fishing Farmers 'or 'Farming Fishermen'? The Quest for Household Income And Nutritional Security On The Kenyan Shores Of Lake Victoria. Nairobi: Adrican affairs.(1997)
- [17] Giulia Robozi, L. B. Emerging Zoonoses: The one health approach. *Safety and health at work, Occupational safety and health research institute*, 30-56. (March 8 2012).