

Dryland Water Resource Conservation and Conflict Management in Loisukut Sub-Catchment in Laikipia North Sub-Country Kenya

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Abstract:

This study examines access to water, use and management of water resources and conflicts in the Loisukut sub-catchment in Laikipia North Sub-Country. Additionally, the study provides information on grassroots initiatives that seek to improve and ensure equitable management of water resources by establishing connections with significant stakeholders. The study is supported by information acquired through the distribution of a questionnaire to various stakeholders, water users' groups, and communities. The study's conclusions indicate a relationship between water availability, consumption, and management that has a significant impact on water conflicts. The discrepancies in access to water are due to ineffective water management initiatives. The study recommends watershed conservation and diversifying pastoralists' economic opportunities will have positive effects on the environment, economy and society.

Keywords: Access to equitable water, use and management of water resources, conflict resolutions.

INTRODUCTION

Water is the lifeblood of our planet and is an essential resource required for human societies for sustaining life and livelihoods, “yet due to increasing inhumane human activities in pursuit of materialism and individual gains, water once everywhere has become an issue of nowhere” (Dorji, 2023). The availability of water on Earth is finite, and with the enormous expansion in global population and growing demand for scarce resources, “the world is confronting a significant challenge for ensuring water security” today (Nayak, 2017). Additionally, the use and management of water resources were impacted directly and indirectly by natural and human-induced phenomena like droughts, wildfires, floods, climate change, and changes in sociocultural and institutional structures; as a result, “the world faces enormous challenges in meeting human and ecological needs for adequate and clean water” (Mumma et al., 2011).

Water scarcity is a major problem for most of the African countries and are classified as ‘water stressed’, based on their per capita water availability, scarcity, accessibility and affordability (Karuaihe et al., 2014). Currently, Kenya's use of water for domestic consumption and exporting goods is roughly in balance with global water use (Mekonnen and Hoekstra, 2021). However, “water is scarce in Kenya and puts high pressure on natural resources, particularly rangeland and water resources in the more densely populated pastoralist and cultivated areas” (Musyima, 2016). Further, poor livestock management practices of

pastoralists coupled with unsustainable use of forest resources have resulted in “deterioration of significant tracts of productive land and scarce water resources in several regions of Kenya” (Lesrima et al., 2021).

The semi-arid Laikipia Country in Kenya has limited water resources and diverse water users are urban dwellers, smallholders, commercial farmers, and pastoralists (Indakwa and Wamba, 2021). The Loisukut sub-catchment in Laikipia North Sub-County is a vital water resource zone supporting different ecological, agricultural, and socioeconomic activities despite being located in a dry region. The sub-catchment experiences water scarcity, pollution, and poor water management techniques like other parts of Kenya. Additionally, the flora in the sub-catchment is badly depleted as a result of overstocking and wildlife, particularly elephants, have further degraded the vegetation through tree-felling (Forum, 2014). In order to address the water scarcity glitches, Loisukut Water Resources Users Association (WRUA)¹ was founded in 2008 to promote sustainable water resource management, and in recent years, policy initiatives such as an increase in water use efficiency at the user level and a river basin management plan have been initiated.

STUDY OBJECTIVES

The main objective of the study is to assess how people access, use, and manage water resources and conflicts in the Loisukut sub-catchment of the Laikipia North Sub-County. The specific objectives are to:

- Analyze how people access, use, and manage water resources; and
- Assess the presence and trends of water-related conflicts and their effects on water users.

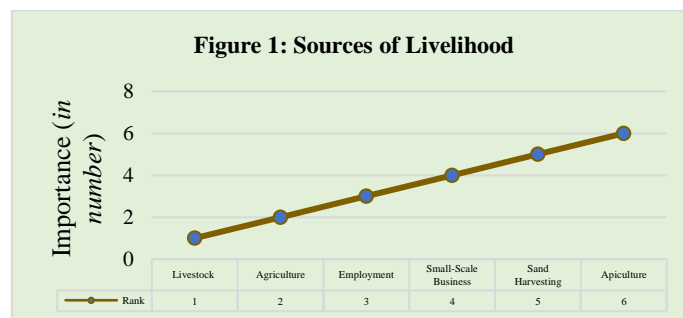
METHODOLOGY

The study used quantitative and qualitative methodologies, collecting primary data through in-person interviews while also doing a desk analysis of secondary information from earlier studies and papers. The author assembled all the data with assistance from staff members working at the SNV corporate office in Nanyuki, Kenya. Key Informant Interviews (KII) and Focused Group Discussions (FGD) were used to gather information from the Laikipia North Commissioner, Chairpersons of the Loisukut WRUA, Borehole Group, San Dam Group, Twara Women Group, and Dodol Water Company.

The primary data were obtained during a field trip to the Loisukut sub-catchment in Laikipia North sub-county in July 2023. The data was recorded, clustered, grouped, summarized, and analysed with SPSS, Microsoft Excel, and Microsoft Word 2010 versions, and is presented descriptively and graphically.

RESULTS AND DISCUSSION

Households Main Source of Livelihood

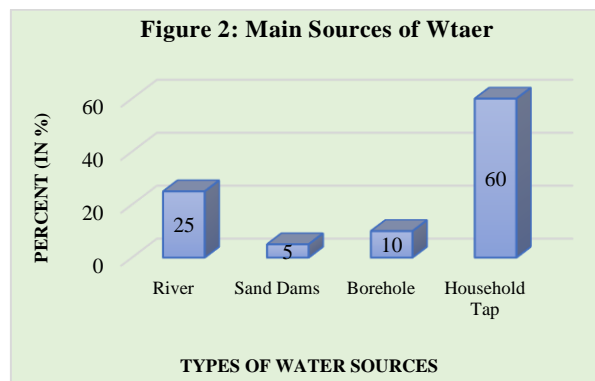


¹ WRUA, a community-based natural resource management institution and are most local participatory currently managing the water resources in Kenya.

The Loisukut sub-catchment falls in ASAL² is located within a conservancy area and open communal land, and has a population of 40,000, the majority of whom are pastoralists (KNBS, 2022). The sub-catchment has a very low population density of 14 per kilometer square, and the community raises a considerable quantity of indigenous breed of cattle.

Figure 1 shows that livestock is the most important source of livelihood, followed by small-scale agriculture, employment, and small business establishments. On a subsistence level, the communities also engaged in other occupations such as sand harvesting and apiculture. However, the majority of the household's source of livelihood significantly reliant on the availability of water supplies.

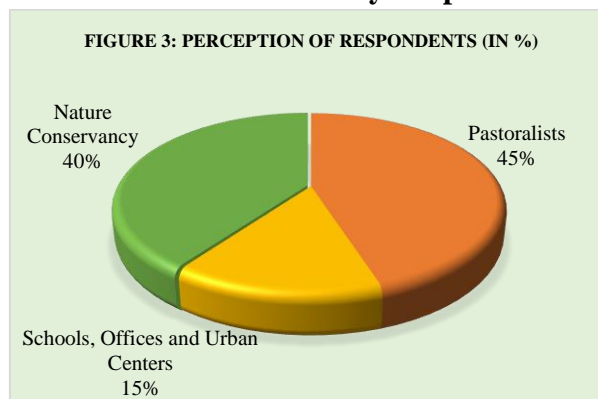
Main Sources of Water



The sub-catchment receives an average annual rainfall of 400mm, is a water-stressed region, and while there are few perennial streams, the River Loisukut, formerly known as the Sinyai River, flows around 93 kilometers and is the sub-catchment's main source of water (Lesrima, 2019).

According to the findings, around 60% of the households relied on water from household taps connected to water reservoirs, followed by 25% from perennial rivers, 10% from boreholes, and 5% from sand dams built in strategic locations, as shown in **Figure 2**. However, residents endured severe water shortages for both drinking and domestic purposes during the dry seasons.

Major Consumers of Water Resources as Perceived by Respondents

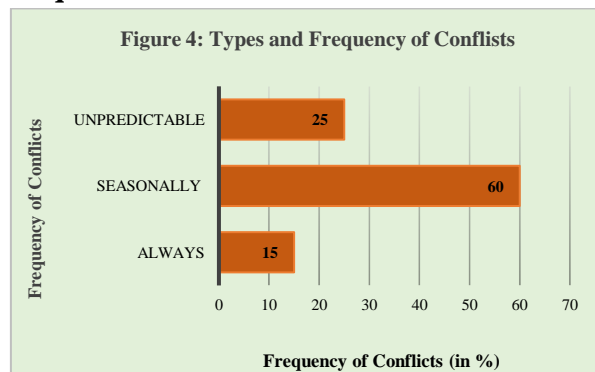


The study shows that there are only three major consumers of water resources in the study area. Furthermore, results in **Figure 3** indicates that pastoralists and nature conservancy are perceived as the

² Arid and Semi-Arid Lands (ASALs) occupy over 80% of the country's landmass and is home to about 36% of the population in Kenya as of July 3, 2023.

major consumers of water resources by 45% and 40% of respondents, respectively. Only 15% of respondents consider schools, offices, and urban centers to be water users. The study established that pastoralists and nature conservancy are the biggest competitors for the utilization of finite water resources. The study also discovered that water usages are related with home, animal, and agricultural purposes; however, water demand is depending on livelihood demands in different locations.

Frequency of Conflicts over Equal Access to Water and Conflict Resolutions



According to the study's findings, conflicts over equal access to water resources are very common. **Figure 4 shows** that 60% of respondents believe conflicts occur seasonally, 25% believe conflict is unpredictable, and 15% believe conflict occurs all the time.

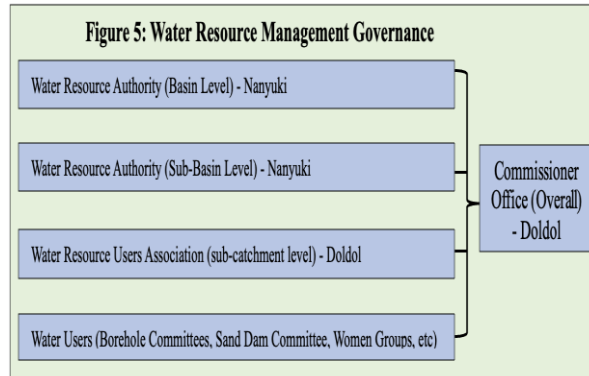
The findings revealed a consistent growth in water-related conflicts within the study area over the years. Conflicts are becoming more common as a result of reduced river flows and erratic rainfall caused by climate change, increased water demand due to economic expansion and population growth, and low trust between users. According to the respondents, water conflicts cause stress, hatred, verbal arguments, fighting, and the loss of property and even human life.

The Assistant Commissioner of the Laikipia North Sub-Country Office stated that “conflict over water resources is a daily reality between human-to-human and human-to-wildlife, and prompt resolution of conflict is critical as it impacts social, economic, and environmental cohesion”. The study established that Commissioner's Office plays an important role in conflict resolution, holding frequent community meetings and resolving problems by emphasizing the value of equal resource sharing and social harmony in society. Further, at the grassroots level, the WRUA aids quick conflict settlement among water users, ensuring equitable and sustainable water to the users.

Management of Water Resources and Initiatives of WRUA

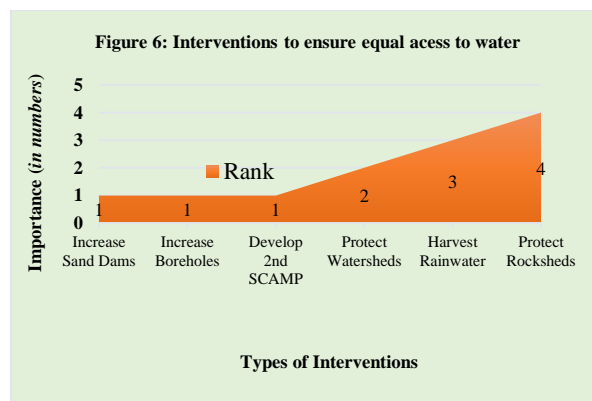
The assumption is that “if the Water Resource Management System performs well, water resources will be shared in an equitable and sustainable manner: without conflicts, pollution, water resource degradation, or unacceptable water-related dangers”. Similarly, water resource management is highly valued and prioritized in sub-catchments. The Commissioner's Office plays an important role in the management of water resources in the sub-catchment, and the WRUA plays an important role at the grassroots in encouraging community participation during decision-making processes and facilitating water resource management to ensure equitable and sustainable access to water resources (Kiteme et al., 2008).

Figure 5 depicts the water resources management governance in the study area. Water Resource Authority (WRA), a state corporation with its headquarters in Nanyuki, has the authority on behalf of the National Government to protect the right to clean water by ensuring proper regulation of water resource management and use in order to ensure sufficient water for everyone now and in the future.



Similarly, in collaboration with government agencies, non-governmental organizations, and water users in the sub-catchment, the WRUA plays a critical role in coordinating water resources management activities such as the development of a Sub-Catchment Management Plan (SCAMP), efficient water use, and rainwater harvesting to minimize waste and optimize water availability. Furthermore, the study found that WRUA encourages community participation by allowing its 210 members to voice their concerns and contribute to decision-making processes, facilitates conflict resolution among water users, improves water infrastructures such as sand dams, boreholes, and tanks to increase water availability during dry seasons, and conducts regular monitoring and sensitization on the negative effects of spraying pesticides/chemicals on cattle and dumping solid waste.

Strategies to Ensure Equal Access to Water Resources



Water is the lifeline and a crucial resource for the residents of the Loisukut sub-catchment to support life and livelihoods. As a result, promising solutions for guaranteeing fair and long-term access to water resources are critical.

The results in **Figure 6** reveal that increasing Sand-dams, Boreholes, and developing the 2nd SCAMP are the best method and ranked as the top intervention priority for guaranteeing equal access to water, followed by watershed protection. It is noticed that respondents do not regard rainwater harvesting at household level and rock-shed conservation to be key priority strategies, which could be related to a lack of information and awareness about the importance of rainwater collecting and rock-shed protection.

Challenges of Water Resource Management in Loisukut Sub-Catchment

The Loisukut sub-catchment faces a number of issues in terms of sustainable water resource management. According to the findings in **Table 1**, there are three key water-related challenges that have increased water scarcity, impaired water quality, and hampered socioeconomic development, social harmony, and the coexistence of humans and wildlife in the sub-catchment. The Chairperson of Loisukut WRUA stated, “we are interested in diversifying into other economic activities that have a lower impact on the degradation of the environment and water resources, but feasible options are limited, and it remains a fact that I am a nobody without cows”. According to the WRUA Chairperson's statement and respondents' perspectives, overgrazing by pastoralists is a severe issue that exacerbates other issues such as catchment degradation, water scarcity, and stifles socioeconomic development in the sub-catchment.

Table 1: Challenges, Cause and Impacts to Water Resource Management.

Challenges	Causes	Impacts
Catchment Degradation	-Overgrazing by pastoralists. -Huge area allocated for conservancy park.	Drying of water resources and conflict over water allocation for humans, livestock, agriculture and wildlife.
Water Shortage	-Drying of rivers and streams. -Reduced rainfall and severe droughts. -Lack of water harvesting and storages.	Inadequate water leading to water theft, conflicts and destruction of water facilities (tanks) and threats to human life by elephants.
Water Pollution	-Solid waste/sewage from Doldol town. -Open Defecation and spraying chemicals/pesticides to cattle.	Decline of water quality and contamination of water sources resulting to outbreak of waterborne diseases and pose risks to human health.

CONCLUSION AND RECOMMENDATIONS

Achieving universal access to adequate and clean water is becoming more challenging as natural and human-induced events and climate change exacerbates water insecurity (Hamlet et al., 2020). The study concluded that conflicts are associated with water resource access, usage, and management. The study established that WRUA has addressed difficulties linked to water scarcity, pollution, and disputes through various programs, resulting in enhanced water availability, better planning, and community engagement. However, the study concludes that inequalities in water access are caused by a lack of funding for implementing the SCAMP, a lack of maintenance of water infrastructures such as boreholes, sand dams, and tanks, catchment degradation due to overgrazing, and a lack of diversification of viable economic activities for pastoralists in the sub catchment. The study's findings suggest that promoting watershed conservation and diversifying pastoralist economic activities will result in beneficial environmental, economic, and social cohesion in the study area.

The following are recommendations for possible improvement and ensuring equitable and sustainable management of water resources and conflicts:

The study found that pastoralists predominate in the study area, and that overgrazing is a major concern in large expanses of watersheds, productive land, and restricted water supplies. Planting native tree

species, protecting rock-sheds, and promoting viable economic activities like ecotourism/wildlife tourism, small-scale enterprises, and upscale conservation agriculture will safeguard watersheds and promote recovery of degraded areas.

The study area falls in a water-stressed zone, and water scarcity is causing human-to-human and human-to-wildlife disputes over water use. The introduction of efficient water-saving technology and rainwater harvesting will encourage a reduction in the significant reliance on rivers for water sources and disputes. Furthermore, support for additional water infrastructure such as boreholes and sand dams in strategic locations, will provide a sense of security and mitigate risks during dry seasons, and capacity building on potential livelihoods will result in system change from a pastoralist nomadic to a semi-nomadic system by relying on a mix of pastoralism and other livelihoods.

The study found a reduction in water quality as a result of pollution caused by open dumping of solid waste/sewage from Doldol town, open defecation, and spraying chemicals/pesticides on livestock, resulting in an increase in outbreaks of waterborne diseases and dangers to human health in the study area. Water management authorities should enforce the rules and regulations to water users, and water users' adherence to the rules and regulations would preserve the water resources from contamination.

The study observed an increase in the growth of invasive **Opuntia** (prickly pear cactus) and frequent water-related disputes in the study area. More research on invasive Opuntia management and productive utilization, as well as the quantities of available water resources, is required to provide information on equitable and sustainable water access, and a reduction of competition and water disputes.

LIMITATIONS

Understanding study limits and their potential consequences on data and conclusions is essential for gaining a deeper understanding of the problems being addressed. As a result, the following are the anticipated limitations of this study:

- There is very limited secondary information about the dryland water resource conservation and conflict management in Loisukut sub-catchment; thus, the information acquired through this study may not be sufficient to produce representative results.
- Information can be biased since the findings and observations are made solely based on the responses of respondents.
- The study was initiated within a short duration, and the information may not be accurate and complete.

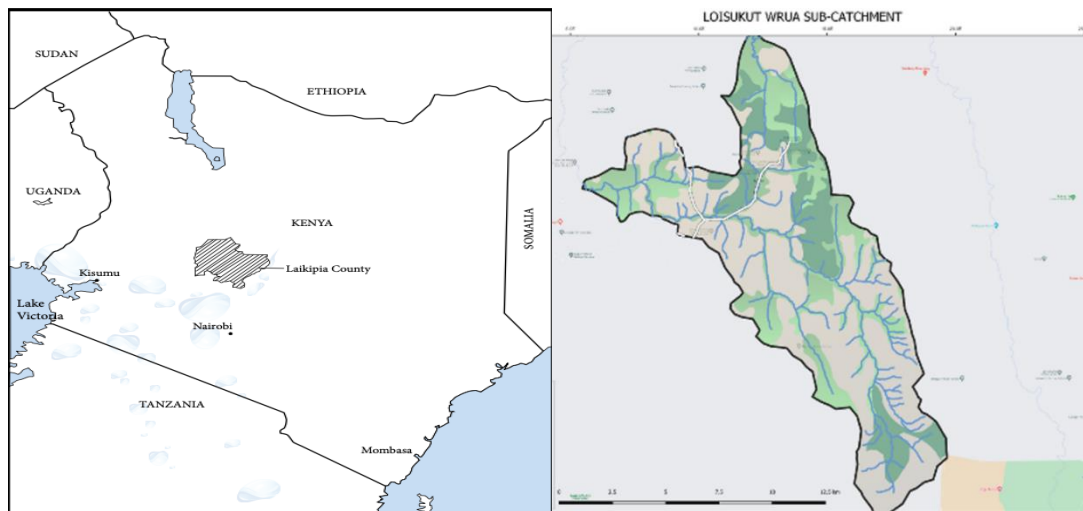


Figure 7: Maps of Study Area

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