

## **SPRING CONSERVATION MEASURES ON WATER RESOURCES PROTECTION IN KENYA: A CASE OF SPRING CONSERVATION PROJECTS IN KERICHO COUNTY**

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## **ABSTRACT**

Springs are the most significant source of water for most of the people in Kenya. Over the years there is evidence of drying up of springs and reduction of volumes of water flowing downstream, making it hard for the people to access this crucial commodity. This mostly affects women and the vulnerable groups within the society. Climate change, land-use and forest cover reduction, are the leading causes of the drying up of springs. Kericho County has witnessed a significant reduction of volumes of water flowing in the springs occasioning the need for initiatives geared towards spring revival, protection and rehabilitation. This study was purposed to ascertain the spring conservation measures on water resources protection in Kericho County. The objectives of this study were; to determine the effectiveness of fencing in water conservation and examining the effectiveness of spring water drainage in the protection of water resources. This research was underpinned on Himalayan Environmental degradation theory and the Hydrological Circle model and adopted a descriptive survey research approach. This study targeted 96 spring Committee members and 9 Officers from the Environment and Water Department in Kericho County making the total population of 105. Since the total population was manageable a census of all respondents was conducted. The data was obtained using a structured questionnaire.

The data collected was analyzed with the SPSS version 26. The analyzed data were displayed in frequency tables, pie chart and bar graphs. All the measures showed a significant effect on water resources protection. The Correlation Coefficient (r) indicated that fencing had a positive 0.55 relationship with water protection and Digging Drainage Ditches indicated a positive relationship of 0.45. The study concluded that the spring conservation measures are critical for safeguarding water resources in Kericho County. Fencing and digging drainage ditches are all effective strategies for enhancing the quality availability and sustainability of water resources in the springs. Each of the above measures contributes in unique ways to protection of the scarce water resources, with fencing preventing access that can lead to pollution, drainage ditches managing runoff and soil erosion, and tree planting supporting the natural hydrological cycle by improving water retention. Further, keen reckoning ought to be made to curtail human activities in and around the springs as engaging in such activities is detrimental to water protection since human activities conversely related to water resources protection.

**Keywords:** Spring Conservation Measures and Water Resources Protection.

## **INTRODUCTION**

The world is faced with the problem of climate change which has led to a serious impact

on the existence of beings on earth. With climate change taking course, cases of global warming, reduction of water resources and drying up of rivers is being witnessed across the globe. Kenya being part of the global community is not left out in this problem. This calls for serious adjustments and need to put in place measures to mitigate the adverse effects it has caused.

Human life revolves around water and any meaningful effort made towards enhancing it is a boost to human life. According to Were *et al.*, (2006), supply of fresh and clean water is regarded as a basic human need and a crucial input in economic production. To prevent human and animal conflict, water should form the basis of social, economic and ecological discourse (Martius *et al.*, 2009). Tambe *et al.*, (2010) asserts that, it's the responsibility of all sensitive governments worldwide to secure water resources. Rechkemmer *et al.*, (2016) opines that though the importance of water has been largely acknowledged, the supply of this resource to the local and vulnerable communities in the villages has not been actualized and is still one of the world's biggest environmental challenges.

Despite the scarcity of water resources across the globe, water catchment areas including the springs lie in ruins as there is uncontrolled access to the water points. This has resulted to massive destruction of water points as a result of human and animal activities such as charcoal burning and planting of eucalyptus and feral animals accessing the water catchment areas. These activities contribute to a bigger extent to the reduction of the water resources available for use by both humans and animals. Studies done before have tried to address this issue elsewhere in the globe however in Kericho County no such studies have been carried out to come up with findings to deal with the problem conclusively.

Kenya is categorized as one of the countries with less endowment of natural waters as compared to most of her neighbours such as Uganda and Rwanda which are richly endowed with natural springs and adequate forest cover. The issue of the management of water resources is also a key contributor towards diminishing water resources as there are less elaborate regulations controlling the usage of water and the protection of the natural springs, water towers and not forgetting to mention effects of human activities such as the planting of eucalyptus in and around the springs and failure to put in place measure to curb soil erosion and the illegal felling of indigenous trees (Republic of Kenya, 2004).

The rampant population upsurge in the country and the quest for land for habitation and farming has led rural communities to clear up existing forests around the springs within Kericho County. This has resulted in the shrinking of water volumes in the springs within Kericho County. This further resulted to strife among the rural communities as well as human and animal conflict which in turn lead to the loss of fauna (Animals) which are the pride of our republic and the chief foreign exchange earner and also the flora as a result of destruction of rare species of trees as a result of felling and charcoal burning. According

to De Sherbinin and Reudenberger (1998), the population growth is considered a major demographic trend affecting water resources.

In Kenya, there is physical evidence that rivers have been shrinking. Kericho County has not been left out despite priding itself as a green county in the sun. The effects of the human activities like charcoal burning and clearing of trees to pave way for human settlement and farming are being felt as there is a notable reduction of water resources in the springs and the rivers. Further, the water available in the streams are not of good quality and not fit for use by human beings since such water resources are ferried using donkeys, buckets and motor circles by most of the rural dwellers. The reduction of the water available in the springs within Kericho County has spiraled down to affect the volumes of water flowing in the banks of giant rivers within Kericho County due to the intricate and complex interrelationship between the water flowing out of the springs and silting its way to the rivers downstream. Prior to the clearing of forests for active planting of tea bushes in the multinationals within of Kericho and for settlement in the rural parts of Kericho County, such rivers as Chemosit and Kipsonoi were once gushing with water bursting their banks and bounds but the circumstances have changed as the volumes downstream have reduced significantly and is even worse during the dry seasons where visible rocks and sand that could not be seen in yester years are at present very visible. At the moment, the volumes in those rivers does not reflect the true meaning given to the two rivers; Chemosit meaning giant and Kipsonoi relating to the Kalenjin allegory of the once giant river that was impossible to cross to the other side due to its bounds till the ritual of giving beads to the river symbolically to have it shrink was performed. Despite the above knowledge and the urgency of actions to correct this situation, most springs in Kericho County were left unprotected and human activities such as cultivation around the rivers, deforestation and charcoal burning was being carried out uncontrolled.

Peck (2020) evaluated the efficacy of fencing to manage animals' effect on conservation of Artesian Spring wetland communities of Currawinya National Park in Australia. The study noted that there are challenges when it comes to the management of the wetlands due to the unregulated access that people and animals have. The findings from such study were insightful to spring conservation projects in Kericho County as crucial lessons and experiences from the same guided in drawing conclusions towards conserving the reducing volumes of water in the springs under conservation.

Sarkar (2018) did a study in Kohar village, Alwar District in India and noted that the District received very little yet saline water. It led to lack of sufficient water for domestic use as well as for agricultural purposes. This led to massive migration out of the said region. However, the concept of digging ditches created a new hope to the people-based on the study. Backed up with the findings of such study, the problem that was ailing the Conservation of springs within Kericho County was addressed effectively and additionally further findings of this study enabled the formulation of locally led initiatives geared towards conserving the water catchment areas as well as increasing the volumes in the water sources.

Alvarez-Garreton, Lara, Boisier, and Galleguillos (2019) evaluated how Chile's water supply was affected by both native forests and forest plantations. The study discovered that replacing native forests with alien or plantation woods, such eucalyptus or pine trees, lowers water quality and depletes water supplies. On the other side, especially during the dry season, larger tracts of forest plantings have been linked to decreased stream flow. The high evapotranspiration rates of exotic forest plantings, which are significantly greater than those of the native forest cover, might help to explain these findings. In Kericho County, the multinational companies as well as local communities have cleared huge tracks of land to pave way for the cultivation of exotic trees to fuel its factories and for commercial purposes the result being the massive loss of water both in the springs and down the streams within Kericho County.

With the above information and the quest for informative discourse geared towards addressing this challenge, this study drew the attention of all the stakeholders including KEWASCO Company limited, the department of water and environment, civil society groups and community-based organizations enjoined in the Kericho county spring conservation Committees established to oversee the rolling out of conservation projects funded by world bank through Flocca initiative. It is on the positive note that the County Government of Kericho prioritized to have all the springs within Kericho County protected. This was done in phases with keen reckoning being priority given to the adversely degraded springs. Additionally, the funding from World Bank through the Flocca initiative was aimed at adopting the locally led initiatives to protect the water resources as well as conserving the environment. These locally led initiatives were aimed at enjoining the community in decision making around the area of conservation as well as to have their buy in so as not to render such projects white elephant. Theories postulated by various scholars point to a situation in future that could be worse if deliberate efforts were not put in place. Case in point is the Himalayan environmental degradation theory which illustrates how the multi-action interaction of human activities led to the destruction of water bodies in that society. This project drew a lot of lessons from this theory while conducting research on the spring conservation projects within Kericho County. Further, the Hydrological circle theory postulates that all the water resources undergo a circular flow and no water resource is lost save for impermeable places thus deliberate efforts need to be undertaken to see to it that water resources are not lost. The Departments of Water and Lands in Kericho jointly hatched an ambitious plan to map out all the riparian zones and water catchment areas and allocated resources to fence them off as well as planting indigenous trees and providing piped water at source. The major areas of focus were the arid and semiarid parts of Soin- Sigowet and some parts of Kipkelion. The residents of Kericho County used different public participation fora to voice their need to have all the water points and springs protected and indigenous trees to replace the eucalyptus which were arguably the major cause of diminishing water resources.

Affirmatively the County Government of Kericho through the County Assembly of Kericho, Committee on water and environment came come up with an Act geared

towards putting in place deliberate measures and regulations to map out all the water catchment areas as well as clearly spelling out stern actions on them that violates the provisions of the Act, Similarly the County Executive Committee Member in Charge of water and environment came up with a clear policy framework which after operationalization provided for the protection of all springs within Kericho County and the subsequent fencing of water catchment areas and the provision of indigenous seedlings being planted on the wetlands and riparian zones thus guaranteeing water resources at present and in future (Kericho County, 2023).

### **Statement of the Problem**

The conservation of water resources remain a daunting task for many governments globally. The availability of tapped water for most rural homes remains a mirage and wishful thinking especially for developing countries, Kenya included. Kericho County is largely made up of rural sub counties with majority of the residents depended on springs as sources of their water for animal and domestic use. Consequently, the conservation of the springs and water resources to enhance availability, safety and even quality remains an unaccomplished task for the department(s) responsible for the same. The volume of the water from these springs continue to drop and fall below expectations for most homes. Furthermore, the danger of pollution and pressure from numerous human activities prevent water systems and resources from providing fundamental services to the fast expanding population (Mwangi *et al.*, 2015). Karuku (2018) found that soil management activities are valuable in the management and conservation of water sources. Ochungo *et al.*, (2019) found that the pollution of water sources from various human actions through dumping at the water sources, affected water quality. Rotich, Hashim, Chege and Nyambura (2020) studied the effects of Radon on underground water.

Despite the above knowledge, little had been done by those tasked with managing the water resources in Kericho County. Evidently there were a lot of gaps which had not been addressed to guarantee water resources protection.

Weldemichel and Lein (2019) conducted studies on the importance of fencing as a means of conserving the Mara and came up with worthwhile findings, the gap in here is that that no similar study had been conducted in Kericho County and this was a perfect opportunity for such study to be conducted in Kericho County and its findings used to improve on water resources protection.

Additionally, Alvarez-Garretón, Lara, Boiser and Galleguillos (2019) did a study on the impacts of indigenous forest on water resources protection in Chile and came up with findings that helped in the conservation of water resources in Chile. However, the same had not been conducted in Kericho County which has a number of indigenous forest and tress and a study of this nature being carried out in this area aimed at establishing solutions towards water resources protection was of great importance in the exercise of conserving spring water resources within Kericho County.

Owuor et al (2018) conducted a study of land use conversion from forests to farms which

is contextual in nature as it focuses on degradation of environment while our study majorly focused on conservation with the aim of improving water resources through adopting various forms of conservation measures within Kericho County.

The conservation measure will take the centre stage in this study away from the conventional land conversion only but this study differently delved more into the conservation strategies.

Further, Ekhuemelo, amonum, Usman (2016) conducted a study on importance of trees in protecting water resources but their findings dwelled on trees only while the current study explored various forms of conservation geared towards protecting the water resources within Kericho county.

The above-mentioned studies have various gaps that have been identified. However, from the above, there was little knowledge on the effectiveness of the water conservation strategies being employed by Kericho County Government and thus the justification that necessitated this research.

### **Objectives of the study**

This covers the objectives that this study endeavored to achieve.

The study objectives were to;

- i. Determine the effectiveness of fencing in water conservation.
- ii. Examine the effectiveness of spring water drainage in the protection of water resources.

## **LITERATURE REVIEW**

This section examined various theoretical foundations together with the empirical literature and a conceptual framework.

### **Theoretical Framework**

#### **Himalayan Environmental Degradation Theory**

The Himalayan environmental degradation theory is an eight-point star theory explaining the complex interrelationships between social and economic factors that lead to environmental degradation. This theory is important as it guide this research towards sticking to the path of spring conservation being guided by the postulates of the theory that with themyriad interrelationship it is possible for economic factors such as increased demand for timber will result in increased logging. Also, Social factors such as religion or cultural practices can eitherconserve or degrade forest. For in the case of conservation the cultural aspects of shrines and evil forest protect the environment because the community will hold the forest so dear as they representcertain aspects of their religion whereas if the community doesn't regard forest and water towers as sacred places, they will effortlessly degrade the forests through engaging in the day-to-day human activities which will bring them in close interaction with the forests (Ives, 1987).



### **Hydrological Circle Model**

This model postulates that the flow or circulation of water in the ecosystem is cyclical in nature and assumed that no water is lost in the circle. The flow is deemed to be closed and that the movement of water between and the atmosphere is equal. There is a natural circulation of water between the rivers, oceans and seas and the land in that case. Evaporation leads to the flow of water to the atmosphere however precipitation through cooling condenses the water and is returned to the land which is then soaked and water is channeled back to the rivers for the circle to continue. It is believed that rains increase precipitation which is a precursor for flooding and increased volumes of water. Within this closed system devoid of human activities, precipitation is equal to evaporation. However, human activities such as irrigation farming, mining irrigation and construction causes imbalance in the circulation (Chen, Chen, Ju & Geng, 2005). For example, the cutting down of trees or deforestation reduces evapo-transpiration which in turn reduces cloud formation thus leading to low precipitation, further the lack of trees leads to increased river flows when water is not intercepted and stored in the trees for the circle to continue. Also, human activities such as irrigation reduces water flows as ground water is reduced making the water table to go low. In the process of taking the water resources to the next point through pipes and canals, it increases evapo-transpiration as water in canals is exposed. Besides the watered crops increase the transpiration thus removing water from the circle (Chen *et al.*, 2005).

It is significant to note that urbanization as a human activity causes the destruction of natural vegetation to pave way for new buildings and roads. This results in the construction of impermeable surfaces like roads and buildings which reduces seepage and infiltration and on the other hand causing the speed of flow of run-off water to the rivers which can easily lead to floods. The net effect is a reduced water table due to lack of seepage of ground water by the impermeable surfaces thus causing water table to reduce. In a nutshell, human activities like mining and creation of reservoirs increase the evapotranspiration and reduce ground water storage leading to imbalance. This model explicitly explains how the destruction of natural vegetation to pave way for farm lands and settlement reduces the water in circulation (Orth *et al.*, 2015).

It is therefore worth noting that both theories, the Himalayan environmental degradation theory and the hydrological circle model shows how human activities results to the imbalance in nature and reduces water resources available for humanity and wild animals.

### **Empirical Literature Review**

The literature under consideration in this section is thematically organized and each facet is considered separately

### **Fencing Off and Water Resource Protection**

Peck (2020) evaluated the effectiveness of fencing to manage animals' impacts on conservation of Artesian spring wetland communities of Currawinya National Park in



Australia. The study noted that there are challenges when it comes to the management of the wetlands due to the unregulated access that people and animals have. The study was based on the negative effects that the unregulated access has on the wetlands. The study noted that fencing off the wetland has been effective in making sure that there is an effective wetlands protection. With fencing there is total elimination of unregulated access and thus preventing the destruction and over utilization of the wetlands.

Patrick (2018) did a study on adapting to climate change through source water protection: case studies from Alberta and Saskatchewan, Canada. The study found out that the identification of potential threats to water resources and finding effective remedies is a plus to conservation of water resources. The study concluded that community adaptation strategies to reduce negative effects on the drinking water sources included having well developed fencing system.

A study on the sustainable water for rural Ecuadorian communities carried out by Yanerz Martiza (2012) shows how well drained springs with high quality drinking are protected through community efforts and mobilization. The techniques adopted can be in the form of spring box techniques or box techniques both. Further a remote collection site or tanks are built away from the protected area in an elevated position which makes the collection and utilization of the water resource easier. All this effort is geared towards providing clean and sustainable water resources for the Ecuadorians. The Ecuadorian communities mobilize their members to a collective protection exercise in what they term as Mingas and this is an enjoyable community event as well as being social in nature. Their collaborative efforts have seen the Ecuadorians built springs that have lasted for decades supplying them with clean and safe drinking waters.

Edokpayi *et al.* (2018) in their study assessed challenges to sustainable safe drinking water among the rural communities in Limpopo province in South Africa and noted that fencing is the most effective way of providing a buffer zone between a protected area and an interaction with human being or animals. This reduces the chances of contamination from muddy animal wastes which in most cases result in water borne diseases. When the area around the spring is protected it therefore implies that there is less disturbance of the biodiversity in and around the spring leading to growth of nodules and other water enriching minerals in the springs making the quality and volumes of water to improve.

Naiga, Penker and Hogl (2015) did a study on challenges in access ways to water sources in rural Uganda and found out that when a buffer zone is erected it therefore implies that human and animal conflict over the water resource is minimized and thus a peaceful coexistence will ensue. Fencing off the area also provides an ample space for the indigenous tress to grow undisturbed thus making the cover around the spring to grow and thus guaranteeing the sustainability of the springs for generations to come. Fencing also thwarts such efforts as encroachment by the unscrupulous members of the public on the land around the springs. The delineation protects the public lands from land grabbers thus ensuring that the future generation will be able to utilize the land and the springs for

ages.

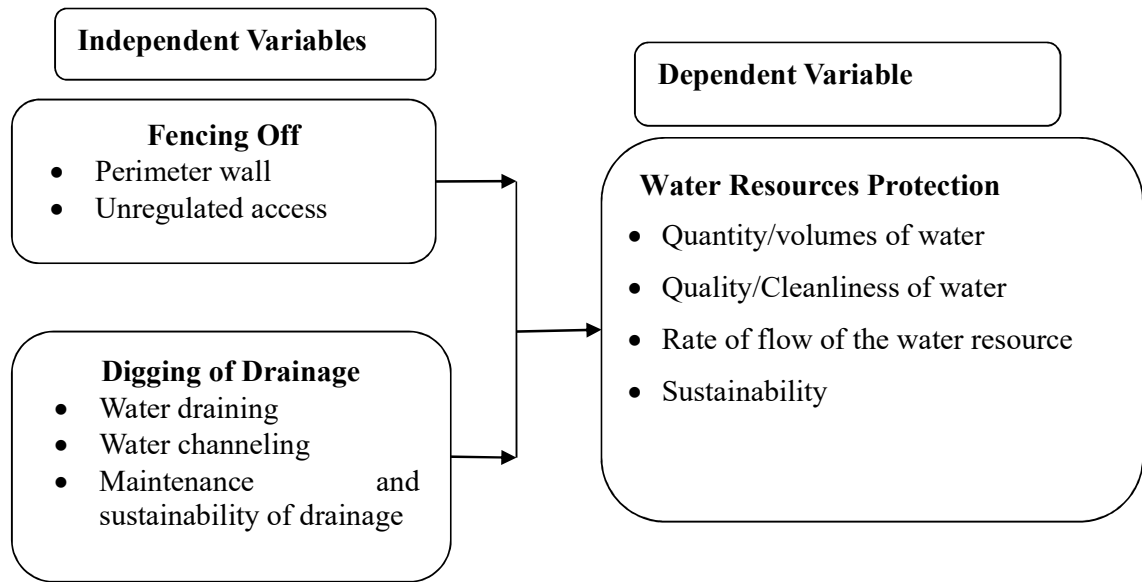
Weldemichel and Lein (2019) did a study on fencing of the Masai Mara national reserve Kenya and found out that though this may seem a dispossession in the name of protection, such acts have ensured that there is an increase in the supply of water as there are no misuses of the scarce water resources that are available.

### **Digging Drainage Ditch and Water Resource Protection**

Sarkar (2018) did a study in Kohar village, Alwar District in India and noted that the district received very little yet saline water. It led to lack of sufficient water for domestic use as well as for agricultural purposes. This led to massive migration out of the said region. However, the concept of digging ditches created a new hope to the people-based on the study. There was a construction of a check dam that was connected to the drainage ditches and thus created an avenue for water supply within the region and at the same time the drainage ditches protect the water source through protecting unregulated interference with the check dam that was built.

Gabriel *et al.* (2018) examined physical and hydrological properties of peat being a concern due to the nature of degradation peatlands were undergoing. The study found out that wood peats drains lots of water than any other wood thus the need to have drainage ditches to manage water resources more effectively thus conserving it. In conclusion, prudent management is necessary for all peatlands and the regions that they drain into drainage ditches, but it is especially important for valley-bottom peatlands that include swamp forest flora. It could be essential to take further steps to improve water delivery. A research on the spatiotemporal dynamics of important ecosystem services in response to Rwanda's agricultural growth was conducted by Rukundo *et al.* (2018). The study discovered that the water output rose from  $2.04 \times 10^9 \text{ m}^3$  in 1990 to  $2.20 \times 10^9 \text{ m}^3$  in 2010 as a result of the building of drainage ditches. The measures so far adopted by the Rwandan government are those that will incorporate farmers know how as well as scientific research to improve water resources. Further, aspects of sustainability ought to be of centre focus with keen eye on managing the demographic aspects of the society in managing water resources.

### Conceptual Framework



### RESEARCH METHODOLOGY

The research utilized the descriptive research design. A survey of all the springs under conservation was carried out across the county to ascertain the true position of the water springs. The research sought a description of “what exists” regarding the water resources conservation strategies within the county (Kothari, 2009). Survey was done by zoning the sub counties based on the rainfall distribution across the year and also by the extent of damage to the water sources.

The research was done in Kericho County. It is approximately 2111 km<sup>2</sup> and neighbors, Kisumu, Bomet, Nakuru, Nyamira, Nandi and Baringo counties. With regard to climate; some parts of Kericho County are semi-arid with uneven rainfall distribution, while the large proportion of the country is overly wet throughout the year. Kericho County comprises of Bureti, Belgut, Ainamoi Soin- Sigowet Kipkelion East and Kipkelion West sub counties. The research area benefits from adequate and well-distributed rainfall, leading to reasonable surface and groundwater resources. The primary rivers traversing the county are the Kipsonoi and Chemosit. Water resource and sanitation management in Kericho County is the responsibility of the Kericho Water and Sanitation Company (KEWASCO), which acts on behalf of the County Government. However, the piped water and sanitation covers the urban centres only while most parts of the country and citizens are served by the many springs for their day to day water provision.

The research targeted to gather data regarding all the water springs under conservation by the County Government of Kericho. The total number of springs that were under the conservation by the Kericho County government were 48 spread out across the 6 sub counties within the county. The study engaged 2 committee members per spring under conservation giving a total of 96 respondents. This was done through purposive sampling with keen reckoning being given to those who could understand the contents under the

Google form, further male and female committee members were chosen so as to get views concerning spring protection from both genders on their experience and understanding on the subject matter of water resources protection through spring conservation. Additionally, the study targeted the officers from the Department of Environment and Water who supervised the projects in each Sub County including the Director, Chief Officer (CO) and the County Executive Committee member (CECM) in charge of the Department of Environment and Water, for the time the research was conducted. Thus the total population was 105. The study conducted a census of all the chosen spring Committee members and the officers from the department of water and environment. A census was considered ideal for this research since the population under research was manageable in size.

The primary data was collected using a structured questionnaire and an interview guide for the 9 officers from the department of Environment and water. The questionnaire was preferred since it generated uniform feedback and responses from large populations (Kothari, 2009). The 96 Spring Committee Members that completed the Google form for the study did so on behalf of the committee members who are currently in charge of overseeing and managing each spring under the conservation strategy. The nine policemen were given the interview guide.

Once the data was received, analysis was done with the help of the Statistical Package for Social Sciences (SPSS). Both qualitative and quantitative statistics were conducted so as to obtain general grouping and feedback from the responses. While the qualitative data was subjected to a theme analysis utilising content analysis, the analysis yielded the means and standard deviations. To determine the regressors and the impact of the independent factors on the dependent variable, a regression analysis was employed.

## **RESEARCH RESULTS AND FINDINGS**

The total number of questionnaires distributed was 105, and 99 were returned fully filled, leading to a response rate of **91%**. Data collected indicated that on gender distribution, 60% of respondents were male, while 40% were female, indicating a slight male dominance in spring conservation roles. Data on education levels indicated that Half of the respondents (50%) had secondary education, while a quarter (25%) had college education, showing a mix of formal education levels in the community. Only 6% had university degrees, which suggests that conservation work often attracts those with less formal education.

### **Effectiveness of Fencing in Water Conservation**

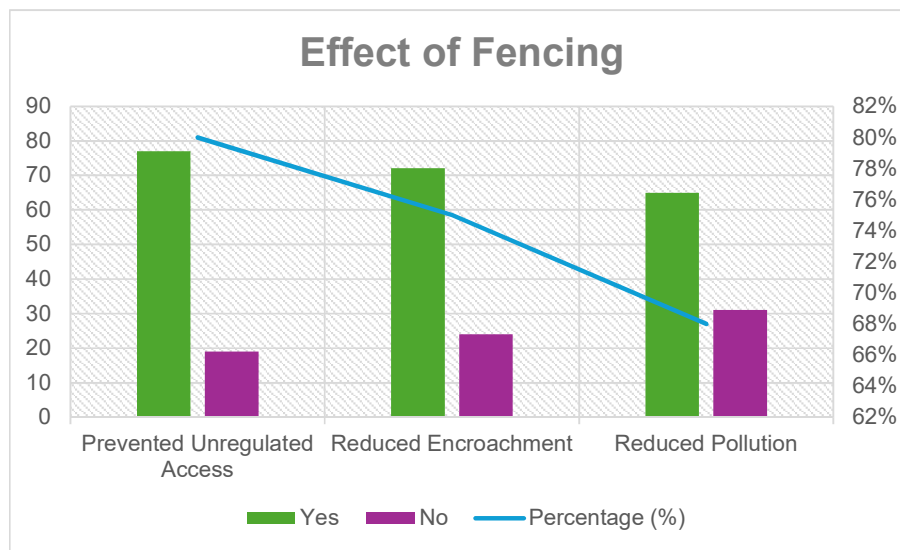
Fencing was highlighted as a critical measure in preventing unregulated access and improving water quality. The analysis examined the participants' views on the effects of fencing on water resources.

**Table 1 effects of Fencing on Spring Conservation**

Effects of Fencing	Yes	No	Percentage (%)
Prevented Unregulated Access	77	19	80%
Reduced Encroachment	72	24	75%
Reduced Pollution	65	31	68%

*Source: Field Data (2025)*

From Table 1, 80% of respondents agreed that fencing prevented unregulated access, while 68% noted a reduction in pollution. Fencing also helped reduce encroachment by humans and animals, as indicated by 75% of respondents.



**Figure 1 Effect of Fencing**

*Source: Field Data (2025)*

The bar graph shows that fencing was particularly effective in controlling access to springs, thereby reducing pollution and human interference.

### Effectiveness of Digging Drainage Ditches

The study explored the effectiveness of digging drainage ditches in managing water flow, pollution and preventing soil erosion.

**Table 2 Effects of Digging Drainage Ditches**

Impact of Drainage Ditches	Yes	No	Percentage (%)
Improved Water Flow	67	29	70%
Reduced Soil Erosion	61	35	65%
Reduced Pollution	56	40	58%

*Source: Field Data (2025)*

As seen in Table 6, 70% of respondents observed improved water flow due to the installation of drainage ditches, while 65% reported a reduction in soil erosion, making this measure effective in conserving water resources.

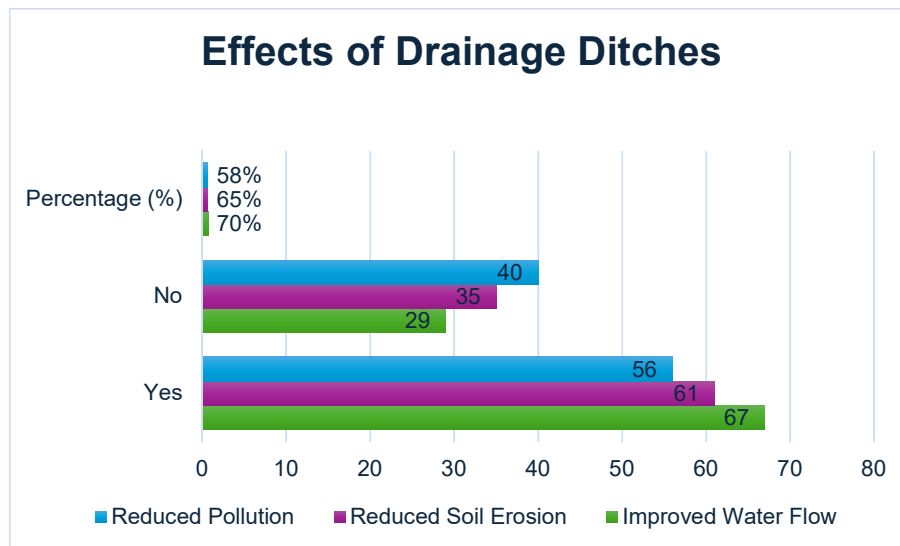


Figure 2 Effects of Draining Ditches

Source: Field Data (2025)

The Bar chart highlights that 70% of participants found drainage ditches effective in improving water flow, reducing erosion and pollution.

### Correlation Analysis

To ascertain the degree of association between the conservation measures and the preservation of water resources, a correlation analysis was performed.

Table 3: Correlation between Conservation Measures and Water Resource Protection

Conservation Measure	Correlation Coefficient (r)
Fencing	0.55
Digging Drainage Ditches	0.45

From Table 3, Fencing showed the highest positive correlation ( $r = 0.55$ ) and the digging of drainage ditches positively correlating at 0.45.

The findings indicate that fencing and digging drainage ditches are effective conservation measures for water resources.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The research findings confirm that spring conservation measures are important for safeguarding water resources in Kericho County. Fencing and digging drainage ditches are all effective strategies for enhancing the quality and availability of water in the

springs. Each of these methods contributes in unique ways, with fencing preventing access that can lead to pollution, drainage ditches managing runoff and soil erosion.

### **Recommendations**

To strengthen the conservation of spring water resources in Kericho County, several recommendations were considered necessary from the study. First, there is need to expand fencing initiatives to protect more springs from unregulated access. Fencing not only reduces human and animal interference but also ensures that the springs remain uncontaminated, allowing for natural recovery and sustained water flow. The County Government should prioritize the fencing of vulnerable springs and educate local communities on the importance of protecting these water sources.

Second, improving drainage management is vital for reducing soil erosion and ensuring that springs maintain their water volume during both wet and dry seasons. The construction of drainage ditches should be expanded to cover more springs, particularly in areas prone to heavy rainfall and runoff. Regular maintenance of these ditches will ensure their effectiveness in directing water flow and preventing pollution.

Community participation remains essential to the success of these conservation measures. Training programs should be implemented to provide local populations with the knowledge and abilities necessary to manage and safeguard water resources, and they should be actively involved in decision-making processes pertaining to water conservation. This will encourage a feeling of accountability and ownership for the conservation initiatives.

Finally, the County Government should develop clear policies that support sustainable water resource management. These policies must align with national and international goals, such as the Sustained Development Goals (SDGs), and ensure that water conservation strategies are integrated into broader environmental management frameworks. Additionally, policy makers should allocate sufficient resources to support the implementation and monitoring of conservation efforts, ensuring their long-term sustainability.

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