

**RESEARCH ARTICLE**

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**Conservation Status of Swamp Wetlands in Uasin Gishu County, Kenya**

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**Abstract**

*Despite their high productivity and provision of many benefits, wetland ecosystems in Kenya are still facing serious threats. In Uasin Gishu County swamp wetlands are under varying degrees of threat because of the rapid human population growth. However, inadequate investigation has been carried out on the integrity of these wetlands even though they benefit the surrounding communities. The aim of the study was to determine the conservation status of selected wetlands in the county. The objectives were to determine the main human activities in and around the swamps and to obtain the local people's perceptions on conservation. A total of 120 informants participated in the study. The Likert Scale Scoring method, observations and informal discussions with community members were used to assess the conservation status of the swamps. The results indicated generally low conservation status of the four swamps studied. The main disturbance events included drainage and reclamation of the swamps for agricultural development, burning, and plant harvesting. Agriculture was rated as the most important use of the wetlands. There were no conservation initiatives in place. There is need to promote indigenous knowledge on conservation through education and awareness programmes with community members living around the wetlands.*

**Key Words:** Uasin Gishu, Conservation, Swamp Wetlands, Likert Scale

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**INTRODUCTION**

Wetlands are fragile and valuable ecosystems supporting diverse species and habitats. They provide many ecological services like groundwater re-charge and discharge, nutrient retention, sediment/toxicant retention, microclimate stabilization and flood control (Kansiime, Saunders and Loiselle, 2007; Kariuki, 2011; Mitsch and Gosselink, 2007). They are also important sources of materials for construction, fuel wood, water, handicrafts, food and medicinal plants (Janousek, 2009; Terer *et al.*, 2012) as well as important reservoirs of carbon, representing about 15% of the terrestrial biosphere carbon pools (Bolin and Sukumar, 2000; Patterson, 1999).

In spite of the crucial functions provided by wetlands to mankind, they are amongst the most endangered ecosystems of the world

(MEMR, 2012). The health of fresh water wetlands is in sharp decline (Grooten, Almond and McLellan, 2012), and half of the world's wetlands have disappeared since the 1990s. Most of them have been converted to other forms of land use or destroyed for commercial development. The majority of the remaining wetlands are under intense pressure from various forms of human disturbance such as settlements and cultivation. Damage to wetlands also results from over-harvesting of wetland resources, polluted discharge from industries and sewage treatment plants, siltation and agricultural runoff.

Rapid human population growth, industrialization and urbanization have largely contributed to loss and unsustainable use of wetlands worldwide (Abila, Rasowo, and Manyala, 2005). In Kenya, anthropogenic

disturbances such as urbanization, conversion into farmland and settlement to cater for the needs of a highly growing population overexploitation, as well as insufficient awareness, unsound management together with inadequate comprehensive legislative framework are rapidly degrading wetlands (Owino and Ryan, 2007; Macharia, Thenya and Ndiritu, 2010; BirdLife International 2009; MEMR, 2010). The above factors have increased the risk of losing wetlands together with their associated traditional uses and practices (Terer *et al.*, 2012). These threats have induced changes that have eroded the ecological and socio-economic values and services derived from wetlands. While most of the damage on wetlands cannot be reversed, it is appreciated that the remaining wetlands can be conserved for the benefit of humankind and biodiversity.

Like many other countries in the world, Kenya has ratified the Ramsar Convention (Mironga, 2005a). However, the convention only protects wetlands of international significance (MEMR, 2012). Wetlands at local levels are perceived as less important because of their small size (Macharia *et al.*, 2010). Their full protection can only be achieved through implementation of management strategies at national or regional levels.

Numerous swamps are among the category of wetlands that have received little attention from environmentalists in Kenya (Njuguna, 1996), including those located in Uasin Gishu County ((Kahuthu, Muchoki and Nyaga, 2005). Few Kenyan swamps are formally protected (Bennun and Njoroge, 1999), and changes in their areas/sizes due to human encroachment over the years are unknown. Previous reports suggest that wetlands, including swamps, have been disappearing at a rate of about 1050 km<sup>2</sup> per year in Kenya (Mironga, 2005 a and b). This has resulted in reduction and loss of habitats and subsequent loss of many useful plants and animals dependent on the wetlands.

Uasin Gishu County has a high population growth rate of 3.8% and this has led to

increased joblessness, soaring demand for essential services along with increased environmental degradation (Kahuthu *et al.*, 2005). Many people have migrated to the county to acquire land thus creating acute pressure on land and this has not spared the wetlands (Kahuthu *et al.*, 2005). Land use activities around swamp wetlands in Uasin Gishu are dominated by crop growing, cattle grazing and settlement. A number of swamps have been reclaimed for crop production and most of the remaining ones are under varying degrees of threat and no measures have yet been taken to protect them (Njuguna, 1996). However, there is paucity and fragmentation of ecological studies on the swamps of Uasin Gishu despite the fact that wetland losses are not easily reversible. Consequently, safeguarding and preservation of the remaining ones is of paramount importance. There is therefore the need for a comprehensive study on the conservation status of swamp wetlands in Uasin Gishu County so that the appropriate management strategies may be implemented.

The main objective of the study was to determine the conservation status of four swamp wetlands in Uasin Gishu County namely Marula, Leseru, Singilai and Chepkongony. More precisely, the objectives of study were (i) to identify the main human activities in and around the swamps (ii) obtain the local people's perceptions on conservation. This would help to suggest management strategies that will ensure continual existence of the swamps.

## MATERIALS AND METHODS

### Study Area

Uasin Gishu County including the sampling sites is illustrated in Figure 1. The County is located between 34°55'33'' and 36°38'58''E and between 0° 2'44''S and 0° 55'56''N (Njuguna, 1996; Odongo, 1996). The total land area of the county is approximately 3218 km<sup>2</sup> and it is mainly agricultural with both large-scale and small-scale farming (GoK, 2002). A total population of approximately 894,179 people inhabits the county (Kahuthu *et al.*, 2005). The mean annual rainfall ranges

between 1100 and 1500 mm, with two peaks in May and August and drier spell from November to February (GoK, 2002). The mean annual temperature is 23°C.

### Methods

Before commencement of the study, permission was sought from local leaders after highlighting the purpose of the study who gave the name of one key informant. The rest of the informants were selected by snow ball sampling technique (Giuliana and Padulosa 2005). A total of 120 informants were selected, 30 from each swamp. They were selected on the criteria of age (not less than 50 years old), and local residency for a period of not less than 30 years.

The conservation status of the swamps was determined based on the attitudinal scales of the selected informants. This was done using the Likert Scale Scoring method (Likert, 1977). A Likert scale with five potential choices and 13 items was used and a numerical value was assigned to each potential choice. The items focused on basic questions concerning the informants' knowledge on the swamps. The informants were asked to rate each item on the response scale and the general level of agreement or disagreement was measured. Each item was rated on a 1 to 5 response scale where 1 = strongly disagree; 2 = disagree; 3 = undecided; 4 = agree; 5 = strongly agree. The sum of rating for all items was the final score for the respondent on the scale. The mean

figure for all the responses was computed at the end of the survey. The final average score represented the overall level of accomplishment or attitude toward the conservation status of the swamps. Differences in the final average score were analyzed using a one way analysis of variance and Duncans Multiples Range Test (DMRT) was used for Post-hoc separation of significant differences (Sokal and Rohlf, 1981). Statistical analysis was performed using Statistical Package for Social Sciences (SPSS 13.1).

For every informant, the Likert scale scores based on the 13 variables had a minimum value of 13 for strongly disagree and maximum possible value of 65 for strongly agree. The average scores were calculated for the 120 informants. Based on the score values, then 13-35 represented low conservation status, 36-46 represented moderate conservation and > 46 represented high conservation status.

Field observations and informal discussions with selected key persons and community members were used to assess conservation initiatives by the local community. Local guides were hired to participate in the discussions and also served as local translators. The discussions were conducted in Kiswahili and Kalenjin languages. Photographs of the study sites were used to add valuable information about the conservation status of the swamp.

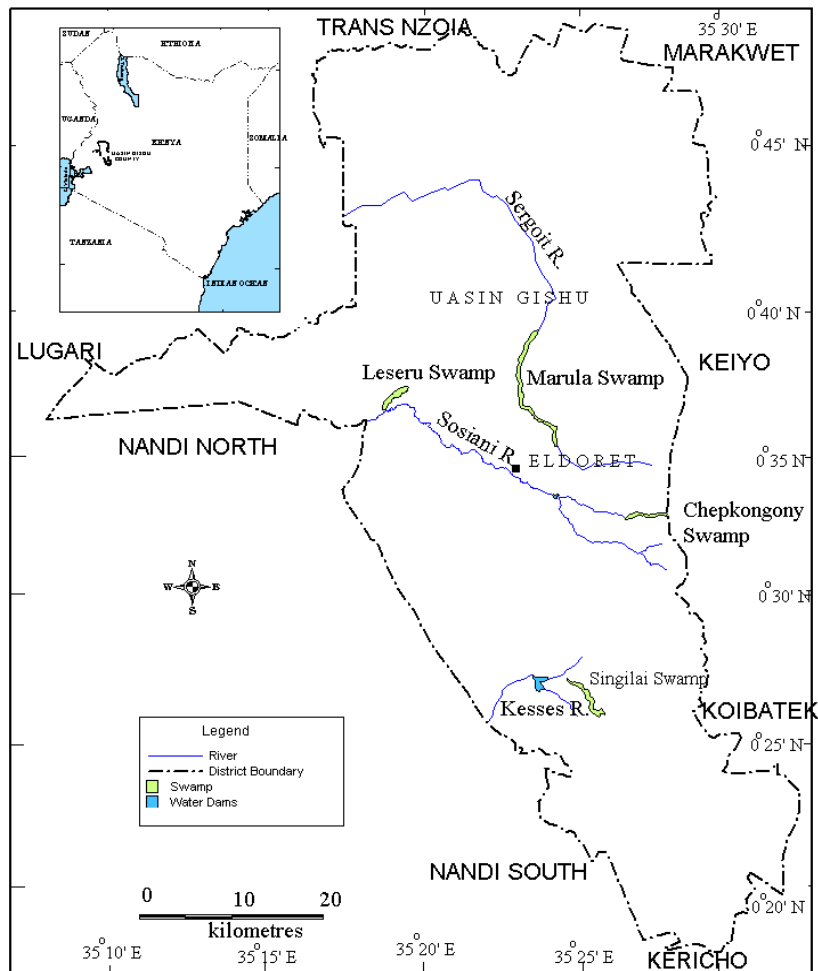


Figure 1. Uasin Gishu County Showing the Study Sites; Inset: Map of Kenya

## RESULTS

The Likert score of each swamp is shown in Figure 2. Marula swamp had the highest score, Chepkongony the lowest while Leseru and Singilai had intermediate scores. For the duration of the study, it was observed that the wetlands were experiencing environmental problems but at varying degrees. Some of the major destructive activities in the swamps included wetland agriculture, encroachment for commercial and residential use, vegetation burning, grazing, harvesting of macrophytes and abstraction of water (Figure 3).

During the informal discussions, the local people reported a decline in size of the swamps over the years. Most of them did not

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know the long term impacts of their activities on the swamps and they were not aware of the ecological services provided by the wetlands. No cultural practices were employed to restore and conserve the wetlands hence resulting to a low conservation status. The local community considered the wetland areas as fertile grounds suitable for cultivation. It was also observed that the need to use swamp resources was driven by the low socioeconomic status of the community. The local councils operating in the study areas were reported to have no interest in conservation and consequently there is lack of concern for the wetland conservation among the local authority workforce.

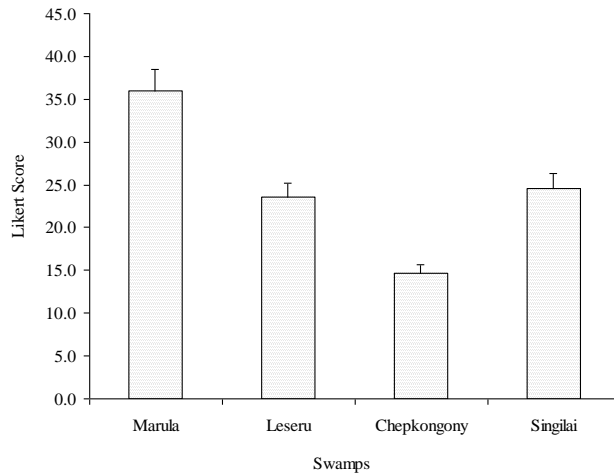


Figure 2. Conservation Status of the Selected Swamps in Uasin Gishu based on the Likert.

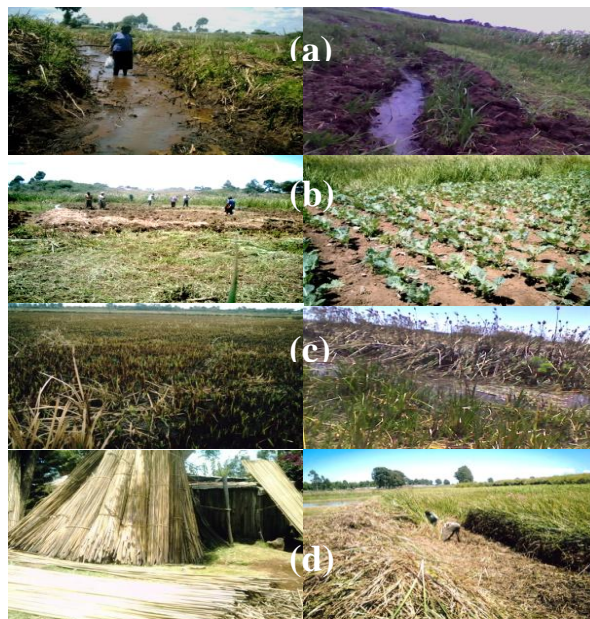


Figure 3. Destructive Activities in the Swamps: (a) Drainage Channels (b) Cultivation (c) Vegetation Burning (d) Harvesting of Vegetation.

**DISCUSSION**

Human pressure and lack of recognition of the importance of wetlands remain a threat to the existences of these valuable ecosystems. Kenya lacks clear policies on utilization of wetlands and this poses a major challenge to their conservation (Abila *et al.*, 2005). Like

most wetlands in Kenya, the wetlands in Uasin Gishu County are important for biodiversity and are also of great socio-economic value to the local community (Odongo, 1996). However, the lack of a proper wetland policy and the fact that these

wetlands are not protected areas makes them very vulnerable ecosystems.

The results of the current study indicate that Marula swamp is the most conserved among the four swamps based on the Likert scores and informal discussions with the respondents in the local community. This could be attributed to the minimal human activities in the swamp area, and partly because of the low population density in most parts of the swamp catchment (Odongo, 1996). Most people living around Marula swamp are engaged in large scale farming of maize and wheat and therefore, pressure to exploit the swamp is lower than in other areas.

Based on the results obtained in the study, Chepkongony Swamp is the least conserved among the four swamps. The footpaths and animal trails in this swamp provided evidence of easy human mobility. There was extensive exploitation of the swamp for agricultural purpose which was largely due to leasing of land for cultivation. Low species diversity and plant biomass were recorded in this swamp in a previous study (Mulei, 2011) and this was attributed to the massive destruction of the swamp and swamp vegetation by the local community.

Among the main disturbance events encountered in the swamps, conversion for agricultural activities was considered the most serious threat to the conservation of swamps in Uasin Gishu and this was attributed to rapid increase in population. Similar observations were made in the Lake Victoria wetlands and wetlands of Kajiado County where there has been large-scale conversion of the wetlands to agricultural land (Mwakubo, Obare, Birungi, Rono and Karamagi, 2007; Owino and Ryan, 2007; Gickuki, Oyieke and Ndiritu, 2001).

In East Africa, particularly Kenya, wetlands have been used intensively or drained to improve agricultural production (Okeyo, 1992). Wetland drainage usually takes place because population pressure and associated food scarcity force the acquisition of new agricultural lands. A study by Ambastha, *et*

*al.*, (2007) also revealed that agriculture was the main important use of the Kabartal wetland ecosystem and the water was drained to make more land available for cultivation.

## CONCLUSION AND RECOMMENDATION

The swamps in Uasin Gishu County are under varying degrees of threat and their conservation status is relatively low. The main disturbance events include drainage and reclamation of the swamps for agricultural and urban development, vegetation burning and plant harvesting. There is need to advocate for sustainable use and conservation of Uasin Gishu wetlands and their resources through wetland conservation initiative that is driven by the local community. There is need to carry out education and awareness with community members living around wetlands in Uasin Gishu to promote indigenous knowledge on conservation. A comprehensive monitoring programme should also be put in place to ensure their continued existence.

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