
**THE INFLUENCE OF CLIMATE ON WATER POTENTIAL OF WETLAND IN UGANDA, A
CASE STUDY OF BUGINGO WETLAND, BUGINGO VILLAGE, KAVULE SUB COUNTY,
MAYUGE DISTRICT**

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ABSTRACT

The study's main objective was to determine how the climate affects the water prospective of the Bugingo wetland reservoirs in the Mayuge district. Based on the study's aims and investigation questions, the data were examined. These included understanding the notion of climate effects in the Bugingo Wetland, identifying the main drivers of the decline of wetlands there, and assessing the effects of climatic change on the wetland water resources. Using random sampling methodology, information was gathered from the locals and the authorities in the Bugingo community. The two plots of 200m, one within the marsh and one on the flanking hill, were sampled via inspection and walking transects over the wetland as the main methods of data collection. For the interview, a random sample of thirty participants was chosen. It was primarily discovered that the wetland's water-holding capacity encompassed both natural and human elements, including all of the land degradation procedures that pose a threat to the area's water supplies. According to the investigation, the harsh climate affects destruction of wetlands and decreased water storage capability in the Mayuge district. Wetland researchers, climate researchers, analysts, members of the public, agrarian belonging, land-use planners, and policy officials should therefore form a large network.

Key words: climate, water potential and wetlands

BACKGROUND TO THE STUDY

Deterioration of the environment and warming temperatures are the two main ways it shows up (Carla 1995). According to Mannion (1997), environmental alteration is the slow and occasionally catastrophic modification of the environment's the hydrosphere, lithosphere, and hydrosphere caused by dynamic systems of energy and material transfer

operating on a global scale. According to Morgan (1986), human behaviors including improper waste disposal and subpar agricultural practices are the main causes of deteriorating soil. According to UN-HABITAT (2011), global warming is defined as a change in a state of the environment that can be determined based on both physical indicators and statistical tests by modifications to the mean or variation of its characteristics and that lasts for a considerable amount of time.

Biological processes or persistent manmade changes in the composition of the atmosphere or in land use can cause warming temperatures. As a result, the length of typical intervals in temperature variance has been steadily increasing, and this is another way to conceptualize global warming. The term "climate variability" describes changes in the average condition and statistics of the climate on all time and spatial scales outside of those of specific weather events. Harvey (2000) asserts that the scientific literature demonstrates that the climate of the planet has altered over the course of its geological history. It is well recognized that over the past century, the earth has warmed.

STATEMENT OF THE PROBLEM

The significant climate impacts that have been felt in Southeast Uganda, notably in the Mayuge district, include an increase in the length of protracted droughts, an increase in temperature and unpredictable precipitation, as well as changes in precipitation patterns and variation. The wetland receives less water because the nearby hills' subterranean water recharges are lessened. The Bugingo Wetland's water quality and quantity will suffer as a result. This indicates that the region will eventually face a water crisis and shortage. Therefore, the purpose of this study is to investigate the main effects of climate change on wetlands. The main wetland degradation procedures throughout the region are also identified.

OBJECTIVES OF THE STUDY

- 1. To determine the impacts of climate on Bugingo wetland.*
- 2. To determine the major causes of wetland degradation in Bugingo wetland.*
- 3. To establish the consequences of climate change on wetland water resources in Bugingo wetland.*

RESEARCH QUESTIONS

1. *What are the impacts of climate on Bugingo wetland?*
2. *What are the major causes of wetland degradation in Bugingo wetland?*
3. *What are consequences of climate change on wetland water resources of Bugingo wetland?*

Methodology

RESEARCH DESIGN

The study based on a descriptive survey, precisely the cross-sectional survey research design in which both qualitative and quantitative methods of data collection was employed. These methods were used for the purposes of drawing valid conclusions. A descriptive survey research design was used because the study intended to select respondents across different homes around Bugingo wetland for their opinions and analyzing them for comparison. A cross-sectional survey was used to gather data from a large number of cases at a particular time.

TARGET POPULATION

The target population, according to Nachmias and Nachmias (2009), is comprised of all pertinent analytical or data units. 30 residents of the Bugingo wetland system located in Mayuge Town Council, comprising two (2) L.C.1 chairperson and two (2) District Environmental Officers, made up the study's target audience. The District Summary Sheet 2002 (Population and projection) states that the Mayuge Town Council has a total population of 6,945 or more, of whom 2,043 are adults who are men, 2,640 are

adults who are women, and the remaining are children. The majority of the people who are both men and women were taken into account for selecting.

SAMPLING TECHNIQUES AND SAMPLE SIZE

According to Gay (1992) 20% is adequate enough to represent a small population while 10% to represent a large population. Random sampling was used to ensure a fair representation of all the groups. The researcher chosen Bugingo wetland and the surrounding area in Mayuge District since it started to experience difference in water potentials

30 years back,

Non-probability sampling was used during the research. This involved selection of participants because they were available, convenient, or represent some characteristic the investigator wants to study.

TABLE 1 SAMPLE SIZE

<i>Target population</i>	<i>N</i>	<i>Sample size(n)</i>
<i>L.C.1 chairpersons</i>	2	2
<i>District Environment</i>	1	2
<i>Citizens</i>	26	26
<i>Total</i>	29	30

RESEARCH INSTRUMENTS

According to Mugenda & Mugenda (2003), surveys are a common method of data collecting because to their relative simplicity and cost-effectiveness when creating and distributing them to big groups. Data gathering techniques included questionnaires, content analysis, and inspections. Cultivation, for example, results in a loss of vegetation cover, which in turn causes climate change and low levels of marshland potential for water. For the D/EO, the chairperson of L.C1, and the citizens, an instrument was created with both open-ended and closed-ended questions.

DATA ANALYSIS TECHNIQUES

Data analysis is the process of analyzing information by using logic and analysis to look at every element of the information gathered utilizing the research instruments. The surveys were organized, coded, and entered into the computer using the Statistical Package for Social Science (SPSS) (Nelson K, 2022) once the data had been collected, confirmed for comprehensiveness, and then evaluated. When analyzing quantitative data, statistics that are descriptive fill in the proportions and frequencies seen in tables, charts, and graphs. Observations and open-ended questions are investigated qualitatively in narrative form and provided as tables.

RESULTS

QUESTIONNAIRE RETURN RATE

The researcher sent thirty questionnaires to the respondents for data collection to be returned to the researcher. 30 questionnaires were considered because the researcher's targeted population was exactly 30. After filling, the questionnaires were returned to the researcher and information of return rate was tabulated see table 1

TABLE 1: QUESTIONNAIRE COMPLETION RATE

RESPONDENTS	EXPECTED	ACTUAL	PERCENTAGE
<i>L.C.1 Chairpersons</i>	2	2	6.89
<i>D/Eos</i>	2	1	3.44
<i>Citizens</i>	26	26	89.65
TOTAL	30	29	100.00

The percentage of the sample who engaged in every investigation procedure as intended is known as the completion rate. There were 26 citizens in the sample, 2 L.C.1 chairpersons, 1 D/EO, and all of them completed and returned the surveys, for a total response rate of 96.6%. For this reason, 96.6% return rate is regarded as a true reflection of the general population's replies (Mulusa, 1988). It is generally thought that the greater the percentage of respondents, the more likely the results are to be approximate to the population, given that the sampling is acceptable. Table 1 of the

primary data is a summary of the survey return rate.

DEMOGRAPHIC INFORMATION OF THE RESPONDENTS.

The demographic information of the L.C.1 chairpersons, citizens and D/EOs was based on their gender, academic level of education, age group, and marital status. The demographic characteristics of citizens covered in this section include their age and duration in current villages.

DEOS, CITIZENS AND CHAIRPERSON'S GENDER

The D/Eos, citizens and chairpersons were asked to indicate their gender and data was presented

TABLE 2 D/EO'S AND L.C.1 CHAIRPERSONS' GENDER

GENDER	D/EOs		L.C.1 CHAIRPERSONS		CITIZENS	
	F	PERCENTAGE	F	PERCENTAGE	F	PERCENTAGE
Male	1	100.0	2	100.0	16	61.5
Female	-	-	-	-	10	38.6
TOTAL	1	100.0	2	100.0	26	100.0

Data on the gender of the D/EOs indicated that one (100.0%) was a female. Data on chairperson's

shows that 0% were female while two (100%) were male, data on citizen's shows that 61.5% were male and 38.6 were female. This shows there is no appropriate gender distribution among D/Eos and no females among the L.C.1 chairpersons. Their gender distribution was deemed appropriate and would not have any way affected the researcher in gathering information about the topic "influence of climate on water potential of wetlands in Bugingo wetland, Mayuge district."

AGE GROUP FINDINGS ON RESPONDENTS

Respondents were asked to indicate their age group ranges in the questionnaires and information on age group was collected and tabulated.

See the results in primary data table 3

TABLE 3 AGE GROUP OF RESPONDENTS

AGE GROUP (years)	D/EOs		L.C.1		CITIZENS	
	F	PERCENTAG	F	PERCENTAGE	F	PERCENTAGE
46 and above	1	100.0	2	100.0	14	58.8
36-45	-	-	-	-	7	26.9
26-35	-	-	-	-	4	15.4
18-25	-	-	-	-	1	3.8
TOTAL	1	100.0	2	100.0	26	100.0

According to the research, all of the D/EO and village chairpersons were over the age of 46. According to age group results on citizens, 58.8% of them were in the 46 and older age bracket, 26.9% were in the 36-45year bracket, 15.4% were in the 26-35year bracket, and 3.8% were in the 18-25year bracket. Since over 70% of participants were aged 26 and above, it was determined that their age group pyramid arrangement was adequate and that the data that they provided to the investigator was accurate. This indicated that the participants were mature enough to provide reliable data.

RESPONDENTS MARITAL STATUS

Respondents were asked to indicate their marital status in the questionnaire and data to this was collected and tabulated. See primary data table 4

TABLE 4 RESPONDENTS RESPONSES ON MARITAL STATUS

MARITAL STAUS	D/EOs		L.C.1		CITIZENS	
	F	PERCENTAGE	F	PERCENTAGE	F	PERCENTAGE
Married	1	100.0	2	100.0	14	58.8
Single	-	-	-	-	7	26.9
Divorced	-	-	-	-	4	15.4
Widowed	-	-	-	-	1	3.8

TOTAL	1	100.0	2	100.0	26	100.0
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Findings indicated that 100% of the D/EO and village chairpersons were married.

Marital status

findings on citizens indicated that 58.8% were married, 26.9% were single because these citizens were still students according to their age range, and 15.4% were divorced while 3.8% of the total returned questionnaires were widowed. Their marital status distribution was deemed appropriate and would not have any way affected the researcher in gathering information about the topic “influence of climate on water potential of wetlands in Bugingo wetland, Mayuge district.”

RESPONDENTS ACADEMIC QUALIFICATIONS

The respondents were asked to indicate their highest academic qualification level. The data was presented.

TABLE 5: DISTRIBUTION OF RESPONDENTS ON ACADEMIC QUALIFICATIONS

QUALIFICATIONS	D/EOs		L.C.1		CITIZENS	
	F	PERCENTAGE	F	PERCENTAGE	F	PERCENTAGE
University	1	100.0	-	-	2	7.7
Tertiary	-	-	-	-	7	26.9
Secondary	-	-	2	100.0	11	42.3
Below secondary	-	-	-	-	6	23.1
TOTAL	2	100.0	2	100.0	26	100.0

The results showed that all of the D/EO were university graduates. Despite the fact that all local chairpersons have a secondary education and are qualified, research on citizens shows that only 7.7% have a university degree, 26.9% have a tertiary degree, 42.3% have a secondary degree, and 23.1 have a lower degree. The results show that the local council chairpersons and D/EOs in the area were highly qualified professionals and as a result, had the best abilities to carry out and manage the preservation of them

and preventive activities. Additionally, because the majority of colleges and other educational facilities have opened up chances to pursue further learning, over 70% of those who responded to the surveys had education academic levels of secondary and above secondary, meaning that 70% of citizens had the knowledge necessary to respond to the questionnaire's inquiries.

FINDINGS ON RESPONDENTS PLACE OF RESIDENCE.

The researcher asked respondents to indicate whether they are citizens of Bugingo village, Kavule sub-county, Mayuge district. The information on place of residence was collected and tabulated.

TABLE 6 FINDINGS ON RESPONDENTS PLACE OF RESIDENCE

RESPONSE	F	PERCENTAGE (%)
Yes	29	100

No	-	-
I don't know	-	-
Total	29	100.0

Data on respondent's place of residence shows that 100% live in Bugingo village, Kavule sub-

county, mayuge district. This shows place of residence was deemed appropriate, information was considered true because all the 29 respondents live in Bugingo village and would not have any way affected the researcher in gathering information about the topic "influence of climate on water potential of wetlands in Bugingo wetland, Mayuge district.

FINDINGS ON WEATHER EXTREMES

Respondents were also asked to indicate whether they experienced any weather extremes in their area.

TABLE 7 FINDINGS ON WEATHER EXTREMES

RESPONSE	F	PERCENTAGE (%)
Yes	26	89.7
No	-	-
I don't know	3	10.3
Total	29	100.0

Data on weather extremes showed that 89.7% of the 29 respondents accepted that Bugingo village

experiences weather extremes. Findings also showed 10.3% are still ignorant on the weather extremes because their response was "I don't know". Since 89% accepted, it would not have any way affected the researcher in gathering information about the weather extremes.

IDENTIFYING OF WEATHER EXTREMES

Respondents were also asked to identify the weather extremes experienced if they believe that Bugingo experiences weather extremes. The information was collected as tabulated as shown in **primary data table 8**

TABLE 8 IDENTIFICATION OF WEATHER EXTREMES

RESPONSE	F	PERCENTAGE (%)
Prolonged drought	8	30.8
Heavy rainfall totals	7	26.9
Thick Cloud cover	6	10.3
High sunshine	5	32
Total	26	100.0

Findings in **table 8** indicated that Bugingo village experiences weather extremes because 8 respondents of the 26 people who accepted that their experiences weather extremes identified prolonged droughts, 26.9% identified heavy rainfall, 10.3% identified thick cloud cover while 32% identified high sunshine.

FINDINGS ON BUGINGO WETLAND DESTRUCTION.

Respondents were also asked to indicate whether Bugingo wetland has been destroyed. Their response was tabulated in **primary data table 4.9**.

TABLE 8 SHOWING RESPONSES ON WHETHER BUGINGO WETLAND IS DESTROYED

RESPONSE	F	PERCENTAGE (%)
Yes	29	100.0
No	-	-
I don't know	-	-
Total	29	100.0

Data on Bugingo wetland destruction in table 8 indicated that there is Bugingo wetland destruction because all the 29 respondents representing 100% accepted that their area is totally destroyed. This therefore showed that the respondent's information given on Bugingo wetland destruction is relevant.

CONCLUSIONS

The wetland degradation is caused by both natural and human factors as recorded in chapter four while the consequences of climate on Bugingo wetland include water purity decline, increase and decrease in water temperatures, and water scarcity. This research also offered the researcher with a high level of practical skills and experience that opened his eyes to the practices, procedures and work-place ethics. It also came with an extra advantage of social networking because the researcher interacted with a big number of people both district staff and Politian's right from village level.

RECOMMENDATIONS

The local people of Busoga sub region especially Mayuge district should at all times conserve wetlands and avoid activities that destroys wetlands like mono-culture, brick making, over cultivation in wetlands, deforestation among others and carry out tree planting. The local people should also act as self-supervisors amongst themselves through reporting citizens who encroach on waterlogged areas to police.

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