

**Effects Of Urbanization On Wetland Waste Management In Uganda, A Case Of Lubigi Wetland In
Kampala**

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Abstract.

The study delved into the effects of urbanization on wetland waste management in Uganda, focusing on the case of Lubigi Wetland in Kampala. Despite wetlands covering only 6% of the Earth's surface, they face alarming degradation globally. The study aimed to contribute updated information on the effects of urbanization on wetland management in Uganda, emphasizing Lubigi Wetland. The main objective is to evaluate the effects of urbanization on wetland management, specifically in Lubigi Wetland. Specific objectives include identifying major urban land use activities affecting Lubigi Wetland, examining the implications of rapid urbanization on Bwaise Wetland, and exploring possible strategies to minimize these implications. The study employed a cross-sectional survey design and storytelling approach, with data collected through oral interviews, questionnaires, observation, and data analysis. Descriptive statistics, correlation, and regression analysis are used to interpret the findings. Findings reveal a significant negative correlation between rapid urbanization and Bwaise Wetland conservation, indicating a strong impact of urbanization on wetland degradation. The regression model quantifies this negative association, emphasizing the urgency of addressing the challenges associated with urbanization, such as increased settlement and encroachment on the wetland. The study suggests the need for comprehensive public education to raise awareness about wetland conservation and the consequences of unchecked urbanization. The study concluded that rapid urbanization has substantial implications for wetland conservation, as evidenced by the negative correlation and regression findings. Urgent strategic interventions and conservation measures are needed to counteract the adverse effects of urbanization and preserve the ecological integrity of Lubigi Wetland. The lower emphasis on awareness creation highlights a potential gap in understanding the broader consequences of unchecked urbanization on wetland ecosystems. The government is recommended to implement and enforce urban planning measures prioritizing ecological preservation, including zoning regulations and sustainable building practices.

Key words: Urbanization and wetland management.

Back ground of the study.

Wetlands occupy approximately six percent (6%) of the Earth's surface area (Jackline et al., 2023).

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Wetlands have one of the highest deforestation rates: 1/3 of the world's mangrove Forests have been lost in the past 50 years while 1/3 of salt marshes have disappeared since 1800s. Globally, about 64% of the wetlands have been lost since 1900 because of human activities, and their destruction will likely continue (Benard & Moses, 2023). Natural wetlands occur on 3.8% of the Chinese landscape (600,000km²); accounting for approximately 10% of the global area of wetlands. However, between 1990 and 2000, 30% of the Chinese natural wetlands were lost. So, wetlands degradation and loss is a global trend. (Joanita et al., n.d.)quoted that water system regulations and drainage for urban agriculture and urban development have been the major causes of the loss of over 50% of the wetlands in countries such as the USA, New Zealand, Australia, Pakistan, Thailand, Niger, Chad, Tanzania, India, Vietnam and Italy. This has happened at a time when there was little knowledge and recognition of two important factors. The first is that in making decisions about water use, environment itself is an important use of water. Water systems need water to function properly and to secure a constant and quality supply for other uses (Irumba, n.d.). Yet some water managers still have difficulty in understanding that the allocations for human use can only be satisfied in the long term by first ensuring the environment allocation that the systems require to continue to perform (Jackline et

al., 2023). The second factor that has affected wetlands has been widespread ignorance about the multiple and beneficial functions that they perform in the basins and coastal areas where they are located.

(Jim et al., n.d.)the direct causes of wetland loss result from a combination of ignorance, social and economic forces and political decisions. The global rise in Urbanization exemplified by the growth in urban population of the maximum or medium sized cities in developing countries is accompanied by dramatically increasing pollution loads to the environment (Esther et al., n.d.). Although a wetland might itself remain, but in a degraded state, many of its benefits are Lost (Frazier, 1996). Population growth coupled with inequitable distribution of resources and access rights has increased the demand for land which in turn has put the greatest pressure on wetlands. Uganda's wetlands originally covered about, 29,000square kilometers about 13% of the total land of the country(Alexander, 2023). They comprise swamps (8,832 square kilometers), swamp Forest (365 square kilometers) and sites with impeded drainage (20,392 square kilometers) and include areas of seasonally flooded grassland, swamp Forest, permanently flooded papyrus such as Lubigi wetland, grass swamp and upland bog(Benard & Moses, 2023). Most wetlands in Uganda occur outside of the protected areas, and their range and quality are rapidly being eroded for

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agricultural land. By the end of June 2016 Uganda's land area covered by wetlands had reduced to about 10.9%(Kilama Luwa et al., 2021).In Eastern Uganda alone 20%, central region 2.8%, Northern

2.4% and Western 3.6% of the wetlands have been destroy, warning that this has implications on the wetland biodiversity and functionality(Nancy & Benard, 2023).

Statement of the problem.

Lubigi wetland is currently undergoing rapid degradation due to the effects of Urbanization and its associated activities (Benard & Moses, 2023). Lubigi wetland area has reduced from 489 ha in 1995 to 85 ha in 2009 and it is at 42% higher degradation rate than the natural average of 30% (Nicholas et al., 2023). Recent urban developments have raised serious concerns on its biodiversity and its contribution to the proper functioning of the wetland (District et al., n.d.). In addition, Uganda is working with UNFCCC to mitigate the loss of wetlands to 12% by 2030 from 10.9% in2014 through restoration of degraded wetlands(Benard & Moses, 2023). A number of studies have been carried out on this wetland, but there is limited information about the effects of Urbanization on wetland and the management of Lubigi wetland. Therefore, this study is intended to contribute to the common cause by availing updated information on the effects of Urbanization activities on wetland management in Uganda.

Main objectives of the study.

The main objective of the study was to evaluate the effects of Urbanization on wetland management in Uganda particularly to Lubigi wetland in Kampala.

Specific objectives of the study.

1. To identify the major urban land use activities that affect Lubigi wetland and the environment as a whole.
2. To examine the Implications of rapid urbanization on Bwaise wetland
3. To examine the possible strategies in minimizing the implications of rapid urbanization on Bwaise wetland.

Research Questions.

1. What are the major urban activities carried out in Lubigi wetland?
2. What are the Implications of rapid urbanization on Bwaise wetland?

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3. Which action plans can be adopted in managing Lubigi wetland ecosystem?

Methodology.

Lubigi wetland is the largest remaining wetland in Kampala city shared by Wakiso district and drains into River Mayanja in the Lake Kyoga basin. The wetland is located on the North West side of Kampala in Rubaga and Kawempe divisions about 7.02 kilometers from the city center. It is a part of a system in which water flows from North towards Lake Kyoga. Kampala city and the study area is located in the Lake Victoria basin climatic zone, which receives between 1,200 - 2000 mm per annum. The research was conducted using a cross sectional survey design as well as a story telling approach. The information and details concerning the various Urban land use activities and factors influencing them in Lubigi wetland, their impacts or effects on Lubigi wetland will be obtained through the use of oral interviews, questionnaires, observation, recording, photographing as well as graphicacy and data analysis. The study population targeted a population of 30 people mostly those who live or stay immediate to area of study because these people are those who use the wetland in various ways. Other members of the public will have a chance to also participate in interviews. According to Mulusa (1988), at least 30% of the total population is representative. Therefore, the sample size for this study shall be 15 respondents. The study used both random sampling and purposive sampling techniques basing on the population of the study area and the management authorities of the study area. The study therefore used 30 respondents. Descriptive statistics are used to describe the basic features of the data in a study. This provided simple summaries about the sample and the measurements. Together with simple graphics analysis, they form a basis of virtually every quantitative analysis of data. Both quantitative and qualitative data analysis was used. Descriptive method included the use of frequency tables, photographs, and pie charts are to be used to present findings from the questionnaires, observation and interview schedules. Correlation and regression analysis were performed for further analysis in STATA (Nelson et al., 2022).

Results.

Implication of rapid urbanization on Bwaise wetland drainage, Kawempe division in Kampala district.

Table 1: Shows the correlation of rapid urbanization on Bwaise wetland conservation.

		Strategy promotion	Tourism development
Strategy Promotion	Pearson Correlation	1	-.507**
	Sig. (2-tailed)		.001

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	N	80	80
Tourism development	Pearson Correlation	-.507**	1
	Sig. (2-tailed)	.001	
	N	80	80
**. Correlation is significant at the 0.01 level (2-tailed).			

Findings from the correlation matrix indicated evidence of a strong significant negative association ($r = -0.507$, $P = 0.001$) between rapid urbanization on Bwaise wetland conservation. The association is statistically significant since the $P - \text{Value} = 0.001$ was less than 0.01 at 99% level of significance (Nelson et al., 2022).

Table 3: Shows the model estimation for the relationship between rapid urbanization on Bwaise wetland conservation.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	-.314	.441	.440	2.10449
a. Predictors: (Constant), Cash Budget				

Findings from the model revealed that there was a negative association (Coeff = 0.314) between rapid urbanization on Bwaise wetland conservation. This implied that a unit increase in urbanization resulted into 0.314 units decrease in the Bwaise wetland conservation. Furthermore, 44.1% of the variations in the Bwaise wetland conservation were explained by the urbanization. This evidenced a negative impact of urbanization on wetland conservation.

Possible strategies in minimizing the implications of rapid urbanization on Bwaise wetland.

Table 3: the possible strategies in Bwaise wetland.

Strategy.	Frequency.	Percentage. (%)
Al Restoring watersheds.	33	41.25
Eviction of squatters and encroachers	33	41.25
creation of awareness (Learning about natural habits)	7	8.75

use of alternative building materials	10	12.5
Total.	80	100

Table 1, indicated that the investigated strategies in Bwaise wetland considerably affected the management of the wetland. Eviction of squatters and encroachers, and restoring watershed are the main strategies since majority of the respondents (33, 41.25%) were in line with those strategies, use of alternative sources of building materials came in next with the 12.5% of respondents in agreement with that followed by creation of awareness (learning about natural habitats) on the impacts of rapid urbanization which was least seconded by the respondents (7, 8.75%) (Christopher & Felex, 2022). Eviction of squatters and encroachers in most urban wetlands of Uganda has always been used as a strategy. This is mainly due to unplanned settlement. In Bwaise wetland, a lot of people both the rich and the poor have settled there leading to the deterioration of the wetland through over extraction of wetland materials such as sand, water, and the vegetation, dumping of wastes and others. The use of alternative building materials has helped in reducing on the over exploitation of wetland materials such as sand, water, papyrus, and others, this has restored the wetland to perform its functions, such as control of the floods.

Discussion of the findings.

The study on the implications of rapid urbanization on Bwaise wetland conservation in Kawempe Division, Kampala District, revealed significant findings with crucial implications for environmental management. The results indicated a strong negative correlation ($r = -0.507$, $P = 0.001$) between rapid urbanization and wetland conservation, suggesting that ongoing urbanization processes were contributing to the degradation of the wetland ecosystem. The regression model further quantified this negative impact, with a coefficient of -0.314 , signifying that a unit increase in urbanization resulted in 0.314 units decrease in Bwaise wetland conservation. The endorsed strategies to minimize implications included restoring watersheds and eviction of squatters and encroachers, highlighting the recognition of direct human impacts on wetland health. The study emphasized the challenges associated with rapid urbanization, such as increased settlement and encroachment on the wetland, necessitating a more mindful approach to urban planning. Furthermore, the relatively lower endorsement for awareness creation underscored the need for comprehensive public education on wetland conservation and the consequences of unchecked urbanization. In conclusion, the findings underscored the urgency of adopting a holistic and proactive approach to urban development, integrating targeted conservation strategies, improved

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urban planning practices, and robust public awareness initiatives to ensure the sustainable coexistence of urban areas and fragile ecosystems like Bwaise wetland.

Conclusion.

In conclusion, the study illuminated the intricate relationship between rapid urbanization and the conservation of Bwaise wetland in Kawempe Division, Kampala District. The robust negative correlation and regression findings underscore the substantial impact of urbanization on the degradation of the wetland ecosystem. The study's revelations point to the urgent need for strategic interventions and conservation measures to counteract the adverse effects of urbanization and preserve the ecological integrity of Bwaise wetland. The endorsed strategies, particularly the restoration of watersheds and eviction of encroachers, offer tangible paths toward mitigating the implications of rapid urbanization. Additionally, the study emphasizes the imperative for urban planning to be more attuned to ecological considerations, incorporating zoning regulations and enforcement mechanisms that balance the demands of urban development with the preservation of delicate ecosystems like Bwaise wetland.

Furthermore, the lower emphasis on awareness creation suggested a potential gap in understanding the broader consequences of unchecked urbanization on wetland ecosystems. Future efforts should prioritize comprehensive public education initiatives to raise awareness among residents, policymakers, and stakeholders about the importance of wetland conservation and the long-term ramifications of unbridled urban expansion. This research serves as a clarion call for integrated and sustainable approaches to urban development, acknowledging the critical need to harmonize the growing urban landscape with the preservation of vital natural resources like Bwaise wetland for the benefit of current and future generations.

Recommendations.

The researcher therefore recommends that the government should implement and enforce urban planning measures that prioritize ecological preservation, including zoning regulations and sustainable building practices. Collaborate with relevant stakeholders to strike a balance between urban development needs and the conservation of Bwaise wetland.

Government should as well Increase efforts to educate and raise awareness among local communities, policymakers, and developers about the ecological importance of Bwaise wetland and the impacts of rapid urbanization. Emphasize the benefits of endorsed conservation strategies and foster community support for

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initiatives that ensure the sustainable coexistence of urban areas

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