Effect of Wetlands Conservation on People's Livelihood around Kyetinda and Mabamba Wetlands, Central Uganda

Abstract

This study in Kyetinda and Mabamba wetlands aimed at answering this objective on the impacts of wetland conservation initiatives on the livelihoods of communities residing around wetlands. A mixed-methods approach was used to examine wetland conservation, and community livelihoods around the peri-urban wetlands of Kyetinda and Mabamba. Sampling followed Taro Yamen's 1968 formula, selecting 540 participants from a target population of 5050. For Kyetinda, the sample size determination considered a population of 2,000 people living within a 250-meter perimeter from the water catchment area, resulting in a sample size of 300. For Mabamba Wetland, the sample size determination considered a population of 600 people living within a 250-meter perimeter from the water catchment area, resulting in a sample size of 240. This totaled 540 participants and 13 key respondents. However, the study involved 370 respondents and 9 Key Informants due to seasonality and poor accessibility of the study areas.

Community perceptions and engagement in wetland conservation revealed moderate awareness and participation, with mean scores of 2.397 and 2.800, respectively. High awareness of ecosystem changes, such as water quality and habitat degradation, scored 3.629, indicating an urgent need for action. Strong beliefs in the importance of wetland conservation for environmental health and biodiversity scored 3.521 and 3.413, respectively. Awareness of conservation's role in climate change mitigation was robust at 3.600. Moderate support for wetland protection policies and the importance of education scored 2.600 and 2.683.

The study also revealed a high positive relationship between wetland conservation and community livelihood ($r = 0.546$, $p = 0.000$, $n = 370$). Regression analysis showed that wetland conservation significantly influences community livelihood, accounting for 29.6% of the variance. The study confirmed wetland conservation as a predictor of community livelihood, emphasizing the importance of balancing conservation and utilization for sustainable development. Recommendations included enforcing zoning laws, educating communities on sustainable practices, and promoting community engagement in conservation efforts.

Keywords: Wetland Conservation Efforts, Community Livelihoods

1. Introduction

Wetlands are critical ecosystems that provide a myriad of ecological, economic, and social benefits globally. They serve as natural filters, regulate water flow, and support rich biodiversity. However, over the past century, these invaluable resources have faced extensive degradation due to human activities such as urbanization and agricultural expansion (Mitsch & Gosselink, 2015; Barakagira &de Wit, 2017; Barakagira &de Wit, 2019). Efforts to conserve wetlands have become increasingly important to sustain their ecological balance and the livelihoods of communities dependent on them. Integrating conservation initiatives with community-based approaches is crucial for achieving positive outcomes. This approach not only enhances wetland health but also supports local livelihoods through activities like farming, fishing, and tourism (Kangalawe & Liwenga, 2005; Barakagira & de Wit, 2017; Sagoe et al., 2021). International initiatives, such as the Ramsar Convention on Wetlands, play a vital role in promoting the sustainable use and preservation of these ecosystems. Despite these efforts, challenges persist, including insufficient awareness, weak enforcement of conservation policies, and conflicting socio-economic interests (Barakagira & de Wit, 2019). These complexities underscore the need for well-coordinated management strategies that balance conservation goals with community needs (Baird et al., 2016). Effective conservation measures are crucial for maintaining the ecological balance necessary for sustaining community livelihoods dependent on these ecosystems.

Efforts to conserve wetlands have become increasingly important to sustain their ecological balance and the livelihoods of communities dependent on them. Integrating conservation initiatives with community-based approaches is crucial for achieving positive outcomes. This approach not only enhances wetland health but also supports local livelihoods through activities like farming, fishing, and tourism (Kangalawe & Liwenga, 2005; Sagoe et al., 2021). International initiatives, such as the Ramsar Convention on Wetlands, play a vital role in promoting the sustainable use and preservation of these ecosystems.

In Uganda, wetlands cover approximately 13% of the total land area, playing a significant role in supporting the nation's biodiversity and water resources (Mafabi et al., 2021). Wetlands in Uganda are estimated to cover about 30,105 square kilometers, representing 10.9% of the country's total area (MWE, 2014; Abet, 2021). According to the AFRICOVER classification, Uganda's wetlands include 7.7% seasonal wetlands, 3.4% permanent wetlands, and less than 0.1% swamp forests

(MWE, 2013). However, like other parts of Africa, wetlands in Uganda have been experiencing continuous degradation and loss, primarily driven by the need for agricultural expansion and urban development (Nabuuma et al., 2017; Barakagira & de Wit, 2017). The wetland cover decline has been significant, with projections showing a decrease from 15.5% in 1994 to 13% in 2017, and an alarming 8.4% by 2019 (Anywar, 2020). This increasing inundation of wetlands threatens community livelihoods, making conservation efforts more crucial than ever.

To address these issues, the Ugandan government has initiated various policies and programs to promote wetland conservation and sustainable utilization. Nevertheless, there is a gap in understanding the socio-economic aspects of wetland use and conservation, particularly in the context of local communities. Wetland degradation caused by extensive swamp drainage for agriculture and other livelihood activities, such as fuel collection, building material acquisition, and handcraft making, is rampant. Unfortunately, the growing market demand for swamp goods and crops has exceeded sustainable levels, leading to further degradation and habitat conversion (NSOR, 2016).

Despite these efforts, challenges persist, including insufficient awareness, weak enforcement of conservation policies, and conflicting socio-economic interests. These complexities underscore the need for well-coordinated management strategies that balance conservation goals with community needs (Baird et al., 2016). Effective conservation measures are crucial for maintaining the ecological balance necessary for sustaining community livelihoods dependent on these ecosystems.

In peri-urban areas, where wetlands often face intense pressure from urban expansion and land-use changes, effective conservation measures are essential. Such measures can mitigate habitat loss, water pollution, and disruptions in ecological processes caused by infrastructure development and overexploitation (Davidson, 2018; Bai et al., 2013). Conservation efforts, such as those led by organizations like the Lake Naivasha Riparian Association in Kenya, illustrate the potential to balance environmental protection with sustainable community development (Mireri et al., 2018). Therefore addressing these challenges requires comprehensive planning and implementation of conservation policies that ensure sustainable use of wetland resources while supporting community livelihoods. This article explores the intricate relationship between wetland conservation efforts

and community well-being, highlighting the importance of integrated approaches to achieve long-term sustainability.

Kyetinda and Mabamba Wetlands, located in Central Uganda, are vital for both ecological stability and as essential resources for nearby communities. Nevertheless, these wetlands are confronting mounting issues stemming from agricultural encroachment, unsustainable resource use, and competing land demands (Kasedde et al., 2019). Consequently, there is a pressing need for research that addresses the intricate balance between wetland utilization, conservation, and the livelihoods of the local population in this region. These wetlands are surrounded by communities heavily reliant on them for fishing, agriculture, water supply, and various ecosystem services, but they are increasingly threatened by overexploitation, pollution, and habitat degradation (Mugabe et al., 2022). Given the profound dependence of local inhabitants on these wetlands, it is imperative to strike a harmonious equilibrium between using the wetlands for sustenance and income generation while safeguarding their ecological significance for future generations. In light of these challenges, our research aims to investigate the complex interplay between wetland utilization, conservation, and community livelihoods in Central Uganda. By gaining insights into the socioeconomic factors and environmental impacts of local activities on these wetlands, our study aims to provide valuable information to policymakers and local stakeholders, facilitating the development of optimal strategies for sustainable wetland management.

In both Kyetinda and Mabamba Wetlands, the poor trend in wetland utilization and conservation is further exacerbated by the limited enforcement of existing regulations and the lack of community awareness of sustainable practices. The absence of effective governance mechanisms has contributed to the degradation of wetland ecosystems (Kansiime et al., 2017; Gwebadze et al., 2019; Barakagira and de Wit, 2019). To reverse these trends, there is a need for targeted interventions that integrate community engagement, policy enforcement, and education on sustainable wetland management practices. The investigation into the intricate balance among wetland utilization, conservation, and community livelihoods surrounding peri-urban wetlands, exemplified by the Kyetinda and Mabamba Wetlands case, occurs within the broader context of global environmental challenges and evolving socio-economic dynamics. In the contemporary landscape, the issues surrounding wetland management are situated within the context of escalating environmental changes and the urgent need for sustainable resource utilization (Adger

et al., 2014). These wetlands face pressures due to various factors including urbanization, climate change, and land-use alterations, posing threats to their ecological integrity (Davidson, 2018).

There is increased support for conservation efforts, both from tourists and local communities, leading to better-managed wetland ecosystems. Van der Valk and Davis (2018), stated that when wetlands are preserved and restored, urban wetlands can serve as recreational areas, providing opportunities for nature-based tourism, birdwatching, and other outdoor activities, thereby enhancing the quality of life for urban residents, thus offering educational opportunities, allowing urban dwellers to learn about the importance of ecological conservation and environmental stewardship. By promoting ecotourism, which focuses on responsible travel and environmental education, wetland destinations can foster a sense of stewardship among tourists, encouraging them to value and protect these unique ecosystems (Higham, 2019).

Tourism can contribute to local economies and raise awareness about wetland conservation however, unregulated tourism may lead to habitat disturbance and invasive species introduction, necessitating careful planning and management (Perez et al., 2020). In recent decades, wetlands have emerged as popular tourist destinations, attracting visitors seeking recreational activities like birdwatching, boating, and nature walks. Wetlands possess aesthetic and recreational value, attracting tourists interested in birdwatching, boating, and nature exploration. These activities stimulate local economies and raise awareness about wetland conservation (Lew & Weaver, 2015). Moreover, wetlands serve as valuable sites for scientific research, offering insights into biodiversity, hydrology, and climate change impacts (Craft, 2017).

Responsible ecotourism practices can enhance public appreciation while contributing to wetland preservation as Nugraha et al., 2019 clearly stated that investments in infrastructure can promote wetland tourism and recreational activities. Well-maintained roads and communication networks make it easier for tourists to reach these natural havens, attracting visitors from distant regions which would in turn increase tourism and not only generate revenue for local communities but also fosters environmental conservation as visitors develop an appreciation for the unique biodiversity of wetlands. Engaging local communities and stakeholders in the planning and management of wetland tourism is vital for ensuring its success and minimizing negative impacts. By involving residents in decision-making processes, their perspectives and traditional ecological knowledge can be incorporated into sustainable tourism practices (Blangy et al., 2015). This inclusivity can

foster a sense of ownership and responsibility among the community, leading to better cooperation and support for conservation efforts.

According to Ferrario et al. (2014), Strategic development that incorporates wetland protection measures can result in harmonious coexistence between human progress and ecosystem integrity when properly planned, infrastructure projects can enhance accessibility, energy production, and transportation networks while minimizing negative environmental impacts. This will create a balancing infrastructure development with wetland conservation is essential to ensure sustainable growth. Mehmood et al., (2021) mentioned that the rise in tourism often leads to improvements in local infrastructure which have to accommodate tourists' needs, investments may be made in roads, transportation networks, and communication facilities, which benefit not only tourists but also residents. This connectivity facilitates the movement of goods and services, supporting local businesses and industries. As a result, economic growth is stimulated, leading to increased trade and investment opportunities which enhances transportation links between wetland communities and larger markets (Nugraha et al., 2019).

Nugraha et al., 2019 highlighted that the construction and maintenance of infrastructure projects create job opportunities for residents, contributing to income generation and poverty reduction as well as the development of skills that lead to long-term livelihood improvements for community members. Therefore, integrated land use planning infrastructure development should be integrated into comprehensive land use planning to ensure sustainable growth and minimize negative impacts on wetland ecosystems (Nugraha et al., 2019). While developing areas near and around wetlands, enhanced accessibility through infrastructure development must ensure that communities living in and around wetlands have improved access to essential services. Properly constructed roads and bridges facilitate easier travel to healthcare facilities, schools, and government offices (Nugraha et al., 2019). This accessibility contributes to better healthcare outcomes, improved education opportunities, and effective public service delivery.

The preservation and sustainable management of wetlands have been shown to improve water quality, making it safe for human consumption and reducing the burden of waterborne diseases (Barlow & Zuur, 2019). Bullock et al. (2018) agree that wetlands act as natural water filters, purifying water and ensuring its availability for nearby communities, and one of the most significant benefits of wetland water purification is the availability of safe drinking water for

nearby communities, Therefore, safe access to drinking water which enhances public health, reduces medical costs, thus improves the overall quality of life for the community.

Wetland conservation practices encompass a range of activities, including habitat restoration, invasive species management, and water quality improvement (Craft, 2015). These practices are often guided by national and international policies aimed at conserving wetland biodiversity and ecosystem services. For example, the Ramsar Convention provides a framework for the sustainable use and management of wetlands worldwide (Ramsar Convention Secretariat, 2018). Similarly, many countries have enacted legislation to protect wetland habitats and regulate human activities within these areas (e.g., the Clean Water Act in the United States, and the Water Act in Australia).

While wetland conservation efforts have led to positive ecological outcomes, their impact on local communities varies depending on various factors, including the socioeconomic context, governance structures, and community involvement (Gomez-Baggethun et al., 2016). In some cases, wetland conservation has resulted in improved livelihoods for local communities through the provision of ecosystem services such as water purification, flood regulation, and ecotourism opportunities (Costanza et al., 2017). However, conflicts may arise between conservation objectives and the livelihood needs of residents, particularly in cases where livelihoods are dependent on activities that may degrade wetland ecosystems (e.g., agriculture, fishing).

The effectiveness of wetland conservation policies relies heavily on their enforcement and implementation at the local level (Brooks et al., 2019). However, compliance with existing policies can be challenging due to factors such as inadequate resources, lack of awareness, and competing land use interests (Peterson et al., 2018). Furthermore, policies that fail to account for the needs and rights of local communities may encounter resistance or non-compliance (Clements et al., 2019). Thus, ensuring the effective implementation of wetland conservation policies requires a participatory approach that engages local stakeholders in decision-making processes.

Wetland conservation efforts have the potential to enhance community livelihoods by safeguarding vital ecosystem services and promoting sustainable resource use. However, achieving these benefits requires a holistic approach that integrates ecological conservation with socioeconomic development and community empowerment (Reid et al., 2020). By addressing the challenges of policy compliance, promoting stakeholder collaboration, and prioritizing the needs of local

communities, wetland conservation initiatives can contribute to both ecological integrity and human well-being.

Wetland conservation efforts can contribute to the enhancement of community livelihoods by preserving ecosystem services such as water purification, flood regulation, and fisheries (Gomez-Baggethun et al., 2016). Sustainable wetland management practices, such as agroforestry and ecotourism, can generate income opportunities for residents while conserving biodiversity and ecosystem functions (Craft, 2015). Furthermore, community-based conservation initiatives empower local stakeholders to participate in decision-making processes and benefit directly from conservation efforts (Peterson et al., 2018).

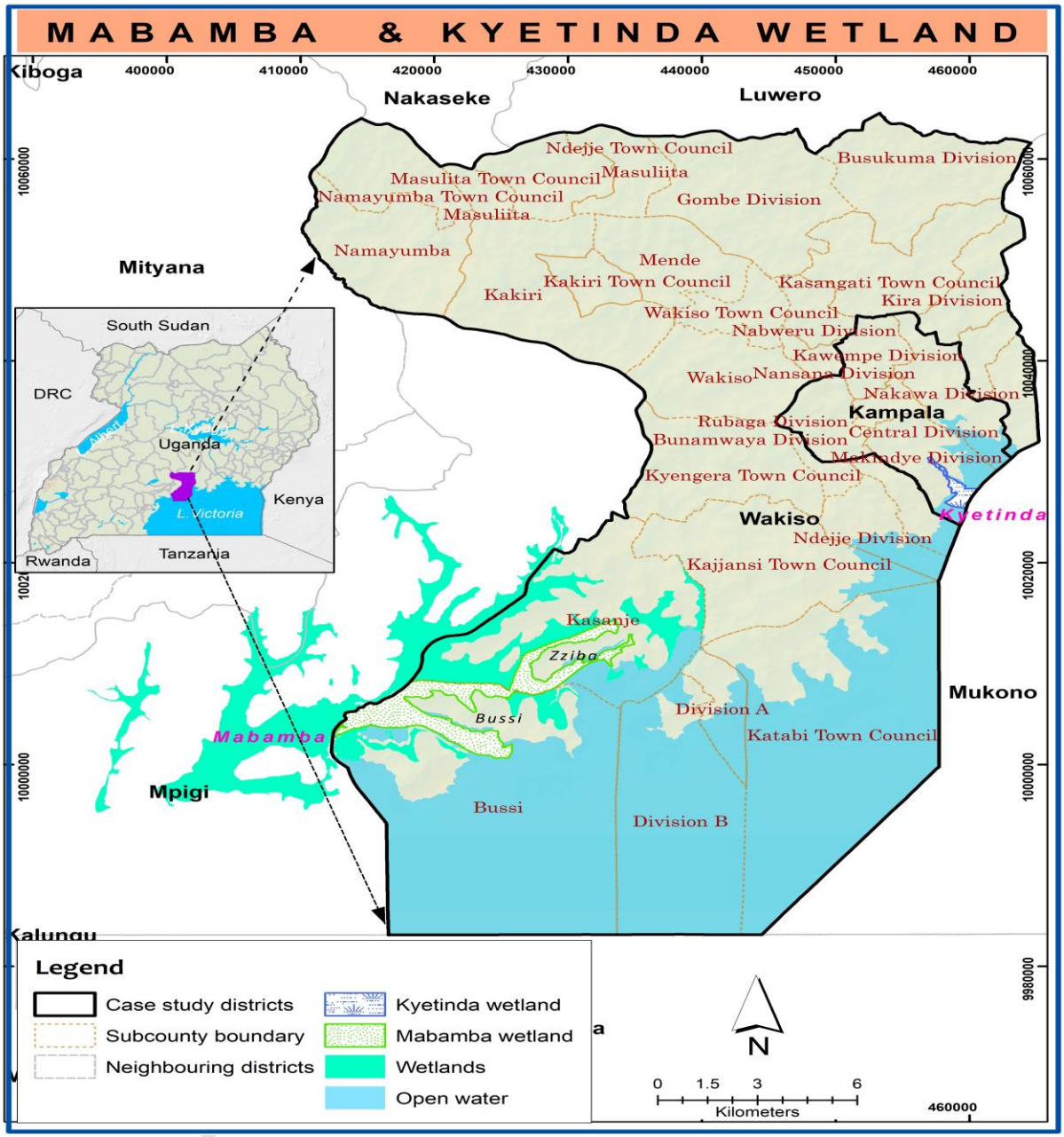
However, achieving synergies between wetland conservation and community livelihoods may involve trade-offs between competing interests and objectives. For example, restrictions on land use within protected wetland areas may limit agricultural expansion and economic development opportunities for local communities (Brooks et al., 2019). Similarly, conservation measures such as habitat restoration may require temporary displacement of communities or changes in traditional land use practices, leading to social conflicts and resistance to conservation initiatives (Clements et al., 2019).

Engagement of local communities in wetland conservation initiatives, as advocated by Peterson et al. (2018), is pivotal for fostering a sense of ownership and empowerment. By integrating traditional knowledge, indigenous practices, and local expertise, conservation efforts can be more inclusive, effective, and sustainable (Gomez-Baggethun et al., 2016). This participatory approach not only strengthens social cohesion but also builds capacity and promotes stewardship, ensuring the long-term viability of wetland ecosystems and the well-being of surrounding communities.

Clements et al. (2019) emphasize the need to reconcile conflicting objectives between conservation goals and the socio-economic needs of local communities. Balancing restrictions on land use within protected wetland areas with economic development opportunities for local communities is crucial to mitigating tensions and fostering sustainable management practices. Reid et al. (2020) underscores the importance of robust policy enforcement mechanisms in safeguarding wetland ecosystems. Inadequate enforcement, coupled with corruption and political inertia, can undermine the effectiveness of conservation policies, perpetuating the degradation of wetland habitats and jeopardizing the well-being of surrounding communities.

2. Study Area

The Mabamba and Kyetinda wetlands are located in Central Uganda and span 2,424 hectares and are home to the globally threatened shoebill stork (Zake, 2014). Kyetinda wetland, situated in Makindye Division, covers an area of 1.43 square kilometres and includes both permanent and seasonal wetlands (UNPD Uganda, 2017). The climate in Mabamba is characterized by a mean minimum temperature of 17.4°C and a mean maximum temperature of 26.7°C. The wet season is April to May and October to November, with the main rainfall peak in April. The dry periods occur from January to February and July to August. The Kyetinda wetland, on the other hand, has a mean annual rainfall of 1500 mm and a mean temperature of around 22.7°C. The Mabamba wetland system is recognized as an Important Bird Area, holding global conservation significance. It is also crucial for protecting the Gaba Water Works, which supplies water to Kampala's two million residents. The soils in the Mabamba wetland system catchment area support agricultural productivity, enhancing household food security and income for smallholder farmers. The Kyetinda wetland shares the same land ownership characteristics as the Mabamba wetland. The Mabamba wetland faces threats from agricultural intensification, vegetation burning, alien species spread, habitat changes, deforestation, bird disturbances, population growth, overfishing, and overfishing. The Kyetinda wetland faces land ownership issues, political interference, population explosion, policy challenges, rainfall intensity, and infrastructural development. Limited information and complex land ownership issues make studying these wetlands essential.


MABAMBA & KYETINDA WETLAND
Kiboga
Nakaseke
Luwero
Mityana
Kampala
Wakiso
Mukono
Mpigi
Kalungu
Kyetinda
Mabamba
Kasanje
Zziba
Bussi
Ndejje Town Council
Masulita Town Council
Namayumba Town Council
Masuliita
Gombe Division
Busukuma Division
Namayumba
Mende
Kakiri
Kakiri Town Council
Kasangati Town Council
Kira Division
Wakiso Town Council
Nabweru Division
Kawempe Division
Nansana Division
Nakawa Division
Rubaga Division
Central Division
Bunamwaya Division
Makindye Division
Kyengera Town Council
Ndejje Division
Kajjansi Town Council
Division A
Katabi Town Council
Division B
South Sudan
DRC
Uganda
Kenya
Rwanda
Tanzania
L. Victoria
Legend
Case study districts
Subcounty boundary
Neighbouring districts
Kyetinda wetland
Mabamba wetland
Wetlands
Open water
N
0 1.5 3 6
Kilometers
400000
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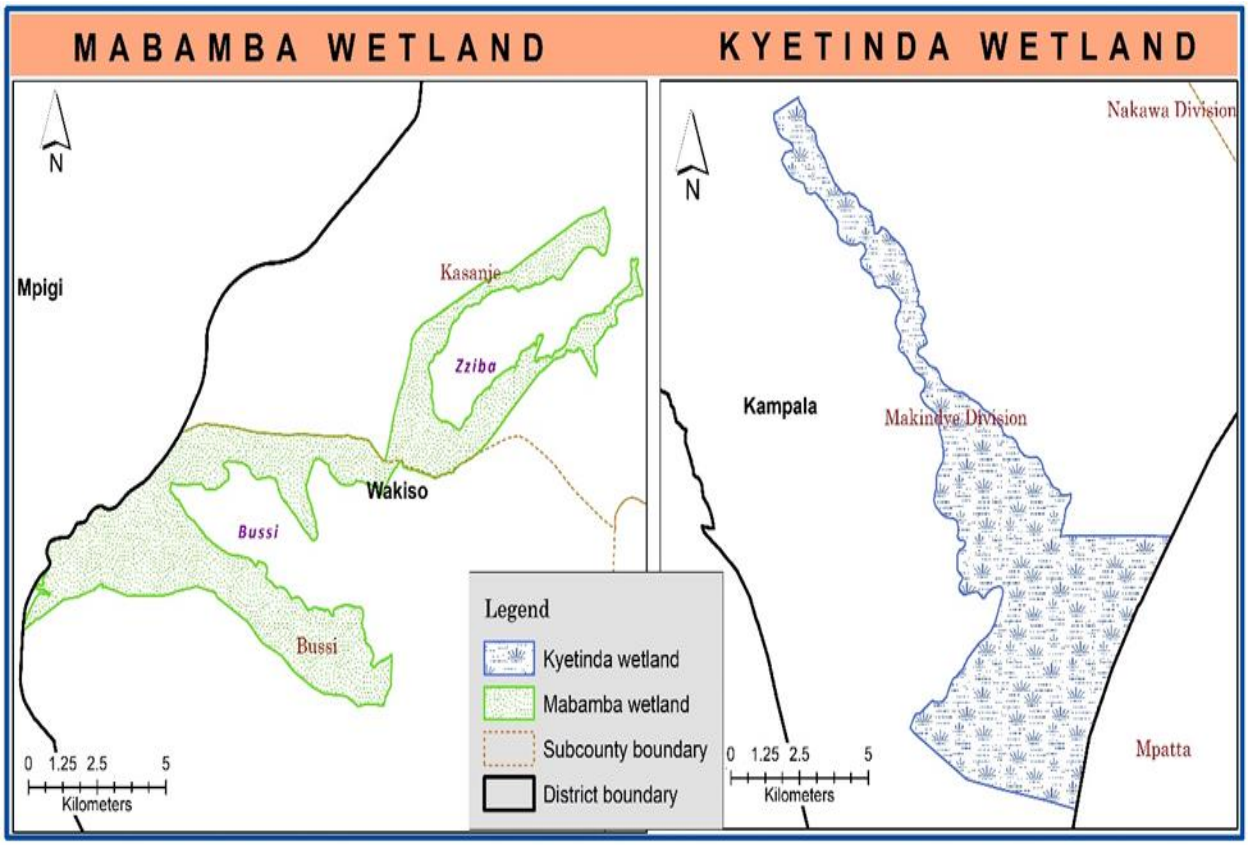

Map 1. Location of Kyetinda and Mabamba wetlands and their surroundings areas, 2024

3. Methodology

This study used mixed approaches to analyse wetland utilization, conservation, and community livelihoods in Central Uganda. Quantitative methods were used, focusing on statistical techniques and standardized measures in the positivist paradigm. The qualitative research approach involved interviews with Water and wetland departments to understand complex relationships and concepts. The cross-sectional survey design was used to evaluate the influence of wetland conservation and community livelihoods and the immediate consequences of conservation efforts. The mixed methods design was sequential explanatory, with quantitative data collected through a survey and qualitative data through interviews and focus group discussions. The study aimed to combine quantitative and qualitative methods to produce a final product that highlights their contributions. The study's sequencing was characterized as sequential explanatory, allowing for a comprehensive analysis of the wetland conservation efforts, and livelihood indicators.

In this study on the "Effect of Wetlands Conservation on People's Livelihood around Kyetinda and Mabamba Wetlands," a mixed-methods approach was utilized. The research aimed to include 5,050 participants, determined using Taro Yamen's 1968 formula. Ultimately, 540 participants were selected from this population. Specifically, for Kyetinda, the sample size was calculated based on a nearby population of 2,000 residents within a 250-meter radius of the water catchment area, resulting in a sample of 300. For Mabamba Wetland, the sample size considered a population of 600 people within the same radius, leading to a sample size of 240. In total, 540 participants and 13 key respondents were intended, but due to seasonal factors and limited accessibility, the study engaged 370 respondents and 9 Key Informants.

4. Results

4.1 Wetland conservation and community livelihood

Table 1 below presents the 10 questions that were meant to generate primary data that are concerned with wetland conservation and community livelihood. A 5-point Likert scale was used to generate the responses. The phrases, Strongly Disagree (SD) Disagree, (D), Neutral (N), Agree (A), and (Strongly Agree), (SA) were used to gauge the levels of awareness and conservation of wetlands by the local community.

Table 1: Descriptive statistics for wetland conservation and community livelihood

Statements	**SD**		**D**		**N**		**A**		**SA**		**M**
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**	
I am aware of ongoing wetland conservation efforts and policies in our community.	95	25.7	155	41.9	20	5.4	78	21.1	22	5.9	2.397
I have actively participated in wetland conservation activities or community-based initiatives.	101	27.3	98	26.5	17	4.6	82	22.2	72	19.5	2.800
I have noticed changes in wetland ecosystems, such as water quality deterioration, habitat degradation, or the presence of invasive species.	37	10.0	66	17.8	28	7.6	105	28.4	134	36.2	3.629

I believe that wetland conservation efforts are crucial for maintaining the health and balance of our local environment	68	18.4	32	8.6	8	2.2	163	44.1	99	26.8	3.521
I think that protecting wetland habitats is essential for preserving the diversity of plant and animal species in our region.	53	4.3	65	17.6	20	5.4	140	37.8	92	24.8	3.413
I am aware of the role wetland conservation plays in mitigating the impacts of climate change.	70	18.9	47	12.7	14	3.8	69	18.6	170	45.9	3.600
Community involvement is necessary for the successful conservation and management of wetlands.	89	24.1	222	60.0	9	2.4	27	7.3	23	6.2	2.116
I support the implementation and enforcement of wetland protection policies to ensure their long-term preservation.	102	27.6	115	31.1	40	10.8	55	14.9	58	15.7	2.600
Education and awareness programs can significantly contribute to fostering a greater appreciation for wetland conservation.	111	30.0	100	27.0	22	5.9	69	18.6	68	18.4	2.683
I understand the importance of proper management of wetland resources for their sustainable use.	177	47.8	89	24.1	4	1.1	62	16.8	38	10.3	2.175

Source: Primary data, 2023

The questions above examine community perceptions and engagement in wetland conservation efforts in these areas, based on a recent study that utilized ten statements to gauge awareness, participation, and attitudes toward conservation. The study revealed that the community in Kyetinda and Mabamba wetlands demonstrates a considerable awareness of ongoing conservation efforts and policies, with a mean score of 2.397, indicating a moderate level of awareness. This

suggests that while there is recognition of conservation initiatives, there is ample opportunity for enhancing community engagement and understanding of the critical role wetlands play in sustainable livelihoods. Active participation in conservation activities scored a mean of 2.800, also in the moderate range. This indicates that community members are moderately engaged in conservation efforts, but there is significant potential for increased involvement. Enhanced participation could amplify the effectiveness of conservation initiatives, ensuring more robust and sustainable outcomes for wetland ecosystems. The community reports noticeable changes in wetland ecosystems, such as water quality deterioration and habitat degradation, with a mean score of 3.629, which falls in the high range. This heightened awareness underscores the urgent need to address environmental issues to safeguard the well-being of the community and preserve the integrity of wetland ecosystems. The awareness of the degradation highlights the community's acute perception of environmental changes, which is crucial for mobilizing local action and support for conservation measures. A strong belief in the crucial role of wetland conservation in maintaining local environmental health is evident, with a mean score of 3.521 in the high range. This reflects the community's understanding of the direct impact of conservation efforts on their environment and livelihoods. Recognizing the essential role of protecting wetland habitats for preserving biodiversity scored 3.413, also in the high range.

This indicates a strong community awareness of the interconnectedness between wetland conservation and biodiversity, emphasizing the importance of these efforts for sustaining a rich ecological environment. Awareness of the role wetland conservation plays in mitigating climate change impacts is robust, with a mean score of 3.600. This suggests that the community understands the broader implications of wetland conservation in addressing climate-related challenges, contributing to long-term resilience. Expressing support for the implementation and enforcement of wetland protection policies scored a mean of 2.600, indicating moderate endorsement. This points to the necessity of balanced regulatory frameworks that can gain stronger community backing through increased awareness and advocacy. Recognizing the significant contribution of education and awareness programs to fostering greater appreciation for wetland conservation scored 2.683. This underscores the potential for expanded educational initiatives to enhance community understanding and support for conservation efforts. Understanding the importance of proper management of wetland resources for sustainable use scored a mean of 2.175, reflecting a moderate level of awareness. This indicates room for further education and advocacy

to promote sustainable practices in wetland resource management. Emphasizing the necessity of community involvement in successful wetland conservation and management scored 2.116, suggesting that community engagement is recognized but could be significantly improved.

4.2 Qualitative results for wetland conservation and community livelihood

The study also obtained the qualitative findings that concern wetland conservation and community livelihoods of people living around the wetlands as reflected in Table 2.

Table 2. showing the thematic content analysis of narratives on Qualitative results for wetland conservation and community livelihood

Theme	**Narrative**	**Inference**
Habitat protection	*'Protecting the cutting of wetland vegetation and damaging of the wetland buffer zones, prevention of water pollution"*	Protecting wetland vegetation and buffer zones, along with preventing water pollution, underscores the importance of habitat protection in maintaining wetland integrity and ecological balance.
Perceptions of the impact of wetland conservation on the local environment	*"If wetlands are conserved, the adjacent local environment is likely to improve in terms of good climate, reliable rainfall, and safe water for drinking, increased in species biodiversity".*	Perceptions highlight the positive impact of wetland conservation on the local environment, emphasizing improved climate, reliable rainfall, safe drinking water, and increased biodiversity.
Changes in the community's livelihoods resulting from wetland conservation efforts?	*"Wetland conservation has improved on the livelihoods of different communities in areas where some efforts have been extended to such, communities in Pallisa district*	Wetland conservation efforts have positively transformed community livelihoods, as evidenced by shifts from lower-income rice farming to more profitable fish farming, benefiting communities like

	residing near Imoto scheme, Buseeta that were originally rice farmers earning less to fish farming earning more".	those near the Imoto scheme in Pallisa district and Buseeta.
How has wetland conservation led to the development of alternative livelihood opportunities for the community	*"Wetland conservation has led to the initiation of different income generating ventures for the various adjacent communities such as fish farming, poultry keeping, apiary (beekeeping), piggery"*	Wetland conservation has catalyzed the development of alternative livelihoods, fostering income-generating ventures like fish farming, poultry keeping, beekeeping, and piggery among adjacent communities.
The level of community engagement in wetland conservation activities	*"At the local level through community-based and catchment management plans where the communities and other stakeholders are put on the forefront of managing wetland resources".*	Community engagement in wetland conservation is robust, with local participation through community-based and catchment management plans, highlighting the significance of involving stakeholders in resource management.
The level of awareness and education within the community regarding the importance of wetlands	*"Different sensitizations and stakeholder engagement meetings in different areas to create awareness to the communities, regarding the importance of wetland resources".*	Efforts to raise awareness and educate communities about wetland importance are evident through sensitization campaigns and stakeholder engagement meetings, emphasizing the role of knowledge dissemination in conservation.
The respondents' expectations for the future of wetland conservation in the area	*"Creating more eco-parks along Mabamba wetland and initiating one on Kyetinda wetland. Formulating more community-based management plans for these wetlands by putting the local people at the forefront of management".*	Respondents anticipate the expansion of eco-parks, particularly along the Mabamba and Kyetinda wetlands, and advocate for more community-centric management plans to enhance wetland conservation efforts in the area.

State your awareness of existing conservation and management policies related to Kyetinda and Mabamba Wetlands.	*"For Kyetinda and Mabamba wetlands, there are no local policies, existing. However, the national policy exists to oversee and regulate all activities done in wetlands is the National Environmental Act, 5 of 2019".*	While there are no local conservation and management policies specifically for Kyetinda and Mabamba wetlands, overarching national regulations like the National Environmental Act, 5 of 2019, govern and regulate activities within these wetland areas.

4.3 Correlation analysis for wetland conservation and community livelihood

To assess whether there is a relationship between wetland utilization and community livelihood in Kyetinda and Mabamba wetland, Pearson's product-moment correlation coefficient was generated at (a 95%) confidence level to compute the degree and direction of the relationship between the two variables, and the results are presented in Table 3.

Table 3 showing the correlation matrix for wetland conservation and community livelihood

		Wetland conservation	Community livelihood
Wetland conservation	Pearson Correlation	1	. 546**
	Sig. (2-tailed)		.000
	N	370	370
Community livelihood	Pearson Correlation	.546**	1
	Sig. (2-tailed)	.000	
	N	370	370

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows that there is a high positive relationship between wetland conservation and community livelihood in Kyetinda and Mabamba wetlands, (r = 0.546, p = 0.000, n = 370). The relationship is statistically significant at a 95% confidence level since the p-value (Sig.) equals 0.000 (<0.050). This means that improvements in wetland conservation shall be related to improvements in community livelihood in Kyetinda and Mabamba wetlands. Similarly, decline in wetland conservation shall be related to a decline in community livelihood in Kyetinda and Mabamba wetlands.

4.4 Regression analysis for wetland conservation and community livelihood

Regression analysis was used to evaluate whether wetland conservation has a significant influence on community livelihood in Kyetinda and Mabamba wetlands. The coefficient of determination (R Square) under regression analysis is presented in Table 4.

Table 4. Model Summary for wetland conservation and community livelihood

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.546	.298	.296	. 30481

a. Predictors: (Constant), Wetland conservation

Table shows Pearson's correlation coefficient (R = 0.546), Coefficient of determination or R Square of 0.298, and Adjusted R Square of 0.296. An adjusted R Square of 0.296 means that wetland conservation accounts for only 29.6% of the variance in community livelihood in Kyetinda and Mabamba wetlands. This means that apart from wetland conservation other factors contribute to community livelihood in Kyetinda and Mabamba wetlands.

To assess the overall significance of the regression model for wetland conservation and community livelihood in Kyetinda and Mabamba wetlands, regression coefficients were generated, and the results are presented in Table 5.

Table 5. Coefficients for wetland conservation and community livelihood

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.305	.155		21.327	.000
	Wetland utilization	.189	.043	.546	4.360	.000

a. Dependent Variable: Community livelihood

To establish whether wetland conservation is a predictor of community livelihood in Kyetinda and Mabamba wetlands and determine the magnitude to which wetland conservation influences community livelihood in Kyetinda and Mabamba wetlands, Standardized Beta and t Coefficients were generated. For the magnitude to be significant the decision rule is that the t value must not be close to 0 and the p-value must be less than or equal to 0.05. Since the t-value of 4.360 is not close to 0 and the p-value<0.05 (=0.000), the study confirmed that wetland conservation is a predictor of community livelihood in Kyetinda and Mabamba wetlands. A standardized Beta

coefficient of 0.546 means; that every 1-unit increase in wetland utilization will lead to an increase of 0.546 units of community livelihood in the Kyetinda and Mabamba wetlands.

Research findings from correlation analysis established that wetland conservation has a moderate positive statistically significant relationship with community livelihood in Kyetinda and Mabamba wetlands. Findings from regression analysis confirmed that wetland conservation has a statistically significant positive influence on community livelihood in Kyetinda and Mabamba wetlands. The study therefore rejected the null hypothesis that was stated thus: ***(H_0) - There is no statistically significant relationship between wetland conservation and community livelihood.***

To establish whether wetland conservation is a predictor of community livelihood in Kyetinda and Mabamba wetlands and determine the magnitude to which wetland conservation influences community livelihood in Kyetinda and Mabamba wetlands, Standardized Beta and t Coefficients were generated. For the magnitude to be significant the decision rule is that the t value must not be close to 0 and the p-value must be less than or equal to 0.05. Since the t – t-t-value of 4.360 is not close to 0 and the p-value<0.05 (=0.000) as shown in Table 6, the study confirmed that wetland conservation is a predictor of community livelihood in Kyetinda and Mabamba wetlands. A standardized Beta coefficient of 0.546 means; that every 1-unit increase in wetland utilization will lead to an increase of 0.546 units of community livelihood in the Kyetinda and Mabamba wetlands.

Table 6: Coefficients for wetland conservation and community livelihood

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	3.305	.155		21.327	.000
	Wetland utilization	.189	.043	.546	4.360	.000

a. Dependent Variable: Community livelihood

Research findings from correlation analysis established that wetland conservation has a moderate positive statistically significant relationship with community livelihood in Kyetinda and Mabamba wetlands. Findings from regression analysis confirmed that wetland conservation has a statistically significant positive influence on community livelihood in Kyetinda and Mabamba wetlands. The study therefore rejected the null hypothesis that was stated thus**:** ***(H0) - There is no statistically significant relationship between wetland conservation and community livelihood.***

The results from regression analysis, specifically highlight the predictive potential of the independent variables (Wetland utilization and wetland conservation) on the dependent variable (Community livelihoods). Regression statistics indicate an R of .726[a], an R Square of .528, and an Adjusted R Square of .519.

Adjusted R Square

The Adjusted R Square value of 0.519 adjusts the R Square value for the number of predictors and sample size in the regression model. It provides a more conservative estimate of the proportion of variability in the dependent variable explained by the independent variables. In this case, the adjusted R Square value remains high (0.519), indicating that the predictive potential of the independent variables on community livelihoods is robust even after considering the model complexity and sample size.

5. Discussions

Wetland conservation was found to be one of the predictors of community livelihoods by this study. There was a moderate positive relationship between wetland conservation and community livelihoods in the peri-urban wetlands of Kyetinda and Mabamba, ($r = 0.546$, $p = 0.000$, $n = 370$). The relationship was statistically significant at a 95% confidence level since the p-value (Sig.) was equal to 0.000 (<0.05). This meant that improvements in wetland conservation could be related to improvements in community livelihoods in the peri-urban wetlands of Kyetinda and Mabamba. A standardized coefficient beta of 0.404 means that wetland utilization accounts for only 40.4% of the variance in community livelihoods in the peri-urban wetlands of Kyetinda and Mabamba.

The community in Kyetinda and Mabamba wetlands demonstrates a moderate awareness of ongoing conservation efforts and policies, with a mean score of 2.397. This indicates some recognition of these initiatives but suggests the potential for enhancing community engagement

and understanding of wetland conservation's importance for sustainable livelihoods (Brown et al., 2017; Millennium Ecosystem Assessment, 2005).

Similarly, community participation in conservation activities is also moderate, with a mean score of 2.800, highlighting the need for increased engagement. Initiatives like local conservation committees and participatory monitoring programs could foster greater community involvement and ownership of conservation projects (Green & Adams, 2018; Pretty, 2003).

Significant changes in wetland ecosystems, particularly in water quality and habitat degradation, are noted with a high mean score of 3.629. This heightened awareness underscores the urgency of addressing these issues to ensure community and ecosystem well-being. Implementing adaptive management strategies that involve community monitoring and decision-making can help mitigate these environmental changes (Jones & White, 2020; Folke et al., 2005).

There is a strong belief in the importance of wetland conservation efforts, with a mean score of 3.521, emphasizing the community's understanding of the direct impact on local environmental health and livelihoods. Educational programs that highlight the benefits of wetland conservation can further reinforce this belief (Smith, 2021; Millennium Ecosystem Assessment, 2005).

High community recognition of wetlands' role in biodiversity preservation, with a mean score of 3.413, reflects awareness of the interconnectedness between conservation and biodiversity. This underscores the need for strategies that prioritize protecting diverse plant and animal species to support a rich ecological environment. Collaborative projects involving local communities in biodiversity monitoring and habitat restoration can enhance these efforts (Brown et al., 2019; Berkes, 2004).

Strong awareness of wetlands' role in mitigating climate change impacts, with a mean score of 3.600, suggests an understanding of wetland conservation's broader implications for long-term resilience against climate-related challenges. Promoting ecosystem-based adaptation approaches can further strengthen community resilience (White, 2020; Munang et al., 2013).

However, the necessity of community involvement in successful wetland conservation and management is only moderately recognized, with a mean score of 2.116. Programs that empower local communities through capacity building and support for community-led conservation initiatives can enhance their involvement and commitment (Jones & Smith, 2019; Pretty, 2003).

Support for wetland protection policies is moderate, with a mean score of 2.600, indicating a need for balanced policy frameworks that involve local stakeholders to increase community support and compliance (Adams & Green, 2021; Ostrom, 1990).

The community moderately appreciates the significant contribution of education and awareness programs, with a mean score of 2.683. Enhanced educational programs tailored to local contexts can deepen community understanding and support for wetland conservation (Smith, 2021; Millennium Ecosystem Assessment, 2005).

Understanding the importance of proper management of wetland resources for sustainable use is reflected by a mean score of 2.175, indicating room for further education and advocacy on sustainable practices. Integrating traditional knowledge with scientific approaches in resource management plans can promote sustainable use and conservation of wetland resources (Green & Adams, 2022; Berkes, 2004).

Interestingly, the study introduces wetland conservation as a critical predictor of community livelihoods, complementing the previously identified factor of wetland utilization. This aligns with Turner and Brown's (2018) holistic perspective, which emphasizes the importance of considering both use and preservation in wetland management for sustainable community outcomes.

The standardized coefficient beta of 0.404 for wetland conservation implies that it accounts for 40.4% of the variance in community livelihoods. Although this is lower than the variance explained by wetland utilization in prior research, it underscores the significant role of conservation. This nuance supports Wang and Chen's (2020) view of the multifaceted factors influencing community livelihoods in wetland environments.

The positive association between wetland conservation and community livelihoods has significant implications for sustainable development, aligning with Ahmed et al. (2021), who stressed the need for conservation measures to safeguard wetlands' ecological integrity and support dependent communities. Integrating conservation practices into broader development strategies is vital for fostering resilience and long-term well-being.

However, potential trade-offs and conflicts between wetland utilization and conservation must be considered. Scholars like Turner et al. (2019) have highlighted the challenges of balancing conservation goals with socio-economic needs. Striking a balance that ensures ecological

sustainability and community welfare is crucial, and policy interventions should navigate potential conflicts.

The study advocates for a holistic approach to wetland management that incorporates both conservation and utilization aspects. This echoes Jones and Brown's (2016) sentiments on the interconnectedness of ecological health and community well-being. Policymakers should recognize the synergies between conservation and utilization, aiming for integrated strategies that enhance ecological resilience and community livelihoods.

Identifying wetland conservation as a predictor for community livelihoods opens avenues for future research. Further investigations could explore specific mechanisms through which conservation efforts impact community well-being. Adopting an adaptive management approach, as suggested by Robinson et al. (2017), would enable policymakers to refine strategies based on ongoing assessments, ensuring that conservation initiatives effectively sustain both wetlands and local communities' livelihoods.

6. Conclusion

The study indicates a moderate positive relationship between wetland conservation and community livelihoods in the peri-urban wetlands of Kyetinda and Mabamba. Wetland conservation significantly influences community well-being, while factors such as wetland utilization also play crucial roles. This underscores the complex and interconnected nature of variables affecting community livelihoods in wetland environments.

7. Recommendations

For the Government (Ministry of Water and Environment), Enforce strict zoning laws and conduct continuous land use monitoring to protect wetland areas. Educate and train communities on crop rotation, organic farming, and sustainable land use practices. Engage communities in conservation efforts, promote tree planting, and restore degraded areas. Highlight the benefits of wetlands to local communities and incorporate them into management strategies to foster support for conservation efforts.

For the Local Community, the local community members should comply with the wetland zoning laws and regulations Comply with Zoning Regulations. They should participate in wetland

conservation through maintaining a healthy wetland by engaging in reforestation and monitoring program initiatives. Reduce the use of harmful chemicals and fertilizers to protect wetland ecosystems. Protect breeding habitats and promote ecotourism as a sustainable economic activity to preserve wetland resources.

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1.

2.

3.

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