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WETLAND DEGRADATION IN ZOMBO DISTRICT, UGANDA: A STUDY ON THE PERCEPTIONS OF THE LOCAL COMMUNITY

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ABSTRACT

This study focuses on the perception of the local community regarding wetland degradation in Zombo district, Uganda. The district has had several wetland restoration and conservation interventions by both the government and development partners. However, the community continues to encroach on and destroy these wetlands, particularly for crop cultivation, sand mining, brick laying and other unsustainable extraction and utilization of the wetland resources. It is therefore important to ascertain the awareness of the local community regarding the causes and implication of degrading wetlands, and their views on how the wetlands can be effectively managed and conserved. It is equally important that wetland restoration and conservation interventions are designed in a way that is accepted by the community to ensure sustainable management and utilization of these wetlands. Purposive sampling was used to select 15 interviewees. Semi structured interviews were conducted, and thematic data analysis was used. The findings revealed that the local community is aware of the socio-economic benefits they derive from wetlands but knowledge about the ecosystem services rendered by wetlands is limited. The local community is also aware of the causes of wetland degradation, but they continue to cultivate in the wetlands because it has been a practice for generations. The local community have a high dependency on the wetlands for their survival especially during the dry season. There is inadequate community awareness creation on sustainable wetland utilization and management and limited community engagement in the management of wetlands in Zombo district. Therefore, the study recommends that the government should help improve community standards of living by providing alternative sources of livelihoods and encourage a mindset change regarding how the wetlands should be used. Importantly, integrated wetland management should be used to conserve and restore the wetlands.

Key words: wetland degradation, wetland restoration, wetland management, Uganda

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1. INTRODUCTION

Wetlands are one of the most economically valuable and productive ecosystems in the world (Moreno-Mateos et al. 2012). They provide a range of ecosystem goods and services that include hydrological functions, carbon storage, biodiversity conservation, fish production, erosion control, fuel production and recreation. Despite the importance of wetlands, their quality and quantity continue to be degraded (Mironga 2005; Rebelo et al. 2010; Sinthumule 2021). This is due to the over exploitation of these resources related to human activities such as agriculture, settlements, and unsustainable utilization of the wetland resources. Depending on region, 30-90% of wetlands in the world have already been degraded especially those within densely populated regions like Western Europe and China, with water shortages like in Australia, and with powerful agro-industries like in the USA (Junk et al. 2013). Africa is awaiting a similar level of degradation (Schuyt 2005).

In Uganda, 13% of the total land area is wetlands with their importance mostly linked to direct use value, for example human settlement and crop growing. Whereas their vital ecological services, like regulating services (air quality regulation, climate regulation, water purification, pest and disease regulation and natural hazard regulation), supporting services (nutrient cycling, pollination, soil formation) and cultural services (spiritual enrichment, recreation, ecotourism, aesthetics, formal and informal education, inspiration, and cultural heritage) are ignored (Willbroad & Kiyawa 2019). These wetlands have been under increasing threat due to the rising population pressure and scarcity of land (Huising 2002). This is seen in a considerable reduction in wetland cover from 15.5% in 1994 to 8.9% in 2016 (Anywar 2020), and the rate of loss and degradation is not matching the restoration targets and resources set by the government. Therefore, protection and conservation of these wetlands should be prioritized.

Zombo district has had several wetland restorations and conservation interventions initiated equally by the government and development partners (G Bedijjo, 2 May 2023, Zombo district local government, personal communication). Nevertheless, the community continues to encroach on and destroy these wetlands especially for crop cultivation, sand mining, brick laying and unsustainable extraction and utilization of the wetland resources. It is therefore important to ascertain the awareness of the local community on the causes and implication of degrading wetlands, as well as their views on how wetlands can be effectively managed and conserved (Moges et al. 2018). Additionally, understanding the perceptions of the local community living around the wetlands is essential (Sinthumule 2021) as this can give insights into people's behaviours and the degree to which they are willing to coexist with a specific natural resource. It also enables interventions to be designed in a way that is accepted by the community to ensure sustainable management and utilization of these wetlands. Therefore, this study seeks to assess the perceptions of the local community on wetland degradation in Zombo district.

1.1 Purpose of the study

The purpose of the study was to assess the perception of the local community on wetland degradation in Zombo District, Uganda. The specific objectives of the study were:

i. To assess the local community awareness of the causes and implications of wetland degradation in Zombo district.
ii. To characterize the local community suggestions for involvement in management and restoration of wetlands in Zombo district.

iii. To determine how the current management and restoration approaches can be changed from top-down to bottom-up in Zombo district.

1.2 Perception of local community on wetland degradation

Evidence from former studies show that communities living on the periphery of wetlands are aware of the ecosystem services and socioeconomic benefits of wetlands and the consequences of wetland degradation (Moges et al. 2018; Mandishona & Knight 2019). Despite this, some communities do not prioritize sustainable utilization and management of these wetland resources (Moges et al. 2018). This is due to land shortage and the dependency of people on wetlands for their livelihoods. A study by Dalu et al. (2022) in South Africa noted that the local communities were more interested in the benefits they derive from wetlands than their conservation due to the high unemployment rates that lead to dependency on wetland use.

On the other hand, some studies show that some communities are willing to conserve wetlands because of the benefits they derive from them. A study carried out in Duthuni village, Vhembe District in Limpopo Province, South Africa showed that community members had a positive attitude towards wetlands and wetland conservation (Sinthumule 2021). The motivation tended to be ethical with some members willing to donate money for wetland conservation and others willing to vote for any politician who promised to protect wetlands. This attitude offers hope for sustainable utilization of wetlands. Eduful and Shively (2015) noted in their study conducted in Ghana that affluent communities had richer knowledge on degradation compared to their poorer counterparts. That knowledge was put into practice only by the affluent due to their economic capacity.

A study conducted in Sinana district of Zale zone, South Eastern Ethiopia, found that the majority of local people do believe that the ecosystem services they get from wetlands have decreased due to wetland degradation and that this in turn is a threat to their livelihoods (Abdela et al. 2023). One of the causes of wetland degradation is poor participatory management of the wetlands among local stakeholders (Dalu et al. 2022). This shows that top-down approaches are insufficient in management of wetland ecosystems. There is therefore a need to develop a shared understanding through bottom-up approaches. Local community involvement should be key in any regulations and policies aimed at protecting natural resources (Eduful & Shively 2015) to ensure acceptance and sustainability (Moges et al. 2018).

The main finding from previous research cited in this section is that people living in communities around wetlands are aware of different ecological functions played by the wetlands and they also know the effects of wetland degradation. However, sustainable utilization and management of wetland resources depends on the economic status of the communities. Those whose economic status is good are willing to sustainably utilize and manage the wetlands but those that have a less favourable economic situation see fewer possibilities in doing so. Furthermore, top-down management approaches are inadequate in wetland management since they do not promote local community participation.

2. METHODS

This section describes the study area, how the study was designed and conducted and how the collected data was analysed.

2.1 Study area

This study was carried out in Zombo district in the north-western part of Uganda (Figure 1). According to the 2014 national census, the district had a population of about 240,400 (Uganda Bureau of Statistics 2016) with an annual growth rate of 2.93%. The district has a total land area of 939.7 km^2, of which 5% is rivers and wetlands (Zombo district local government 2020). The district has a mainly tropical climate and, in some cases, bordering temperate due to its location within the eastern topographical rainfall zone. Rainfall is bimodal with peaks in April and August. Agriculture accounts for 84% of the district's land use with subsistence farming growing mostly food crops such as cassava, groundnuts, beans, sweet potatoes, Irish potatoes, and bananas (Zombo district local government 2020).

Administratively, the district comprises of two counties, Okoro and Ora, and 13 lower local governments. For this study, communities from the three sub counties of Athuma, Jangokoro and Akaa were considered because they are the users of the Nyagak wetland which sustains the water flow of river Nyagak, the biggest river in the district.

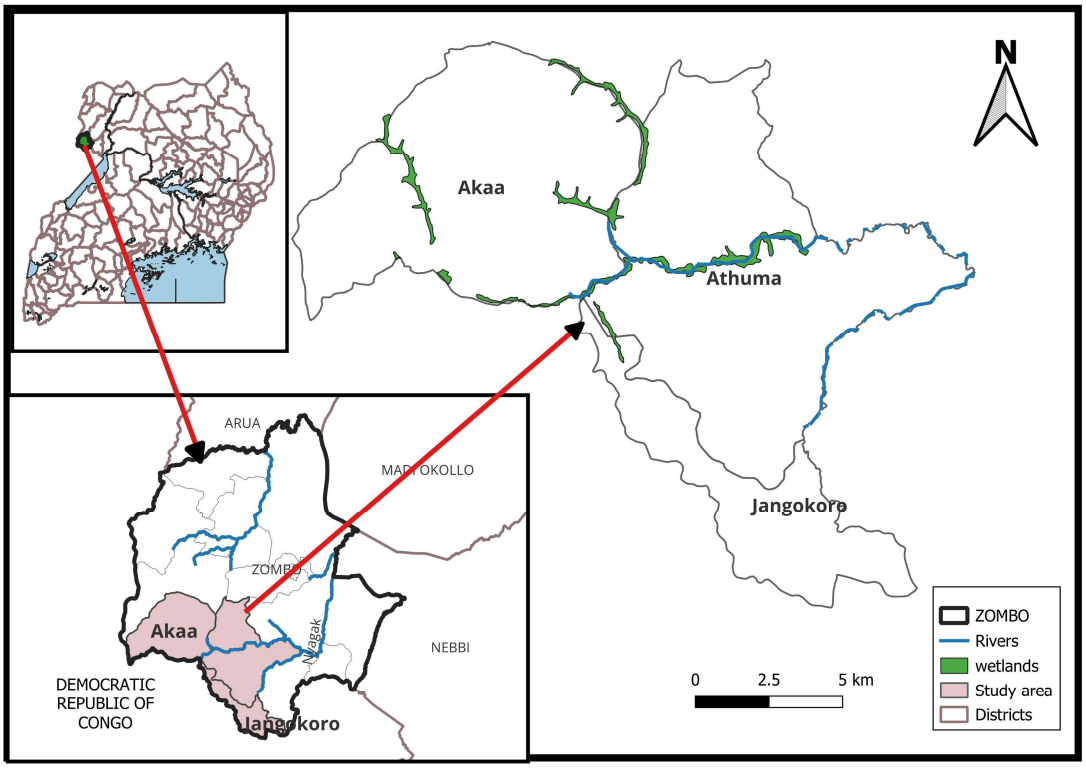


Figure 1: Map of the study area. (Source: Uganda Bureau of Statistics 2019).

2.2 Study design

For this study, a qualitative research approach was adopted where selected respondents were interviewed using a semi-structured interview guide during data collection (Merriam & Tisdell 2016). This approach enables a deeper understanding of a situation from those experiencing or who have experienced it, while also taking into consideration the importance of participants' individual points of view that can only be understood as a result of their experience and

worldview (Castleberry & Nolen 2018). It also involves getting people's spoken or written words and it enables one to see situations and the world through the eyes of other people (Taylor et al. 2016). This study purposively sampled 15 farmers from the three sub counties of Akaa, Jangokoro and Athuma. Purposive sampling was used because it enables the researcher to determine what information is required beforehand and then search for sources who can and are willing to provide that information based on their expertise or experience (Tongco 2007). In all, seven women and eight men were interviewed. The interviewees were selected based on their proximity to the wetland, gender and knowledge and experience as users of the wetland. Initially, the researcher intended to interview only five women, but the extension staff mobilised seven women due to miscommunication.

Subcounty extension workers compiled the list of respondents, some of whom were senior citizens who spoke for other community members who benefit from the wetland. The extension staff were used to identify the respondents because they work closely with the communities, and they know the wetland users. The head of the Natural Resources Department of Zombo district local government was involved as the supervisor during the data collection process. He oversaw the selection of interviewees and the hiring, training, and supervision of data collection assistants. He was chosen because of his expertise and experience in the management of natural resources in the district. Three data collection assistants were hired and trained to conduct the interviews. The researcher guided the supervisor through the interview guiding questions to ensure understanding of the interview questions. The supervisor in turn trained the data collection assistants.

The researcher instructed the supervisor to get consent from the interviewees in advance through the subcounty extension staff. The venue and time of the interview was scheduled by the interviewees. The interviews were conducted in the local language as all three data collection assistants speak the local language (Alur). The assistants also translated from English into the local language since the interview guide was in English. One data collection assistant was a woman and two were men. The female assistant interviewed five women who were selected from one subcounty. This was to enable the women to be comfortable and speak freely. The other two women were selected among the five respondents from the second subcounty. They were interviewed by the male data assistant who interviewed respondents in that subcounty. As deducted from the interview audio recording, the two women interviewed by the male data assistant seemed able to speak freely to the interviewer.

Data was collected in the first week of July 2023. During data collection, the assistants explained the purpose of the study to the interviewees before the interviews started and permission to record the interviews was also sought. This was to confirm their consent and to put them at ease while answering the questions. Each interview was audio recorded, and written notes were taken for the responses. All interviews were conducted in the local language and the responses were translated and written in English by the data collection assistants. The audio recordings were all in the local language and the researcher was able to listen to the interviews clearly. The interviews were 40 minutes each on average with the shortest being 20 minutes and the longest 70 minutes. All the respondents were available for the interviews, but some interviews were rescheduled for different days because of a change in the weather. Because of the short time allocated to each interview, probing was sometimes limited, and the interview was also sometimes hurried by asking the next question before an interviewee had finished answering or elaborating on the previous one. This caused the study to miss out on some personal stories and experiences.

2.3 Data analysis

The data collection supervisor sent the audio recordings and scanned written notes to the researcher, who was based in Iceland, after the interviews were completed. The written notes contained the interviewees' answers as recorded by the interviewers. The researcher listened to the audio recordings and compared them to the written notes to make sure that all relevant information was captured in the notes from the interviews. Thematic analysis was used to analyse the data (Vaismoradi et al. 2013) whereby the responses from the interviews were organized in themes according to the study objectives. This was done in such a way that the audio recordings were listened to and transcribed into English text. The responses were coded using Microsoft Excel. Open coding was used since the themes identified were based on the responses given and the study objectives. After that, the data was scrutinized for any issues and then it was used to create patterned interpretations and conclusions according to the study objectives.

3. FINDINGS

The themes presented in this section are the awareness on the ecological and economic importance of wetlands in Zombo district, suggestions for participatory wetland management in Zombo district and proposed approach on wetland management and restoration in Zombo district.

3.1 A way of living: Awareness on the ecological and economic importance of wetlands in Zombo district

The study revealed that wetlands are vital to the livelihood of the people of Zombo district. The majority of the inhabitants are subsistence farmers who depend on rain fed agriculture. They use wetlands mainly for crop cultivation and the extraction of wetland resources like sand and vegetation (papyrus and reeds). These wetlands have been degraded due to unsustainable utilization of their resources, but the community does not have alternative sources of livelihood. All the farmers interviewed acknowledged that they derive some of their livelihoods from the activities they do in the wetland. These activities included crop growing, fish farming, harvesting of the wetland plants such as reeds, papyrus, and elephant grass for construction and sale (Figure 2). Out of the socio-economic activities mentioned, crop growing was ranked as the most important activity done in the wetland. Crop growing in the wetlands is carried out during the dry seasons, whereas during the wet seasons, cultivation is done uphill from the wetlands. This has been a cultural practice for generations.

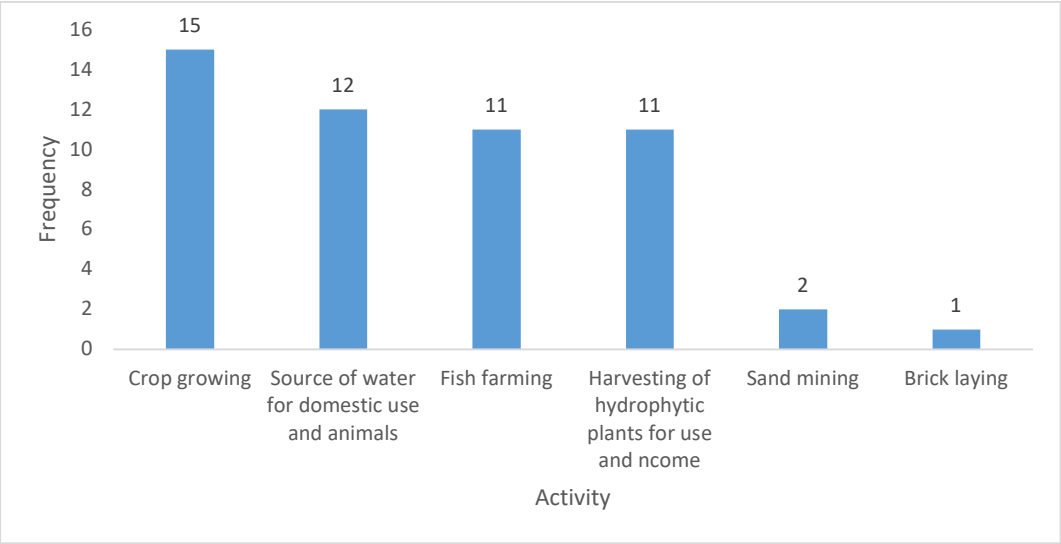


Figure 2: Activities in the wetlands that the interviewees engage in for their livelihood.

A male respondent described some of the activities done in the wetlands:

> *We get a lot of benefits from this wetland […] During the dry seasons we cultivate the wetland and plant crops such as beans, potatoes, sugarcane, maize, vegetables, tomatoes and so many more. And this is the most important activity we do in this wetland […] Fish farming is also done in the wetlands whereby fishponds are constructed, and fish is raised. The water we use for domestic use is drilled from the wetland and it is also a source of drinking water for our livestock […] we also harvest resources from the wetland, such as papyrus, that are used as building materials, and we also sell some to increase our income.*

Whereas all the respondents listed the socio-economic benefits of the wetland, nine were able to mention some of the other ecological functions of wetlands. This implies that they attach more value to the socio-economic benefits they derive from wetlands than their ecological importance. The functions mentioned included rainfall formation, regulation of temperatures, habitat for animals, sustaining the flow of the river Nyagak, and purification of water. A male respondent mentioned the importance of wetlands as habitats for some animals and how the presence of these animals can be used to determine the level of degradation:

> *This wetland pulls for us rainfall in this area […] I also know that wetlands are habitats of some animals like frogs whose reduction or disappearance from the wetland are used as an indicator of degradation […] Another benefit of wetlands is that they have some animals that are used for educational purposes in schools*.

Another male respondent mentioned the hydrological function of the wetlands and the importance of the wetlands to their microclimate:

> *The water from this wetland feeds into river Nyagak so it sustains the flow of the river […] We the people of this subcounty enjoy cool temperatures compared to other areas because of this wetland.*

3.1.1 Utilisation and responsibility issues

All the respondents acknowledged that the wetlands have deteriorated over the years in both quality and size. This is seen as negative changes mentioned by the respondents, which include reduction in water level, flooding during the rainy season, reduction or disappearance of some plant and animal species and reduction in crop yield. It was noticeable from the data that those older than 60 years had more information on these changes compared to those younger than 50 years. They all attributed the degradation to their own unsustainable utilization of the wetlands and their resources. An elderly female respondent mentioned that:

> *There has been loss of some plant species in this wetland[…]When I got married in this village, the wetland had reeds which we harvested over the years and they are not there anymore […] the vegetation cover has also changed over the years, instead of the reeds, elephant grass, couch grass that we had before, now we have another type of vegetation which is not as useful […] the water level has also reduced compared to what we had before when the wetland was waterlogged […] crop yield has also reduced as a result of loss of soil fertility […] The water level has reduced because of the way we reclaim and cultivate the wetlands.*

The respondents also recognized that they are experiencing the effects of wetland degradation due to their own activities. A male respondent mentioned that:

> *The changes we are seeing and experiencing in and around the wetlands are because of the way we are using these wetlands [...] the water level has reduced because of the way we are draining the wetlands for cultivation. We are experiencing floods during the rainy season because of the reduction in size of our wetlands. […] Because of over harvesting papyrus and reeds, we do not have them anymore and they are very scarce in those areas that still have them.*

Whereas these farmers acknowledge that the degradation of the wetlands is because of their activities, they still believe that cultivating in wetlands is not wrong since it has been a cultural practice for generations. They believe that the government can teach them a better way of sustainably cultivating in the wetlands. A female respondent said:

> *I don't think stopping us from cultivating in the wetland is the solution because even our grandparents cultivated these wetlands. They are the only way we can grow food crops during the dry season […] Government should sensitize and train us on the right way of cultivating in these wetlands because right now the wetlands are not giving us good yields.*

Another female respondent believes that since the wetlands are not producing good yields as before, the government can provide them with high yielding crops that can be cultivated in the wetlands.

> *Government should provide us with crop seeds that can do well in the current state of the wetland because currently our crop yields are low due to the reduction of soil fertility.*

3.2 Suggestions for participatory wetland management in Zombo district

The respondents stated that the community is not involved in project planning in the district as projects are designed without consultation with the community. This has contributed to the continued degradation of these wetlands. The majority of the respondents acknowledged that the government carries out activities around the wetland. These activities are mainly community sensitization to the dangers of encroaching on the wetland, and demarcation of buffer zones with pillars and, in some places, with the planting of indigenous trees. Even with these efforts by the government, the community continues to cultivate beyond the buffer zones and unsustainably harvest wetland resources. However, all respondents mentioned that the community is not involved during planning of these projects. Most of the female respondents stated that they are not informed of some interventions and are not involved in any way. Whereas most of the male respondents stated that they are informed about projects before and during implementation, they are mainly involved as a source of labour. A female respondent stated that:

> *Sometimes the government implements projects in our wetland without us knowing…. for example, I saw pillars planted along the wetlands. I think they are demarcations for wetland boundaries, but I was not informed about that intervention before implementation. Maybe they might have informed the local council I chairman and some few people because I see people are still cultivating beyond the pillars.*

Whereas a male respondent confirmed that he was informed about an intervention:

> *Yes, government demarcated the buffer zone with pillars. Not everyone respects the demarcations, some people still cultivate beyond the buffer zone […] The government uses our area councillors and local councils to inform us of any projects that are going to be implemented in or around the wetlands.*

The respondents suggested a participatory wetland management where government agencies and/or NGOs that want to restore and manage the wetland have a joint project planning with the communities around the wetlands. This will enable the views of the community to be taken into consideration. A male respondent said:

> *The government should carry out joint planning and implementation with us the local community so that our views are taken into consideration in these projects […] The government should continuously sensitize us as some community members see some of these interventions as land grabbing by the government.*

Another male respondent suggested that the government should improve their standard of living and provide them with alternatives so that they are able to stop overexploiting the wetlands and their resources:

> *The reason why people are going into wetlands is because of land shortage. So, I suggest that the government should provide these people cultivating in wetlands with funds so that they are able to hire land uphill because so many people are cultivating in these wetlands, and they have been doing that for generations. Even me, I inherited this part that I am cultivating from my parents and if the government tells me to leave without giving me an alternative, how will I survive?*

3.3 Proposed approach in wetland management and restoration in Zombo district

The study revealed that there has been a top-down approach in the management and restoration projects. The projects are initiated and planned by government without community engagement. The community is only involved in the implementation stage where they are informed by the government implementers about the project and then the community members provide paid labour. These communities are then required to sustain the projects after implementation is completed with minimal supervision by the government. The projects fail because the community does not "own" them. The respondents suggested an integrated approach in wetland management and restoration where the project ideas are initiated by the government since the community might not have the capacity or knowledge to initiate projects. Planning and implementation should be jointly done by both the community and the government so that ideas from the community are also incorporated into the project design. This would ensure that the local community accept and own projects. A male respondent mentioned that:

> *The government and/or NGOs should come up with project ideas first and then come and plan together with us, the community members, on what to do because we, the community members, may not come up with any project ideas. Planning together will make us understand and implement the project activities well.*

Another male respondent had the same suggestion. He mentioned that:

> *Projects should be initiated by government technical staff from the subcounty or the district because we, the community members, do not have the capacity to initiate projects. The ideas should then be brought to the community for joint planning with the government staff. The community ideas and concerns should be taken into consideration […] this is because we, the community, are the users and misusers of the wetlands.*

This indicates that the community members have ideas and concerns on wetland management and that these can be addressed if the community is fully engaged in all the project stages.

4. DISCUSSION

This section discusses the main findings in relation to the study objective which was to assess the perception of the local community on wetland degradation in Zombo District, Uganda. The discussion is structured to answer the research questions which include: What are the causes and implications of wetland degradation in Zombo district? How do the local community in Zombo district want to be involved in the management and restoration of wetlands? And how can the current approach in wetland restoration and management be changed from top-down to bottom-up in Zombo district?

4.1 A way of living: Awareness on the ecological and economic importance of wetlands in Zombo district

The findings show that all the respondents were aware of the socio-economic benefits of the wetland. This is in line with a study conducted by Mandishona and Knight (2019) in Zimbabwe that showed that the majority of the people living in the periphery of wetlands are aware of the socio-economic benefits of wetlands. Moreover, not all the respondents were aware of the other

ecosystem services of the wetlands. This could be because the wetlands provide them with their immediate socio-economic needs (Moges et al. 2018). Bakema and Iyango (2000) noted that the perception of many people regarding wetlands is affected more by the direct benefits they derive from them than by their ecological functions. In Zombo district, where the community entirely depends on rain fed agriculture, the wetlands are their sources of food production during the dry seasons. They therefore value these wetlands for the socio-economic benefits they attain from them while not paying special attention the other ecological benefits of wetlands.

The findings also indicate that all the respondents were aware that the wetlands are degraded, and they acknowledged that it is because of their own agricultural activities and unsustainable utilization of the resources. However, because they cannot cultivate outside the wetland areas during the dry season and they do not have other alternative sources of livelihood, they have no other choice than to continue to cultivate in the wetlands even after being sensitized to the effects of wetland degradation. Due to their high dependency on wetlands for their livelihoods it is only natural that the local communities are more interested in the benefits they derive from wetlands than their conservation (Dalu et al. 2022). Other sources of livelihood that can improve standards of living should therefore be provided to this community to avoid the overexploitation of wetland resources. This is because affluent communities that have other livelihood options and good knowledge on degradation are the ones who put into practice good management practices due to their economic capacity (Eduful & Shively 2015). In this study, the respondents declared that they are willing to be engaged in wetland management, therefore they might be ready to take up alternative livelihoods if made available.

4.2 Suggestions for participatory wetland management in Zombo district

The community is not involved in the planning of projects. This might be one reason for why they continue to degrade the wetlands since they are unaware of the purpose of these initiatives. The community may also feel that these projects do not concern them as they were not informed about them at the initial stages. The study revealed that some community members are informed about interventions before implementations, whereas others are not informed. Participation in implementation is also limited to a few. Additionally, they lack other sources of livelihood that could deter them from overexploiting the wetland resources. These findings suggest that low involvement in management of wetlands by local communities that depend on wetland resources and have insecure livelihoods that are based on direct exploitation of natural resources, hinders conservation and restoration efforts (Shrestha 2013). In this study, the respondents noted that women are usually not involved in the implementation of projects. This is because of culture norms where women are left to handle domestic chores rather than attending village meetings where developmental matters are discussed. James et al. (2021) described how studies across different countries have found that because of societal or cultural norms, women are usually excluded from decision making in conservation and management of natural resources. This discourages some community members from accepting projects and renders the projects unsustainable. Therefore, both men and women should be involved in project planning and implementation for sustainability. Some studies show that female engagement in conservation efforts leads to positive results. For instance, a study in Bangladeshi wetlands showed that community resource management is more successful when both men and women are actively involved in conservation and management (Sultana & Thompson 2008). The female respondents in this study were eager to be involved in projects as could be seen in their suggestions to be involved in project activities.

The respondents suggested that the community should be involved in the planning of these projects. This should be done through community engagement in the planning and implementation processes. This would enable the inclusion of their views in project design and they would be able to accept and "own" these projects. Zaldívar-Jiménez et al. (2017) noted that to achieve sustainable impacts, it is important to involve the local community in restoration projects and to foster effective community engagement.

4.3 Proposed approach in wetland management and restoration in Zombo district

The current approach in wetland management in Zombo district is top-down where project initiation and planning are done without community engagement. The respondents preferred an approach where the government initiates projects, but the local community is fully involved in the planning and the implementation stages. This is because they do not have the capacity to initiate projects on their own. It was noted by Dalu et al. (2022) in a study conducted in South Africa that while the local community lacks the required resources and expertise to manage wetlands on its own, co-management by all parties was feasible. This was also seen in the positive attitude portrayed by the respondents in this study who are willing to work with the government and other stakeholders. This is in line with the 1992 Earth Summit held in Rio de Janeiro which proposed that in local resource management discussions, local communities should be engaged in all stages of planning, decision making, and project implementation in order to make decisions that are more locally acceptable, suitable and appropriate (Smith 2008). Engaging the community in Zombo district would enable effective information flow that can reach all community members including the women. This would also enable the women's ideas to be included and taken into consideration during decision making. This in turn may lead to project acceptance and sustainability. This finding suggests that there should be an integration of top-down and bottom-up approaches in wetland management in Zombo district.

The study had some limitations, particularly in data collection, because the data was collected in the absence of the researcher as the researcher was in Iceland and data was collected in Uganda. This might have affected the quality of the data. This was apparent from the interview recordings where some interviewees were not given an opportunity to elaborate on some of their responses. The interview questions were translated back and forth from English to the local language which could have led to distortion in the flow of responses. Therefore, the study findings must be taken and applied with caution.

5. CONCLUSIONS

The study revealed that the local community is aware of the socio-economic benefits they derive from wetlands, but knowledge of ecosystem services rendered by wetlands is limited to a few. This is because most of the community is mainly concerned with the direct value of the wetlands that contribute to their livelihood. There is also limited community sensitization to other forms of importance of wetlands in Zombo district according to the interviewees. The government is recommended to increase the intensity and coverage of community sensitization in the district to create awareness on the ecological importance of wetlands.

The study revealed that the local community has a high dependency on the wetlands for their survival, especially during the dry season when they produce food crops entirely in these wetlands. They continue to cultivate in these wetlands even with visible indicators of degradation because of poverty and a lack of alternative sources of livelihoods. The study

recommends that the government should improve their standard of living by providing the community with alternative sources of livelihoods. Irrigation should also be promoted in these communities so that during the dry season they are able to cultivate crops outside the wetlands.

Whereas the local community members are aware of the negative effects of their activities in the wetlands, they do not seem ready to make any restoration initiatives. Instead, they place the responsibility onto the government to initiate projects. This is because they believe that they do not have the expertise and resources to do it themselves. The government could empower this community by training and providing resources that can enable them to manage and restore these wetlands.

There is limited community engagement and awareness creation regarding sustainable utilization and management of wetlands in Zombo district. Therefore, the government and development partners are encouraged to use and promote integrated wetland management to conserve and restore these wetlands. Only then would the conservation and restoration projects be successful and sustainable in Zombo district.

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APPENDIX

Interview question guide

Biodata

1. Sex

Male ☐ Female ☐

2. Age: Below 25 years ☐ 25-49 years ☐ 50-74 years ☐ 75+years ☐
3. For how long have you been using this wetland?

Local community awareness on the causes and implication of wetland degradation

1. Do people in this sub-county use wetlands to generate benefits for their living (i.e., provide income & food)?
2. Can you tell me the major socio-economic activities that people do in this wetland for their survival?
3. Can you rate the above socio-economic activities from the most to the less frequently carried activities in wetlands?
4. What changes have you noticed in the use of this wetland over the years?
5. Are the numbers of people carrying out activities in this wetland increasing?
6. What changes do you see to the plants, animals and water level of the wetlands due to human activities?
7. Apart from the socio-economic activities being done in wetlands, what other benefits do you think wetlands provide to people in this area?
8. What effects do you think the socio-economic activities carried out in wetlands are having or will have on the importance of wetlands?

Local community suggestions for involvement in the management and restoration of wetlands

1. Do government agencies and/or NGOs carry out activities in and around wetlands for the protection and restoration of the wetlands?
2. How do the government agencies and/or the NGOs involve local community members in the protection and restoration of wetlands (i.e. from planning to decision making & participation in protection & restoration activities)?
3. What do you think is the best way wetlands can be protected and restored?
4. How best or in what ways do you think government agencies and/or NGOs should involve local community members in wetland protection and restoration?

How the current management and restoration approach can be changed from top-down to bottom-up.

1. What could be the best way to improve the wetland conditions in this area?
2. How are wetland management and restoration projects initiated in this area?
3. What could be the best way to initiate projects that improve the wetland condition? And why?
4. How would you like these projects to be implemented? And why?