

# **Wetland Use and Conservation in Peri-urban Communities: Reflections from Budeli, Mutoti and Mphego near Nandoni Dam, Limpopo Province, South Africa**

**Priscila Banda and Trynos Gumbo**

Department of Urban and Regional Planning  
University of Johannesburg  
PO Box 524 Auckland Park, 2006, South Africa  
[pbanda@uj.ac.za](mailto:pbanda@uj.ac.za), [tgumbo@uj.ac.za](mailto:tgumbo@uj.ac.za)

**Emmaculate Ingwani**

Senior Lecturer Department of Urban and Regional Planning  
Department of Urban and Regional Planning  
University of Venda  
Private Bag X5050 Thohoyandou, Limpopo, 0950  
[ingwani@gmail.com](mailto:ingwani@gmail.com)

## **Abstract**

The study analysed wetland resource uses and conservation perspectives in peri-urban communities of small towns. Wetland ecosystems provide many services to local communities amid threats of extinction and degradation. Wetland ecosystems are increasingly disappearing and this creates an imbalance in nature. This requires sustainable strategies to enhance conservation amid spatial development in the areas. The research is a phenomenal case study of three villages located in the peri-urban zone of Thohoyandou - a small town located in Limpopo Province of South Africa. The study is informed by the ecosystem services theoretical framework and adopted the mixed methods research approach to guide data collection. A household questionnaire survey was undertaken in Budeli, Mutoti and Mphego peri-urban villages of Thohoyandou town. A study sample of 309 households participated in this study. Descriptive statistics that included frequencies and percentages were used to analyse quantitative data, whereas thematic analysis was used to analyse qualitative data. The research findings reveal that wetland ecosystems support the livelihoods of households living in the peri-urban communities in many ways. Human land-use activities are key drivers of conversion of wetland ecosystems into residential, livestock grazing fields and brick molding areas in villages Budeli, Mutoti and Mphego respectively. From the study findings it was derived that perspectives on wetland use and conservation alone are not adequate to save and protect wetland ecosystems. Collaborative implementation of spatial planning legislations and practices to complement grassroots efforts by local communities to curb the disappearance of wetland ecosystems is greatly needed.

## **Keywords**

Conservation, Peri-urban villages, Small towns, Wetland ecosystems, Wetland use

## **1. Introduction**

Wetlands ecosystems provide many services of significant social, economic and environmental value to human well being, at the same time are ecologically sensitive (Ampatzidis and Kershaw 2020). This justifies the rising attention or interest to formulating and implementing sustainable management strategies for wetlands in recent years. The South African Department of Environmental Affairs (SADEA) (2018) affirms that in the context of South Africa as far as wetland management and rehabilitation in rural settings is concerned; they contribute significant social benefits for vulnerable communities and indirectly assist municipalities in achieving basic service provision. This is due to the fact that addressing the economic, developmental and spatial injustices of apartheid land policy and planning is a huge task. As part of this challenging task, municipalities have been given the Constitutional mandate to provide basic services to their populations especially previously disadvantaged communities. However, despite

two decades having passed since the abandonment of racially discriminatory policies many rural areas on the outskirts of cities lack basic services or lack an acceptable quality of basic services due to slow progress in basic infrastructure rollout, poor infrastructure planning and poorly maintained infrastructure due to the lack of financial resources to fund the establishment and maintenance of the required service infrastructure, in particular for the smaller municipalities and a lack of human capacity and skills to deal with the complex problems and constraints of achieving acceptable levels and qualities of service provision in rural areas. This implies that rural populations across South Africa still rely heavily on the natural resources for subsistence and the sustaining of livelihoods which is associated with rivers and wetlands. As a result wetlands continue to be destroyed at an alarming rate and are being poorly managed, this is concerning in the context that wetland degradation is not easily reversible as they are sensitive ecosystems and hence conservation of the existing ones is essential. In light of the urbanization processes in the developing world, projections shows that in Africa there is a gross overestimation of rural to urban migration and therefore confound the true definition of urbanization (Ferguson 2007). Studies have shown that permanent urban migration is decreasing in Africa and growth in established cities is a function of higher than normal birth rates in urban areas (Potts 2009). Literally rural is the new urban. Not only is the urban or rural dichotomy inadequate for addressing the needs of the growing populations in Africa, but the rural migration occurring on the continent is overwhelmingly toward smaller cities and towns (Collinson et al. 2007). Peri-urban areas represent the landscape interface between city and rural areas is no exception to population boom dynamics exacerbated by livelihood deficient copying mechanisms accompanied by natural resources use by the poor that include arable land for subsistence and commercial crops, grazing land, water and harvestable resources which all act as safety-net when municipal services are absent or fail (International Management Water Institute 2018). In light of the changing cityscapes, peri-urban areas are fast becoming urbanised and not much has been done to analyse wetland use and conservation by its local communities in the quest of meeting livelihoods so as to capture important information about wetland engagement with improving the status quo into a more sustainable one in these areas and hence justifies the need to carry out this study. In the case of Budeli, Mutoti and Mphego peri urban areas in the small town of Thohoyandou, wetland ecosystems surrounding these peri-urban areas are being affected negatively by development expansion on them, consequently leading to vulnerable and disappearance of them. These wetland ecosystems also have been seriously altered from their original state in terms of quality and size due to the pressure brought about by development creating an imbalance in nature.

### **1.1 Objectives**

The objectives of the study are

1. To examine wetland use in peri-urban communities of Budeli, Mutoti and Mphego
2. To analyze wetland conservation in peri urban communities of Budeli, Mutoti and Mphego
3. To profer strategies to improve wetland interaction with local communities in Budeli, Mutoti and Mphego.

## **2. Literature Review**

This section represents the findings of literature review on the concept of wetlands, wetland ecosystems, peri urbanity and small towns in South Africa.

### **2.1 The concept of wetlands**

Wetland ecosystems are among the most valuable ecosystems on the planet (Mitsch and Gosselink 2015). They continue to be cited as the most valuable parts of the landscape in ecosystem service assessments (Constanza et al. 2014; De Groot et al. 2012; McInnes 2013). Wetlands are sometimes described as kidneys of the landscape because they function as the downstream receivers of water and waste from natural and human sources. They stabilize water supplies, thus mitigating both floods and drought. They have been found to cleanse polluted waters, protect shorelines and recharge ground water aquifers. Wetlands also have been called nature's supermarkets because of the extensive food chain and rich biodiversity they support. They play major roles in the landscape by providing unique habitats for a wide variety of flora and fauna. Empirical ecosystem unit estimates studies conducted on selected ecosystems including wetlands in 1997 and 2011 showed that wetlands especially inland swamps and floodplains were found to be more considerably more valuable than lakes and rivers, forests and grasslands. The value translated to monetary terms translated to United States dollar (\$USD) per hectare per year was \$US 27 021 in 1997 and \$US 25 681 in 2011 (Constanza et al. 1997). This shows that wetlands are of great value however continue to be used unsustainably with its interaction with neighbouring communities.

## **2.2 Wetland ecosystems**

Millennium Ecosystem Services (2005) categorises wetland ecosystem services in a number of ways that is provisioning ecosystems that includes products obtained from ecosystems such as food, shelter, timber, fiber of genetic resources; regulating ecosystem services include air quality regulation, climate regulation, water purification, disease regulation, pest regulation, pollination and natural hazard regulation; cultural ecosystem services include benefits that people obtain from ecosystems related to spiritual enrichment, recreation, ecotourism, aesthetics, formal and informal education, inspiration and cultural heritage and supporting services include basic ecosystem processes of nutrient cycling and primary productivity that may in turn lead to three services listed above. The common pressures driving wetland degradation include increased demand for land for agriculture, forestry and husbandry (Lannas and Turpie 2009; Junk et al. 2013; Grundling et al. 2013; Van Asselen et al. 2013; Xu et al. 2019; Fang et al. 2019), construction of infrastructure and the societal demands of space for urbanisation and development (Kotze and Breen 1994; Macfarlane et al. 2012). Reynolds and Ryan (2018) highlighted other pressures on wetlands such as pollution and alien species invasion. It is estimated that about 30 to 90% of the world's wetlands have already been destroyed or have been strongly modified by human activities (Junk et al., 2013). South African Department of Environment, Forestry and Fisheries (2020) estimated that 65% of South Africa's wetlands are under threat and that 48% of them are critically endangered. This represents a severe impact on a vital resource in a water scarce country like South Africa. Although South Africa's wetlands are protected by a number of legislation such as the Constitution of South Africa, the Conservation of Agricultural Resources Act, the National Environmental Management Act, the National Water Act and the Environmental Provision of the Mineral and Petroleum Resources Development Act these statutory frameworks lack enforcement, particularly in rural and peri-urban areas. Wetland degradation in south Africa not only impacts on ecosystem functioning but also affects the lives and livelihoods of those who depend on wetlands particularly the poor and as a result there is a need to conserve the remaining wetlands (Dahlberg 2005; Walters et al. 2006; Lannas and Turpie 2009). The study seeks to contribute to the literature on wetland use, conservation and community (peri-urban dwellers) perspectives that live in proximity with peri urban wetlands.

## **2.3 Peri urbanity**

Peri-urbanisation is defined as the process that involves the conversion of rural land uses on the fringes of cities to urban land uses, primarily residential (Adam 2020). Bartels et al. (2020) points out the consequences of peri-urbanisation as physical, economic and social transformation in an incremental manner. Although the changes in peri-urban areas tend to be associated with improvements in economic activities as peri urban dwellers are presented with opportunities to tap into services rendered by the city (Chirisa et al. 2016; Ravets et al. 2013), some scholars argues that peri-urbanisation produces inequalities, as peri urban settlers are deprived of resources such as land and water due to the increasing population (Abdulai et al. 2020; Bartels et al. 2020; Ingwani 2019). This has an implication on the quality of life of people who live in the peri-urban areas. It is fundamental to consider peri-urbanisation at policy level as giving it less attention results in disregarding the challenges associated with the process and the quality of life of local residents. Peri-urbanisation is a concept that has multiple and varying impacts on peri urban areas across the globe. It is argued that for example in developed countries, peri-urbanisation is characterised by positive social and economic change while in the developing world, it is a zone characterized by chaos, usually resulting in sprawling developments (Abdulai et al. 2020). The effects and challenges posed by peri urbanisation process may differ depending on the context and place. Peri-urbanisation challenges in South Africa were facilitated and made worse by economic, developmental and geographical injustices of historic apartheid land policy and planning.

## **2.4 Small towns in South Africa**

The definition of a town differs from one country to another based on the history of urban development of each country or population size, function and morphology (Matai et al. 2021). In South Africa a town is defined administratively that is a settlement designated as urban and demographically as a compact settlement of 2500 or more, the majority of whom will be involved in non-farm employment. Rogerson (2003) argued that poverty is greatest in South Africa's small towns due to the large urban centre inclination or bias over small towns which emanated from the past colonial injustices of apartheid in land policy planning and management.

## **2.5 Tragedy of the commons**

The study also made use of the theory of the tragedy of the commons in light with wetland use and conservation. The theory puts emphasis on common pool resources that yield finite flows of benefits such as firewood, fish and

water where is difficult and costly to exclude potential users (Ostrom, 1994). A person's use of a resources system subtracts resources units from the quantity of units available to others. The initial theoretical studies of common-pool resources tend to analyse simple systems and the resource generates a predictable, finite supply of one type of resource unit in each time period. Users are assumed to be short-term, profit-maximizing actors who have complete information and are homogeneous in terms of their assets, skills, discount rates and cultural views. In this theory, anyone can enter a resource, take resource units and users are viewed as being trapped in the situation there are in.

### 3. Description of the study area

Thohoyandou town was established in the late 1970's and located along the main road between Makhado and Kruger National Park (Wuriga 2005; Sinthumule 2022). The three selected peri urban villages are located close to Nandoni dam and are along Levhuvhu River. Nandoni falls under Ward 18 and 19 of Collins Chabane Local Municipality and Wards 19, 20, 26, 36, and 41 of Thulamela Local Municipality in the Vhembe District Municipality in Limpopo Province. Figure 1 is an illustration of Nandoni Dam, Budeli, Mutoti and Mphego villages map. This shows their location within the study area.

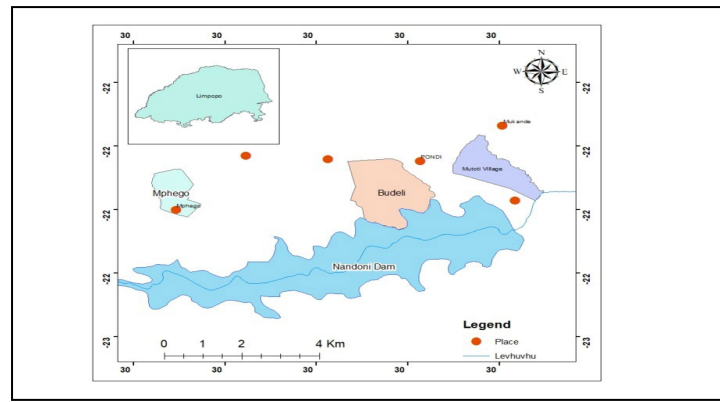


Figure 1: Map showing Nandoni Dam, Budeli, Mutoti and Mphego villages in Limpopo, South Africa

Thulamela Local Municipality area is the area of jurisdiction that encompasses the peri-urban villages of Budeli, Mutoti and Mphego and covers vast track of lands mainly tribal and Thohoyandou Town as its political, administrative and commercial centre. In terms of population, Thulamela Local Municipality is the second largest of all the municipalities in Limpopo Province. The political leadership of the municipality is vested in the Municipal Council comprising of 81 Councillors of whom 41 are Ward or directly elected Councillors, 40 Proportional Representative (PR), representing political parties. Additional members of Council are 7 Senior Traditional Leaders or their representatives who sit on the Council as Ex-Officio representing the traditional systems of governance. The construction of Nandoni dam was mainly to improve water resources management coupled with the desire to ameliorate economic development through water based recreation and tourism (Department of Water Affairs and Forestry 2003). The suppositions gravitated on local communities that economic development would result from recreational utilization of the dam and that water related recreation in the study area would not only lead to employment creation but also improve their lives and livelihoods which would lead to poverty alleviation. Peri urban villages selected for the study has been facing challenges that are rapidly expanding economy and booming population, the choice between conservation of wetlands for future generations and land-use development for various uses such as residential, industrial and commercial, becomes a difficult one. Wetland quality in these peri urban areas has been undergoing serious alteration or disturbance. The northern bank of Nandoni dam with villages Budeli, Mutoti and Mphego have the most dense vegetation and rich in species diversity. Wetland in these villages consists of riverine bushes that are being affected by overdraw of water from them for different uses coupled with cultivation among other activities.

### 4. Methods

This research employed a case study research design to capture insights of residents residing in three peri-urban villages namely Budeli, Mutoti and Mphego in terms of their engagement with wetland ecosystems. The experiences of the households living in the three peri urban villages were based on wetland use and conservation over a period of

1 year. The research also adopted a mixed methods research approach which infuses qualitative and quantitative data to provide a more complete understanding of a research problem (Cresswell 2018). This study made use of stratified random sampling technique to canvas heads of households as the sampled elements. A total sample size of 309 households was used for the study which comprised of 115 households in Budeli, 46 households in Mutoti and 148 households in Mphego village. Purposive sampling to select wetland sites using the researcher’s judgment for observations was employed.

The paper used primary data sources that is, household questionnaire survey for peri urban households of Budeli, Mutoti and Mphego and observations of wetland sites. The information gathered included respondent’s awareness of wetland ecosystems, types of wetlands, activities taking place on wetlands, how well wetlands meet their livelihoods, benefits derived from wetlands and threats that wetlands within the peri urban areas. Awareness of legislation in wetland management, frequency of use of wetlands, extent of wetlands affected, ownership of wetlands, measures taken by the public to manage wetlands, existing groups in wetland management, wetland ecosystem conservation measures and extent of wetlands affected was also gathered. Data analysis made use of tabulating collected survey data in Microsoft Office Excel and all analyses were conducted using Statistical Package for Social Science (SPSS) version 25 for Windows. Descriptive statistics (frequencies and percentages were used to summarise the data.

## **5. Results and Discussion**

This section presents findings on types of wetlands in the peri-urban areas of Budeli, Mutoti and Mphego, wetland use in Budeli, Mutoti and Mphego, effects of activities conducted on wetland ecosystems in Budeli, Mutoti and Mphego villages and wetland conservation strategies in Budeli, Mutoti and Mphego.

### **5.1 Types of wetlands in the peri urban villages of Budeli, Mutoti and Mphego**

The study found out that on the type of wetlands the majority of household respondents in Budeli (55%, n=63) and Mphego (95%, n=141) pointed out that swamps are the most prevalent in those respective areas. In Mutoti village 59% (n=27) of household respondents pointed out that the predominant wetland type is made up of a combination of swamps and marshes. In Budeli 43% (n= 49) of respondents affirmed that besides swamps only being the major wetland type there are also marshes. Findings from respondents 5% (n=7) revealed that in Mphego marshes are not dominant as compared to Budeli and Mutoti. The study revealed that wetlands found in the three peri-urban are swamps and marshes or a combination of both. Table 1 summarises the findings on wetland types in the three selected villages from household respondents.

Table 1: Types of wetlands found in Budeli (n=115), Mutoti (n=46) and Mphego (n=148)

Types of wetlands	Budeli	Mutoti	Mphego
	%	%	%
Marsh	2	6	5
Swamps	55	32	95
Marshes and swamps	43	59	-
Bogs	-	-	-
Fen	-	3	-
Other	-	-	-

### **5.2 Wetland use in peri-urban villages of Budeli, Mutoti and Mphego**

The study found out that 60% of respondents in Budeli not so frequently use wetlands followed by not at all frequent 14%, somewhat frequent 12%, very well frequent 10% and lastly extremely frequent 4%. It also found out that 65% of household residents in Mutoti somewhat frequently use wetlands followed by very well frequent 18%, not at all frequent 12%, extremely frequent 3% and lastly not so frequent 2%. In addition, in Mphego 37% majority respondents affirmed very well frequent, not at all frequent 26%, not so frequent 15%, somewhat frequent 14% and lastly extremely frequent 8%. The study showed that the majority household respondents in Budeli not so frequently use wetlands, in Mutoti somewhat frequently use wetlands and in Mphego very well frequently use wetlands.

The study also found out that 67% majority of respondents in Budeli attributed residential development as the major activity taking place on wetlands in the area whereas in Mutoti 47% of majority respondents pointed out that animal trampling as the major activity in the area. In Mphego 78 % of respondents attributed brick making activity as the

dominant activity there. Findings also identified other contributing activities that are either in combination with others or contribute as separate entities. In Budeli respondent's also pointed out that there is a combination of residential development and animal trampling 22% and illegal dumping 6%. Activities such as water pollution, water abstraction and erosion are also present in Mutoti although they contribute a smaller percentage 1% respectively. Findings also revealed that in Mutoti there is also illegal dumping 27%, residential development 15%, water pollution 6%, cultivation 3% and erosion 2%. In Mphego the study revealed that besides brick making, cultivation 12%, residential development 6%, erosion 3% and illegal dumping 1% are also contributing threats in the area. Based on findings it is demonstrated that various activities pose threats to wetlands ecosystems in peri-urban areas. Table 2 shows the activities on wetland ecosystems in Budeli, Mutoti and Mphego in summary.

Table 2: Activities on wetland ecosystems' in Budeli, Mutoti and Mphego

Wetland threats	Budeli	Mutoti	Mphego
	%	%	%
Illegal dumping	6	27	1
Residential development	67	15	6
Brick making	-	-	78
Animal trampling	-	47	-
Water pollution	1	6	-
Water abstraction	1	0	-
Cultivation	-	3	12
Erosion	1	2	3
Animal trampling and illegal dumping	-	-	-
Residential development and animal trampling	22	-	-
Animal trampling and water pollution	-	-	-
Illegal dumping and residential development	2	-	-
Residential development and brick making	-	-	-

Findings reveal that wetland uses or activities practiced on wetlands pose a threat to wetland ecosystems within the three selected villages leading to disappearance and or extinction. Table 2 illustrates that in the three peri-urban villages of Budeli, Mutoti and Mphego wetland use is diverse and varies in intensity in terms of its users that is the household community. This shows that wetland ecosystems in these areas provide a strong support system which compliments their way of life.



Plate 1: Residential development in Budeli, livestock grazing in Mutoti and cultivation in Mphego.

Plate 1 shows the pictorial view of some wetland uses taking place in Budeli, Mutoti and Mphego villages. In this case residential development, livestock grazing and cultivation respectively. This shows the nature and extent of the wetland activities and their impact on wetland ecosystems within the respective villages.

### **5.3 Effects of activities conducted on wetland ecosystems in Budeli, Mutoti and Mphego villages**

The study findings showed various activities conducted on wetlands in Budeli, Mutoti and Mphego such as residential development, animal trampling, brickmaking, illegal dumping and cultivation. These activities have noticeable detrimental effects to the wetlands and their surrounding environment. These effects have led to the size and quality of wetland ecosystems to be compromised as well as conversion of wetland sites into new uses. Residential development in Budeli which involves land clearing of wetland sites has destroyed wetland ecosystems natural vegetation. In Mutoti, animal trampling which is the major wetland use in the village is resulting in the destruction of wetland vegetation coupled with overgrazing by livestock. In Mphego brick-making is having effects

on both the surrounding wetland ecosystem and the wetlands themselves. These effects include water pollution affecting the water quality of wetlands, scooping out of soil from wetland bodies and escarpments leading to their degradation as well as destruction of natural vegetation in the brick making process of soil excavation. This affects ecosystem balance as far as wetland vegetation inhabitant species are concerned as it results in alteration of food networks. Dumping of solid waste in the three peri-urban villages has led to observable effects in wetland water quality, affecting aquatic life and aesthetic quality of wetland ecosystems. In Mutoti and Mphego, cultivation is also contributing to conversion of wetland sites into new uses. In the case of cultivation, it has led to the introduction of new vegetation species that may not co-exist with natural wetland vegetation (invasive species), alteration of mineral composition of wetland soil due to the use of fertilisers which affects the type of vegetation and how it copes in the new soil environment, the disappearance and drying up of wetland sites.

#### **5.4 Wetland conservation strategies in Budeli, Mutoti and Mphego peri-urban villages**

The study revealed through local residents residing in Budeli, Mutoti and Mphego had a general consensus that they were not aware of legislation in wetland management. This means that wetlands continue to be under threat because of lack of awareness on legislation that protects wetlands and that advocates for sustainable use of wetlands by balancing wetland use and conservation. Based on findings it is shown that all local residents in the three selected peri urban areas are not aware of wetland legislation. A total of 95% respondents in Budeli, 97% respondents in Mutoti and 97% respondents in Mphego recommended educating the community as far as wetland conservation measure is concerned. Additional measures also recommended by the local residents are participation, enforcement by the local authority and partnerships that is local residents, local authority and traditional leaders.

#### **5.5 Benefits derived from wetland ecosystems**

The study revealed that household residents obtain food through fishing from wetland ecosystems in their communities. Food through fishing is major benefit for villages Budeli 35%, Mutoti 71% and Mphego 43%. The study showed that local household residents in Budeli and Mutoti engage in recreation activities. Farming is also derived in villages Budeli 8%, Mutoti 5% and Mphego 23%. Recreation is also a common benefit in the three villages; Budeli 9%, Mutoti 24% and Mphego 5%. Table 3 summarises benefits derived from wetlands in the three selected villages Budeli, Mutoti and Mphego.

Table 3: Benefits derived from wetlands in Budeli, Mutoti and Mphego peri-urban villages

Benefits	Budeli	Mutoti	Mphego
	%	%	%
Water supply	1	0	17
Food through fishing	35	71	43
Recreation	9	24	5
Farming	8	5	23
Aesthetic appeal	15	-	5
Recreation and aesthetic appeal	0	-	0
Food through fishing and aesthetic appeal	8	-	2
Farming and aesthetic appeal	9	-	5
Food through fishing and recreation	15	-	0

The benefits derived in the three peri-urban villages are also in combination of each other for example food through fishing and recreation, food through fishing and aesthetic appeal and farming in combination with aesthetic appeal.

#### **5.6 Wetlands meeting livelihoods**

The study showed that in Budeli and Mphego there was a general consensus that wetlands meet livelihoods very well attested by 56% and 60% respondent rate respectively. A total of 68% household respondents in Mutoti affirmed that wetlands somewhat meet their livelihoods. Table 3 shows how well wetlands meet livelihoods in the three peri urban villages.

#### **5.7 Extent of wetlands affected**

Findings showed that 41% majority of respondents in Budeli response was somewhat affected on extent of wetlands affected in their area followed by extremely affected 22%, not so affected 21% and very affected 16%. In Mutoti

70% of respondents attested that wetlands in their particular area was extremely affected preceded by very affected 21%, somewhat affected 6% and lastly not so affected 3%. In Mphego the study also showed that 79% of majority households affirmed wetlands in their area is extremely affected followed by very affected 14%, somewhat affected 4% and not so affected 3%. These findings based on the study show that wetlands in Mutoti and Mphego are extremely affected by human activities engaged by the local community and Budeli also in terms of severity precedes the former.

## **5.8 Discussions**

The results reveal that wetlands ecosystems in the study are common goods because of the fact that they are naturally occurring, easily accessible and free implying less accountability on the part of the users. Wetland ecosystems provide many services such as food, water, recreation, support the surrounding environment (regulating service). In terms of wetland use the results of the study showed that household respondents are knowledgeable about wetlands and importance as an ecosystem within their local communities. On the type of wetlands the study revealed that local communities are aware on the type of wetland ecosystems within their area and the supporting services they provide that are essential in their lives. The study reveals different activities that the local communities in the peri-urban villages of Budeli, Mutoti and Mphego engage in on wetland ecosystems so as to take advantage of the natural resources available there. These activities include brick-making, residential development, cultivation, grazing fields for livestock and water abstraction. On the downside these activities produce undesirable results such as erosion, water pollution, degradation and illegal dumping of solid waste that have both short term and long term detrimental effects on the wetland ecosystems. The wetland ecosystems services are finite however in this case supported by results from the study reveal that the level of use is significant and if left unchecked would result in a reactive state that affect the natural environment with irreversible damage. This is made worse by the level of unawareness of wetland conservation legislation. Conservation of wetland ecosystems according to the findings from the study is alarming as household respondents show that they are not aware of any wetland conservation legislation that protect wetland ecosystems. Lack of awareness by the local community is a cause of concern as change starts from a shift in the mindset. Local household participation starts with awareness and a sense of responsibility in attaching value, use and conservation in natural resources such as wetland ecosystems. A proactive mindset in this case study in terms of wetland use would facilitate sustainable use of wetlands ecosystems. Household residents in Budeli Mutoti and Mphego agreed that the community should be made aware of wetland conservation together with participatory approaches through stakeholder engagement and partnership of the responsible authorities in land management in peri-urban areas. With this in mind it is a positive affirmation on the part of the local community as planning decisions start with those that operate on the planning environment. The study results showed that wetlands meet livelihoods of all communities in the selected peri-urban areas and findings on extent of wetlands affected through responses from households indicate that there is lack of accountability in terms of use and conservation. This shows that there should be a culture of accountability that involves a shift in mindset in placing value to natural resources such as wetlands as their existence benefits both the local and the natural environment and absence of thereof will lead to vicious cycle of poverty.

## **5.9 Recommendations**

The study recommends the following:

- Educating the community through positive reinforcement by key stakeholders that rejuvenates the local community's minds on striking a balance between wetland use and conservation measures or practices.
- Forming partnerships with concerned stakeholders that is local municipal authority and traditional leaders
- Participatory approaches initiatives on bringing awareness on wetland value, use and conservation strategies.
- Enforcement by the Local municipal authority.
- Local community engagements on the best practices that help sustain the environment at the same time that meets their livelihoods.
- Joint implementation of spatial planning legislations and practices to complement efforts by local communities to curb the disappearance of wetland ecosystems.

## **6. Conclusions**

The study concludes that wetland conservation does not mean that household communities should not utilize wetland resources. There is need for educating the community, participatory approach in wetland conservation and formation of partnerships between land management authorities that is the local authority, traditional leaders



together with the local community. Positive affirmations on wetlands is not enough hence there is need for a practical inquiry in fusing theoretical constructs in the form respondents perspectives or views with the practical wetland conservation. There is need to strike a balance between wetland use and conservation in the quest of meeting livelihoods within the peri-urban community. Joint implementation of spatial planning legislations and practices to complement efforts by local communities to curb the disappearance of wetland ecosystems is required.

## References

- Abdulai, I.A., Abubakri, A., and Elias, D.K., Secondary cities under siege: examining peri-urbanisation and farmer households' livelihood diversification practices in Ghana. *Heliyon*. 15(2): 8-9, 2020.
- Adam, D., Special report: The simulations driving the world's response to COVID-19. *Nature*. 580(7): 316-319, 2020.
- Ampatzidis, P., and Tristan, K., A review of the impact of blue space on the urban microclimate. *Science of The Total Environment*. 80(2): 730, 2020.
- Assessment, M. E., *Ecosystems and human well-being: wetlands and water*. World Resources Institute, 2005.
- Barbier, E., Robert, C., and Robert, R.T., Guidelines for the evaluation of tropical wetlands. Taller Internacional de Trabajo para la Elaboración de un Manual de Evaluación Económica de los Bienes y Servicios de los Humedales Tropicales 1991: Centro Agronómico Tropical de Investigación Enseñanza). CATIE, Proyecto Conservación para el Desarrollo Sostenible en América Central. 50(3): 1997.
- Bartels, L.E., Antje, B., and David, S., Towards situated analyses of uneven peri-urbanisation: an (urban) political ecology perspective. *Antipode*. 52(5): 1237-1258, 2020.
- Chirisa, I., Building resilient infrastructure in the face of climate change in African cities: Scope, potentiality and challenges. *Development Southern Africa* 33(1): 113-127, 2016.
- Collinson, M.A., Stephen, M.T., and Kathleen, K., Migration, settlement change and health in post-apartheid South Africa: Triangulating health and demographic surveillance with national census data. *Scandinavian journal of public health*. 55(1): 77-84, 2007.
- Dahlberg, A.C., and Catie, B., Addressing trade-offs: experiences from conservation and development initiatives in the Mkuze wetlands, South Africa. *Ecology and Society*. 14(2): 115, 2009.
- De Groot, R., Global estimates of the value of ecosystems and their services in monetary units. *Ecosystem services*. 1(1): 50-61, 2012.
- Department of Environmental Affairs Annual report 2018
- Fang, C., Agricultural development and implication for wetlands sustainability: a case from Baoqing County, Northeast China. *Chinese Geographical Science* 29(2) : 231-244, 2019.
- Ferguson, J., Formalities of poverty: Thinking about social assistance in neoliberal South Africa. *African Studies Review*. 50(2), 71-86, 2007.
- Grundling, A.T., Theresa, E., Catharina V.B., and Jonathan, S.P., Assessing the distribution of wetlands over wet and dry periods and land-use change on the Maputaland Coastal Plain, north-eastern KwaZulu-Natal, South Africa. *South African Journal of Geomatics* 2(2): 120-138, 2013.
- <http://klipriviersberg.org.za/wp-content/uploads/2018/08/Draft-Wetland-Management-guidelines.pdf>
- Ingwani, E., Livelihoods Resilience in Peri-urban Communal Areas of Zimbabwe. *Journal of Urban Systems and Innovations for Resilience in Zimbabwe-JUSIRZ* 1.1& 2, 74-93, 2019.
- Junk, W.J., Current state of knowledge regarding the world's wetlands and their future under global climate change: a synthesis. *Aquatic sciences*. 75(1): 151-167, 2013.
- Kotze, D.C., A rapid assessment method for coupling anthropogenic stressors and wetland ecological condition. *Ecological Indicators* 13(1): 284-293, 2012.
- Lannas, K.S.M., and Jane, K.T., Valuing the provisioning services of wetlands: contrasting a rural wetland in Lesotho with a peri-urban wetland in South Africa. *Ecology and Society*. 14(2): 2009.
- Louw, S., The Ministry of dry taps? The Department of Water Affairs and Forestry and the transition to market-based service provision in South Africa. *Politeia* . 22(1), 93-118: 2003.
- Macfarlane, D., Wetland offsets: a best-practice guideline for South Africa. South African National Biodiversity Institute and the Department of Water Affairs. Pretoria, 2014.
- Macinnis, N.C., Climate change impacts exacerbate conservation threats in island systems: New Zealand as a case study. *Frontiers in Ecology and the Environment* 19(4): 216-224, 2021.
- Mitsch, W.J., and James, G., The value of wetlands: importance of scale and landscape setting. *Ecological economics* 35(1): 25-33, 2014.
- Potts, D., The slowing of sub-Saharan Africa's urbanization: evidence and implications for urban livelihoods. *Environment and Urbanization* 21(1): 253-259, 2009.

- Ravetz, J., Christian, F., and Thomas, S.N., The dynamics of peri-urbanization." Peri-urban futures: Scenarios and models for land use change in Europe. Springer, Berlin, Heidelberg, 13-44, 2013.
- Reynolds, C., Urban animal diversity in the Global South. Urban Ecology in the Global South. Springer, Cham, 169-202, 2021.
- Rogerson, C., Towards" pro-poor" urban development in South Africa: the case of urban agriculture. Acta Academica . 31(3): 30-158, 2003.
- Sink, K.J., National Biodiversity Assessment 2011: Technical Report. Volume 4: Marine and Coastal Component. South African National Biodiversity Institute, Pretoria, 2012.
- Sinthumule, N.I., Conservation Effects of Governance and Management of Sacred Natural Sites: Lessons from Vhutanda in the Vhembe Region, Limpopo Province of South Africa. International Journal of Environmental Research and Public Health. 19(3): 1067, 2022.
- Tendeng, B., Hugo, A., and Louis, I., Moose (*Alces americanus*) habitat suitability in temperate deciduous forests based on Algonquin traditional knowledge and on a habitat suitability index. Ecoscience. 23 (3): 77-87, 2016.
- Wuriga, R., Conflicting perceptions over water distribution in Sibasa-Thohoyandou area: interpreting local narratives, 2005.
- Xu, F., Electricity production enhancement in a constructed wetland-microbial fuel cell system for treating saline wastewater. Bioresource technology. 288, 2019.

## **Biographies**

**Priscila Banda** is a part-time lecturer, teaching assistant and PhD student in the Department of Urban and Regional Planning at University of Johannesburg from 2021 to date. She is also a multi-skilled International Development and Urban Planning Professional with an interest in urban and regional development, regional development, infrastructure development, sustainable urban transportation, regional economics and planning. She has over 9 years of professional experience in the development field. The experience entails teaching, academic researching and working for International Land and Housing Development Corporation in South Korea. Currently, Priscila is working towards her PhD thesis completion at the University of Johannesburg.

**Prof Trynos Gumbo** is a Full Professor and Head of Urban and Regional Planning Department; School of Civil Engineering and the Built Environment; Faculty of Engineering and the Built Environment; University of Johannesburg. His fields of expertise include Spatial design and urban economics Smart and Sustainable Cities and regions Intelligent Transport Systems & Infrastructure Planning Integrated and Sustainable Human Settlements Spatial Planning and Planning Law Rural Planning and Development, indigenous knowledge systems Housing, Governance, Modeling & Technology Spatial analysis using Geographical Information Systems Statistical Analysis using Statistical Package for Social Sciences. He has over 18 years of higher education experience.

**Dr Emmaculate Ingwani** is a Senior lecturer in the Department of Urban and Regional Planning at the University Venda. Dr Ingwani holds a PhD in Sociology from the University of Stellenbosch, South Africa; and a Master of Urban and Regional Planning from the University of Zimbabwe. She is a member of the South African Planning Institute (SAPI); the Zimbabwe Institute of Regional and Urban Planners (ZIRUP), and the South African Council for Planners (SACPLAN). Her research work focuses mainly on socio-spatial planning imperatives of the built environment constitutive of land, peri-urbanity, small rural towns, sustainable development, ecologically sensitive areas, social justice, spatial justice, and livelihoods.