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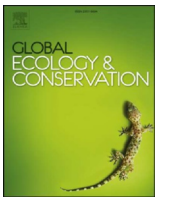

An analysis of communities' attitudes towards wetlands and implications for sustainability

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ABSTRACT

Wetlands provide a range of environmental, cultural and economic values, however, despite this they continue to be degraded and destroyed at an alarming rate. As a result, protection and conservation of the remaining wetlands is significant. An understanding on the attitudes of the people living in the peripheral of wetlands is crucial for conservation and management of wetlands. The aim of the study was to analyse communities' attitudes towards wetlands and the implications for sustainability at Duthuni Village falling under the Vhembe District in Limpopo Province, South Africa. Door-to-door surveys were undertaken from 29 July to the end of October 2020 during which interview-administered questionnaires were used to collect data. Systematic random sampling was used to obtain a sample of 312 households from the target households of 1 655. Data obtained from questionnaires was analysed using descriptive statistics and this helped to generate frequencies up to 100% from the responses. The study showed that wetlands play a significant role in the lives of people as sources of water for domestic and irrigation purposes, important areas for fishing, harvesting of plant resources for roofing and handcraft production, crop production and valuable land for grazing purposes. The study revealed that the majority of respondents (98.1%; n = 306) in the study area had positive attitudes towards wetlands and wetlands conservation. Motivation for wetlands conservation tended to be ethical, with 67.6% (n = 211) of local communities willing to donate money for wetlands conservation, and 83% (n = 259) willing to vote for a councillor who promised to protect wetlands. It is concluded that the positive attitude of communities toward wetland conservation offers some hope for sustainable utilisation of wetlands.

1. Introduction

Wetlands are among the most productive ecosystem in the world (Moreno-Mateos et al., 2012; Li et al., 2020). They provide a variety of goods and services and a range of direct use values that are critical for supporting human lives and livelihoods. Despite their values and functions, wetlands continue to be destroyed at an alarming rate and poorly managed (Rebelo et al., 2010; Junk et al., 2013). Wetlands destruction or degradation are not easily reversible (Momanyi Mironga, 2005) because they are sensitive ecosystem. As a result, protection and conservation of the remaining wetlands is significant. Fundamental to wetlands conservation and management is understanding the attitudes or perception of the people living in the peripheral of

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wetlands. The concept of 'attitude' has been used in relation to the positive or negative responses by local people towards one or more stimuli, but can also be linked to possible conduct and behaviour (Karanth et al., 2008).

As documented by many scholars, the assessment of people's perception and attitudes has become an important aspect in many studies dealing with conservation and natural resource management (Ndaruga and Irwin, 2003; Mandishona and Knight, 2019; Hassan et al., 2019). The literature suggests that understanding people's attitudes or perceptions is a major factor in the success of a conservation projects or survival of natural resources (Nsengimana et al., 2017; Mogomotsi et al., 2020). In addition, the perception or attitudes of local communities can provide insight into people's behaviours and the extent to which they are willing to coexist with a particular resource (Mir et al., 2015). A wealth of studies have been done on the attitudes and perception of wetlands in various parts of the world including United Kingdom (Rispoli and Hambler, 1999), Australia (Dobbie and Green, 2013), Nepal (Sah and Heinen, 2001), India (Ambastha et al., 2007), Kenya (Ndaruga and Irwin, 2003; Momanyi Mironga, 2005), Zimbabwe (Mandishona and Knight, 2019), Ethiopia (Moges et al., 2018) and Rwanda (Nsengimana et al., 2017). However, literature suggests that fewer studies have been done on the perception or attitudes of wetlands focusing on rural populations particularly in South Africa. The aim of this study was to analyse communities' attitudes towards rural wetlands and the implications for sustainability in Duthuni Village falling under the Vhembe District in Limpopo Province, South Africa. The analysis is not only important in policy decisions but also critical in providing insights on how the perceptions, attitudes, and current practices may influence wetland sustainability.

2. Literature review

According to the Ramsar Convention on Wetlands (2016, p. 9), 'wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres'. Wetlands are estimated to cover 570 million hectares (5.7 million km^2) which is roughly 6% of the Earth's surface (Junk et al., 2013; Mitsch and Gosselink, 2015). They are important natural resources around the globe, providing many direct and indirect benefits. For instance, wetlands provide habitat for wildlife, fisheries and water conservation; they also improve water quality, play a key role in biogeochemical cycles, act as sources or sinks for carbon and reduce flood and storm damage (Yuan and Zhang, 2010; Graymore and McBride, 2013; Dhandapani et al., 2019; Li et al., 2020; Bhowmik, 2020). In addition, wetlands also play significant roles in the provision of recreational and tourism opportunities (Dahlberg, 2005; Aazami and Shanazi, 2020) and climate change regulation (Petrescu et al., 2015; Gumbricht et al., 2017). Although wetlands provide invaluable ecosystem services, many of these services are not traded in regular economic markets, and thus have no observable prices (Hassan et al., 2019). This has contributed to ongoing wetland degradation around the world. 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, 1996; Macfarlane et al., 2012; Ajibola et al., 2012; Burgin et al., 2016). Other pressures on wetlands include pollution (Oberholster et al., 2008; Reynolds and Ryan, 2018) and alien species invasion (Zedler and Kercher, 2004; Walters, et al., 2006). Junk et al. (2013) estimated that about 30–90% of the world's wetlands have already been destroyed or have been strongly modified by human activities.

It is estimated that in excess of 65% of South Africa's wetlands are under threat and that 48% of these are critically endangered (Nel and Driver, 2012; Department of Environment, Forestry and Fisheries, 2020). This represents a severe impact on a precious resource in a water-scarce country like South Africa. Although the country's wetlands are protected by a number of pieces of legislation including the Conservation of Agricultural Resources Act of 1984, the National Environmental Management Act 107 of 1998 (NEMA), the National Water Act 36 of 1998 (NWA) and the environmental provisions of the Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA); these statutory frameworks are not enforced, particularly in rural areas. Even though efforts are made to protect wetlands, particularly in urban areas by conducting Environmental Impacts Assessments (EIAs), parts of the reports have been found to be of poor quality. For instance, in a study that reviewed EIA reports of projects with the potential of impacting on wetlands in South Africa, Sandham et al. (2008) found that identification and evaluation of impacts that are potentially detrimental to wetlands were poorly executed. As a result, wetlands in the country continue to be degraded or destroyed at an alarming rate (Kotze and Breen, 1996; Macfarlane et al., 2012). Wetland degradation in South Africa not only impacts on ecosystem health and functioning (Lannas and Turpie, 2009; McCartney et al., 2011), but also affects the lives and livelihoods of those who depend on wetlands, particularly the poor (Dahlberg, 2005; Walters, et al., 2006; Lannas and Turpie, 2009). As a result, there is a need to protect or conserve the remaining wetlands. Central to achieving conservation objectives of protecting natural resources is understanding of people's attitudes. This study set out to contribute to the literature on conservation and society by examining communities' attitudes towards rural people living in the peripheral of Duthuni wetlands.

3. Material and methods

3.1. Study area

The study focused on wetlands in Duthuni Village. Over the years, Duthuni wetlands have been an important resource for local communities, and they are still playing a vitally important role for local communities in the 21st century. Duthuni Village

(22°58'19.36"S; 30°22'52.98"E) is situated on communal land falling under the Tshivhase Tribal Authority. The land is state-owned but administered by the local chief. The village lies within Thulamela Local Municipality, in the Vhembe District Municipality in Limpopo Province, South Africa (Fig. 1).

According to the Census (2011), Duthuni Village covers an area of 6.70 km^2. The village has a population of 6 345 people, distributed across 1 655 (246.93 per km^2) households. There are more women than men, with 3 481 (54.86%) of the total (6 345) population individuals being females (Census, 2011). The main sources of income include formal employment (mostly civil service), self-employment, subsistence agriculture, livestock farming, and resource gathering. Other important sources include grants from government (mainly pensions and child grants) and home-based microenterprises such as sewing, car wash and welding. The primary land uses in the village include subsistence agriculture, livestock farming, and human settlement.

3.2. Data collection

Permission to conduct this research was obtained from the local chief and the Tribal authority. After getting permission on the 29 of July 2020, primary data was collected using interview-administered questionnaires between July and October 2020, during the COVID-19 pandemic. All protocols of wearing facemasks, gloves and keeping a distance of 1.5 m from respondents were observed throughout the research process. Following White et al. (2005), the questionnaire used to collect data in this study contained both fixed response and open-ended questions. Fixed response questions were used in order to ensure precision of responses from informants, whereas open-ended questions were used to allow participants to express themselves in their own words. The questionnaires were designed to collect socio-demographic and economic characteristics, respondents' knowledge of wetland benefits, and their attitudes towards wetland conservation. Likert-type questions, which use a rating scale to measure attitudes of informants were limited to three points only (Jacoby and Matell, 1971) because this form is most frequently used in African contexts (Bless et al. 2006).

Questionnaires were first written in English, and then translated into Tshivenda by the bilingual author and three research assistants. Translation was important to ensure ease of communication with the respondents. The Tshivenda version of the questionnaires were then translated back to English by the researcher and three research assistants. In line with Walliman, (2011), questionnaires were pre-tested on 20 respondents from Ndondola Village bordering the study area. This was important in order to confirm that the questions were clear and unambiguous. The pre-testing revealed rephrasing or reorganising of the questionnaire was not required. Following Neuman (2014), the participants were interviewed face-to-face by the researcher and the three research assistants. The average duration of an interview was approximately 30 min.

3.3. Sampling procedure

Households in Duthuni Village were selected using systematic random sampling approach. The rationale behind using this sampling approach was to reduce the potential for human bias in the selection of households included in the sample. In addition, there is assurance that the population will be evenly sampled (Walliman, 2011; Bernard, 2017). According to Cohen et al. (2007), systematic random sampling is the method that requires selecting samples based on specific intervals. Thus, quantitative interviews were administered in every fifth household until a sample of 312 households were selected from the target households of 1 655 (95% confidence level; 5% margin of error). In order to minimise sampling error, the researcher and research assistants sampled at least one Ward in a village within a day. Questionnaires were administered to the household head in every fifth household, timed for when the household heads were likely to be at home (e.g., during daylight hours and weekdays). According to Posel (2001) and Budlender (2003), the household head can be a male or a female individual who has assumed responsibility for the household. In cases where the household head was not present, any adult member of the household above the age of 18 was interviewed (Kothari, 2004). In homes where there was no one to answer the questionnaires, the researcher returned to the household at a different time (later that same day or on the following weekend). If still no response was obtained, another household (alternately to the left and then the right of the original household) was selected.

3.4. Data analysis

All the data collected were recorded on a data sheet, transcribed into English by the author, and then tabulated in Microsoft Office Excel 2016 (Microsoft Corporation, Redmond, Washington, WA, USA). The data were analysed using Statistical Package for Social Sciences (SPSS), version 25 for windows (IBM SPSS Inc., Chicago, USA). For open-ended questions, the researcher generated codes from the responses. The codes were generated by grouping similar responses from the questionnaires into one category. The codes were then registered on the SPSS software and a descriptive statistics tool was selected to analyse the codes that were generated from the questionnaires. This helped to generate frequencies up to 100% from the questionnaire responses. In some cases, episodes from open-ended questions were recounted in the write-up, using the exact words of the respondents to provide a vivid description of the situation for the reader.

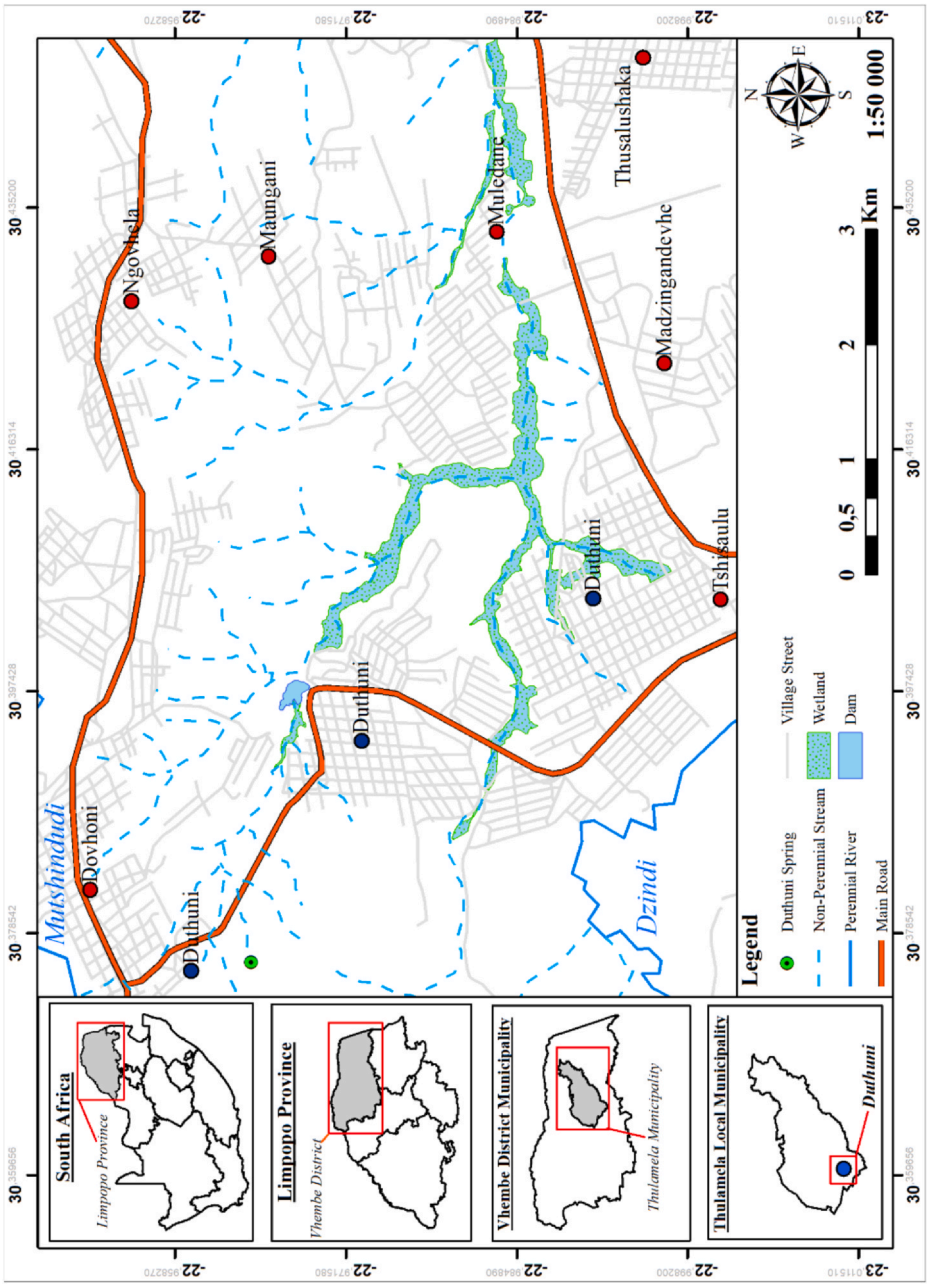

Fig. 1. Location of the wetlands in Duthuni Village falling under the Vhembe district in Limpopo Province of South Africa. Author 2021.

4. Results

4.1. Socio-economic profile of the respondents

The questionnaire sample consisted of 65.7% (n = 205) women and 34.3% (n = 107) men. The fieldwork was conducted during the day when men were generally at work and as a result, women became respondents for most households. Of the respondents participating in the survey, the majority (51.6%; n = 161) were single, 39.7% (n = 124) were married, 7.7% (n = 24) were widowed, and the remaining 1% (n = 3) did not specify. The ages of the respondents ranged from 18 to >60. A total of 27.9% (n = 87) of respondents were between the ages of 18 and 30 years, 21.5% (n = 67) were between 31 and 40 years of age, 20.5% (n = 64) were between 41 and 50 years of age, 14.4% (n = 45) were between 51 and 60 years, and 15.7% (n = 49) were older than 60 years. In terms of education, 7.7% (n = 24) had never attended school, 13.1% (n = 41) had attended as far as primary school, 53.2% (n = 166) had secondary school as their highest level of education, and about half that number (26%; n = 81) had tertiary education.

The majority (66%; n = 206) of the respondents were unemployed, while 10.3% (n = 32) were self-employed. Thus only 14.1% (n = 44) specified they were formally employed, and the remaining 0.6% (n = 2) did not specify. Those who were self-employed were involved in home-based micro enterprises such as sewing, welding, upholstery, handcraft production, subsistence agriculture, car-washing and livestock farming. The study also found that 9.3% (n = 29) had no income at all, 7.7% (n = 24) had an income of <R500, 30.1% (n = 94) had an income of R501–R1000, 20.2% (n = 63) had an income of R1001–R2000, 31.4% (n = 98) had an income of >R2000, and the remaining 1.3% (n = 4) did not specify their income. Sources of income were found to range from formal employment to home-based micro enterprises and state welfare grants (child grant and old age pension). The study showed that 56% (n = 175) relied on welfare grants for survival. 58.3% (n = 182) of respondents had lived in the area since birth, 18.3% (n = 57) had been in the area for 1–10 years and the remaining 23.4% (n = 73) had stayed for 11–20 years.

4.2. Knowledge of importance of wetlands in Duthuni Village

Knowledge questions in the community questionnaire consisted of whether respondents knew of wetlands and, if so, what were the benefits or significance of wetlands to their lives. All respondents knew wetlands in the study area but most importantly, they knew about the significance of wetlands. Informants varied in terms of the benefits and services provided by wetlands (Fig. 2).

The majority of respondents (53.8%; n = 168) reported that they use water from the wetlands for drinking and 30.1% (n = 94) reported using water from the wetlands for washing clothes and cars, and for irrigation. Water is obtained from the wetlands because the municipal taps in Duthuni Village remain dry, which forces people to depend on water from wetlands and springs for domestic and irrigation purposes. As one respondent explained: *sometimes we spend two months without water from our taps. The only option we have is to use water from springs and wetlands. Unfortunately, we face this sad reality in this village (Respondent 1).* In addition, 3.8% (n = 12) reported using wetlands for grazing their livestock, 1.9% (n = 6) harvest bulrushes and sedges (*Cyperus latifolis and Cyperus sexangularis* respectively) and reeds (*Phragmites mauritianus*) for handcraft production, 2.2% (n = 7) used the wetland for crop production, 1.0% (n = 3) fished in the wetlands, while the remaining 7.1% (n = 22) reported that they do not directly benefit from wetlands. Respondents indicated that wetlands are used for grazing purpose only during drought

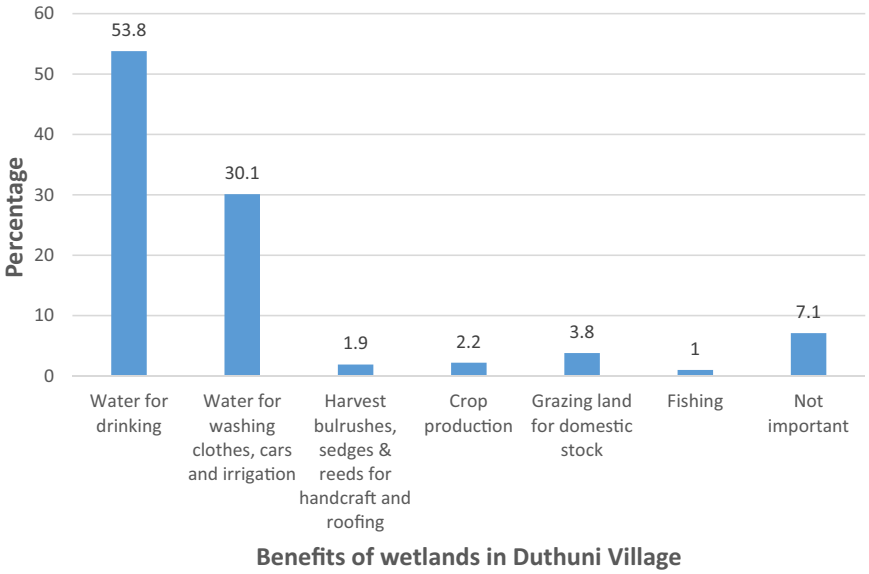

Fig. 2. Benefits that local people obtain from wetlands in Duthuni Village falling under the Vhembe district in Limpopo Province of South Africa.

Table 1
Relationships between gender, education and economic status (in percentage) towards perceived uses and values of wetlands in Duthuni Village falling under the Vhembe district in Limpopo Province of South Africa.

Activities	Gender	%	Education	%	Economic status	%
1. Water for drinking	Men	51.4	Illiterate	58.3	No income	51.7
	Women	55.1	Primary	51.2	<R500	50.0
			Secondary	59.6	R501-R1000	62.7
			Tertiary	42.0	R1001-R2000	55.5
					>R2001	45.9
2. Water for washing cars and irrigation	Men	30.8	Illiterate	25.0	No income	24.1
	Women	29.8	Primary	24.4	<R500	41.6
			Secondary	27.1	R501-R1000	26.6
			Tertiary	40.8	R1001-R2000	36.5
					>R2001	27.6
3. Harvesting of plant for roofing and handcraft production	Men	2.8	Illiterate	4.2	No income	0.0
	Women	1.5	Primary	4.9	<R500	4.2
			Secondary	1.8	R501-R1000	0.0
			Tertiary	0.0	R1001-R2000	3.2
					>R2001	3.1
4. Crop production	Men	0.9	Illiterate	0.0	No income	6.9
	Women	2.9	Primary	4.9	<R500	0.0
			Secondary	2.4	R501-R1000	2.1
			Tertiary	1.2	R1001-R2000	1.6
					> R2001	2.0
5. Valuable land for grazing purposes	Men	3.8	Illiterate	8.3	No income	10.3
	Women	3.9	Primary	2.4	<R500	4.2
			Secondary	1.8	R501-R1000	1.1
			Tertiary	7.4	R1001-R2000	1.6
					>R2001	6.1
6. Fishing	Men	1.9	Illiterate	0.0	No income	0.0
	Women	0.5	Primary	2.4	<R500	0.0
			Secondary	0.6	R501-R1000	1.1
			Tertiary	1.2	R1001-R2000	0.0
					>R2001	2.0
7. Not important	Men	8.4	Illiterate	4.2	No income	6.9
	Women	6.3	Primary	9.8	<R500	0.0
			Secondary	6.7	R501-R1000	6.4
			Tertiary	7.4	R1001-R2000	1.6
					>R2001	13.3

seasons and when the grazing reserves in the surrounding village are low. In terms of agriculture, the main crops that are planted are maize and pepper.

4.2.1. Relationships between gender, education and economic status towards perceived uses and values of wetlands in Duthuni Village

The study found that majority of women (55.1%) and those with income of between R500-R1000 (62.7%) relied on drinking water from the wetlands. A higher proportion of illiterate people, and those with primary and secondary education levels also depend on drinking water from the wetlands, as compared to people with tertiary education (Table 1). This is because those with tertiary education are employed and have stable salaries and as a result, they have boreholes in their households or have cars that are used to collect water from other areas. The study revealed that 40.8% of those with tertiary education relied on water from the wetlands for washing cars and irrigation purposes as compared to those with lower education levels. In addition, those with tertiary education were not involved in harvesting of wetlands plant for roofing and handcraft production. Rather, illiterate and those with primary education did this activity. The study also found that women without income relied on wetlands for grazing their livestock and crop production. Those who do not benefit from wetlands were mostly men and those with salaries of more than R2001 (high-income people) (Table 1). This is because they have sufficient money to buy food and other basic household essentials and can also afford to drill water from underground for domestic purposes.

4.3. Attitudes of local communities towards wetlands in Duthuni Village

Attitudes towards wetlands held by community members varied across a wide range of positive, neutral and negative responses (Table 1). A high proportion of respondents (89.4%; n = 279) were pleased that their village is located within the area that has wetlands. Of the respondents who participated in the survey, 93.3% (n = 291) agreed that wetlands existed for the betterment of local people. As one respondent narrated: '*Although we are not far away from the Thathe Vondo Dam, we do not have water in our village. As a result, we rely on water from the wetlands for domestic and irrigation purposes. Others rely on water from wetlands for their car wash businesses. We also rely on sedges and reeds from the wetlands for production of handcrafts, which is a source of income for some people. Life will be impossible without wetlands in this village' (Respondent 2).* When asked if they were aware that wetlands are protected by law is South Africa, 42.6% (n = 133) said 'yes', 34.6% (n = 108) said 'no' and the remaining

Table 2
Attitudes of community respondents towards wetlands (n = 312) in Duthuni Village falling under the Vhembe district in Limpopo Province of South Africa.

Attitude question	Response %		
	+	0	–
Are you satisfied that your village is located near an area that has wetlands?	89.4	3.2	7.4
Do you agree/disagree that the wetlands exist for the betterment of people in this village?	93.3	3.8	2.9
Do you agree/disagree that wetlands should be protected wherever they are found?	98.1	1.6	0.3
I would vote for a councillor who promised to protect wetlands in this village.	83	8	9
Are you willing to donate money that can be used to protect wetlands?	67.6	6.4	26
Have the actions of local people resulted in the conservation of wetlands in this area?	59	6.4	34.6
Penalties should be imposed on people who cause wetlands destruction.	92.9	3.8	3.2
Agriculture or any land use activity that is destructive around wetlands should be controlled.	85.9	9.9	4.2
Areas of wetland that are degraded should be rehabilitated or restored.	96.2	3.2	0.6
Rehabilitation of wetlands is a waste of money when local people are poor and short of land.	17	7.1	76
Are you aware that laws in South Africa protects wetlands?	42.6	22.8	34.6
Government has no role in raising awareness towards wetlands conservation in Duthuni.	48.7	26.3	25
Overall, do you like or dislike wetlands?	93.6	2.2	4.2

22.8% (n = 71) were 'not sure'. Those who said yes indicated that there were no measures taken by responsible authorities to encourage sustainable wetlands utilisation, reduce wetlands degradation or conserve wetlands.(Table 2).

When asked if the government has played a role in raising awareness about wetland conservation, 48.7% (n = 152) said 'yes', 25% (n = 78) said 'no' and the remaining 26.3% (n = 82) were 'not sure'. Those who indicated that the government has played some role in raising awareness could not indicate the role played by the government in raising awareness. Despite the government not having done anything to raise awareness on wetland conservation in the area, nearly all respondents (98.1%; n = 306) agreed that wetlands should be protected wherever they are found. The study found that all men in the study area had positive attitudes towards conservation of wetlands whereas only 2.7% of women were negative and 0.7% were not sure. The study had also revealed that all respondents who were above the age of 50 years had positive attitudes towards wetlands conservation as compared to those who were below the age of 50. In addition, all those who had not received any formal schooling had positive conservation attitudes towards wetlands as compared to those who had a primary, secondary and tertiary education (Table 3).

When asked if they would vote for a councillor who promised to protect wetlands in their village, 83% (n = 259) said 'yes', 9% (n = 28) said 'no', and the remaining 8% (n = 25) were 'not sure'. When asked if they were willing to donate money which would be used to protect wetlands in their village, 67.6% (n = 211) said 'yes', 26% (n = 81) said 'no', and the remaining 6.4% (n = 20) were 'not sure'. Of the 210 respondents who were willing to give a donation, 20.5% (n = 43) would be prepared to donate R10 ($0.64), 20.5% (n = 43) would donate R20 ($1.27), 17.6% (n = 37) would donate R30 ($1.91), 9% (n = 19) would donate R40 ($2.54), 15.2% (n = 32) would donate R50 ($3.18) and the remaining 17.1% (n = 36) would donate more than R50 (>$3.18). When asked if their actions have resulted in the protection or conservation of wetlands in the area, 59% (n = 184) said 'yes', 34.6% (n = 108) said 'no' and the remaining 6.4% (n = 20) were 'not sure'. Those who agreed indicated that there are no designated rangers or officials appointed by the chief or local authorities to guard against the destruction of wetlands in the area. In addition, the government has done nothing to help protect wetlands in the area. Rather, local people have taken it into their own hands to protect wetlands against destruction. Those who disagreed indicated that human activities (particularly cultivation and channelling of water from wetlands) have contributed toward degradation of some parts of wetlands in the area which is a course for concern. The latter group were of the view that more needs to be done to protect the remaining wetland areas.

Table 3
Relationships between gender, age, education and economic status (in percentage) towards conservation of wetlands in Duthuni Village falling under the Vhembe district in Limpopo Province of South Africa.

Categories	Respondent type	+	0	-
Gender	Men	100.0	00	00
	Women	96.6	0.7	2.7
Age	18–30	97.1	1.4	1.4
	31–40	97.8	2.2	00
	41–50	95.7	4.3	00
	51–60	100.0	00	00
	>60	100.0	00	00
Education	Illiterate	100.0	00	00
	Primary	93.8	6.3	00
	Secondary	99.1	0.9	00
	Tertiary	97.2	1.4	1.4
Economic Status	No income	92.0	8.0	00
	<R500	100.0	00	00
	R501-R1000	98.6	1.4	00
	R1001-R2000	100.0	00	00
	>R2001	97.0	1.5	1.5

When asked if penalties should be imposed on people who cause wetland destruction, 92.9% (n = 290) said 'yes', 3.2% (n = 10) said 'no' and the remaining 3.8% (n = 12) were 'not sure'. A higher proportion of respondents (85.9%; n = 268) were of the view that agriculture or any land use activity that is destructive within and around the wetlands should be controlled. Thus, despite the shortage of land for agriculture in Duthuni Village, the majority of respondents do not support the conversion of wetlands into agricultural lands. Instead of converting wetlands into farmlands, 96% (n = 312) of the respondents were of the opinion that the areas of wetlands that are degraded by agriculture or any other type of land use activity should be rehabilitated. Thus, the majority respondents (76%; n = 237) view rehabilitation or restoration of wetlands as an investment for current and future generations and not as a waste of money. It was suggested that local communities should be the ones involved in rehabilitating wetlands in the area. Overall, the majority of respondents (93.6%; n = 292) appreciate wetlands and had positive attitudes towards wetlands in the study area.

5. Discussion

The results of this study show that respondents have good knowledge about wetlands and that wetlands are an important ecosystem for local communities. The study recorded numerous benefits that local communities obtain from the wetlands; these include water for domestic use and irrigation, fishing, harvesting of plant resources for roofing and handcraft creation, crop production and using the area for grazing purposes. It is important to note that these activities are practiced on a subsistence basis, as in the case of Letseng-la-Letsie and Mfuleni in Lesotho and South Africa respectively (Lannas and Turpie, 2009). The use of wetlands for a variety of purposes is not unique to the study area. Wetlands have also been reported in West Africa (Adams, 1993), East Africa (Wood, 2001; Bikangaga et al., 2007; Anthonj et al., 2016; Nsengimana et al., 2017), southern Africa (Turpie, et al., 2006; Mandishona and Knight, 2019), Australia (Verschuuren, 2006; Graymore and McBride, 2013) and Romania (Romanescu et al., 2011) to have a wide range of cultural, and socio-economic significance. Unlike in other wetlands where majority of respondents use the wetlands for agriculture (Ambastha et al., 2007; Taiwo, 2013), in the current study, majority of interviewees use water from the wetlands for domestic and irrigation purposes. Despite wetlands value and the functions, they have often been regarded as unproductive wastelands, the value of which can be realised only by conversion to some other use (Bond et al., 1988). Such thinking has contributed to destruction of wetlands globally, including from agricultural conversion, with the latter being the main reason for elimination of wetlands in many parts of the world (Czech and Parsons, 2002; Schuyt, 2005; Taiwo, 2013). For example, in Kabartal Wetland in India (Ambastha et al., 2007) and in the Jimma Highlands in southwestern Ethiopia (Moges et al., 2018) most of the people, mainly agriculturists, are in favour of draining the wetlands for agricultural purposes.

In southwestern Ethiopia, the majority of interviewees did not express an interest in conserving wetlands; this was based on the small area of their landholdings and the requirement to meet their livelihood needs (Moges et al., 2018). In contrast, despite the shortage of agricultural land in the study area, the majority of respondents do not support the alteration of wetlands into agricultural lands. Almost all respondents (98.1%; n = 306) were of the view that wetlands must be protected. Motivation for wetland conservation in Duthuni Village tended to be ethical, with the majority of interviewees (67.6%; n = 210) being willing to donate money for wetland conservation, and 83% prepared to vote for a local councillor who promised to conserve the local wetlands. These results are consistent with Rispoli and Hambler (1999) who found that the majority (74%) of respondents, in Oxfordshire and Cambridgeshire in the United Kingdom were willing to pay money and 83% were prepared to vote for a local politician supporting wetland conservation. The results of this study are consistent with other studies that reported a clear majority of local communities who strongly support the conservation of wetlands (Sah and Heinen, 2001; Momanyi Mironga, 2005; Mandishona and Knight, 2019). For instance, the majority of respondents in Borrowdale (93%) and Belvedere (85%) wetlands in Zimbabwe support the conservation of wetlands (Mandishona and Knight, 2019). However, as Momanyi Mironga (2005) has noted, conservation of wetlands does not mean that people should not utilise wetland resources.

Conservation attitudes have been found in some studies to be strongly influenced by educational level (as in the case of Ghodaghodi Lake area in Nepal where higher levels of education were associated with positive conservation attitudes) (Sah and Heinen, 2001). However, in the present study, all those who had not received any formal schooling had more positive conservation attitudes as compared to those with higher levels of education. Thus, positive conservation attitudes in this study have been found to be strongly influenced by resource use or benefits, with majority respondents (92.9%; n = 290) benefiting directly from wetlands. This is consistent with Johansson (2005) who identified consideration of human wellbeing and recreation, human survival, and respect for nature as the personal motives for biodiversity conservation. Similarly, Opdam et al. (2015) also noted various reasons, namely sociocultural, sustainability, and economic frames contribute to motivation for conservation of biodiversity. As a result, the action of people in the Duthuni community towards wetlands has not led the total destruction of wetlands or conversion of wetlands to other land uses unlike in the case of Kabartal wetland in India (Ambastha et al., 2007) and Kisii District in Kenya (Momanyi Mironga, 2005).

As a strategy to avoid the destruction or degradation of wetlands in the study area, a high proportion of respondents were of the view that agriculture or any land use activity that is destructive around wetlands should be controlled and penalties should be imposed on people who cause wetlands destruction. Unlike in Ethiopia's Jimma Highlands where the majority of respondents (66%) did not express interest in restoring or rehabilitating wetlands (Moges et al., (2018), in the study area, the majority respondents (96.2%) were of the view that areas of wetlands that are degraded should be rehabilitated or restored. Thus, local people view rehabilitation of degraded wetlands as an investment for current and future generations. In a similar study in Oxfordshire and Cambridgeshire, United Kingdom, Rispoli and Hambler (1999) also found that majority respondents

(73%) were supportive of wetlands restoration or rehabilitation. According to Grenfell et al. (2007, p. 43), rehabilitation or restoration is the process of 'reinstating natural ecological driving forces within part of a degraded wetland to recover former or desired ecosystem structure, function, biotic composition and ecosystem services'. In South Africa, the Working for Wetlands (WfWet) programme that was initiated in 2000 has been mandated with the responsibility of rehabilitating wetlands through co-operative governance and partnerships (WfWet, 2005). In the present study, local communities are interested to forming a partnership with WfWet in order to rehabilitate wetlands in the area. This is an important step and could contribute to job creation for local communities because the majority of WfWet's funding is through the Expanded Public Works Programme (EPWP). These results give cause for optimism that public attitudes are not an overarching obstacle to wetland conservation and rehabilitation, and there is improved awareness of the socio-economic importance of wetlands.

6. Conclusion

One of the important lessons learned from case studies elsewhere is the potential danger in generalising findings from one study and applying them in other contexts. It is important to note that case studies vary from one place to another and between countries. In light of this drawback, the findings of this study have notable relevance and resonance beyond the case study examined. This study has shown that wetlands in rural areas where there is poor service delivery provide a variety of goods and services and a range of direct use values that are critical for supporting human lives and livelihoods. The study revealed that local population hold significantly more positive attitudes towards wetlands and wetlands conservation. This include their determination to control activities causing wetland destruction or degradation, willingness to donate money for wetlands conservation, and preparedness to vote for a councillor who promised to protect wetlands. These positive attitudes of communities towards wetlands and wetlands conservation offers some hope for sustainable utilisation of wetlands.

Despite the positive attitudes held by the majority of respondents, there is no institutional or governmental support for raising wetlands conservation awareness and more effective wetlands use by residents. In addition, as is the case of Zimbabwe, existing South African wetland legislations (Conservation of Agricultural Resources Act of 1984, the NEMA Act 107 of 1998, the National Water Act 36 of 1998) are not being implemented effectively (Mandishona and Knight, 2019). Thus, there is no proactive approach by government (municipalities and provincial department) to reduce wetlands degradation and help conserve the remaining areas of wetlands. This study suggests that there is a need for municipal, provincial and national government to intervene in raising awareness regarding wetlands conservation, particularly in rural areas. In addition, the government should work with communities to help, not only with the conservation of the remaining wetlands, but also to rehabilitate or restore parts of wetlands that are degraded. The institutional support to wetlands conservation combined with the willingness of local communities to coexist with the wetlands can help to ensure sustainable utilisation of wetlands.

Declaration of Competing Interest

The author declare that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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