

Review Article

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The Nexus between Ecosystem Services, Livelihood Strategies and Social Well-Being of Riparian Communities Around Sandleni Mntjuzalala Wetlands, Eswatini

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ABSTRACT

An explorative descriptive study was carried out at the Ngololweni wetland in the Shiselweni region of Eswatini to assess the linkages among ecosystem services, livelihood strategies, and social wellbeing of riparian people. This study followed both quantitative and qualitative research paradigms. A structured questionnaire was used to collect the quantitative data and an interview schedule was used to collect the qualitative data through interviews with key informants. A checklist was also used for observation purposes. The data revealed the important nexus between the wetland, livelihood strategies and the peoples' wellbeing as 93.7% of the respondents reported that the wetland was important for their livelihoods. Several important services provided by the wetland to the people were also reported including the importance of the wetland in the provision of water and harvesting of resources, its importance in the harvesting of resources, and its importance in culture, water availability, and harvesting of resources. Several activities were reportedly practiced in and around the wetland of which, the major reported is the harvesting of resources 63.5% of the respondents. The outstanding resources harvested among others include umhlanga, umuzi, incoboza and likhwane which are used for cultural purposes by young maidens and also older women for making traditional handcraft. The paper concludes that people form an integral part of wetlands and derive a range of products from, and also influence, wetland processes. Hence, any attempt to mismanage and destroy this linkage can have an adverse impact on the livelihood of the people. It recommends that the Government of Eswatini through the Ministries of Tourism and Environment, Agriculture, and Natural Resources should harmonize and develop a policy and guidelines to specifically protect the wetlands and guide their use in the country. Furthermore, the Ministry should conduct capacity building and awareness campaigns among riparian people to embrace the protection and sustainable utilization of the country's wetlands.

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Introduction

The livelihoods and wellbeing of people in developing countries are synonymous with the ecosystems and the services these ecosystems provide. This implies that human beings and the ecosystems such as wetlands are in an intricate linkage through the resources and services they provide [1-3]. However, these linkages and connections are usually accompanied by adverse challenges that impact negatively on the sustainability of the resources and the services people harness. This paper yearns to explore the intricate relationship between ecosystem services, livelihood strategies, and social wellbeing amongst riparian people – taking the Sandleni Mntjuzalala wetlands under the Shiselweni Region of Eswatini as a case study.

Wetlands as defined in the Ramsar Convention Manual [4] 6th Edition (2013), under Articles 1.1 and 2.1 offer unique ecosystems in which water is the primary factor controlling the environment and associated plant and animal life. These ecosystems occur

where the water is at or near the surface of the land or where the land is covered by shallow water [5]. Wetlands can also be considered as areas of marsh, fen and peat land, with water that is static or flowing, fresh, brackish or salty including areas of marine water whose depth at low tide does not exceed six metres [4,5]. Wetlands are found in almost every region of the earth and are considered the most biologically diverse of all ecosystems. Because of this diverse nature, the protection and sustainable utilization of resources from such ecosystems is of paramount importance to the livelihoods and wellbeing of people around them [6]. point out that, wetlands cover only about six per cent of the earth's surface and play an important role in biogeochemical cycles. In Eswatini, the Eswatini National Trust Commission (ENTC) as the Administrative Authority (ENTC, 2015) state that wetlands cover an area of about 2.7% of the 17, 364 km² of the total land mass of the country and most of these require urgent protection.

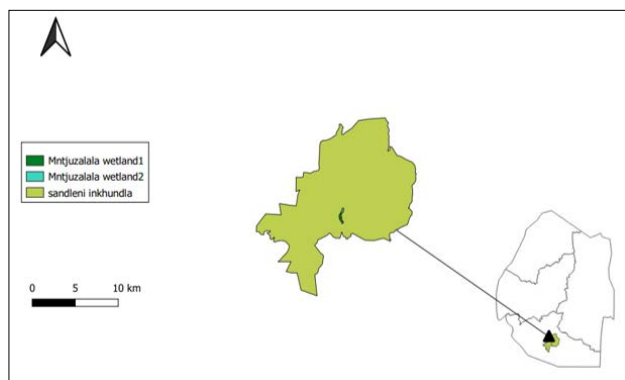


Figure 1: Eswatini – Sandleni Mntjuzalala wetlands Location Map

Contribution of the Study

A plethora of literature about wetlands abound. For instance, He, Gallager, and Min [2] examined the perceptions of ecosystem services and social well-being in the Wuyishan National Park, China. Their study analysed the importance of and linkages between ecosystem services and wellbeing based on the impact of new designation of protected areas on this social-ecological system. Kafumbata, Jamu and Chiotha reviewed the importance of African lakes and their management challenges and concluded that African inland lakes contribute significantly to food security, livelihoods and national economies through direct exploitation of fisheries, water resources for irrigation and hydropower generation [7]. Highlighted that most studies assume that there are multiple relationships between ecosystem services and human well-being, but there are few studies that quantify these relationships [8]. Xu and colleagues examined the relationships between ecosystem services and human well-being changes based on carbon flow [9]. However, they maintain that the current understanding of how ecosystem services flow affects human well-being is not sufficient. This indicates that there is limited literature on the linkages (nexus) between wetland ecosystems, the resources and services they provide, and peoples' livelihood strategies and social wellbeing. In addition, all these studies were not conducted in the context of Eswatini given its different cultural background and topography. Therefore, this study strives to address these gaps.

Literature Review

Ecological Importance of Wetlands

Wetland ecosystems provide many useful ecological functions and services including: water storage, water purification, ground water recharge, stabilizing of local climate conditions, flood mitigation, retention of nutrients, sediments and pollutants [10,11]. They are also habitats to several flora and fauna species of different importance [4,11,12]. The floral species growing in the wetlands of Eswatini include *Umhlanga* (*Phragmites australis*), *Umuzi* (*Isolepis costata*), *Incoboza* (*Cyperus articulatus*), *Likhwane* (*Cyperus latifolius*) and *Umncozi* (*Syzgium cordatum*) while the faunal species include several birds, mammals, reptiles, amphibians, fish and invertebrates including worms and crabs [12,13].

The Economic Commission for Africa Secretariat, points out that, target three (3) of the Millennium Development Goal (MDG) number seven (7) requires countries to ensure environmental sustainability and reduction in the loss of biodiversity. Furthermore, the Sustainable Development Goal (SDG) 15 requires countries to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification, halt and reverse land degradation and halt biodiversity loss [14,15]. In

particular, SDG 15.1 had called upon states to ensure conservation, restoration and sustainable use of terrestrial and inland fresh water ecosystems and services especially forest, wetlands, mountains and dry lands in line with the obligations under the international agreements by the year 2020 [16]. However, up to date, this goal has not been achieved in Eswatini due to several factors, and thus, the condition of several wetlands in the country continue to deteriorate and degrade.

Wetland Degradation

One of the major constraints to the wise use of wetlands in Africa is lack of knowledge by planners and natural resource managers on the benefits that wetlands provide and the techniques by which they can be utilized in a sustainable manner [17]. In addition, abject poverty within households in riparian areas in developing countries is a major driving force behind the degradation of wetlands due to overharvesting of wetland resources [3,18,19]. Furthermore, increasing population growth coupled with efforts to increase food security is escalating the pressure to expand agriculture and resource harvesting within wetlands. The environmental impact of wetland agriculture and resource harvesting can, however, have profound social and economic repercussions for the people who depend on their ecosystem services other than those provided directly by agriculture and resources harvesting [20]. Observations in Eswatini show that many people also harvest sand and other materials from the wetlands for construction purposes.

Financial barriers including inadequate funds for wetland restoration and protection activities and also poor coordination of funds in programmes where wetlands are included is a major contributor to wetland degradation in the country [21]. In addition, low level of awareness relating to the importance of wetlands and the people's attitude of extracting benefits from wetlands while considering only short term benefit and disregarding long term sustainability of the wetland is another profound factor that is contributing to wetlands deterioration [22].

Institutional barriers such as inadequate monitoring of wetland's health and unclear roles and responsibilities of agencies whose work overlap with wetland restoration and protection also contribute to degradation of wetlands [21]. Unfortunately, there is also no specific legislation governing the use and management of wetlands in Eswatini [18]. Furthermore, Dlamini, Gumedze, Manyatsi, Thusi and Mkhathshwa and also Murye posit that, the management of wetlands in Eswatini is through poorly coordinated sectoral pieces of legislation by; Ministry of Natural Resources - Stream Bank Regulations (1951), Ministry of Agriculture and other institutions including the Eswatini Environment Authority (EEA) and Eswatini National Trust Commission (ENTC) [18,23].

Contribution of Wetlands to Livelihoods

Wetlands contribute immensely to the livelihoods and wellbeing of millions of people in the sub-Saharan region of Africa. In many places and especially in developing countries like Eswatini, wetlands are inextricably linked to cropping and livestock rearing systems [20]. There is a diversity of ways in which wetlands in Africa contribute to the livelihood, wellbeing and poverty reduction [24]. One of these ways is through the harvesting of resources found in them. In Eswatini in particular, wetlands are mainly used for harvesting different species of plants because of their economic and cultural values and also for medicinal uses. These values make wetland resources as safety nets for many rural riparian households' economies and as sources of medicine and building materials. The wetlands in Eswatini are also used for cultivation of crop, harvesting of water for domestic, agricultural purposes, fishing and for construction [6,25]. These activities have

had major adverse impacts on the wetlands leading to several of them drying up and others deteriorated due to the influx of agricultural chemicals and harvesting of other resources and also sand for construction purposes.

Prudent Management of Wetlands

Wetlands are highly productive ecosystems that provide habitats for a diversity of wildlife species and afford various ecosystem services. Literature search has revealed that a lot of work has been written on the capacity of wetlands to provide a diverse range of functions and services to support people, ecological systems and the physical environment. However, the intricate functional linkages between wetlands, people and livelihoods, and the survival of people, has been neglected in as far as wetland management is concerned and that has largely been driven by environmental challenges (Alikhani, Nummi, & Ojala, 2021) [26,27].

The effective management of wetlands requires an understanding of the basic processes, the animal and plant life history strategies, and principles of wildlife management as well as the relationships these ecosystems have with the local people who fundamentally utilize them for several purposes. In addition, it is critical to take cognizance of the awareness and knowledge of the local people in regard to the importance of the wetlands [28,29]. The techniques used to manage wetlands also differ widely depending on target species, coastal or interior wetlands, and available infrastructure, resources, and management objectives [30]. Furthermore, Gary et al. [30] went on to say, ideally, wetlands are managed as a complex, with many successional stages and hydro periods represented in close proximity. For example, if the management is geared towards wildlife, typically it will involve manipulating water levels and vegetation in the wetland, and providing an upland buffer. Commonly, levees and water control structures are used to manipulate the wetland hydrology in combination with other management techniques for instance disking, burning, herbicide application to create the desired plant and wildlife responses [30].

Methodology

The study was carried out at the Sandleni Mntjuzalala wetlands in the Shiselweni region of Eswatini. It was explorative and descriptive in nature and followed both quantitative and qualitative research paradigms. It targeted the wetlands and the households around it and the sample size was determined by data saturation. A simple systematic probability sampling method was used to determine which households participated in the study. The households were assigned numbers and every third household was drawn into the sample. In households, the most senior person was drawn to the study. In those households that had no one or had a child under the age of 18 or for any reason were inaccessible by the time of the data collection, the next household was drawn into the study and a recounting was done in that the third household from that one became the next household to be drawn into the study. Structured questionnaires were prepared, pretested and used for the quantitative data collection. For the qualitative data, observation checklists were prepared and used to record observations and also an interview schedule was used for in-depth interviews with key informants from the Eswatini Water and Agricultural Development Enterprise (EWADE). The quantitative data were captured into a Statistical Package for Social Sciences (SPSS) version 20 and analysed using descriptive statistics. The qualitative data were used to triangulate the quantitative data. The findings were then presented as narrative and in figures. Ethical considerations were kept in that among others, the identities of the respondents were not revealed and all permissions and consents were sought.

Results

Figure 1 shows the reported opinions of the respondents towards the importance of the wetland. Majority 93.7 % (n=74) reported that the wetland is important to them and only 6.3 % (n=5) say that the wetland is not important to them. This finding agrees fairly well with Bhowmik whose study focused on the importance of different types of wetlands [31]. This finding shows that the people around the wetland at Sandleni Mntjuzalala are aware of the importance of the wetland. Observations on the ground showed that the wetland was also being used as a pasture which is in concurrence with as study by Kakury, Turyahabwe and Mugisha [32]. Probably this is why the respondents saw it as an important resource.

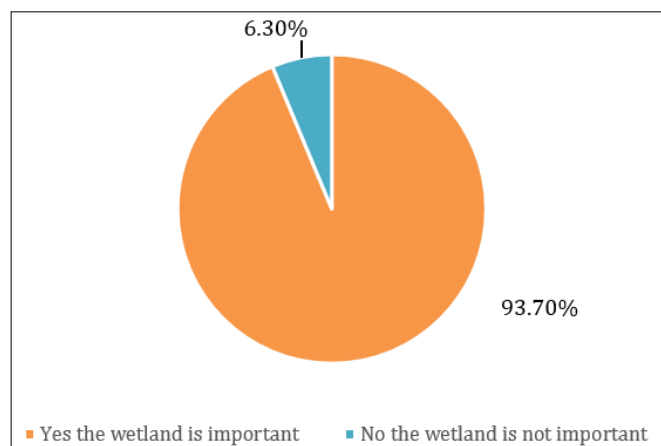


Figure 1: Importance of the Wetland at Sandleni Mntjuzalala

Figure 2 shows the reason why the wetland is important to the respondents. At least 23% (n=17) had the view that the wetland is important because of water availability and harvesting of resources. Similarly, 23% (n=17) of the respondents said the wetland is important for harvesting resources, and another 17.6% (n=13) said that it is important for culture, water availability and harvesting of resources, and 14.9 % (n=11) said it is important for culture and harvesting of resources. Another 9.5% (n=7) reported that it is important only for water availability. Furthermore, 4% (n=7) opined that the wetland is important for culture only and another 4% (n=4) reported its importance to culture and water availability. Finally, 1.4% (n=1) said the wetland is important for scenic beauty, culture, water availability, and harvesting of resources. The importance of wetlands has also been reported by Lee [33]. The cultural importance of wetlands is very significant in maintaining social cohesion among communities as also pointed out by Murye [3]. Most of the respondents stated that the wetland is important because of availability of water and for harvesting of various natural resources.

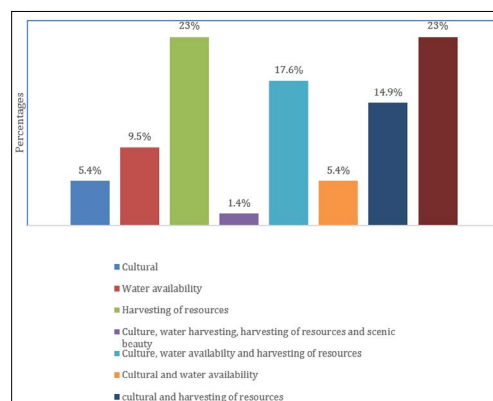


Figure 2: Important aspect of the wetland at Sandleni Mntjuzalala

Figure 3 shows that most of the respondents about 63.5% (n=47) are harvesting resources around the wetland and 14.9% (n=11) of the respondents are harvesting resources and practice livestock grazing around the wetland. About 6.8% (n=5) of the respondents are harvesting resources and fishing while 4.1% (n=3) of the respondents are harvesting resources, livestock grazing and bird watching and another 4.1% (n=3) of the respondents are harvesting resources, fishing, livestock grazing and game and bird watching. Few of the respondents 2.7% (n=2) are harvesting resources, livestock grazing and fishing around the wetland. The rest of the respondents 1.4% (n=1) are grazing their livestock around the wetland, another 1.4% (n=1) are fishing and yet another 1.4% (n=1) are fishing, livestock grazing and bird watching around the wetland.

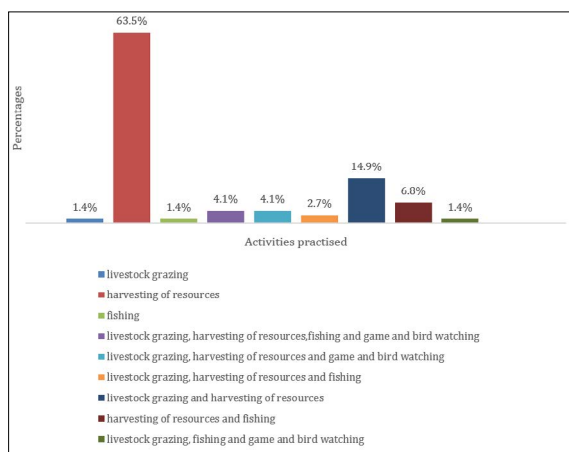


Figure 3: Activities practiced around the wetland Sandleni Mntjuzalala

The data in figure 3 show that the major interaction of the people with the wetland is resource harvesting. The figure shows that the resources harvested are mainly grass as (36.7%; n=29) of the respondents indicated so. A further 35.4% (n=28) of the respondents said they harvested water and grass, 8.9% (n=7) said they harvested water, grass, and fish. In addition, 6.3% (n=5) said they harvested nothing from the wetland, 5.1% (n=4) said they drew water from the wetland, 3.8% (n=3) said they harvested water, grass, fish and clay, 2.5% (n=2) harvested grass and fish and 1.3% (n=1) harvested fish. These findings agree fairly well with a study by Avellán and Gremillion which examined biomass on plants that are harvested from wetlands. The data has demonstrated the intricate relationship between the people, resource harvesting and the wetland as an ecosystem [34]. This shows that the wetland provides a safety net for livelihoods and wellbeing of the people at Sandleni Mntjuzalala. These safety nets are in the form supplementary food security, cultural artefacts, and sources of income.

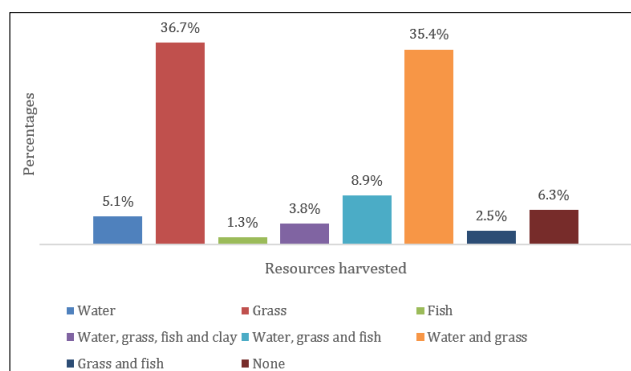


Figure 4: Resources harvested from the wetlands at Sandleni Mntjuzalala

On further interrogation, it was revealed that the mostly harvested grass species include umhlanga - (*Phragmites spp.*), (*Ascolepsis spp.*) - umuzi, *Schoenoplectus spp.* - incoboza and (*Cyperus spp.*) - likhwane which is used for culture by young maidens and also women can make traditional handcraft using these resources which they sell for income generation.

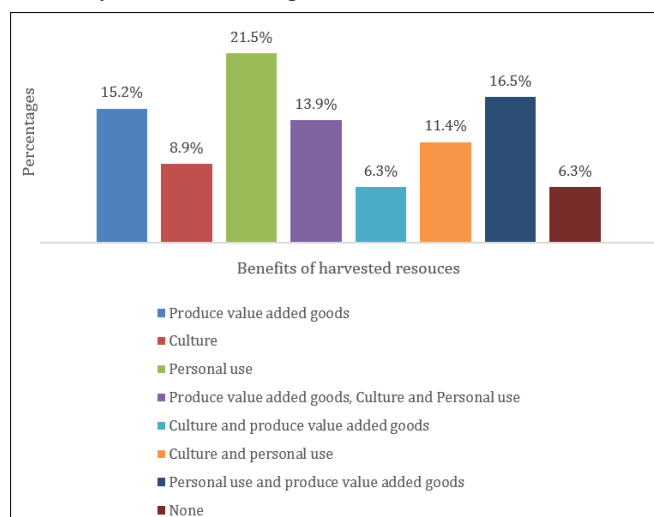


Figure 5: views of the respondents on the benefits of harvested resources from the wetlands at Sandleni Mntjuzalala

Figure 5 shows that 21.5% (n=17) of the respondents use the resources harvested for personal usage and 16.5% (n=13) of the respondents use the resources to produce value added goods and for personal use. Another 15.2% (n=12) of the respondents uses the resources harvested to produce value added goods while 13.9% (n=11) are those that harvest resources from the wetland for culture, personal use and production of value added goods. Furthermore, 11.4% (n=9) of the respondents harvest the resources for culture and for personal use. A few of the respondents 8.9% (n=7) harvest resources for culture use. The least 6.3% (n=5) are respondents that harvest resources for culture and produce value added goods another 6.3% (n=5) are respondents that are not benefiting anything from the wetland. The findings show that the most of the harvested resources are used for personal use and produce value added goods. This further confirms the intricate linkages ecosystems, livelihoods and people have.

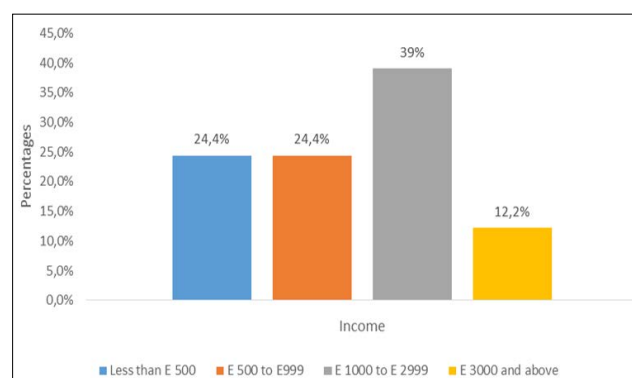


Figure 6: Income generated by households per season from harvesting wetland resources at Sandleni Mntjuzalala

Figure 6 shows that 39% (n=16) of the respondents earned E1000 to E2999 from selling harvested resources from the wetland. Another 24.4% (n=10) of the respondents reported that they received less than E500 from the selling of the harvested resources

while another 24.4% (n=10) of the respondents receive E500 to E999 from selling harvested wetland resources. Another 12.2% (n=5) reported that they are receive E3000 and above from selling harvested resources. The data indicate that most of the households in the Sandleni Mntjuzalala area use the wetland as an economic safety net for their households. Thus, emphasizing the close linkages between the people and their ecosystems. This compares fairly well with Murye [3] whose study considered the socio-economic contribution to households from harvesting of marula in Eswatini.

Respondents were further asked to indicate for what purpose they used the income generated from selling the wetland resources. Figure 7 shows that 46.3% (n=19) used the income for taking care of household day to day needs and 19.5% (n=8) used the income for paying school fees and taking care of day to day needs and 17.1% (n=7) used the income for health services and taking care of household day to day needs. Another 12.2% (n=5) reported that they are using the income generated for paying school fees and taking care of household day to day needs and paying for health needs and 4.9% (n=2) use the income generated from selling the wetland resources for paying school fees.

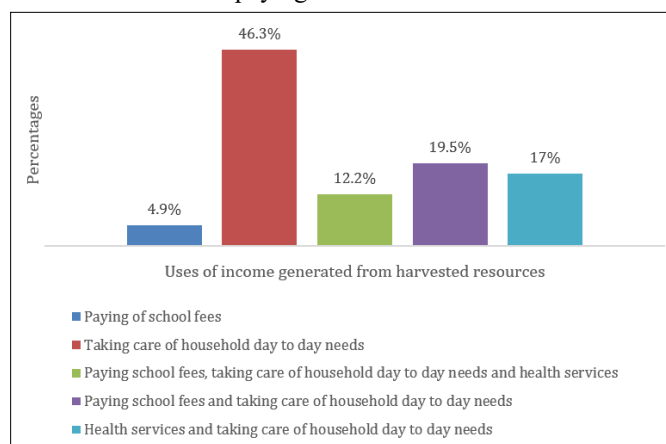


Figure 7: Uses of income generated from harvested resources at Sandleni Mntjuzalala

The findings in figure 7 indicate that the overall livelihood and wellbeing of the people around Sandleni Mntjuzalala hinges on harvesting resources from the wetland. This implies that without the services provided by the wetland, many households would be pushed further into deep poverty and this would have an adverse impact of the overall wellbeing of the people. Hence deterioration of the wetland would have dire consequences on the entire people. This calls for the relevant authorities to put in place structure that would foster the protection of this crucial resource. The finding in this study concur with finding from a study by Murye [3] where his study respondents highlighted the importance of resources harvested from ecosystems as important sources of their household income. They further indicated similar uses for the income they obtained from selling such ecosystem resources.

Conclusion

The paper concludes that wetlands makes a substantial contribution to the economies and livelihoods of riparian communities in Eswatini and, hence, are in a nexus. Furthermore, the harvesting of resources from the wetlands plays a fundamental role in culture which is paramount in creating social ties and cohesion among the Swazi nation. The increased harvesting of resources from the wetlands has a detrimental impact on the sustainability of

the wetland ecosystem. There are disjointed policy and legal frameworks for the protection of wetlands in Eswatini. Finally, the destruction of wetlands due to unsustainable utilization of its resources will deepen the existing poverty levels of the riparian people and lead to the deterioration of quality of life, especially in the impoverished households that are proportionally more dependent on its services [35-37].

Recommendations

This paper recommends that the wetlands in Eswatini be utilized sustainably through awareness campaigns amongst the riparian communities. The ENTC as the Administrative Authority of wetlands in the country working under the supervision of the Ministry of Tourism and Environment Affairs, the Ministry of Natural Resources & Energy and also the Ministry of Agriculture should harmonize the legal framework for management of wetlands in the country. The Government of Eswatini should revisit its policies on rural development in order to encourage and strengthen the creation of employment opportunities in rural areas so as to reduce the dependency on natural resources and wetlands in particular. It is important that the harvested and exploited resources from the wetlands be based on the available resources and thus issued permits be based on the quantity available for the specific period. This is important so as to guard against overexploitation of these important resources.

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