BLUE IN THE GREEN ECONOMY: LAND USE CHANGE AND WETLAND SHRINKAGE IN BELVEDERE NORTH AND EPWORTH LOCALITIES, ZIMBABWE

L Mutisi
Department of Environmental Science
University of South Africa

G Nhamo
Institute for Corporate citizenship
University of South Africa

ABSTRACT

The blue in the green economy is an emerging term that speaks of the importance of water and wetlands in the green economy. The research sought to assess the extent of wetland degradation with respect to land use change, particularly housing and agriculture developments in Belvedere North and Epworth, Harare, Zimbabwe. The research made two important findings. Firstly, both the Belvedere North and Epworth wetlands have been severely degraded by anthropogenic activities, with housing developments and urban agriculture as the major contributors of this degradation. The development of residential properties in the wetlands results from the high demand for residential space in Harare. Secondly, the research found that wetland degradation was closely linked to the lack of clear wetland policies both at national and local levels. The study concludes that an integrated land use approach has the potential of minimising wetland loss and degradation.

INTRODUCTION

The concept of the blue in a green economy emerges from debates by Small Island Developing States – SIDS (2014) to and from the global Rio+20 summit that addressed the green economy in the context of sustainable development and poverty reduction. From the SIDS perspectives, the green economy transition would not be a platform to achieve sustainable development and reduce poverty if greater efforts were not put towards sustaining seas and oceans given the amount of resource endowment in these marine bodies that include biodiversity, oil, minerals, water, fisheries, tourism, carbon sinks, etc. In support of the need to include the "blue" in the green economy, the United Nations Environment Programme – UNEP

(2012:3) indicates that "A worldwide transition to a low-carbon, resource-efficient Green Economy will not be possible unless the seas and oceans are a key part of these urgently needed transformations." Needless to indicate that the water bodies have been for a long time viewed as externalities in economic growth and development as they were and still are targeted for waste discharge.

In the context of this paper, the "blue" in the green economy was taken as all-encompassing to include inland wetlands. Hence this research sought to unpack how land use changes, particularly housing and agriculture developments in the City of Harare, Zimbabwe's capital, are contributing to the loss and degradation of the Belvedere North and Epworth wetlands as the world moves into top gear to implement and promote the outcomes of Rio+20. The research also focused on determining possible intervention measures to minimise loss of these wetlands under the emerging concept of the green economy. Wetland degradation has been an issue of concern for a long time and it is against this background that nations met for the Ramsar Convention in Iran in 1971 to address concerns regarding wetlands and their degradation. It was noted that "the degradation and loss of wetlands is more rapid than that for other ecosystems" (Ramsar Convention Secretariat, 2007:11).

According to Springate-Baginski, Allen and Darwall (2009:xiii), wetlands are defined as, "areas of marsh, fen, peat land 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." Barbier, Acreman and Knowler (1997:71), encompassing the Ramsar definition, "defined 30 groups of natural wetlands and nine manmade ones". Overall, these wetlands can be categorised into five wetlands types, namely, estuaries, marine, riverine, palustrine and lacustrine. The wetlands have, however, been threatened by developments such as housing. The main reason for wetland destruction is primarily due to increasing populations in different nations, leading to huge demands for housing developments.

In Zimbabwe, the capital city Harare has witnessed an increase in population due to a number of factors such as rural to urban migration, and this has resulted in an increase in the demand for land for housing development. The increase in population has resulted in families occupying almost all the available and open portions of land, leading to denser living in the suburbs. This high demand for land has resulted in a progressive encroachment of wetland areas and the eventual loss of some wetlands. There is, however, a call for sustainable utilisation and conservation of wetlands if the ecological functions of the wetlands are to be realised. Barbier, Acreman and Knowler (1997:89) confirm that "conservation can only be achieved if wetlands can be shown to be of value and, in some cases, of greater value than proposed alternative uses of the wetland site itself or of the water feeding the wetland."

Harare has an estimated population of 1 469 million people (ZimStat, 2012:115). From an administrative point of view, Harare is an independent city almost equivalent to a province. Harare has become a trade centre for different agricultural products such as maize, tobacco, cotton and soya beans. Industries in Harare are mainly textiles, steel, chemicals and food, among others. Mining activities are evident in Harare's surroundings, with gold being the most mined. These commercial activities naturally pull workers to the city.

METHODOLOGY

The aim of the research was to understand wetland degradation in relation to land use change, particularly housing and agriculture developments in the City of Harare since 2000. On this basis, the following twin objectives were spelt out: (1) to determine the link between land use change (housing and agriculture development) and its effects on the wetlands in Epworth and Belvedere North suburbs in the City of Harare; and (2) to evaluate responses put in place by the City of Harare in order to address housing development in the face of threatened wetlands, including clearing housing developments following environmental impact assessment (EIAs) studies or lack of such responses.

To select respondents in Epworth, a random sample was used due to the informal haphazard nature of settlement in the suburb. The study area had a total of 307 units and the study targeted 20% of these units. This resulted in a total sample of 60 respondents being selected randomly. Epworth is a suburb that consists of both formal and informal settlements. The informal settlements have arisen due to an influx of people who were rendered homeless by an informal settlement destruction operation code-named *Murambatsvina* (operation restore order) in 2005, as well as the political situation that was experienced in Zimbabwe in the first decade of the 2000s. "From a human perspective, operation restore order did not occur in a policy vacuum (UN Habitat, 2005:22)."

To select respondents in Belvedere North, systematic sampling was employed because the Belvedere North population is logically homogenous and uniformly distributed. Systematic sampling is the most ideal method of sampling since the houses were situated in a linear form and this assisted the researcher to use stand numbers to select respondents. Systematic sampling assisted the researcher to select the respondents in a manner that is uniform with respect to the households under study. There were 101 houses that were considered in the study area. Of these 101 houses, a total of 25 respondents were selected on the basis of selecting one out of every four houses in the area. The materials used in the collection of data were mainly pretested questionnaires that were prepared by the researcher. A total of 25 questionnaires were used in the field during data collection. Belvedere North is formally a residential area. However, the area has seen other developments. For

instance, a multipurpose hotel has been constructed in the area. The Belvedere area has an approved layout and displays a formal settlement in comparison to Epworth.

To select the professional interviewees, non-probability purposive sampling was employed. Non-probability purposive sampling permitted the selection of interviewees (professionals) whose qualities or experiences permit an understanding of the phenomena in question and are therefore valuable. A total of 15 interviewees were purposively chosen due to their knowledge of issues under investigation. The researcher selected residents from the study areas for the purposes of gathering data.

A total of 25 respondents were interviewed in Belvedere North suburb and 60 respondents in Epworth. The materials used during data collection entailed structured and semi-structured questions in a questionnaire. The questionnaires that were used were divided into household and professional questionnaires. The household questionnaires had three sections, namely, personal information, key wetland issues and policy issues. The household questionnaires had 10 questions that were coded. The professional questions had 18 questions that were coded. According to Cresswell (1994:24), "surveys include cross-sectional and longitudinal studies using questionnaires or structured interviews" for data collection. In this research, respondents for the questionnaire were from household heads in the selected suburbs, namely Epworth and Belvedere North.

The Department of the Surveyor General of Zimbabwe gave the researcher black and white Aerial Photographs (APs) of the study sites that were taken in 2002. These APs were scanned at 400 Dots Per Inch (DPI). Photographs are normally taken once a year in Zimbabwe. Geographical Information System (GIS) 10.1 was used to ensure that the APs were imported. These APs were immediately saved into the tagged image file (tif) format. The Digital Elevation Model (DEM) was used to orthorectify the images. Orthorectification is a process of geo-referencing the APs. The detection of land use change for the years 2008-2014 was digitised during the dry season from Google Earth images.

The analysis of data involved the display of the spatial extent of wetlands in ArcGIS 10.1. ArcView 10.1 measures shapes (polygon) in hectares. Wetland areas and their related images were then calculated for the wetland sites so as to observe changes. The detections of land-use change are expressed as a percentage after calculations. The generation hybrid "land use and land cover (LULC) digital classification" was used to calculate "pattern metrics" (Pan *et al.*, 2004:118). Making reference to type of crops and dwellings (structures) present will aid in the process of ground-truthing for the wetland areas. Some of the environmental indicators include "land cover/land-use (irrigated areas; areas of forest; land-use changes; land cover conversion; land-use and conservation; biodiversity, wildlife habitats, landscape; road infrastructure; habitat fragmentation)" (Lausch & Herzog,

2002:4). Collected data was analysed through the Statistical Package for Social Scientists (SPSS). Direct observation of the wetland area was used to examine existing natural features.

THEORETICAL ORIENTATION

From an international perspective, wetlands are conserved in consideration of the Ramsar Convention on Wetlands signed on 2 February 1971 in Ramsar, Iran. The Ramsar Convention introduced the World Wetlands Day that commemorates the establishment of the convention in the conservation and sustainable utilisation of wetlands. This comes as "the sprawl of urbanization not only results in direct habitat loss, but also generates additional pressures on the existing biodiversity" (McInnes, 2010:5). The Ramsar Convention promotes and seeks for commitment from member countries to ensure wetlands are sustainably utilised and that these wetlands are planned for. In McInnes' view (2010:7), for "the prosperity of future generations and the protection of wetland biodiversity, it is essential that society adopts a more sustainable approach to urbanization, recognizing the need to protect the natural resource base that sustains urban areas".

The United Nations HABITAT – UNHABITAT (2008:ii), estimates that "by 2030 the majority of Africans will be urban residents, and the majority of them are predicted to live in slums and informal settlements unless radical corrective measures are taken." It further estimates that approximately 50% of the globe's population lives in urban areas, and that this figure was likely to increase in the future. In the same report (2008:74) the "projected near tripling of the 2007 urban population in absolute terms and the commensurate shift from the current urbanization rate of 41.7 percent to 55.4 percent in 2030 is a momentous demographic shift that will have significant impacts." It was noted that populations living in urban areas seek accommodation and cities are expanding both horizontally and vertically to meet this demand. The UNHABITAT (2008:70) report notes "efforts should aim at effectively managing horizontal spatial expansion." Generally, the responsibilities of local governments are limited to land use, infrastructure provision and associated urban development strategies. The advantages of urban strategic planning includes an increase in governance and cooperation that aids municipalities in coming up with sustainable development strategies.

Wetlands have been threatened by human activities in urban areas. In Turkey, it was noted that urban development and dam construction are a threat to wetlands. According to Karadeniz, Tiril and Baylan (2009:1109), "draining of the wetlands has accelerated with the capability to cultivate vast areas due to mechanized agriculture and the increase in the construction of dams and roads in these years." The research shows that Turkey had a total of 94 wetlands by 2007. These 94 wetlands had many factors threatening them over time. They have been threatened by unsustainable fishing and chemical contamination, among other factors, thus contributing to wetland depletion.

As urbanisation has been seen to be on the rise, it is evident that sensitive and fragile ecosystems are threatened by land use activities, and in particular, housing and its associated infrastructure. Wetlands, being habitats for aquatic fauna as well as being the main support of vegetation species, have been threatened by the housing developments. Feresu (2010:112) said "wetland mismanagement has also led to land degradation and siltation of rivers."

Urban housing demand has been rising in several developing nations, including Zimbabwe, over the years. What is evident in this is that the housing demand is also linked to affordability. Chirisa (2010:50) says "the majority of the people were self-employed largely as street vendors and cobblers". For instance, the bulk of urban settlers residing informally in settlements are low income earners and as such they demand housing they can afford. The low income earners, who are mostly informal traders, often occupy space that is cheap, thus resulting in informal settlement. In Epworth, for instance, Chirisa (2010:51) notes that "a population of up to twenty thousand has invaded the land there and put up very substandard structures, not even meeting the minimum of the expected standards – without proper infrastructure".

McInnes (2010:21) says "one of the dominant factors underlying wetland loss is population growth, which imposes great pressure on water resources and undeveloped land areas for settlements, higher agricultural and industrial production and infrastructure expansion". An example in Zimbabwe is Chitungwiza Town, which was constructed on wetland areas as a response to housing demand (Masara, 2012:S12). The Chitungwiza Municipality allocated houses on wetland areas resulting in environmental disturbance. Waste disposal, as well as erosion of the wetland areas, was evident due to demand for commercial and residential space. Masara (2012:S12), argues further saying "many people have taken to dumping waste uncollected by the council in the wetlands while others have turned them into agricultural fields owing to their ever-wet natural state".

PRESENTATION OF DATA, ANALYSIS AND DISCUSSION OF FINDINGS

Land-use changes in the Belvedere North and Epworth wetlands

Both wetland areas can be classified as *dambos* (commonly known as *vleis*). This could be because the wetland area has water in some seasons and not in others. The *dambos* are mostly treeless with grass being the dominant vegetation. The wetland vegetation comprises *typhalatipholia* in most of its sections. The soils are grey-black in colour and permanently moist. The *vlei* shows the presence of silt in some portions, thus proving the presence of water. The GIS calculations show that the total area of the Belvedere North study site is 59.2 hectares. Of the 59.2

hectares, a total of 24.89 hectares are under human occupation and the remaining 34.31 hectares (57.9%) is still uninhabited wetland. Calculations show that the total area of the Epworth study site is 62.26 hectares (Figure 1). Out of the land areas, 39.25 hectares (63%) was under human occupation and use leaving just 40% as uninhabited.

A comparison of historical and current aerial photographs shows that there have been changes in the wetland uses in both Belvedere North and Epworth. Figure 1 is a 2011 photograph of the Belvedere North wetland before it was occupied. It shows that most of the tall trees have been cleared. The trees were cleared to facilitate the cultivation of food crops. Figure 2 shows the same wetland in 2014. The construction in the 2014 photograph is a shopping mall constructed by a Chinese company in 2013.

Figure 1: Belvedere North wetland before settlement (Google Earth April 2011)

Figure 2: Belvedere North wetland after settlement (Google Earth, April 2014)

The wetland in Epworth also shows an increase in occupancy. Figure 3 shows the Epworth wetland before it was occupied (2011). Figure 4 shows the same wetland in 2014. The 2014 figure shows a dense informal settlement that grew in just three years. An interesting observation is that the settlement was linear following the Jacha River nearby.

Figure 3: Epworth wetland before settlement (Google Earth, April 2011)

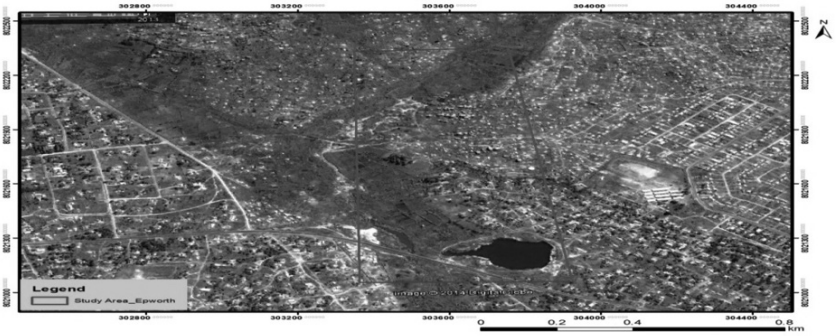
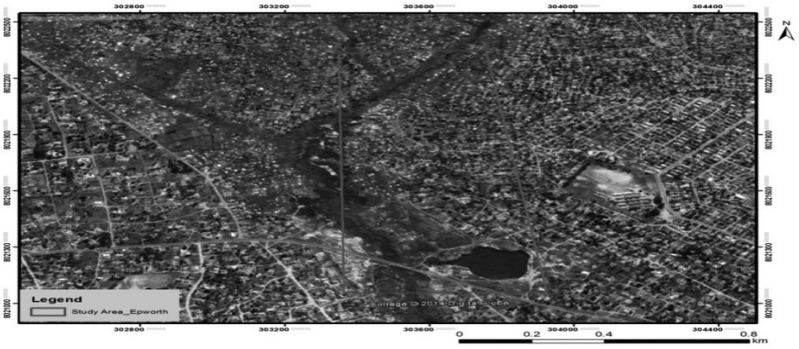


Figure 4: Epworth wetland area after settlement (Google Earth, April 2014)



Overall, the comparison between the two areas indicates that Belvedere North wetland has a commercial property that covers most parts of the wetland. The Epworth wetland was mainly dominated by residential dwellings as compared to Belvedere North wetland. The area disturbed in the Epworth wetland (63%) was more pronounced compared to the Belvedere North wetland (42%). The vegetation in both wetlands was almost similar, although much of it had been destroyed in Epworth as compared to Belvedere North.

Activities in wetland areas

Activities in the wetlands under review were also investigated. The major activities in the wetland were housing, urban agriculture and dumping of waste. The Belvedere North area has been inhabited for more than 15 years. The suburb was formally planned by the City of Harare and is thus fully serviced with water and roads. Initially, the houses in Belvedere North were more than 300m away from the wetland. However, a high demand for residential land has led to the allocation of land within wetlands. The mall shown in Figure 2 is the latest of buildings constructed on the Belvedere North wetland as at 30 May 2014.

Part of the wetland is yet to be designated legally. The undesignated portion of the wetland is being used for agriculture and illegal dumping of waste. Residents dispose of waste in wetland areas and this refuse goes uncollected for days. On the other hand, "council is failing to collect refuse in residential areas" (Goredema & Sithole, 2013:195). The residents usually dump wood components, leaves falling from trees, plastic, paper and metallic components. The refuse piles up over time and disturbs the aesthetic value of the wetland area. The residents said they use the wetlands for waste dumping because of the infrequency of municipal waste collection services. An article by Masara (2012:S12) titled "Will wetlands abuse ever stop?" confirms the disposal of waste in wetlands in Chitungwiza Town.

Urban agriculture is carried out all year round depending on the availability of water in the wetland. The residents grow crops such as maize, sweet potatoes and yams on a subsistence basis. The cultivation process involves the creation of ridges so as to create channels for water to both drain the land and irrigate the crops. The respondents said that they add fertilisers such as Ammonium Nitrate (AN) to enhance growth of the crops in the wetland. The residents stated that they had not been prohibited from cultivating or dumping in wetlands. Cultivation on wetlands is confirmed by Goredema and Sithole (2013:196) but they said "it is illegal to cultivate". They explain that wetlands are being used for agriculture by residents on a subsistence basis.

The residents added that if the local authority formally notified them that wetland encroachment is prohibited then probably they would comply. The majority of the respondents (84%) stated that they were not aware of any notification or campaigns in the Belvedere North area with regards to wetlands. In contrast, 16% of the residents stated that they had heard about concerns about wetlands in television programmes. This shows the inadequacy of the current wetlands awareness and protection programmes in the area.

There were 60 respondents in the Epworth area. The respondents residing in the Epworth wetland comprised mainly women. The women comprised 82% of the respondents and all had gone through secondary education. According to the 2012 Census Report (ZimStat, 2012:115), Epworth's Ward 6 had a total of "12 838 females and 12 759 males". This makes a total of 25 597 people in one ward out of seven wards. Most of the respondents were able to communicate and understand

issues regarding wet areas. However, the respondents were informally employed with only 23% being formally employed. The women said that the Epworth area does not have a sewer and water reticulation system and as such they use other means for their livelihood.

As observed in literature, the Epworth area largely comprises informal settlers who have illegally occupied land. The literature shows that "another phenomenon of informality (*Ma-Gada*) involves residents who are living on planned land yet they were not officially allocated by the Local Board or Ministry" (DSHZT, 2009:43). These informal settlements extend to wetlands in the area. This is because the wetlands were some of the previously unoccupied pieces of land.

The residents abstracted sand from the wetland for construction of their own houses. Some of the extracted sand was sold to locals who were building in Epworth. A study carried out by Chirisa (2010:52) shows that different communities thrive on their surrounding environment but to the extent of exploiting the existing resources to exhaustion; "particularly loss of biodiversity, pollution, deforestation and sand poaching". This is a common scenario in Epworth, especially considering the demand for space.

The absence of a proper sewer system has resulted in residents constructing open pit latrines for their toilets. The open pit latrines have been erected in the wetland and during the rainy season, sewage leaches from latrines. The latrines are open holes that are not lined. Besides, open wells are dug close to dwellings and toilets in the Epworth wetland (Figure 5). The open wells have a depth of between 0.8 and 1.9 metres, depending on the location of the well. Some of the boreholes are protected from contamination by lids, but such protected wells are few in number. The open wells are deepened in the dry season so as to access water. The water from the open wells is used for cooking, drinking, washing and watering vegetables. The water from the open wells was visibly dirty and respondents acknowledged this. They claimed that they boil this water prior to drinking.

Figure 5: Open wells in Epworth (Photograph by Luke Mutisi on 26/10/2013)

Observations in the Epworth wetland included washing of clothes, abstraction of water for domestic use, artisanal quarry mining, sand abstraction, defecation, subsistence agriculture and construction of houses. These activities were not controlled by either the local authority or the EMA. The residents said that they were traditionally used to utilising wetlands to their benefit. In Epworth as a whole, there are currently no formal or informal organisations responsible for the management of wetlands. In addition, there has been no enforcement of standing by-laws by the local authority, despite a growth in informal settlements. According to Boadi *et al*. (2005:466), "sub-Saharan Africa has (a higher) rate of urbanisation" than the provision of land and water resources.

More than 92% of the locals claimed that they had not been informed about wetland destruction. However, they acknowledged that wetlands are beneficial in a significant way. The residents said that wetlands have been beneficial through supporting the cultivation of food crops such as maize, vegetables and sweet potatoes (Figure 6). The cultivation of crops was carried out all year round in the wetlands area because water is readily available.

Figure 6: Cultivation, settlement and toilet in the Epworth wetland (Photograph by Luke Mutisi on 26/10/2013)

The wetlands in Epworth were under threat because the area was highly populated. From the 2012 census report (Zimstat, 2012), Epworth had a total of 161 840 people with 25 597 people being in the study area (Ward 6). This population had the potential of placing pressure on the wetlands, as there is no sewer system.

To complement responses from residents, further information was sought from selected professionals. Information from professionals was meant to augment that of residents from the two study areas. All the professionals agreed that housing developments were mushrooming due to the land pressure facing the council. In particular, one of the Housing Cooperative Heads stated that there was pressure on the land due to the increasing population as a result of in-migration.

To address the increasing population, the cooperatives were targeting all the available open spaces such as wetlands. One of the respondents argued that, "Land in Harare is scarce and as such we are opting for wetland areas as residential land since it is available and not being utilized. Suburbs such as Avondale, Budiriro, Strathaven, Monavale, Ashdown Park, Westlea and Tynwald are already built up in wetlands. As cooperatives, we will encourage all land beneficiaries to include special foundations during construction."

Another Housing Cooperative Head concurred to the same as he said, "wetlands are open spaces that could be utilized by locals to ease the accommodation challenge. However, constructions should be carried out in an appropriate manner to minimize falling of housing structures. If wetlands are the available land, why not use them?"

All 15 respondents agreed that wetlands were being affected by activities such as housing, urban agriculture (Figure 7), dumping of waste, water pollution, and water and sand extraction. However, housing stood out (70%) as the major activity in wetlands. Urban agriculture, dumping of waste and sand extraction (25%) contributed to wetland degradation. As indicated in Figure 7, urban agriculture is practised in most wetlands in Harare. One of the senior environmental planners from the City of Harare had this to say about urban agriculture: "Urban agriculture is rampant in Harare wetlands regardless of the prohibition by the local authority. Residents grow maize and sweet potatoes in wetlands on a subsistence basis. This destroys the aquatic-related flora and fauna in wetlands."

Figure 7: Cultivation in Epworth wetland (Photograph by Luke Mutisi, 25/10/2013)

An EMA official further slammed urban agricultural and waste dumping activities in wetlands. He said that "Wetlands are fragile ecosystems that need to be preserved. However, these wetlands have been used for urban agriculture and dumping as well. Pollutants from these activities have affected water quality due to fertilizers introduced during cultivation. Besides, housing plays a major role in the drying up of wetlands."

Another official from the same organisation said that, "wetlands were 'breathing spaces' for the suburbs. In other words, they reduce chances of flooding in the suburbs in times of continuous rains. Wetlands would help in the maintenance of the water table. Water abstraction and degradation should be minimized if wetlands are to benefit the generations to come."

A Ministry of Health and Child Care official indicated that the destruction was due to infrastructural developments. He said pollution of wetlands had deleterious health impacts on water users downstream. The official stated that housing developments carried a higher chance of introducing pollutants to the wetland, which eventually affects the quality of water. He said that, "pollution from housing activities affects downstream water users. This creates serious health hazards to the communities as residents drink dirty water thereby affecting their health." This shows that urban agriculture most likely has a role to play in the degradation of wetlands. Degradation of wetlands affects the water-loving vegetation and the water-retaining soils.

A total of six (6) planning officers were part of the respondents. Of these, two (2) were from the City of Harare, two (2) from the Ministry of Local Government and Public Works and two (2) from private planning consultancy firms. All these planning officers agreed that wetlands were threatened by housing developments and proper planning was the solution. An official from the City of Harare suggested that "the way forward to addressing land pressure is to plan vertically. In this I mean that high rise buildings should be built in the available space so as to ease the pressure on wetlands."

In addition to the council official, the researcher also engaged private sector professionals in this area. One senior official from Deam Planning Consultancy (Pvt) Ltd (a firm that offers planning and environmental services in Zimbabwe) said that wetlands have to be zoned for recreational purposes. The senior official proposed that, "wetlands are to be zoned as recreational areas. This will mitigate impacts on wetlands. For instance, a wetland can be used for bird viewing. This will ensure that the wetland is not disturbed by any other activities."

An official from the Ministry of Local Government wherein the Department of Physical Planning is housed indicated that available land should be allocated to citizens. He said that "Plans are underway to allocate land in developable areas outside Harare. Besides, the Government of Zimbabwe is planning on expanding the City of Harare boundaries so as to create residential space."

An academic from the University of Zimbabwe said that wetlands were to be zoned as protected and restricted areas. He stated that, "the *Regional, Town and Country Planning Act* (1996) requires that sensitive ecosystems be preserved by restricting construction and cultivation within a 30 metre distance from a river or stream. This is not being respected as residents cultivate in the wetlands."

Wetland awareness and enforcement of related by-laws

All the respondents agreed that awareness was being carried out regarding wetlands. However, they disagreed as to any law enforcement being carried out in the area. The respondents said that the lack of enforcement contributed to wetland degradation. An ecologist from the Ministry of Agriculture and Mechanisation blamed the local authority for failing to enforce by-laws. He said that "the local authority is not enforcing its existing by-laws. Instead, it has not addressed the issue of degrading wetlands. Those destroying wetlands should be arrested and fined for destroying wetlands."

One City of Harare official argued that it was not their sole responsibility to carry out enforcement. He said that EMA was also responsible for enforcing wetland-related issues. He argued and said that, "the City of Harare has been trying its best to enforce laws. The introduction of EMA meant all the responsibility regarding wetlands would be on them. As the City of Harare, we know that EMA gives fines to wetland offenders."

On the contrary, the EMA official who responded said that enforcement was difficult as some of the land was politically negotiated. Besides, some of the wetland areas were allocated to individuals seven years prior to the introduction of EMA. He further argued that some developers would develop on wetlands and then regularise the land later. He said, "As EMA, we are trying our best to ensure that wetlands are preserved. The major challenge is that some of the land had already been approved by the local authorities. Besides, some of the developers politically find their way to ownership of land."

All the professionals suggested that stakeholder engagement may address issues of wetland degradation. The Ministry of Environment, Climate Change and Water agrees that stakeholder engagement may assist in addressing wetland degradation. Unfortunately, forums have been carried out lately and as such, they have to be planned for. EMA, pressure groups, local authority and the general public should meet to address wetland issues.

Stakeholder engagement in informal communities would create a platform for conscientising the locals about the functions of wetlands. He further said that it was not easy to stop urban agricultural activities as some locals survive from the crops they grow in wetlands. He also said that proper policing would ensure that wetlands were preserved although the process would take time before being embraced.

Issues emanating from the stakeholder forums should then be incorporated into policy. To establish a sound policy, previous by-laws and policy instruments have to be revised. Wetland preservation may be assisted by a people-driven policy. In other words, contribution from different individuals would create sustainable strategies for wetland utilisation.

It is interesting to note that 44% of the respondents did not know of any future plans regarding wetlands. About 12% of the respondents were not sure as to how these wetlands were going to be managed. It is in this regard that policy on wetlands is not clear, therefore the existing environmental policies may need to be reviewed if wetlands are to be protected.

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that an integrated land use approach has the potential of minimising wetland loss and degradation. This is possible through the formulation and implementation of a comprehensive policy involving all relevant stakeholders. This will ensure a coherent decision-making process. In as much as integrated land use planning and policy formulation are potential approaches to wetland sustainability, the drive to implement policy by policy makers concerning wetlands has to be explored. As ignorance concerning the ecological importance of wetlands exists in some cases, it is critical to consider wetland benefits above other competing developments such as housing and urban agriculture. This can be achieved through merging interrelated disciplines with the idea of integrating wetland information. For instance, deriving engineering solutions could promote development yet preserve wetlands. It is also suggested that environmental impact assessments, as planning tools, should be carried out simultaneously with the town planning aspect. If given to proper planning, wetlands have a huge chance of survival.

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