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Importance of Community Participation in Sustainable Utilization of Wetlands: Case of Chebvute in Zvishavane District of Zimbabwe

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Abstract: Since the turn of the 21st century, the central government in Zimbabwe encouraged community participation in natural resources utilization. The research intends to understand the efficacy of this paradigm shift on sustainable wetland utilization in communal areas, focusing specifically on Chebvute wetland in Zvishavane district of Zimbabwe. Research data was gathered through questionnaires, semi-structured interviews, direct observations and field measurements. These instruments targeted 19 purposively selected plot holders, project chairperson, Environmental Management Agency officer, Agritex officer and the headman. Mapping of the wetland area and its landuse was done using global positioning system receivers and the map was produced using ILWIS, ArcView and Google Earth images. Research findings revealed that the conserved wetland increased its size and biodiversity. Generally, all crops grown had estimated yields higher than the national averages per hectare. The average maize yield was 2.726 tonnes per hectare compared to national average of 0.87. However, conflicts between plot holders, other community members and officials from government institutions such as Environmental Management Agency and Agritex should be ironed out in order to safeguard the wetland's future.

Key words: Community participation, sustainable utilization, wetland utilization.

1. Introduction

A wetland is defined in the Environmental Management Act of Zimbabwe Chapter 20:27 as any area of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and includes riparian land adjacent to the wetland [1]. According to Fuggle et al. [2], a wetland is an area dominated by water due to impeded drainage with both characteristic flora and fauna flourishing. These definitions imply that wetlands are areas that are permanently or temporarily covered with flowing or stagnant water. The physical potential of inland valleys and wetlands in Sub-Saharan Africa can be conservatively estimated at 135 million hectares and only 1.3% of this potential is actually cultivated [3]. The estimated size of wetlands in Zimbabwe is 1.28 million hectares which is about 4.6% of the country's land area [3]. There are different types of wetlands. Generally, wetlands in Zimbabwe are of gentle slope with fertile soils formed through gleying process which makes them suitable for crop cultivation [3, 4]. Wetlands in Zimbabwe include floodplains, marshes, pans, swamps and artificial impoundments [5].

Wetlands are important since they provide a wide range of uses including grazing domestic and wild animals, a source of food such as fish, fruits and crops for people, extracting wood for cooking and construction, a source of medicine and water, enshrine religious values as well as providing ecological services such as water purification, climate regulation,

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nutrient transfers and flood attenuation [6-8]. Due to rapid increase in human population and high levels of poverty and unemployment, increasing number of marginalized people are moving and settling in fragile wetland areas in search of new means of livelihood through farming in Zimbabwe [6]. Consequently, wetland resources are increasingly degraded through various consumptive uses especially agriculture [9]. This paper seeks to understand the extent to which wetlands can be sustainably utilised through local participation in light of the increased demand for their use to meet people's growing livelihood needs.

Nyakaana [9] noted that defining and achieving sustainable development is a major issue for policy debates both in the developed and developing countries as different approaches and strategies are being harnessed in natural resources conservation and utilization. This has resulted in different schools of thought where policy makers and planners are recommending various of perceived best strategies for managing natural resources including wetlands. According to Mbereko et al. [6], the dominant thinking has been that local use and management of wetlands is damaging to the environment and that local people do not have responsibility over the resources hence external intervention was necessary. This has resulted in prohibitive laws on wetland use in communal areas which were later repealed such as the Water Act of 1976 and Natural Resources Act of 1941 in Zimbabwe. Exclusion of local people in natural resources conservation resulted in ignorance and therefore massive degradation as local communities lack incentives to partake sound conservation strategies. On the other hand, Kangalawe et al. [10] argued that one of the major constraints to wise use of African wetlands is lack of knowledge by planners and natural resource managers on the benefits that they provide and techniques by which they can be utilised in a sustainable manner. This situation results in false premised planning which again champions exclusion of local people, hence intensified resources degradation.

Dahlberg [7] also indicated that the major threat to availability and access to wetlands is that of competing interests over resources between local communities, conservation authorities and development planners. This was further confirmed by Mbereko et al. [6] as they highlighted that the competing roles of government, traditional institutions, local leadership and non-governmental organizations were responsible for increasing degradation of wetland resources in Zimbabwe. These institutions regulate access, use and conservation of wetlands, hence destructive differences arise due to conflicting roles. Conflicts were also seen by Dahlberg [7] to be a result of lack of engagement amongst various stakeholders with diverse interests and understanding of the wetland environment and its resources. In general, involvement of various institutions has resulted in divergent views and interests on wetland resources to the detriment of this special resource.

In light of the above arguments, Shrestha [11] argued that community participation plays a vital role in the development of capacity for the management and utilization of their resources in a sustainable way. This was further echoed by Martin et al. [12, 13] who indicated that effective management of natural resources is best achieved by giving focused value for those who live with them, since an attempt to establish resource management without resource use is likely to be futile or unsustainable. Community participation can be achieved through devolution of authority and capacity building of community based organizations [3]. This was also confirmed by Nemarundwe [15] who noted that destruction of wetlands was due to social and behavioural factors of local community. Evidence to date indicates that local people's involvement in wetland management can contribute significantly to maintaining or restoring ecological integrity and community well-being [14, 15]. With declining government resources, it is clear that involving local communities as the main actors in wetland

management is by far the most promising solution to the ever-increasing threats to the integrity of wetlands [14, 15].

However, failure of some community based natural resources management programmes has been noticed in various areas resulting in some scholars questioning the efficacy of the approach. Mukamuri et al. [13] attributed this common failure not to local communities' participation but to misconstrued participation of local people as they were merely asked to participate in projects conceptualised and developed by external experts and development agencies. Therefore, the question in this regard is, are community projects for communities or for development planners? Silima [16] further attributed failure of natural resources utilization programmes to poor participation of local communities in their planning, implementation and monitoring. Therefore, local communities instead of being custodians of wetland resources through incentives obtained as goods and services, they end up being a degrading force due to lack of shared goals.

In Zimbabwe, since the turn of the 21st century there has been a paradigm shift towards putting communities at the core in management and utilization of natural resources. The EMA (Environmental Management Act) through SI (statutory instrument) 230 of 2003 allows for equitable and effective participation of all interested and affected parties in environmental management, including wetlands. Conservation and utilization of wetlands was also embraced and reinforced in the country through its acceptance of the provisions of Ramsar Convention on Wetlands. This convention through its Conference of Parties in 1999 encouraged incentives for local people's participation for long-term benefits [14]. However, since wetlands are ecologically sensitive areas, through the EMA section 113 subsection 1-3, the minister may impose limitations on development in or around such areas [1]. This act therefore gives leverage for wise use of wetlands by communities. It is in light of this legislative shift and debate on the role of local people in natural resources management that the research examined the importance of local community participation in sustainable utilization of wetland areas.

2. Methods and Materials

2.1 Study Area

Chebvute wetland is located on western part of Zvishavane district in Midlands province, Zimbabwe (Fig. 1). The wetland is found in natural farming region four that receives an unreliable and unpredictable annual average rainfall ranging from 450-650 mm distributed in a unimodal pattern between November and April [17]. Natural farming regions are a classification of the agricultural potential of Zimbabwe, from natural region one (> 1,000 mm of rainfall per annum) which represents high altitude wet areas to natural farming region five which receives low and erratic rainfall averaging 550 mm per annum. Prevailing semi-arid conditions in Chebvute area compromised productivity of rain-fed agriculture for predominantly subsistence farmers in the area. Kangalawe and Liwenga [10] noted that droughts are frequent in Zvishavane district and they normally have severe impacts on household food security. Therefore, Chebvute wetland with its perennial wet conditions provides ideal conditions for all year round farming since irrigation is the only viable option to enhance agricultural production in semi-arid and arid environments. Greyish soils from gleying process are dominant in the area.

The wetland is utilized and directly conserved by 86 plot holders from nine villages namely Manyunga, Mudhonga, Chabvepi, Mukwekwe, Hlupo, Musindo, Nyika, Ruzive and Ziyan'a since year 2002. These villages are under chiefs of Hwedza and Mapanzure with the later only in charge of two villages involved, that is, Ruzive and Ziyan'a.

2.2 Methods of Data Collection and Analysis

The research generated both quantitative and qualitative data for a detailed understanding of how the

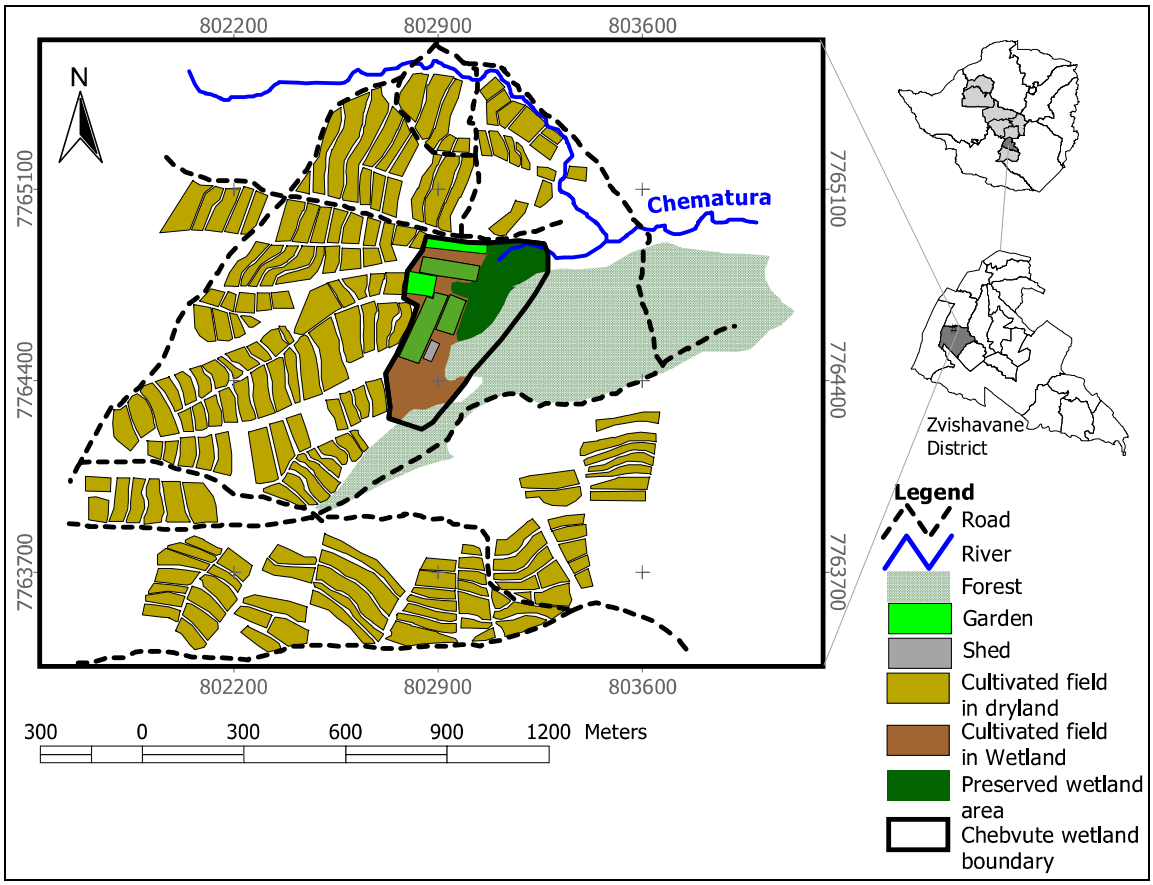

Fig. 1 Location of Chebvute wetland in Zvishavane district of Zimbabwe.

wetland was being utilised and conserved for long-term benefits of both people and the wetland ecosystem. Data was collected using a combination of research instruments such as questionnaires, semi-structured interviews, direct observations aided by checklists and field measurements. A sample size of 22.35% was used representing 19 plot holders who were purposively chosen for questionnaires. Plot size of each sampled farmer was measured and estimated yields of various crops grown were established. Semi-structured interviews were conducted with the project chairperson, headmen, District Environmental Management Agency officer and Agriculture, Technical and Extension Service (Agritex) officer.

The Environmental Management Agency officer was selected as she was guiding the local community with technical information on conservation of the wetland environment and its resources. Agritex officer was responsible for imparting farmers with knowledge and skills on conservation farming for both maximum returns from their agricultural activities and conservation of the wetland which was the primary source of water in the area. Project chairperson who is a member of the community was interviewed to acquire in-depth information on the history of project development, role of plot holders, role of Environmental Management Agency and Agritex, role of non-plot holders who were part of the community but not members of the project, benefits from wetland utilization, conservation strategies implemented and challenges threatening the viability of the project on wetland utilization and conservation. Headman was interviewed on the socio-cultural and economic importance of the wetlands. Direct observations were

made to establish an inventory of biodiversity in the wetland area through quadrants.

GPS (global positioning system) receiver was used to establish coordinates to map the wetland as well as demarcating landuse in the area. Coordinates from the field were later reprojected from the UTM (universal transverse mercator) projection system to the LatLon (Latitude Longitude) WGS84 in ILWIS (integrated land and water information system) 3.6. These coordinates were overlaid onto a map of the area in Google Earth 5. An image of the area was obtained in JPEG (joint photography experts group) format from Google Earth 5 which was converted to the TIFF (tagged information file format) and georeferenced in ILWIS 3.6 using the UTM projection system (zone 36). Themes depicting the landuse and physical features (cultivated fields, roads, rivers, forest areas and wetland area) were digitized in ILWIS 3.6 and then exported to ArcView 3.2 in order to construct the map of the wetland as well as its surrounding landuse activities.

3. Results and Discussion

3.1 History of Wetland Project Development

Chebvute wetland has been in existence since the pre-colonial period when it was managed through indigenous knowledge systems. During the pre-colonial period, the wetland area was regarded as a sacred place. It was spared from human habitation and utilization. People solely benefited from the wetland by fetching water from Chematura River whose source remained the wetland even today (Fig. 2). The indigenous name of the river suggests that it was the source of food for the area. The colonial government

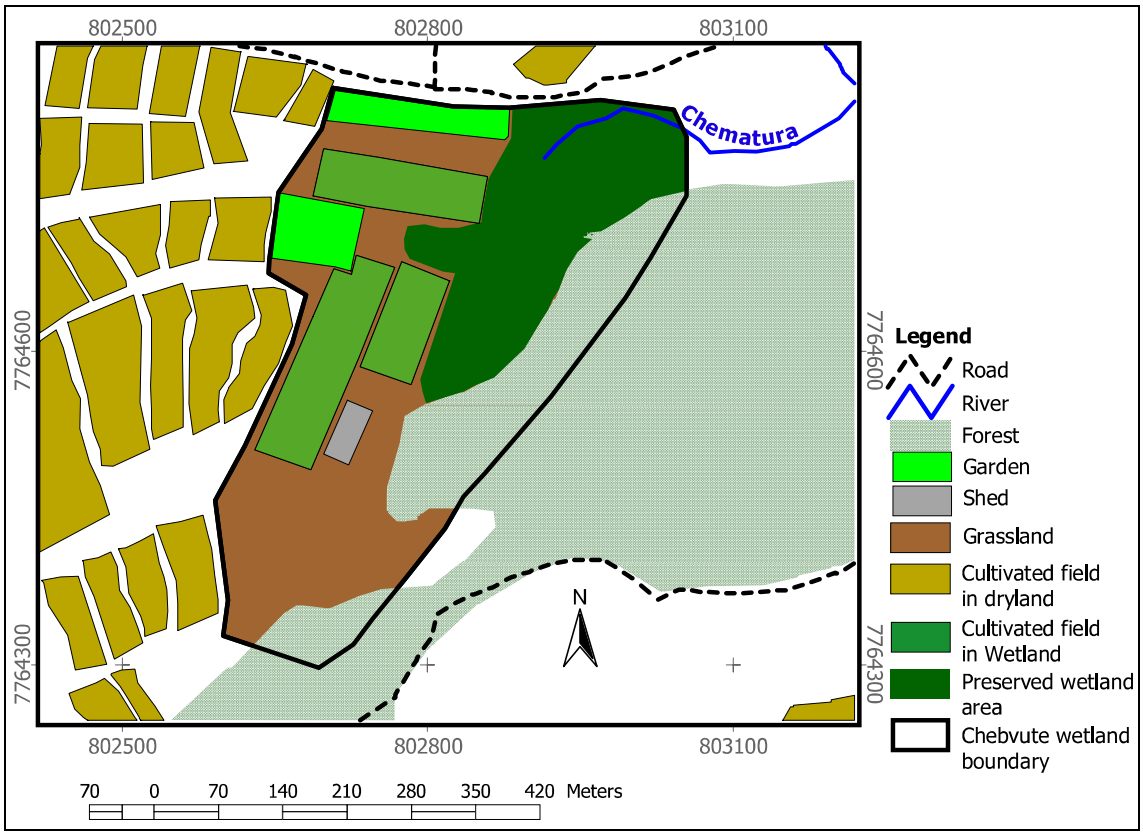

Fig. 2 Landuse in the wetland area and its surroundings.

prohibited use of the wetland by the local people. This scenario meant that the government then was responsible for conservation of wetland environment and its resources through LDO (Land Development Officers) who prohibited human activities within 30 metres. According to Environmental Management Agency officer, the post-colonial government continued with colonial policies until year 2002 when the EMA was put in place. The act allowed for the establishment of Chebvute scheme which utilizes the wetland through agriculture for the benefit of both local community and the wetland ecosystem.

Before the establishment of Chebvute wetland scheme in year 2002, the size of the conserved wetland was smaller than it is now. The colonial government only managed to fence about 10 hectares of the land, focusing primarily on the core of the wetland without considering the effect of the surrounding area. Today, the size of the wetland is 15 hectares as protection now including forest and grassland on the margin of the wetland (Fig. 2) in order to minimize soil erosion and to provide for protection of a larger biosphere. Currently, 9 hectares of the land is preserved whilst 6 hectares are used for farming in order to improve rural livelihoods in this semi-arid communal area of Zvishavane. According to the project chairperson, the wetland area was almost dry before the current set-up of involving local people in utilization and conservation. Drying of the wetland was due to vandalisation of the existing protection fence between 1980 and 2001, as people wanted to destroy the colonial legacy of denying them access to the important resource. Water was restored in the wetland area in order to establish the current scheme through conservation measures which will be discussed later in this paper.

At the inception of the project, people volunteered to be members and they paid a joining fee. Those who are joining now are paying US$5. The people in the project came from surrounding villages such as Manyunga, Mudhonga, Chabvepi, Mukwekwe, Hlupo, Musindo, Nyika, Ruzive and Ziyan'a. Decisions on utilization and conservation of wetland were based on consensus in order to uphold the spirit of fair representation and stewardship. 89% of plot holders were females with males only constituting 11%. Firstly, this exhibits the dominant trend in rural Zimbabwe where households were headed by females with absentee husbands in urban areas or outside the country looking for better income outside agriculture. Secondly, this trend shows a common cultural practice in Zimbabwe where men empower women to run small projects whilst they focus mainly on seasonal cropping on larger portions in dryland and cattle production. Therefore, access to the wetland was not dependent on gender lines despite the fact that the community was highly patriarchal. Although the wetland is primarily used and conserved by local people, there are other stakeholders involved in capacity building. These include Agritex officers, Environmental Management Agency officers, local and traditional leaders (councillors, kraalheads, headmen and chiefs).

3.2 Capacity Building for Sustainable Wetland Utilization

Environmental Management Agency officer indicated that before the commencement of the project, all project members were educated on effective use and conservation of the wetland. Moreover, beneficiaries took part in look and learn tours of similarly established wetland projects in Zimuto area in Masvingo province and Murehwa area in Mashonaland East province. Experiences from these tours were used as part of training programme to share ideas and views on good farming and conservation methods being practiced in visited areas. Contrary to findings by Ref. [5] that there was lack of training specifically targeted to wetland utilization and development in the SADC (Southern Africa Development Community) region, at Chebvute wetland training programmes and awareness campaigns were conducted by Agritex officers, Environmental Management Agency officers, donors and pioneer members of the scheme (Fig. 3).

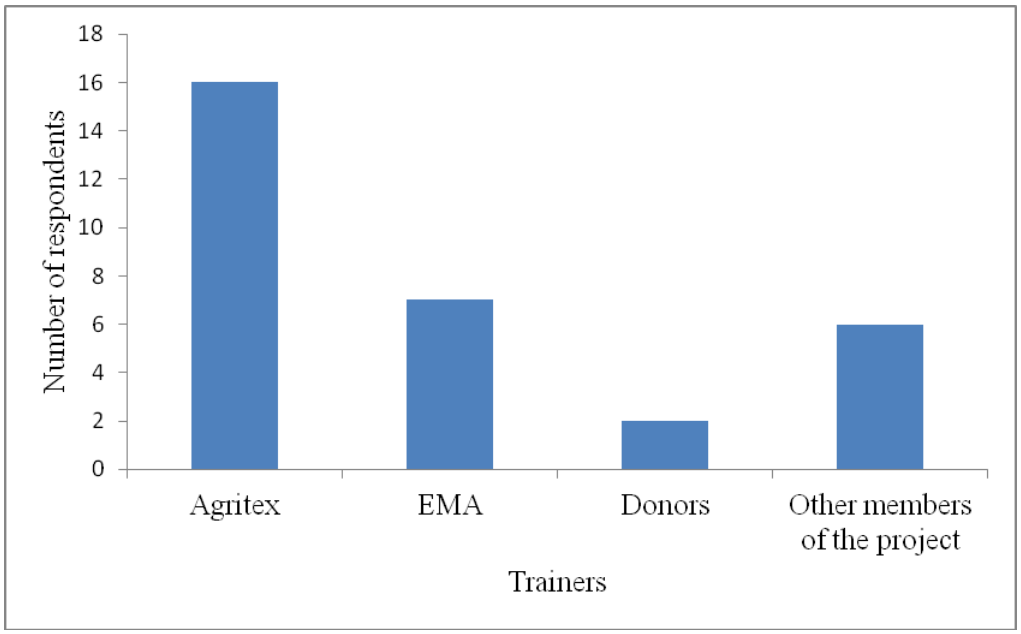

Fig. 3 Training providers on sustainable utilization of wetland.

All plot holders concurred that it was the training received from the aforementioned government institutions which significantly enhanced their ability to sustainably utilise the wetland. Initially, plot holders in Chebvute got support from SADAMP (Small Holder Dry Areas Management Programme) in the form of seeds, fertilizers and fence to protect the area from domestic animals which could destroy the wetland through trampling as well as crops in the fields. New members joining the scheme also received training from experienced pioneer plot holders.

3.3 Motivations to Wetland Use and Conservation

There was growing concern in the decline of the fragile and sensitive Chebvute wetland among the local people and government arm responsible for environment conservation, the Environmental Management Agency. A number of factors influenced the local people to conserve the wetland as shown in Fig. 4.

The majority of the plot holders (95%) interviewed revealed that the major reason they voluntarily joined the project was to conserve the wetland from further degradation threatening its extinction. This was in light of increased unsustainable use of the wetland as people resorted to poaching of resources such as timber in the area in order to evade prosecution from government officials, then under Natural Resources Board, who were in charge of protecting the place. Degradation of the wetland was mainly attributed by all plot holders to exclusion of the local people in ownership, access and use of the wetland. Another factor which contributed to the establishment of the current wetland project was poverty as the existing climatic conditions perpetuated food insecurity. The area received mean annual rainfall of 500 mm. All plot holders indicated that increased rainfall scarcity made the wetland the only reliable source of water for annual farming due to lack of irrigation infrastructure in the area. Since all farmers in the wetland area lack enough capital to embark on capital intensive farming, fertile soils in the area also provided a low cost opportunity for enhanced production amongst farmers.

Plot holders (67%) were also motivated by experiences of sustainable livelihoods observed during tours in Zimuto and Murehwa wetlands. It is through these tours that farmers realised the potential of wetlands to enhance rural livelihoods. The project

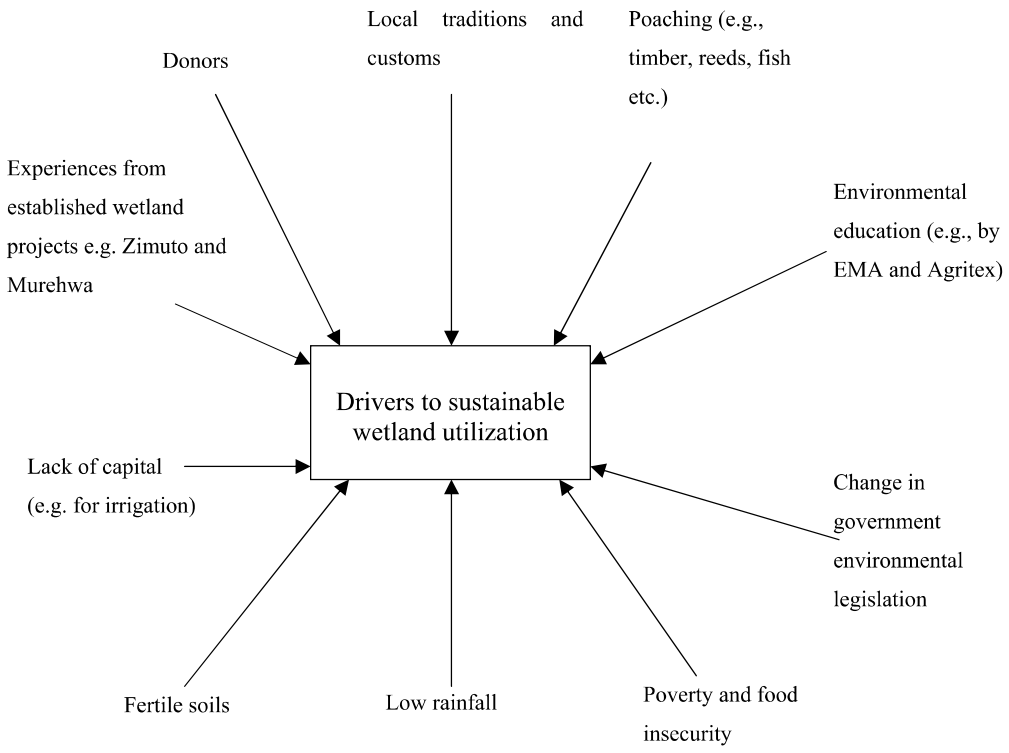

Fig. 4 Drivers to sustainable wetland utilization.

chairperson indicated that support from SADAMP, especially fence boosted confidence amongst farmers as it meant minimized crop destruction by domestic animals especially during the winter season when they roam freely. In addition, the local communities were motivated by the realization that Environmental Management Agency now considered their rights to access and use of the wetland in a sustainable manner. This was shown by change of Environmental Management Agency's motto as confirmed by its officer to: "Protecting the Environment, with People in Mind". This policy shift made Chebvute community realize that it was their mandate to conserve the wetland, that is, it gave them sense of responsibility. Maintenance of the wetland further made Chematura River perennial since the wetland provided a permanent source of water, hence gardens were established downstream and livestock had annual source of drinking water. This scenario meant that people in the area were to maintain large and healthier herds of cattle which were also their major source of income through selling and provision of draught power. Furthermore, existence of the wetland meant that water tables in the area remained high allowing wells and boreholes not to dry up. With these benefits in mind, all plot holders felt motivated to conserve the wetland.

3.4 Biodiversity in the Wetland

The wetland area was found to be endowed with different animal and plant species. Common type of animals found in the area were warthogs, baboons, monkeys, duikers and at one point elephants. These animals were attracted to the area by evergreen natural vegetation which provided both habitat and grazing pasture as well as a source of drinking water. Vegetation in the protected wetland area can be classified as forest, mountain, aquatic and grassland (Table 1 and Fig. 2).

Table 1 Tree species distribution in and around Chebvute wetland.

Forest	Mountain	Grassland
Acacia rehmanniana (*muunga*) Dichrostachys cinerea (*mupangara*) Acacia karroo (*mubayamhondoro*) Bauhinia thonningii (*musekesa*) Uapaca kirkiana (*muzhanje*) Strychnos spinosa (*mutamba*) Parinari curatellifolia (*muhacha*) Pterocarpus angolenses (*mubvamaropa*) Syzigium guineense (*mukute*) Ficus natalensis (*muonde*) Ficus capensis (*mutsamvi*) Brachystegia spiciformis (*musasa*) Julbernadia globiflora (*mutondo*) Euphorbia ingens (*mukonde*) Acacia polycantha (*chitataunga*)	Acacia rehmanniana (*muunga*) Siebenana (*rukato*) Acacia sieberana (*muunga*) Brachystegia boehmii (*mupfuti*) Brachystegia glaucescens (*muunze*) Brachystegia spiciformis (*musasa*) Julbernadia globiflora (*mutondo*) Euphorbia ingens (*mukonde*)	Acacia karroo (*mubayamhondoro*) Dichrostachys cinerea (*mupangara*) Bauhinia thonningii (*musekesa*) Ficus natalensis (*muonde*) Ficus capensis (*mutsamvi*)

Tree species found in the wetland represent almost all tree species scarcely found in the surrounding communal area under different ecological conditions. Forest ecosystem is dominated by more tree species due to its adjacent location to water (Fig. 2). Aquatic ecosystem was dominated by reeds and buffalo grass. The existence of the various tree, grass and animal species shows that local community was succeeding in conserving biodiversity on the wetland and its surrounding area.

3.5 Benefits of Wetland Farming

The major economic activity carried out in the wetland was farming. According to the project chairperson, the average plot size for each farmer was 200 m^2. However, the average plot size from the sampled farmers was 188 m^2 with variations as shown in Fig. 5. The size of each farmer's plot was determined by the time of joining the scheme, the means of land acquisition and availability of land. 58% of farmers who indicated that they volunteered to join the scheme at its inception had plot sizes above 200 m^2 whilst 37% and 5% of farmers who later acquired land through traditional leaders and parents respectively had plots of less than 200 m^2 (Fig. 5).

Majority of farmers (84%) on Chebvute wetland grow various crops for both subsistence and commercial purpose. Due to perennial availability of

Fig. 5 Plot sizes of sampled farmers in m^2.

water, all sampled farmers indicated that they have got three cropping seasons per year. Crops grown include maize, sugar beans, potatoes, tomatoes, wheat, onions, cassava, bananas, leafy vegetables, peas, carrots, pumpkins and sweet potatoes. All farmers specialize in at least two of the indicated crops with maize and beans being the most popular. Maize is grown by 83% of the farmers since it is a staple food. The Agritex officer indicated that farmers in the wetland harvest were earlier than those in irrigated areas in the district. Hence, their produce fetched fairly high prices due to less competition on the market. Generally, farmers obtain high yields from crops grown in the wetland (Table 2).

Majority of farmers (68%) indicated that agricultural benefits from the wetland were far much better than those obtained from dryland. According to Agritex officer, Zvishavane area is not recommended for maize, potatoes and beans cropping as even in a good farming season harvests are far less than 1 tonne per hectare. However, the average maize yield obtained of 2.726 tonnes per hectare was higher than Midlands province's average of 0.68 tonnes per hectare in season 2009/2010, the national average of 0.74 tonnes per hectare in 2009/2010 and national 10 year (2000-2010) average of 0.87 tonnes per hectare as shown in Ref. [18]. Sugar beans output of 1.237 tonnes per hectare was above national average of 0.56 tonnes per hectare in season 2009/2010. Therefore, the wetland availed an opportunity for local people to grow crops not permitted by general agro-ecological conditions in the area. Considering that farmers involved in wetland utilization harvest thrice per year, 77% of them were food secure.

However, farmers' yield per crop varies irrespective of existence of fertile gleysols across the farming area. The major problem was that farmers along the fence often lost yield to domestic and wild animals raiding as the fence is sometimes vandalised. Agritex officer indicated that farmers plant at different times hence some were exposed to pests and diseases depending on timing. Agritex officer further revealed that lack of income to buy inputs also compromised some farmers' productivity level. 17% of plots were owned by old farmers who rely on child labour. According to Agritex officer and project chairperson poor management in these plots often resulted in low output. Generally, the wetland remained the major source of food and income for school fees among plot holders.

Whilst farming was the major landuse in the wetland, all plot holders and the project chairperson indicated that the wetland also provided other benefits such as fishing, thatch grass, fencing poles, beekeeping as well as medicine from existing biodiversity. Non-plot holders in the surrounding villages also benefited directly and indirectly from wetland conservation. Direct benefits include water for gardening downstream and cheap farm produce from farmers in the wetland whilst indirectly EMA officer indicated that it controls wildfires and floods.

3.6 Measures Applied to Conserve the Wetland

Benefits from wetland utilization significantly changed attitude of plot holders towards wetland

Table 2 Average annual yield from each sampled farmer.

Crop	Number of sampled farmers who responded	Average estimated yield for each sampled farmer (kg/188 m^2)	Average estimated yield for each sampled farmer (ton/ha)
Tomatoes	3	190	3.572
Beans	12	65.8	1.237
*Maize	12	145	2.726
Potatoes	2	132	2.482
Wheat	2	62.2	1.169

* Figures are shown for dried maize only as farmers failed to estimate quantities for green maize sold. This means that output of maize is higher than what is shown in the table.

conservation as confirmed by all plot holders who responded to questionnaires. Plot holders participated in wetland conservation in various forms as shown in Fig. 6. The project chairperson revealed that the current wetland management system's sustainability was largely hinged on division of labour.

All plot holders including traditional leadership indicated that the wetland area was also partly preserved through traditional beliefs. It was believed that the wetland is home to mermaids which superstitiously cause disappearance of violators of traditional customs in the area. For example, dirty pots were not allowed to fetch water, people must not wear black clothes and vulgar languages were prohibited near the wetland. Sometimes disappeared cattle and people are heard rumbling in the wetland. However, on daily basis the major conservation activity done by plot holders was wetland guarding as indicated by 32% of farmers. Plot holders indicated that they guard the wetland to curb fence vandalisation, illegal grazing by domestic animals and illegal destruction of crops and trees. Moreover, 32% of the interviewed farmers revealed that they practiced conservation agriculture which involves crop rotation, minimum tillage and maintenance of 30% ground cover as advised by Agritex officers. Agritex officers were ensuring strict adherence to conservation farming on each plot. This allows the plot holders to maintain soil fertility, retain moisture and minimize soil erosion by growing cover crops like beans and pumpkins. Fence was maintained regularly and sand traps were established upslope to minimize soil erosion into the wetland. These conservation methods managed to preserve the wetland to its current size of 9 hectares. Lastly, the Environmental Management Agency officer indicated that illegal cutting of trees in the forest on wetland hinterland was prohibited unless permission was granted through traditional leadership.

3.7 Challenges to Sustainable Wetland Utilization and Conservation

Despite improved benefits from the wetland amongst local people, a number of identified factors were still threatening sustainable utilization of the wetland. The major problem as revealed by 36% of plot holders was that of fence vandalisation resulting in domestic animals accessing the wetland. According to Environmental Management Agency officer, cattle trampling was associated with drying of some peripheral parts of the wetland area. Contrary to Svotwa et al. [4, 6] findings that cattle were allowed for grazing in wetlands in communal areas of Zimbabwe, in Chebvute wetland they were not allowed since cattle trampling was identified as a degrading factor. 26% of farmers indicated that they were being demotivated by wild animals such as warthogs which constantly invade

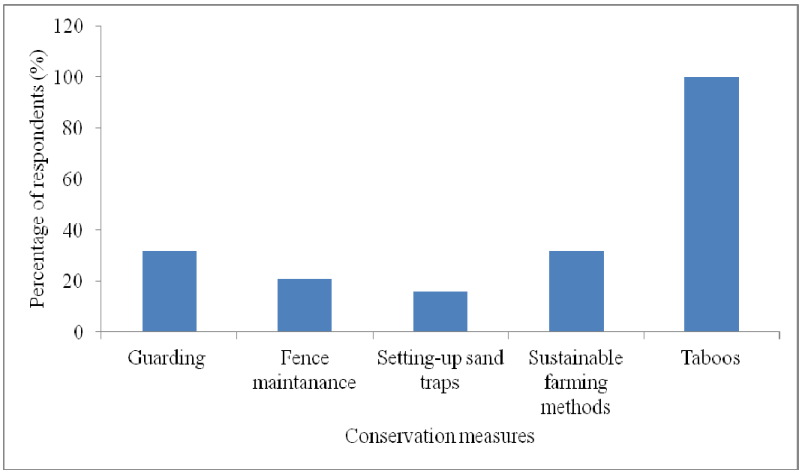

Fig. 6 Conservation methods used in the wetland.

their fields especially during the evening, hence unprecedented crop loss. 54% of farmers revealed that absence of mesh wire allowed the problem of crop destruction by wild animals and goats to continue.

Furthermore, 26% of farmers also indicated that conflicts between plot holders and non-plot holders threaten sustainable utilization and conservation of the wetland as non-plot holders were accused of stealing from the fields, illegal cutting down of trees in the forest area and destroying the fence to allow their animals to have access to grazing. Agritex and Environmental Management Agency officers observed that some farmers disregard technical advice given such as need for conservation farming and opt for intensive application of inorganic fertilizers which was likely to cause water pollution. Moreover, Agritex and Environmental Management Agency officers indicated that some plot holders on several occasions tried illegal extension of their farming area into the preserved wetland area. These actions were signs of lack of cooperation in protecting the wetland by some few (4%) farmers. However, the interviewed culprit farmers were fully aware of the negative consequences of their activities. These plot holders were only concerned with utilizing the wetland for profit making rather than conserving it. Lastly, 7% of farmers indicated that the involvement of Environmental Management Agency was interfering and weakening their role as the custodians of the wetland to sustainably conserve this resource. They indicated that Environmental Management Agency was influencing most decisions on wetland conservation hence undermining their independence on decision making and amount of benefits obtained. This shows that competing roles of local people and other stakeholders undermine performance of community based natural resources management programmes.

4. Conclusion

Local people's participation has resulted in restoration and increase in size of the wetland ecosystem. This is evidenced by abundance in flora and fauna species. Sustainable wetland utilization was achieved through empowering local communities as primary users and preservers whilst technical support came from government agencies such as Agritex and Environmental Management Agency. Methods used to conserve the wetland include establishment of sand traps, fencing, sustainable agriculture, traditional taboos and guarding. Crop productivity was higher in the wetland than dryland per unit area. This acts as a major motivator since farmers managed to improve their food security and income in this semi-arid area where chronic food insecurity is experienced. However, wetland existence is likely to be compromised by conflict between plot holders and non-plot holders, conflict between plot holders and Environmental Management Agency, disregarding of technical advice by farmers from Agritex, lack of finance to maintain fence in order to eradicate increased encroachment by domestic animals and poaching of wood. Generally, community participation largely proved to be a panacea to sustainable wetland utilization although there is no project without some loopholes.

5. Recommendations

- The excluded community members (non-plot holders) should be involved in utilizing and conserving the wetland so that everyone would have a sense of ownership hence minimizing degradation;
- Some of the profit realized from the selling of crops should be reinvested for the maintenance of the wetland, for example, buying fence and agroforestry activities instead of relying on donors;
- Women should assume higher positions in the committee since they represent the majority to minimize their level of disgruntlement;
- Mesh wire must be installed around the gardens to eliminate crop destruction by domestic and wild animals;
- Controlled hunting of wild animals must be introduced to minimize damage of crops by animals.

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