

## Utilisation of Wetland Plant Resources for Livelihood in Swaziland: The Case of Lobamba Lomdzala Area

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**Abstract:** The objective of the study was to determine the utilisation of wetland plant resources for livelihood and income generation in Swaziland. The study was carried out at Lobamba Lomdzala area located in the middleveld of Swaziland. The area has about 13500 inhabitants with 2000 homesteads. A questionnaire was administered to 92 randomly selected homesteads within the area. Information collected included type of wetland plant resources harvested and income generated from wetland plant resources. About 85% of the respondents collected wild fruits for domestic use and for sale. The dominant wild fruits collected were *Syzygium cordatum*, *Vangueria* spp and *Ficus* spp. The monthly income from sale of the fruits varied, with the highest being R900 (US\$120) per homestead. Forty respondents (43%) collected indigenous medicinal plants for income generation and another 40% collected them for own use. The dominant indigenous medicinal plants collected were *Helichrysum rugulosum* and *Hypoxis hemerocallidea*. The monthly income from harvested medicinal plants ranged from R100 to R600 per homestead. All the homesteads interviewed collected plant material for craftwork, with the dominant plant species collected being *Cyperus latifolius*, *Cyperus articulatus*, *Festuca costata* and *Coleochloa setifera*. The material was either sold or used to make handicraft or shared with neighbours. The annual income from selling handicraft material and finished products ranged from R200 to R4000 per homestead. *Phragmites* spp was collected and used as building material by three homesteads. Thirty homesteads harvested it and delivered it to the Queen Mother's (*Indlovukati*) home for traditional and cultural use. The results demonstrated that wetland resources were a source of income for rural homesteads in Swaziland. Their cultural and/or religious significance is well appreciated in the Swazi tradition. It is concluded that wetlands need to be protected from threats of degradation due to overgrazing of livestock, overexploitation and drainage to pave way for agricultural and other uses.

**Key words:** Indigenous knowledge, handicraft, livelihood, medicinal plants, wetland resources

### INTRODUCTION

Wetlands are defined as areas where water covers the soil, or is present at or near the surface of the soil all year or for varying periods of time during the year, including the growing season. Water saturation largely determines how the soils develop and the types of plant and animal communities living in and on the soil. Wetlands may support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favour the growth of specifically adapted plants and promote the development of characteristic wetland soils (US-EPA, 2006). Types of wetlands identified in the study included marshes, swamps, flood plains and dambos (Masarirambi *et al.*, 2010). A wetland is usually characterized by a number of hydrological characteristics (water sources, water depths and evaporation characteristics); soils characteristics (hydric soil

indicators, soil colours, soil hydrogeochemistry processes); vegetative characteristics (hydrophytic vegetation, biodiversity) and chemical characteristics (oxidation/ reduction processes).

Wetlands in Swaziland are characterised by standing water, hydromorphic soils and the presence of hydrophytes such as floating plants, *Typha (libhuma)*, *Phragmites (umhlanga)* and *Cyperus (likhwane, inchoboza, incoshana and insikane)* plant species. They generally include pans, swamps, marshes, lakes, flood plains and river and streams banks (Masarirambi *et al.*, 2010).

The wetlands of Swaziland provide habitats to various species of mammals and birds. The mammals found in wetlands include water mongoose (*Atilux paludinosus*), cape clawless otter (*Aonyx capensis*) and vlei rat (*Otomys irroratus*) (Monadjem, 1998). Large mammals found in the wetlands include common

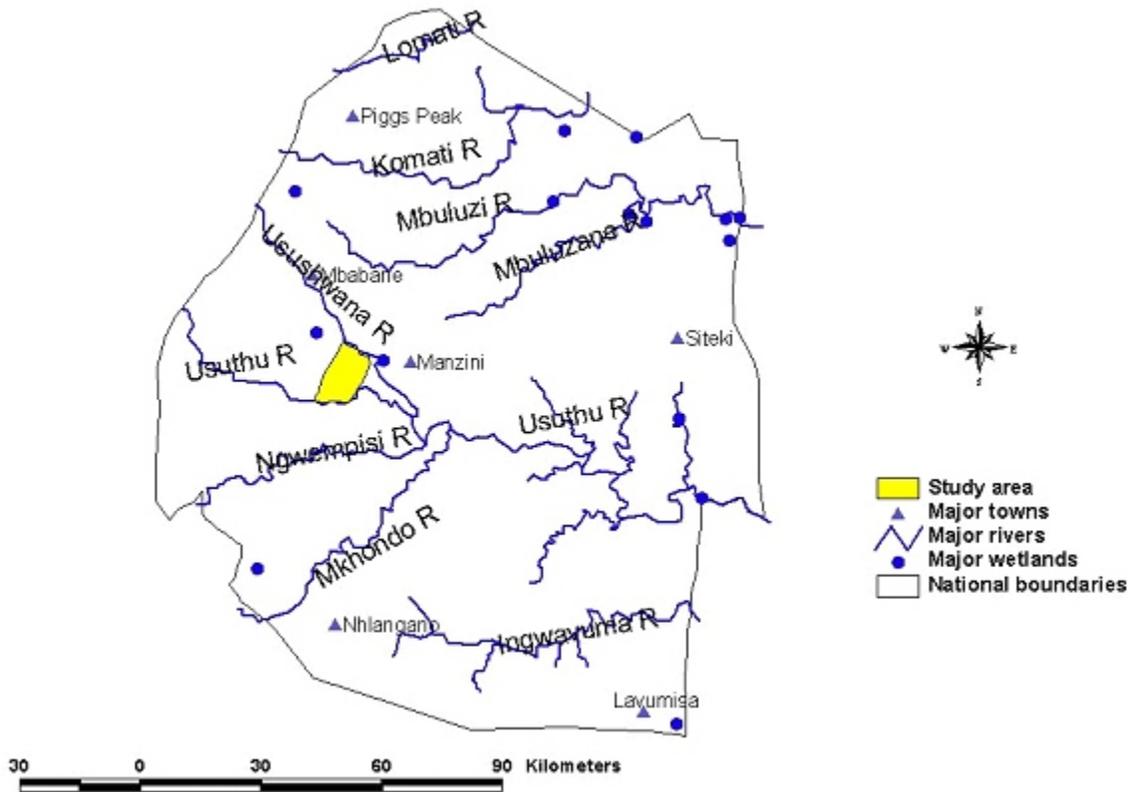


Fig. 1: Location of study area and distribution of major wetlands in Swaziland

reedbuck (*Reduca arundinum*), waterbuck (*Kobus ellipsiprymnus*) in the Lowveld wetlands, hippopotamus (*Hippopotamus amphibius*) (Monadjem, 1998). Monadjem (2000), recorded 200 water bird species along the lower Usuthu River basin.

Wetland areas are very valuable natural resources in Swaziland (Masarirambi *et al.*, 2010) as they provide recreation and tourism attractions and are used for small-scale agricultural production (Mwendera, 2003). A number of plants species that are found in wetland areas are important economic resources for women in the country. For example, *Cyperus articulatus* and *Schoenoplectus corymbosus* plants are used for making food mats, sleeping mats, bags, and baskets, hence provide economic livelihood to many women (Edje, 2006). Wetlands are also used for crop production, collection of building material (*Adiria microcephala*), edible fruits (*Syzygium cordatum*) and livestock grazing in some areas (Edje, 2006). Despite the social and economic importance of wetlands to livelihoods of Swazi people, there is dearth of documented information pertaining to details of their resources, use and custodianship against the background of their fragility and potential threat to flora and fauna biodiversity in the country.

The aim of the study was to document the utilization of wetland plant resources for income generation and livelihood in Swaziland, using a case study of Lobamba Lomdzala area which is known in the country as a source of material for making craft, especially sleeping mats. The issues that threaten sustainable use of the wetland resources were also identified.

## METHODOLOGY

**Description of study area:** The study area is situated in Manzini region of Swaziland with a total population of 13453 inhabitants and 2015 homesteads (Government of Swaziland, 2007). It is bordered by Usuthu and Usushwana rivers (Fig. 1). The area is divided into six communities; Kamacondza, Mdtutshane, Malkerns, Mahlanya, Bethany and Dwaleni. The hamlet of Malkerns is the commercial hub of the area. It has all the signs of an urban area; serviced by a good network of roads between the major cities and towns, having its own shopping centre with several shops and stores as well as Automated Teller Machines (ATMs) for all the major banks in the country. SwaziCan, the largest fruit canning factory in the country, is located in the area. The factory employs about 2000 people during peak seasons. However, a majority of

the residents in the area lack formal and decent housing as most of housing structures are informal and of poor quality. There is lack of proper drinking water supply systems and sanitation especially among the informal settlements. The formal settlements, on the other hand, provide accommodation to local public workers, including the police and teachers.

**Data collection:** A questionnaire was used to solicit information on the use of wetland resources for livelihood and income generation. A total of 92 homesteads were randomly sampled for interviews from the total population of 2015 homesteads. The information solicited by the questionnaire included types of floral materials collected from the wetlands, their use and related values. These included; building materials, wild fruits and vegetables, medicinal plants, and craft material. Factors that threaten sustainable use of wetland resources were also recorded.

## RESULTS AND DISCUSSION

**Profile of respondents:** A total of 92 subjects were interviewed within the six communities that constituted the study area as shown in Table 1. About 61% of the respondents were females. The ages of the respondents ranged from 18 to 97 years. The families had been residents in the Lobamba Lomdzala area for different periods, ranging from 10 years to over 100 years. Sixty four percent of the respondents (59 respondents) were married, 17% (16 respondents) were single, and 19% (17 respondents) were widowed.

**Collection of wild fruits for livelihood and income generation:** The homesteads collected several types of indigenous fruits for different purposes. The dominant fruits collected are shown in Table 2. They included guavas (*Psidium guajava*), tincozi (*Syzigium cordatum*), wild strawberry (*Fragaria virginiana*), emanulwa (*Vangueria infausta*), emakhiwa (*Ficus spp*) and granadilla (*Passiflora edulis*). Guavas and granadilla were introduced in the country some centuries ago, and have since naturalized and are now growing in the wild. Only 14 respondents (15%) reported that they did not collect any wild fruits. Thirty-five respondents (38%) collected wild fruits primarily for sale, while 43 respondents (47%) collected the fruits for home consumption. Similar use of fruits was previously reported in rural areas of Swaziland and Zimbabwe (Masarirambi *et al.*, 2010; Kadzere *et al.*, 2004; Campbell, 1987) The majority of respondents who collected fruits for domestic use were from Malkerns, this may be due to the fact that not much wild fruits are available within this peri-urban community such that residents cannot collect enough quantities for sale. On the other hand, more rural communities like

Table 1: Distribution of respondents from different communities

Community	Male	Female	Total
Bethany	7	10	17
Dwaleni	3	12	15
Mahlanya	7	8	15
Malkerns	3	12	15
Mdutshane	9	6	15
Kamacondza	7	8	15
Total	36	56	92

Table 2: Number of homesteads collecting different wild fruits

Wild fruit collected	No. of homesteads participating in collection
Guavas ( <i>Psidium guajava</i> )	65
Tincozi ( <i>Syzigium cordatum</i> )	48
Wild strawberry ( <i>Fragaria virginiana</i> )	36
Emanulwa ( <i>Vangueria infausta</i> )	29
Emakhiwa ( <i>Ficus spp</i> )	13
Granadilla ( <i>Passiflora edulis</i> )	2

Table 3: Purposes of collecting wild fruits for homesteads

Area	Not collected	Sold	Home use	Grand total
Bethany	0	12	5	17
Dwaleni	0	11	4	15
Mahlanya	1	7	7	15
Malkerns	2	0	13	15
Mdutshane	6	1	8	15
Kamacondza	5	4	6	15
Grand total	14	35	43	92

Bethany and Dwaleni have bigger land areas and plenty of wild fruits for both own consumption and for sale (Table 3). The monthly income from sale of wild fruits is shown in Table 4. Income ranged from R100 to R900, with the majority of respondents getting an income of R200 or less. The availability of wild fruits is seasonal and the different fruits are available at different times of the year (Campbell, 1987; Masarirambi *et al.*, 2010). Due partly to seasonal availability, processing of wild fruits in Swaziland has been reported (Masarirambi *et al.*, 2009). There is need to improve existing and develop new enabling policies for better conservation and efficient utilization of indigenous fruits for the benefit of communities that protect them (Kadzere *et al.*, 2004, Cunningham, 2001).

**Collection of indigenous medicinal plants:** Fifteen respondents (16%) reported that they did not collect any indigenous medicinal plants, while 40 respondents (43%) collected them for income generation purposes. Another 37 respondents (40%) collected them for home use (Table 5). All the respondents from Bethany and Dwaleni collected medicinal plants for either income generation or for home use. On the other hand seven respondents (8%) from Mdutshane community and five from Kamacondza (5%) did not collect any plants for medicinal purposes. This may be because of scarcity of such plants within the two areas. The dominant medicinal plants harvested by respondents included *Imphepho* (*Helichrysum*

Table 4: Monthly income from sale of wild fruits

Homestead ID	Community	Combination of wild fruits collected	Monthly income (R)
79	Dwaleni	<i>Tincozi, emantulwa</i> , strawberry	100
83	Dwaleni	Guava, <i>tincozi</i>	100
19	Mdutshane	<i>Tincozi</i> , guava	100
59	Mahlanya	Guava, <i>emantulwa, tincozi</i>	150
80	Dwaleni	Guava, strawberry	150
2	Settlement	Guava, <i>tincozi</i> , strawberry	200
56	Mahlanya	Guava	200
57	Mahlanya	Guava, strawberry	200
58	Mahlanya	Guava, strawberry, <i>tincozi</i>	200
60	Mahlanya	Guava, strawberry, <i>tincozi</i>	200
68	Bethany	Guava, strawberry, <i>emantulwa, tincozi</i>	200
71	Bethany	Guava, strawberry, <i>tincozi</i>	200
72	Bethany	Guava, strawberry, <i>tincozi, emantulwa</i>	200
74	Bethany	Guava, strawberry, <i>tincozi</i>	200
75	Bethany	Guava, strawberry, <i>tincozi</i>	200
76	Bethany	Guava, strawberry, <i>tincozi, emantulwa</i>	200
78	Dwaleni	Guava, <i>tincozi, emantulwa</i>	200
81	Dwaleni	<i>Tincozi, emantulwa</i> , strawberry	200
85	Dwaleni	Guava, strawberry	200
86	Dwaleni	Guava, strawberry, <i>tincozi</i>	200
90	Dwaleni	Guava, granadilla	200
7	Settlement	Guava	240
1	Settlement	Guava, strawberry, <i>emantulwa</i>	250
3	Settlement	Guava, <i>tincozi</i>	300
64	Bethany	Guava, strawberry, <i>emantulwa</i>	300
69	Bethany	Guava, strawberry, <i>tincozi</i>	300
70	Bethany	Guava, strawberry, <i>emantulwa</i>	300
73	Bethany	Guava, strawberry, <i>emantulwa</i>	300
77	Bethany	Guava, strawberry, <i>tincozi, emantulwa</i>	300
87	Dwaleni	Guava, strawberry, <i>tincozi, emantulwa</i>	300
89	Dwaleni	Guava, <i>tincozi, emantulwa</i>	300
91	Dwaleni	Guava, granadilla, strawberry	300
52	Mahlanya	Guava, <i>emantulwa, tincozi</i> , strawberry	800
61	Bethany	Guava, <i>emantulwa</i>	900

*rugulosum*), African potato (*Hypoxis hemerocallidea*) and *Gobho* (*Gunnera perpensa*) (Table 6). *Helichrysum rugulosum* is used as an aromatic sedative for insomnia and it is burnt as a fumigant against insects, as well as for treating common colds. *Hypoxis hemerocallidea* is believed to boost human immune system and is reputable for effectiveness in suppressing HIV/AIDS. It is also used

Table 5: Purposes of collecting indigenous medicinal plants by respondents

Community	For income			Total
	No collection	generation	For home use	
Bethany	0	11	6	17
Dwaleni	0	5	10	15
Mahlanya	1	9	5	15
Malkerns	2	7	6	15
Mdutshane	7	4	4	15
Kamacondza	5	4	6	15
Total	15	40	37	92

as a tonic for athletes. The monthly income from sale of indigenous medicinal plants ranged from R100 to R600 per homestead (Table 7). Some common medicinal plants are harvested on demand, partially processed (crushing and blending) and sold to customers within the communities. However, plant species such as *Hypoxis hemerocallidea* and *Helichrysum rugulosum* are harvested in large quantities and taken to urban markets, mainly Manzini and Mbabane, where they are sold unprocessed. The harvesting of these plant species is not regulated and the activity may threaten their sustainability. Harvesting of indigenous medicinal plants takes place all year round. There is need to avoid over-exploitation of indigenous medicinal plants (Cunningham, 2001; Amusan, 2006), partly through the use of local indigenous knowledge and health care systems.

**Use of indigenous plant species for craft:** All the homesteads either harvested indigenous plant species for making craft for sale or sold the harvested plant material unprocessed. The dominant plant species that were harvested were *likhwane* (*Cyperus latifolius*), *incoboza* (*Cyperus articulatus*), *lukhasi* (*Festuca costata*) and *lutindzi* (*Coleochloa setifera*). The plants are used for weaving sleeping mats, table mats and for marking thatching ropes (Table 8). The use of fibre plants from wetlands in Swaziland for making woven craft products like sleeping mats, mini versions of sleeping mats, wall decorative hangings and drying mats or trays for fruits and vegetables in the communities was described by Zwane and Masarirambi (2009). These plants are mainly harvested during the winter months (June to August). During the harvest period people from other areas in the

Table 6: Indigenous medicinal plants harvested by respondents

Medicinal plant	No. of homesteads participating in collection	Uses
<i>Imphepho</i> ( <i>Helichrysum rugulosum</i> )	54	Sedative for insomnia and fumigant against insects
African Potato ( <i>Hypoxis hemerocallidea</i> )	35	Boost immune system, suppressing HIV/AIDS
<i>Gobho</i> ( <i>Gunnera perpensa</i> )	14	Roots used for menstrual pain and male impotence
<i>Insikane</i> ( <i>Cyperus fastigiatus</i> )	11	Tonic to hasten inception of menstruation
<i>Umcopho</i>	9	Leaves used for body "steaming"
Guava ( <i>Psidium guajava</i> )	7	Leaves for fever, coughs, boils and diabetes. Stem and bark for stomach ache
<i>Lilula</i> ( <i>Brunsvigia</i> spp)	1	Straighten child's bone and treats barrenness in women
<i>Umsilinga</i> ( <i>Melia azeolarach</i> )	1	Roots for anal prolapse
<i>Mafodlwane</i> ( <i>Agaratum conyzoides</i> )	1	Antiseptic for wounds, respiratory tract disorder and worms

Table 7: Income from sale of medicinal indigenous plants

ID	Community	Indigenous plants used	Monthly income (R )
50	Mahlanya	<i>Imphepho</i> , African potato	100
42	Malkerns	<i>Imphepho</i>	100
3	Settlement	<i>Imphepho, lilula</i> , guava leaves	100
80	Dwaleni	<i>Imphepho</i> , African potato	100
76	Bethany	<i>Mafodlwana</i> , African potato	100
74	Bethany	<i>Imphepho</i> , African potato	100
77	Bethany	<i>Imphepho</i> , African potato	100
2	Settlement	<i>Imphepho</i> , guava	100
66	Bethany	<i>Imphepho</i> , African potato	150
59	Mahlanya	<i>Gobho, insikane</i>	150
51	Mahlanya	<i>Imphepho, gobho</i> , African potato	200
46	Mahlanya	<i>Imphepho</i> , African potato	200
40	Malkerns	<i>Imphepho</i> , African potato	200
39	Malkerns	<i>Imphepho, gobho</i> , African potato	200
65	Bethany	<i>Imphepho</i> , African potato	200
78	Dwaleni	<i>Imphepho, inskane</i> , African potato, <i>gobho</i>	200
75	Bethany	<i>Imphepho</i> , African potato	200
67	Bethany	<i>Imphepho</i> , African potato	200
55	Mahlanya	<i>Imphepho</i> , African potato	200
84	Dwaleni	<i>Imphepho</i> , African potato, <i>insikane</i>	200
79	Dwaleni	<i>Imphepho</i> , African potato, <i>gobho</i>	200
70	Bethany	<i>Imphepho, inskane</i> , African potato	200
64	Bethany	<i>Imphepho</i> , African potato	200
82	Dwaleni	<i>Imphepho</i> , African potato, <i>insikane</i>	200
60	Mahlanya	<i>Imphepho</i> , African potato, <i>insikane</i>	200
54	Mahlanya	African potato, <i>gobho</i>	200
35	Malkerns	<i>Imphepho</i> , African potato	200
69	Bethany	<i>Imphepho, inskane</i>	200
57	Mahlanya	<i>Imphepho</i> , African potato	200
17	Mdutshane	<i>Imphepho, bucopho</i>	200
43	Malkerns	<i>Imphepho, gobho</i>	200
52	Mahlanya	<i>Imphepho, gobho</i> , African potato, <i>umsilinga</i> , guava leaves	200
16	Mdutshane	<i>Imphepho, bucopho</i>	250
68	Bethany	<i>Imphepho</i> , African potato	300
14	Settlement	Guava leaves, <i>bucopho</i>	300
19	Mdutshane	<i>Imphepho</i> , guava, <i>umchopho</i>	400
38	Malkerns	<i>Imphepho</i> , African potato	400
32	Malkerns	<i>Imphepho</i> , African potato	600

Table 8: Dominant plant species used for craft

Plant species	No. of homesteads	Use of plant species
Incoboza ( <i>Cyperus articulatus</i> )	63	For weaving sleeping mats
Likhwane ( <i>Cyperus latifolius</i> )	63	For weaving sleeping mats
Likhasi ( <i>Festuca costata</i> )	19	For weaving sleeping mats and ropes
Lutindzi ( <i>Coleochloa setifera</i> )	18	For weaving table mats and for making ropes for thatching

country migrate to Lobamba Lomdzala for the sole purpose of harvesting wetland plants. They often hire vans and trucks to transport their harvest back to their respective home areas. The reported annual income from harvested wetland plants used for craft ranged from R200 to R4000. Forty two respondents (46%) earned between R501 and R1000 per annum, and another 37% earned between R1001 and R2000 per annum (Table 9).

**Cultural uses of indigenous plants from wetlands:** The wetlands within Lobamba Lomdzala area play a major

Table 9: Reported annual income from harvested indigenous plants used for craft

Community	No. of Homesteads	Reporting Range of Income					Total
		R200-500	R501-1000	R1001-2000	R2001-3000	R3001-4000	
Bethany	0	10	7	0	0	17	
Dwaleni	2	6	7	0	0	15	
Mahlanya	2	6	7	0	0	15	
Malkerns	0	11	3	1	0	15	
Mdutshane	1	4	7	3	0	15	
Kamacondza	2	5	3	4	1	15	
Total	7	42	34	8	1	92	

role in Swazi culture. Maidens from every part of the country collect reeds (*Phragmites* spp) from within the area and deliver them to the Queen Mother (*Indlovukati*) for construction of wind breakers (*emagama*) around the royal village. This is followed by a national ceremony (the reed dance) where the maidens dance to honour and pay homage to the Queen Mother. The date of the dancing ceremony, that takes place at the end of August or the first week of September, is declared a national holiday. Thirty respondents (33%) reported collecting reeds (*Phragmites* spp) for traditional and cultural use at the Queen Mother's residence. Another major cultural use of wetlands resources from the area is the harvesting of *Umhlume* (*Breonadia silicina*) logs that are used for building royal cattle kraals at Ludzidzini, the traditional headquarters of the country. Five respondents indicated that they harvested *Breonadia salicina* on certain occasions and delivered it to the Chief's residence for the purpose of building the kraal.

**Other uses of indigenous plants from wetlands:** Twenty respondents (22%) reported that they collected plant material from wetlands for building various structures within the homesteads. Tree species that were collected for building purposes included umhlume (*Breonadia salicina*), *lugagane* (*Cyphia elata*) and *umphahla* (*Ziziphpus mucronata*). Two homesteads (2%), from Kamacondza, reported that they collected building material for income generation. One respondent got an income of R200, while the other one got an income of R760 from sale of building material harvested from wetlands. Throughout the world, wild, naturalized or non-cultivated plants provide a 'green social security' to hundreds of millions of people, for example in the form of low-cost building materials, fuel, food supplements, herbal medicines, basketry containers for storage, processing or preparation of food crops, or as a source of income (Cunningham, 2001).

**Issues threatening the sustainable utilization of wetland plant resources:** The respondents cited several issues threatening the sustainability of utilization of wetland resources and the dominant concern was overgrazing of wetlands by livestock. The majority of wetlands that were accessible to members of the community fell under communal land ownership that is not fenced. Livestock grazing is therefore not controlled leading to overgrazing and subsequent land degradation and loss of indigenous plant species. Wetlands sustainability is also threatened by invasive alien plant species which are spreading rapidly. The major threat is posed by the trifid weed (*Chromolaena odorato*) and wild tobacco bush (*Solanum mauritianum*). On the other hand, wetlands are gradually drying up as water is

Table 10: Threats to utilization of wetland resources

Issue	No. of respondents identifying with issue
Overgrazing of wetlands by livestock	90
Invasion of alien invasive species	39
Diversion of water for other uses	20
Drainage of wetlands for other uses	15
Soil erosion	10
Pollution of wetlands	9
Land owners deny access to wetland resources	5

increasingly diverted and/or abstracted from rivers and streams for irrigation and domestic purposes. Some wetlands are deliberately drained to allow cropping activities and construction of homesteads (Table 10). Similar practices of wetland degradation have previously been reported (Masarirambi *et al.*, 2010). In a bid to curb the imminent loss of wetland ecosystems, some private land owners strictly deny communities access to wetland resources within their premises. It is, however, advised from a social context, that private land owners allow limited access to wetland resources to neighbouring communities for sustainable plant harvesting annually. It is when communities realize value and their involvement in use of such resources that resources in wetlands can be protected in the long run as opposed to haphazard plunder and subsequent destruction of the already fragile wetland environments. Giving sense of ownership to communities has been reported to protect plant biodiversity (Kadzere *et al.*, 2004; Cunningham, 2001).

## CONCLUSION

There are various socio-economic activities undertaken in the wetlands within Lobamba Lomdzala area that make significant contributions to poverty alleviation, food security and cash income to the communities living in the area. A number of plants that are found in the wetlands are important resources for socio-economic development of the rural people. Various plants are a source of edible fruits, such as *Psidium guajava*, *Syzigium cordatum*, *Vangueria infausta*, *Ficus* spp., Some medicinal plants found in the wetlands, for example *Hypoxis hemerocallidea*, are making a contribution to the fight against HIV and AIDS. Wetlands also provide a huge endowment of plant species for craft, timber for construction and cultural activities. It is, however, regrettable that wetlands in Swaziland are degrading at an alarming rate due to indiscriminate harvesting of floral species, drainage for cultivation, overgrazing and cutting down of trees for building and construction purposes. Unless environmentally friendly regulatory measures are immediately put in place to slow down degradation of wetlands, the vital source of livelihood will face extinction in the foreseeable future. Research is needed to come up with sustainable wetland management strategies that integrate various needs of all stakeholders.

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