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Successes, Threats, and Factors Influencing the Performance of a Community-Based Wildlife Management Approach: The Case of Wami Mbiki WMA, Tanzania

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Additional information is available at the end of the chapter

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Abstract

Over three decades, community-based wildlife management (CBWM) has been promoted as a promising option for achieving biodiversity conservation and community development. From the outset, different development partners have facilitated implementation of this process. However, studies on its effectiveness are limited, and the reported outcomes are mixed. In this study, I used qualitative methods (interviews, focus group discussion, informal interviews, direct observations, and secondary data) to assess the performance of the CWBM approach in Tanzania in view of its contribution to sustainable natural resource management and enhanced local livelihoods. The study used the Wami Mbiki Wildlife Management Area (WMA) as a case study. While the CBWM scheme was designed to achieve dual objectives, this study found that the resultant efforts, in this case, were largely unsuccessful following the end of donor support in 2011. The WMA lacks effective anti-poaching patrols, leading to increased illegal activities, such as poaching, overgrazing, tree cutting, and charcoal burning. Although the community-based organization was successfully established as an institution to provide leadership in natural resource management and tourism development, some key actors still lack necessary entrepreneurship and managerial skills, transparency, and good relationships to ensure its success and sustainability.

Keywords: community-based, natural resources management, threats, Wami Mbiki, wildlife management area

1. Introduction

1.1. Background

Over the past 3 decades, in most developing countries, there has been a paradigm shift in the management of natural resources from a top-down, state-centered approach to more decentralized approaches [1–3]. The new approach has been driven by factors such as constrained resources for conservation, biodiversity loss, and burgeoning rural populations [4, 5]. This alternative approach, which seeks to integrate wildlife conservation and rural development objectives, has been widely promoted as a strategy across the developing world that aims to conserve biodiversity, while simultaneously enhancing the rural livelihoods [6]. Moreover, this strategy provides an arena for other conservation strategies, for instance payment for ecosystem services, on which to build [7, 8]. The proponents of community-based wildlife management (CBWM) argue that devolving control of natural resources to local communities increases local participation, improves management of those resources, reduces conflicts, thereby improving the resource base and provision of benefits to communities [9–12]. Since its inception, many international conservation and development agencies and partners have supported the CWBM approach [13, 14].

However, several studies from different parts of the world have revealed unexpected outcomes, mixed results in performance, and some degree of disillusionment with the CBWM approach [9, 10, 15]. Some studies show that, despite its popularity, CBWM has not met expectations of halting biodiversity depletion and poverty reduction among the local communities that have implemented it (e.g., [16–19]). However, a few successful and convincing reports have demonstrated a positive correlation between livelihood improvement and conservation. For instance, Communal Area Wildlife Conservancies in Namibia are considered a major success story as the result of reduced illegal wildlife use and recovery of game populations [20]. Elsewhere, the impact of CBWM is harder to discern as many studies focus on the area of land conserved rather than effectiveness of the program [5]. Mixed factors have been reported to affect CBWM performance, such as the type of communities involved in CBWM, resource governance, effectiveness of the institutional framework, availability of skilled personnel, stakeholders' capacity, reinvestment of CBWM projects, revenue sharing, and community cohesion [21, 22].

This chapter examines the performance of Wami Mbiki Wildlife Management Area (WMA) in Tanzania. WMAs are community-run protected areas, where several villages come together and set aside land for wildlife conservation. In return, these villages generate income mainly through sport hunting and photographic tourism [23]. Under this arrangement, the wildlife resource remains the property of the state although the villagers acquire the user rights of this resource. This chapter seeks to answer three main questions: (a) To what extent has the Wami Mbiki WMA contributed to sustainable natural resource conservation and enhanced rural livelihoods? (b) What are the threats facing this particular WMA? and (c) Which factors influence the performance of this WMA?

This study adopts the World Conservation Union's (IUCN) definition of a "protected area" as a clearly defined geographical space, recognized, dedicated, and managed, through legal or

other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values [24]. I proceed by first presenting the CBNRM framework; thereafter, I describe briefly the history of WMAs before outlining the methodology of the study, then presenting the results and providing a discussion. Generally, I conclude that more anti-poaching effort is needed to save the remaining wildlife because of the multiple threats to the survival of wildlife in the study area.

1.2. The CBNRM framework

Community-based natural resource management (CBNRM) is the management strategy of natural resources aiming to reduce poverty, conserve natural resources, and promote good governance and decentralization [25]. It requires some degree of devolution of decision-making power and authority over natural resources to communities and community-based organizations [26]. The CBNRM approach is built upon common property theory which argues that common pool resources can be utilized sustainably provided certain principles are applied [27]. These principles include the autonomy and recognition of the community as an institution, proprietorship, and tenurial rights, rights to make the rules and viable mechanisms to enforce them, and on-going incentives in the form of benefits that exceed costs [27, 28]. CBNRM is based on three key assumptions: (a) local people are better placed to conserve natural resources; (b) people will conserve a resource only if the benefits exceed the costs of conservation; and (c) people will conserve a resource that is directly linked to their quality of life [55, 56].

The local communities living with natural resources are best placed to conserve and manage them as they have sufficient knowledge and experience. A community in this context is defined as a group of people living within a legally defined geographic area with diverse socio-economic interests and capabilities with a shared interest in conserving natural resources [29]. Before colonialism, traditional institutions existed in local communities which had developed systems and practices for natural resource management [30–33]. Other studies point out that local communities share an interest in conservation of natural resources as their livelihoods are intricately connected to these resources (e.g., [34]). Thus, people will conserve and manage resources that they perceive to contribute positively to their livelihoods [35]. Also, people living closest to natural resources have more to lose from depletion and degradation of these resources [36]. If given proper support and incentives, they will be most likely to effectively conserve them. Such an approach is also a cost-effective alternative to the fortress (fences and fines) approach to natural resource management.

In order to ensure sustainable and effective management of natural resources, the benefits must outweigh the costs [37–39]. Ostrom et al. [40] demonstrate this by pointing out that “an individual’s choice of strategy in any particular situation depends on how he/she perceives and weighs the benefits and costs of various strategies and their likely outcomes.” Therefore, communities will only embrace a participatory approach as a long-term livelihood strategy if it proves attractive to them [41]. For sustainable management of natural resources, participation of local communities is imperative. Participation can best be achieved through decentralization of authority over the resources and promotion of good governance. Governance, in simple terms, means the process of decision-making and the process by which decisions are implemented (or

not implemented) [42]. However, good governance includes several key elements, that is, participation, rule of law, transparency, responsiveness, consensus-orientation, equity and inclusiveness, effectiveness and efficiency, and accountability. Based on this premise, this chapter considers these issues in theory and in practice by exploring the case of the Wami Mbiki Wildlife Management Area.

1.3. The wildlife management areas in Tanzania

In the 1980s, Tanzania experienced a wildlife crisis where almost half of its elephant population and entire black rhino population were wiped out through poaching [33]. Learning from the past failures, the government of Tanzania formulated the first comprehensive wildlife policy in 1998 advocating the devolution of natural resources governance to local communities. This policy provided opportunities that linked sustainable natural resource conservation and rural development [23]. The policy recognized the establishment of Wildlife Management Areas (WMAs) as one of the strategies for devolving management responsibilities and rights to local communities. WMA regulations were formulated in 2002 alongside the establishment of 16 pilot WMAs. The policy encouraged wildlife management at the local level by allowing local landholders to “manage wildlife on their land for their own benefit” ([23]: 13) in order to enhance conservation and alleviate poverty through sustainable utilization of natural resources [23]. The main assumption was that if local people acquire ownership of wildlife resources and obtain tangible benefits from them they are likely to manage the resources sustainably. This required a shift from state-centered control of natural resources to local communities, which also, maximized the value of wildlife-rich land compared to alternative land use so as to improve the standard of living and in turn provide incentives for communities to support conservation efforts.

The first pilot WMAs were established in 2003 and user rights granted in 2006 and 2007. Additional WMAs were created subsequently [43]. Currently, there are 17 WMAs that have attained authorized association (AA) status while 22 are in various stages of development. The number of villages in each WMA can range from 2 to 30. The WMAs cover over 23,000 km² of Tanzania’s land surface. In designating a WMA, several villages have to set aside portions of their land for wildlife conservation and develop management plans and regulations for managing the land. Government approval is required for the plans to become operational and for formal ownership to be given to the communities. To be able to manage the WMA, an authorized association (AA), that is, a Community-based Organization (CBO) representing the member villages must be established and granted user rights by the Minister of Natural Resources and Tourism. Virtually all WMAs have been developed with external support (e.g., USAID, GTZ, DFID, UNDP, GEF, DANIDA, WWF, AWF, WCS, and ADAP). The costs of establishing a WMA are far beyond community affordability and are estimated to range between US\$250,000 and \$300,000 [44].

There has been considerable criticism of the concept of WMAs, facilitation, and devolution of management responsibilities. In practice, the government has retained considerable residual control of WMAs and has attempted to recentralize control of natural resources [45]. Administrative processes to establish WMAs have been criticized as bureaucratic, excessively

complex, and with many hurdles hindering their development [46]. Although some WMAs generate revenue for their member villages, there is insufficient evidence that benefits exceed income received prior to the WMAs establishment [47]. The Wildlife policy was revised in 2007 and “Non-Consumptive Utilization of Wildlife Regulations” were formulated in 2008 which recentralized many powers and benefits to the government [46]. However, new regulations issued in 2012 have afforded more control and benefits to communities [48].

2. Research methodology

2.1. Study area: the Wami Mbiki Wildlife Management Area

The study was conducted in the Wami Mbiki Wildlife Management Area located in the central eastern part of Tanzania between latitudes 06°10'00" and 06°30'00" S and longitudes 37° 50'00' and 38°15'40" E. The WMA's core wilderness area covers 2500 km²¹, combining land from 24 villages. The WMA was first identified in 1995 in a joint effort between local elders and tourist hunters who were concerned about unsustainable utilization of natural resources that threatened the future of the area and the livelihoods of the surrounding communities. It therefore started as a pilot project in 1997 with support from the Danish Hunters Association (DHA) and funding from DANIDA. The CBO named the Wami Mbiki Society (WMS) was registered on 15 July 2002 under the Societies Ordinance Act, with registration no. 11491. It became an authorized association in January 2007 and received user rights in April 2007 [49]. The WMS comprises representatives from member villages.

Facilitation of the Wami Mbiki WMA through DHA took place in three phases. The first phase (1998–2001) aimed at developing the WMA, sending Village Game Scouts (VGS) for training and building guard stations. The second phase (2002–2006) was mainly for building staff capacity, delegate training, and development activities in the surrounding villages. The third phase (2006–2011) focused mostly on business to attract investors. Generally, the funds received from DHA supported data collection for the development of land use plans (LUPs), business plans, and the legal establishment of the Society, formalizing a constitution, a general management plan, bylaws, community education and capacity building, protection of the natural resources as well as operational and technical expenses for the WMS.

The Wami Mbiki WMA has abundant flora and fauna. Wildlife species found in the WMA include lion, leopard, elephant, hartebeest, waterbuck, greater and lesser kudu, giraffe, buffalo, yellow baboon, hyena, wild dog, cheetah, bush pig, hippopotamus, and zebra among others. The area is also rich in birdlife, including varieties of miombo specialties such as the racket-tailed roller, pale-billed hornbill, rufous-bellied tit, and miombo wren-warbler, as well as many other birds. The primary vegetation type inside the WMA is open and closed woodlands, bushland, and inundated grasslands. The WMA has both rivers and natural ponds that serve

¹The size is given as 63,000 ha (630 km²) by the WMA Authorized Association Consortium (AAC) website (www.twma.co.tz), and 250,000 ha (2500 km²) by the Wami Mbiki Society website (makingithappentz.blogspot.dk).

as sources of water for wildlife. The Wami River divides the WMA into two segments (north and south) (**Figure 1**).

The climate of the area is warm tropical with short rains from October to December and long rains from March to May, ranging between 600 and 1200 mm per annum. The average annual temperature ranges between 26 and 28°C. The altitude ranges between 350 and 400 m above the sea level. The area is interspersed with rocky hillsides of thin soil cover and valleys with deep clay or alluvial soils.

The major land uses are agriculture, wildlife and forest conservation, livestock grazing, and human settlements [50]. Subsistence farming is the major economic activity (95%) followed by

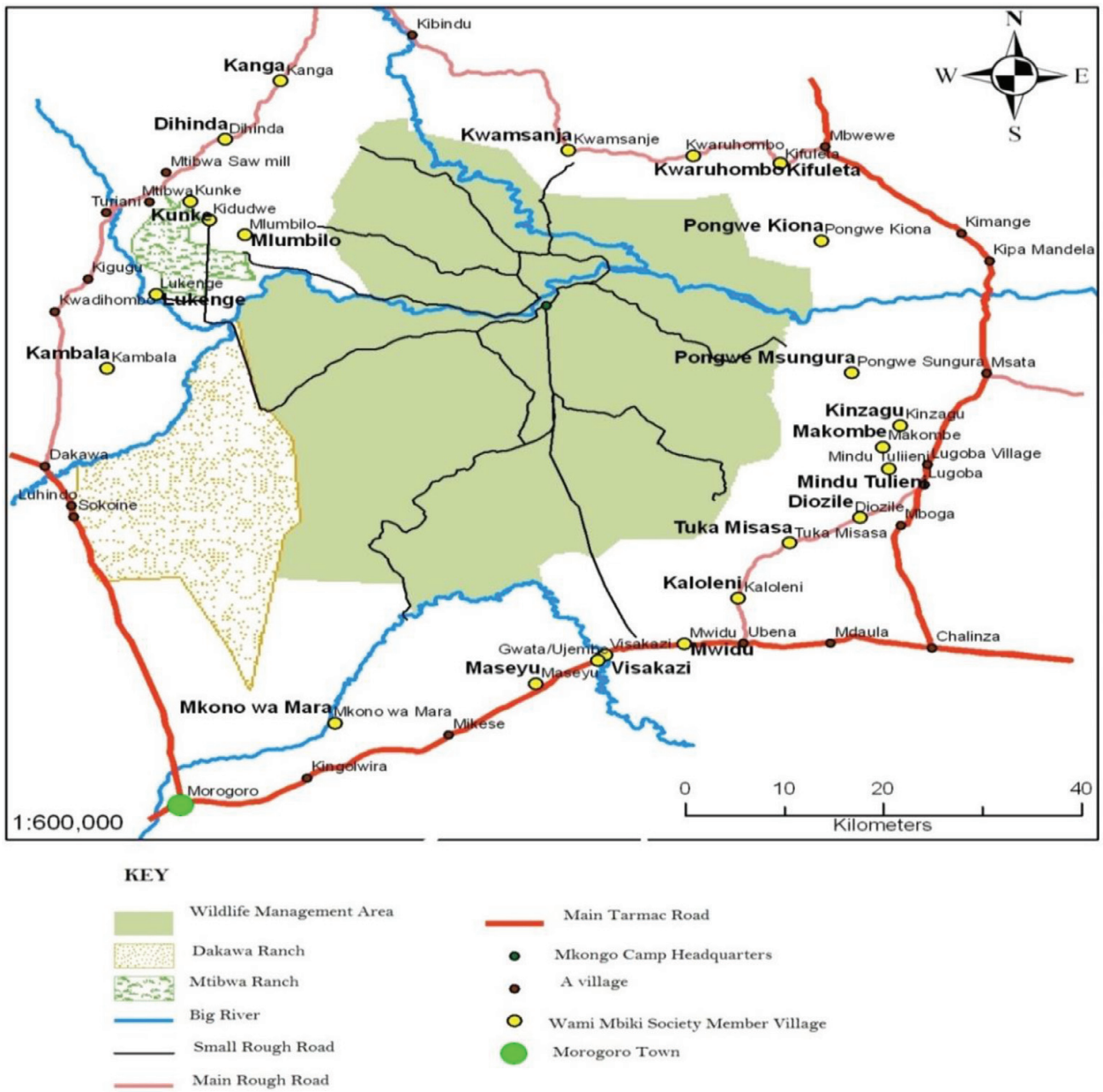


Figure 1. Map showing the Wami Mbiki Wildlife Management Area.

livestock grazing [51]. The main food crops include sweet potatoes, beans, cow peas, bambara nuts, tomatoes, pumpkins, and finger millet among others. Cash crops include pineapples, pumpkins, tomatoes, cashew nuts, and cow peas. Other income-generating activities for local communities include beekeeping, masonry, and small-scale business. Moreover, a few residents are employed as teachers, hospital staff, and prison staff. The population of member villages in 2006 was over 65,935. The main ethnic groups are Wakwere, Wazigua, Wamasai, and Wagogo.

2.2. Data collection

Data were collected using interviews, focus group discussions, direct observation, and informal discussions. Fifty-one interviews were conducted with people who were purposively selected and key informants. Interviewing was terminated when further data added no new insights to the research questions. Interviews lasted between 1 and 2 hours. Participants were encouraged to express themselves freely, and they were guaranteed anonymity and confidentiality. Interviews were conducted in Kiswahili, a common language in the study area. Moreover, four focus group discussions with generally 8–12 people were held to gather various viewpoints on the success and constraints of the WMA.

Finally, I reviewed relevant documents such as government policy documents, reports, and several existing published and unpublished studies conducted in the area. I used a tape recorder to record the data. Soon after data collection, the information was transcribed, organized into categories, and grouped into themes. The identified core themes were linked to the aims of the study, and these served as the basis for my findings and discussion presented below. Statements supported by appropriate quotations from the interviews are provided where necessary to elucidate a theme.

3. Results and discussion

3.1. Contribution of the WMA to biodiversity conservation and community welfare

3.1.1. *Contribution of the WMA to biodiversity conservation*

The study showed a notable improvement in biodiversity conservation in Wami Mbiki between 1997 and 2011. This improvement is attributed to the efforts of the DHA through funding support from DANIDA. The funds facilitated patrol activities, payment of staff salaries, and support for community development projects. The wildlife numbers increased notably as shown in **Table 1** below. Information from the Bagamoyo District Game Officer also indicated that wildlife killed by poachers decreased from 40 animals in 2006 to 14 in 2011.

Despite the impressive increase over almost a decade, the 7 years that followed this success experienced a decline of about two thirds of the wildlife population, coinciding with the ending of donor support in 2011. This is manifested by infrequent and low sightings of some species such as lion, leopard, eland, sable antelope, giraffe, elephant, zebra, and reedbuck.

Year	Number of large mammals
1997	5000
2004	12,578
2009	20,000
2010	31,900

Source: Refs. [44, 50].

Table 1. Number of wildlife from 1997 to 2010.

Wild dogs and cheetahs are not seen in the area anymore, suggesting the possibility of local extinction. Field estimates by the VGS (see **Table 2** below) show that all animals (except crocodiles and hippos) have decreased significantly. The respondents acknowledged an increase of crocodiles. This is partly because they are not hunted and have abundant food (i.e., livestock and wildlife).

Interviews show that elephant sightings are rare, but elephant signs such as dung, foot prints, and carcasses are observed in the area. The carnivores (lions and leopards) are decreasing partly because some are killed by pastoralists in retaliation for predation on livestock.

3.1.2. *Contribution of the WMA to community welfare*

3.1.2.1. *Development projects*

During phase 1 (1998–2001), DHA supported development projects in 14 villages—Dihinda, Kwamsanja, Lukenge, Kunke, Kanga, Kidudwe, Maseyu, Mwidu, Kaloleni, Tukamisasa, Diozile, Ponwekiona, Kwaruhombo, and Kifuleta. In the second phase (2002–2006), DHA distributed 1M TZS (2,000US\$) to each member village per annum. Furthermore, from 2008 to 2011, the WMA earned 20M TZS (about 17,000 US\$) annually from investment in photographic tourism. Half of the revenue was disbursed to the villages.

Several projects were implemented using DHA support and revenue collected from the WMA (see **Table 3**). These projects were implemented under the supervision of DHA staff.

3.1.2.2. *Employment*

The DHA employed 47 people; most of them were from the member villages. Following the termination of support and the concession fee, the number of staff decreased by more than a half, partly due to the lack of income to pay staff (see **Table 4** below).

In June 2011, the WWF started supporting WMA. The VGS were given an allowance of 5000 TZS (2USD) per day. The allowance stopped in February 2012 as WWF ceased its activities in the area. The patrol activities continued as VGS expected payment from WWF once it resumed its activities. However, when WWF re-commenced its activities in July 2013, it did not pay the VGS their arrears of salary. Consequently, the VGS sued the WMS in the labor court. Since January 2014, the VGS have received no pay apart from a portion of fines imposed on

Animal species	2010	2017
Hippopotamus	500	350
Elephant	500	About 100
Impala	18,000	Less than 1000
Sable antelope	1000	Less than 60
Hartebeest	About 700	Less than 100
Eland	About 600	Less than 100
Giraffe	About 500–600	Less than 50
Zebra	About 800	Less than 70
Grysbok	About 300	Less than 50
Reedbuck	About 200	Less than 20
Buffalo	About 2000	less than 300
Kudu	About 500	Less than 100
Warthog	About 2000	Less than 200

Source: Game scouts report.

Table 2. Field estimates of wildlife populations in 2010 and 2017.

Type of project	Number
Construction of classrooms	35
Construction of doctor's house	1
Construction of teachers' offices	2
Construction of teachers' houses	10
Construction of water pond	1
Construction of culvert	1
Construction of meeting hall	1
Construction of dispensaries	3 (of 14, 12, and 3 rooms)
Construction of pit latrines	2 latrines (of 4, 2, and 4 holes)
Drilling of water well	2
Renovation of classrooms	23
Renovation of teachers' office	1
Renovation of dispensaries	2
Finishing of village government office	1
Making of desks	40

Table 3. Projects supported by DHA and WMA revenue.

Staff	Number	
	2007	2016
Game scouts	26	20
Protection officer	1	0
Drivers	5 (4 for patrol cars, 1 for tractor at Mkongo Camp)	1
Community workers	4	0
Cashier	1	1
Messenger	6 (4 at Mkongo Camp, 2 at Morogoro Office)	0
Secretary	2	0
Accountant	1	0
Manager	1	0
Total	47	21

Table 4. Number of staff in 2007 and 2016.

apprehended offenders. Due to the lack of payment and work equipment, the WMA has retained few VGS. Currently, the VGS conducts occasional foot patrols near the WMA headquarters and a few areas under severe threat (see Table 5).

3.2. Threats facing the Wami Mbiki Wildlife Management Area

The study revealed numerous threats facing the WMA. These include agriculture, settlements, illegal logging and fishing (particularly the use of poisons), charcoal burning, uncontrolled grazing, and bushfires. Also, the wildlife faces unrelenting pressure from poaching, retaliatory killings, and habitat loss. These threats are discussed below:

3.2.1. Uncontrolled cattle grazing

Wami Mbiki was set aside for conservation. Human activity was prohibited in the area. An uncontrolled number of livestock (from within and outside member villages) has caused

2007	2017
Work equipment	Number (s)
Cars—4	1 car is used occasionally, 3 are not working
Motorcycles—6	Motorcycles—3
Tractor—1	Not working
Boats—2	Not working
Weapons—13	Working—8, fell into the river—2, held at a police station—2, broken by poachers—1
Mkongo camp buildings	Totally ruined

Table 5. The WMA work equipment in 2007 and 2017.

overgrazing in the area following the end of donor support in 2011. The livestock grazing in the area comes from Arusha and Manyara (Mang'ati and Mbulu tribes), Mwanza and Shinyanga (Sukuma tribe), Kilosa (Maasai tribe), and Kilimanjaro (Pare tribe). Many of these have entered the WMA through Kwamsanja, Mindutulieni, Pongwemsungura, and Bwawani areas. Some pastoralists obtain permits from the village government to enter the WMA. Some villages have registered them as villagers but other villages have denied them registration. Those without a permit force entry and allow their livestock to graze inside the WMA. Regardless of the size of the herd, the village authorities impose a fine of 50,000 TZS. These pastoralists have built settlements and livestock stockades inside the WMA.

Moreover, pastoralists from WMA member villages (Kambala, Mindutulieni, Visakazi, Kaloleni, and Tukamisasa) also graze their cattle in the WMA in drought seasons but do not build stockades (*bomas*). Due to overgrazing, the potential breeding sites and hiding places for wildlife have been degraded. For instance, one VGS stated *"on routine patrol, we have found two impala calves who had been trampled to death by a herd of cattle because the impala fled leaving the calves behind."*

In the process of keeping tsetse flies and dangerous wildlife away, pastoralists use chemicals and burn fires which can cause wild fires. Moreover, they cut down trees to build *bomas* and settlements and litter the area with plastic bags and bottles. Due to continued degradation, most water pans have dried up. This situation is likely to increase competition for space and resources (food and water) between the livestock and wildlife, resulting in increasing stress for the wildlife. Also, it increases the possibility of poaching, leading to the migratory wildlife escaping to other relatively well-protected areas such as Saadani National Park. Efforts by the VGS to remove pastoralists from the WMA led to attacks on two occasions leaving two VGS severely injured. The expansion of livestock numbers and degraded habitat has discouraged the development of Wami Mbiki WMA as a tourist site since tourists visiting the area see more livestock than wildlife (Interview no. 5, June 2016).

In 2014, with support from KDU and Tanzania Forest Services (TFS), the VGS conducted an operation to remove livestock from the WMA. About 2400 cattle, 125 goats, 76 sheep, and 13 donkeys were removed from the WMA. Using the Mvomero District bylaws, a fine for one cow from WMA member villages was 15,000 TZS (8.7 US\$) while non-member village was charged 25,000 TZS (14.5 US\$). The Regional Commissioner's call on WMA invaders to vacate the area by September 1, 2017 appeared to be largely successful.

3.2.2. Farming and settlement

The study revealed that farmers from Kanga and Mziha villages lived inside the WMA before the area was proclaimed a WMA. When protection of the area weakened, people from other villages such as Dihinda (Masimbani), Kunke (Pagani), Kidudwe (Sungwindala), and Mhumbilo invaded the area. They constructed block houses and cattle enclosures (*bomas*) leading to felling many trees. Due to the presence of large numbers of people living inside the WMA, some political parties, that is, CCM (2010) and CUF, opened branches inside the area (at Kwalubendo and Pagale Forest Reserve) at Kunke Village.

3.2.3. Poaching

The study showed that poaching is a serious issue in the area despite its designation and VGS patrols. In 2008, the VGS retrieved two elephants' tusks and weapons. The elephant carcasses had been burnt after removal of the ivory so as to destroy evidence. Kikoti [52] also observed poaching signs such as meat racks near Wami River, bullets wounds, trunks cut by snares on four collared elephants, and a burnt elephant skull. It was reported that elephant poachers now not only take the ivory but also collect elephant meat to sell. This renders it impossible to identify the numbers of elephants killed in the area. Two different kinds of poaching occur in the area – commercial (for meat and/or ivory) and subsistence. Commercial poachers mostly kill elephants, hippopotamus, giraffe, buffaloes, hartebeest, and eland using cars or motorcycles, shotguns, and rifles. Subsistence poachers use muzzle loaders, rifles and shotguns, snares, fires, dogs, machetes, torches. and motorcycle horns and sell surplus meat. One respondent stated *“Strong light on animals makes them confused and motionless, thus making it easy for poachers to kill them. Through this method, a poacher can kill up to 20 impalas in a day for business purposes. These poachers usually walk on foot or use a bicycle.”* The study also showed that some pastoralists who graze livestock in the WMA also poach themselves and/or collaborate with poachers. For instance in 2010, pastoralists killed an elephant at Kwamsanja Village. A study which collared 17 elephants (5 in Saadani NP and 12 in Wami Mbiki WMA) found that 3 of the 12 elephants in the WMA had bullet wounds and 1 had a cut trunk [52]. Among the 24 villages, most poaching is organized from Kunke Village. The meat collected is sold at Madizini (Turiani). One piece of meat can be sold for about 5000 to 7000 TZS (2–3 US\$). Meat from one impala can yield 60,000–70,000 TZS (27–31 US\$).

Fish are also poached. One VGS stated *“in 2014, we caught poachers (men and women) who used insecticide (Thiodan) and dynamite to harvest fish in the Wami River. Many fish died and were spoiled.”* Water from the Wami River is used by many people for drinking and cooking. The use of insecticides and dynamite fishing can make water unsafe for human consumption.

Some cases of poaching in the Wami Mbiki WMA are linked with government officials. For instance, the Wami Mbiki Newsletter of June 2009 reported that in 2008 three poachers were arrested with hundreds of kilograms of bush meat carried in a government vehicle. The VGS and WMS face many difficulties dealing with these kinds of cases because the poachers are protected. For instance, one respondent stated *“when some notorious poachers are arrested, they get released without any punishment. There are cases when poachers are arrested with all evidence such as guns and wildlife products but after some time they are released without any form of explanations and given back the evidence. After a few days, the same poachers can be found poaching in the same area. This situation makes it very difficult to stop poaching in Wami Mbiki.”* The same respondent stated *“the current trend of poaching in Wami Mbiki makes the WMA increasingly unlikely to secure an investor.”*

3.2.4. Tree cutting

The study revealed overharvesting of trees in the area for firewood (cooking at home, selling, baking bread, and hardening bricks) and construction (houses and toilets). The main tree species used by the community are *Acacia mellifera* and *Spirostachys Africana*. Poles and logs

from *Acacia mellifera* (also called black thorn/hook thorn or mkambala) are good for bee hives, building material (termite resistant), domestic uses (pestles), fencing, firewood, fodder, land improvement (nitrogen fixing), and medicine. The *Spirostachys Africana* (called micharaka) is used because it is not damaged by termites and is thus good for construction of toilets and wood houses.

Tree cutting is undertaken by people from within and outside the WMA. More than 11 cases of the confiscation of illegal logs from the WMA area have been reported. The main destination for logs was Dar es Salaam and Morogoro. Some apprehended culprits were fined, and others were taken to the court. The normal fine for a lorry of more than 3 tones is 1MTZS and a lorry of less than 3 tones is between 500,000 and 700,000 TZS.

The study also showed that the WMA does not have a permit to sell the confiscated logs. One respondent stated: "...seized logs at Pongwekiona, Kwamsanja, and Superdoll (Mtibwa) areas were sold by TFS. The money was deposited with the central government.... The same thing happened in other incidents involving logs and charcoal...." The WMA did not receive any share of the revenue even though the trees were harvested in the WMA. This situation created tension and conflict between the Wami Mbiki Society and TFS officials.

3.2.5. Charcoal burning

Charcoal is burnt along the WMA borders and inside the WMA. There is a growing market for charcoal in some WMA member villages, a situation which threatens the existence of the WMA. Most of the charcoal is sold along the Dar es Salaam— Morogoro road. Few of those committing illegal activities in the WMA are caught. For instance, in 2015, there were 20 court cases related to charcoal burning and 8 cases related to wildlife killing/poaching. In 2016, there were few court cases because many of those caught were willing to pay a fine. Presently, 22 motorcycles and 31 bicycles have been confiscated because offenders have failed to pay the fine.

3.3. Human/Wildlife conflicts

3.3.1. Crop raiding

The study showed that elephants, impalas, and monkeys are primarily responsible for invading farms. The areas mostly affected are Mwidu, Kwansanja, Makombe, Pongwemsungura, and Diozile villages and Mtibwa Sugar Plantation. The types of crops affected are sugarcane, maize, and banana. Elephants are most destructive because they eat crops and trample over them. In 2015 in Mwidu Village, about 18 acres were destroyed. The elephants' seasonal movements, expansion of agricultural land, and the proximity of human settlements and agriculture to elephant habitats increase the possibility for crop damage. Large tracts of land for example from Kambala Village have been allocated to sugarcane, a situation that triggers human-wildlife conflicts. The study revealed that the VGS do not respond on time when called in cases of problem wildlife. Due to this, the villagers take matters in their own hands and local hunters kill the offending animal.

3.3.2. *Livestock depredation*

The study showed that the villages most affected by predators are Mwidu, Tukamisasa, Diozile, Kwamsanja, and Pongwekiona. The most destructive animals are leopard, lion, and hyena. In 2015, at Mwidu Village, two goats were killed by a hyena, and near Pongwemsungura Village, a cow was killed by a lion.

3.3.3. *Killing of humans*

The study showed that wildlife also kill/injure people in villages adjacent to the Wami Mbiki WMA. For instance, in 2015, hyena injured two people at Maseyu Village. Elephants have also attacked people inside the WMA, especially livestock keepers and poachers. The total number of victims is unknown because most cases of wild animal attacks on human are not reported because it is illegal to enter the WMA without permission. The reasons given for attack were: (a) some people are killed in the process of trying to kill elephants (poaching), (b) some are attacked while grazing livestock in the area, and (c) some are killed because of making a noise that disturbs the elephants. Crocodiles also attack and kill fishermen/women. For instance, in 2016, three pastoralists and two fishermen were killed by crocodiles. In 2015, four pastoralists, two fishermen, and one poacher were killed by crocodiles. Due to frequent attacks from crocodiles, people have ceased to swim in the river.

It is not only the case that wildlife kills people but also humans kill wildlife in retaliation. For instance in 2015, two lions were killed by villagers at Pongwekiona Village.

3.4. **Factors contributing to poor performance of the Wami Mbiki WMA**

3.4.1. *Termination of donor funding and lack of a reliable source of income*

When donor funding ended in June 2011, the Wami Mbiki WMA was left without any source of income. At this time, no contract for alternative investment had been secured. In 2012, the Wami Mbiki WMA took the initiative to attract investors in photographic tourism and four applications were received. However, before an agreement could be reached, the negotiations failed. The possible reasons for this failure could be the required annual investment fee of TZS 45 million (US\$ 28,125), which was too high considering the low tourism potential and the investment required to develop photographic tourism in the area [44].

Apart from that, the investment agreement was for only for 3 years, which is considered too short a period for an investor to recover their costs. One investor, Safari Legacy, spent about US \$300,000 setting up camp between 2008 and 2011. The company discontinued their investment because of the complexity of operating in the WMA which made it impossible to sustain a profitable business [44]. Since 2011, patrol activities in the WMA decreased leading to an increase in illegal activities.

3.4.2. *Lack of benefits to local people*

A major challenge facing the Wami Mbiki WMA is the ability to generate sufficient benefits for the community to create incentives for them to maintain, manage, and support conservation. There has been no income at household/community level or other benefits from small business (e.g., handicrafts) or other wildlife-related activities. Many respondents felt that the WMA benefits only a few individuals and do not see the importance of keeping it—as one respondent stated *“we see no benefits from Wami Mbiki...so it is better for our land to be returned back to us...”* WMA records indicate that the WMS collected 689,000 TZS; 1,585,300 TZS; and 2,274,300 TZS in 2004, 2005, and 2006, respectively [53]. Also, interviews show that between 2008 and 2012, some tourists visited the WMA, but now there are none. Some of the revenue collected was distributed to member villages.

3.4.3. *Politics*

Some political leaders, such as ward councillors, partly contribute to the increase in illegal activities in the WMA because they defend encroachers and people involved in illegal activities. For instance in 2017, the ward councillors for Mtibwa led a demonstration to protest against the dislocation of people from Wami Mbiki (in Pagale Nature Reserve).

3.4.4. *Lack of commitment by village leaders*

The study showed that village leaders sometimes mislead villagers concerning the formal boundary of the WMA and encourage them to oppose the WMA. This encourages people to continue with illegal activities inside the WMA. Due to this, there has been occasional shifting of the WMA boundary. For instance one respondent stated *“The efforts to protect natural resources in the WMA are weakened by many people...leaders, young, and old... people do not like enhanced protection of the WMA so that they can continue with illegal activities...”*

3.4.5. *Lack of commitment by the village game scouts*

The field data showed that most VGS collaborate with poachers and other people who engage in illegal activities inside the WMA. For instance, the WMS leader said *“in 2015, a poacher was apprehended with elephant ivory, two guns (rifle and muzzle loader), and a bicycle. ...the responsible game scouts employed delaying tactics and released the poacher....”* The study also revealed that VGS allow illegal activities inside the WMA (e.g., ruby, rose garnet gemstone extraction, and gold sieving from the Wami River; hunting, etc.) with the intention of receiving financial gain from the perpetrators.

3.4.6. *Lack of communication*

The study showed that villagers do not receive information and updates from WMS leaders on matters pertaining to the WMA. Since 2011, no meetings have been conducted for village representatives to share information with villagers on the performance of the WMA. The lack

of communication between WMS management and local communities has made it difficult to secure full support from local people on conservation issues. The WMS council meetings are primarily financed by revenues from fines.

3.4.7. Mismanagement of WMS properties and double standards

The study showed that in 2015/2016, the WMA in collaboration with KDU, TANAPA (Mikumi, Udzungwa and Sadani NPs), and TFS removed livestock from the WMA. More than 2000 cattle were rounder up, and their owners paid about 37M TZS in fines. Apart from these fines, 8M TZS was collected from seized cars, motorcycles, and apprehended poachers. The revenue was used to pay the VGS, repair a car, and buy food for the VGS. However, there are claims that the WMS mismanaged the money accruing from this exercise.

The study further revealed that there are double standards in deciding the amount of fines, a situation which encourages corruption as one respondent reported: *"in 2016, we conducted a joint patrol and confiscated a lorry with charcoal. Instead of paying a set fine of 12Mas, we received 3M ...in a similar incident a lorry was charged 1M instead of 7M."*

Since 2002, there have been five changes in WMS leadership. Some leaders were fired due to mismanagement of money and misuse of WMS property. Also, some were accused of showing partiality in handling cases related to illegal activities in the WMA and for defending and protecting those who were illegally harvesting resources in the WMA.

3.4.8. Interests of the facilitator

The DHA interest was to acquire a tourist hunting block for business purpose. This is reflected in the article in WFSA where they stated that an increase in the wildlife populations in the WMA could tolerate controlled hunting "...populations of most game species ... can tolerate controlled harvesting through tourist hunting. ... but it is of the utmost importance to attain the block allocation as to diversify the economic activities of the WMS" ([54], p 211). However, for ecological reasons, the Ministry of Natural Resources and Tourism (MNRT) revoked user rights for consumptive tourism in the WMA.

3.4.9. Lack of technical personnel

The WMA lacks creative and competent personnel who are able to assist the WMA in business terms to increase income. This situation enforces the dependency of the WMA on fines paid by apprehended poachers and other offenders for its operations.

3.4.10. Conflicts

There have been conflicts among the WMS leaders. Also, there have been cases of VGS being fired without enough evidence, which creates enmity and promotes illegal activities in the WMA. Several meetings have been held to discuss internal conflicts instead of discussing the development of the WMA. There are also conflicts between WMS leaders and government staff (TFS offices in Mvomero and Bagamoyo) in relation to revenue collected from fines and selling confiscated logs. This leads to the lack of cooperation in dealing with illegal activities in the WMA.

3.5. People's perception of the WMA

People perceive the WMA to benefit WMS leaders but not the community. This is because since 2011, they have not received any benefit from the WMA. The villages heard that the WMA received 37 M TZS, but none of this found its way to the local communities. The expenditure of money was not transparent, and the board of trustees was not involved. For different reasons, some villages, for example Mziha, declined to send a representative to the WMS and wished to leave the WMA. Villages like Tukamisasa, Kwamsanja, and Kunke demanded the return of their land so that they could utilize it for agriculture, charcoal burning, etc. Some people were of the opinion that a new donor and/or investor should be sought soon to avoid the complete disappearance of wildlife in the area.

3.6. Proposed possible ways to improve the current situation

The community proposed the following so as to improve the current situation:

- a. The efforts of the Regional Commissioner, especially those requiring people to vacate the area, together with frequent patrols, are crucial. For instance, the operations conducted in the area reduced the number of cattle in the WMA.
- b. Maintenance of roads is important for people to be able to access the area. Currently, the WMA has poor roads and some areas are not accessible by car.
- c. The WMA leaders should resolve their differences and work as a team. This is important as it will enhance the success of the WMA.
- d. The WMA leadership should use the constitution and regulations to guide WMA operations. The study showed that WMA leaders do not follow procedures on issues pertaining to WMA activities, for example, handling issues related to WMA property and revenue, and hiring and firing WMS staff. Most VGS have been fired in a perfunctory manner without adequate justification. For example, up to 2017, 40 VGS had been fired without any investigation of their behavior. These procedures should be transparent and proper investigation must be undertaken before firing staff.
- e. A way should be found for sharing income derived from logs or timber harvested in the WMA. The current situation whereby the TFS takes all the money collected is discouraging. Since the WMA comprises village land and villagers have protected the trees they consider they deserve a share of the proceeds. The money accrued could help pay patrol activities and VGS salaries.
- f. WMA leaders should follow the procedures for handling WMA income, for example, depositing money in the bank first before incurring any expenditure. The study showed that money collected from fines has been used without depositing it in the bank. This situation encourages mismanagement of WMA income. Moreover, since periods of office for WMA leaders are relatively short, newly-elected leaders should receive training.
- g. The government should give special considerations to the interests of WMA facilitators because experience shows that they have contributed to the success of most WMAs.

- h. The government should strengthen the WMA in terms of protection and leadership because it is a guardian of all WMAs.

4. Conclusion

The findings of this study showed that following the end of donor support in 2011, almost all activities in the Wami Mbiki WMA ceased. As a result of inadequate protection, the area is severely affected by environmentally unfriendly activities such as poaching, illegal timber harvesting, charcoal burning, overgrazing, and overfishing. The population increase in the area has demanded large tracts of land for agriculture, thereby increasing pressure on the Wami Mbiki WMA. Several factors have been identified that contribute to the poor performance of the WMA. Although the government has tried to improve the situation by removing the livestock inside the area, more effort is still needed to save the remaining wildlife in the area.

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