Benefit-sharing and Managerial Capabilities of Indigenous Wildlife Management: The Case of the Ngarambe-Tapika WMA

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Abstract

Wildlife management areas (WMAs) are set for the conservation of wildlife and the improvement of livelihoods. Despite implementation, for more than 16 years some Tanzanian WMAs did not assess their successes and failures. The Ngarambe-Tapika WMA was among un-assessed WMAs in benefit acquisition, the capability of indigenous chosen to join WMAs, and challenges facing the managerial authority. Given the paucity of information on the aforementioned aspects, a comprehensive study was undertaken using questionnaires and interview surveys from indigenous authorities and community members that are not in the managerial system. 82.9% of the respondents receive benefits allocated to the ecosystem. About 90% of the respondents declared that the indigenous authority chosen to join the WMAs managerial system can undertake their tasks. The reported challenges included insufficient managerial infrastructure and limited awareness of conservation regulations related to reconciling human-wildlife conflicts. The study recommends the improvement of managerial infrastructure and regular training for the managerial authority.

Keywords: *benefit, challenges, managerial, Ngarambe-Tapika, wildlife management areas.*

Introduction

Wildlife Management Areas (WMAs) are protected areas for conserving wildlife and recreational activities (Sulle et al., 2011). Conservation of biodiversity in WMAs is done by the government and local communities living adjacent to protected areas, whereas indigenous land becomes a wildlife refuge (Igoe & Croucher, 2007). Before being deprived of natural resources, local communities accessed them for cultural and economic values (Thakadu, 1997; Lane, 1996; Warren, 1996), with the natural resources being protected using indigenous knowledge. According to some studies, disagreements between local communities and biodiversity governing authorities stemmed from the idea of separating nature from culture (Martinez, 2003; Mbaiwa, 2002; Wiersum, 1997), which resulted into conflicts between conserving authorities and local communities, and which subsequently impaired the expected outputs of WMAs. The idea of establishing WMAs emerged in the 1980s in Africa as an integral part of community-based conservation and extension (CBC) to subvert older conservation movements that disregarded the interests of local inhabitants (Adams

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& Infield 2001; Roe et al., 2000; Agrawal et al., 1997; Hackel, 1999). The purpose of establishing WMAs was to ensure potential biodiversity conservation while improving communities' livelihoods within a refuge ecosystem (Baldus & Caudwel, 2004; Baldus et al., 2004). Thus, the establishment of WMAs was meant to enhance the goals of sustainable conservation of wildlife resources and improve the livelihoods of communities whose village lands are wildlife refugia (Hackel, 1999). This was to be done by the guidance of Wildlife Acts within a respective country, taking into account that local communities that had let their land be used as WMAs expected a sustainable availability of natural resources from their land, provision of funds for activities related to the management of natural resources, provision of social services, good developmental plans, and secure markets for different tourism products produced within the WMAs' ecosystems (Emerton & Mfunda, 1999; Gillingham & Lee, 1999; Songorwa, 1999).

The decline of keystone species of wildlife as a consequence of poaching and habitat fragmentations in Tanzania (Bergin, 1996; Krischke et al., 1996) necessitated the adoption of pragmatic approaches in wildlife conservation, including the establishment of WMAs. In Tanzania, the implementation of WMAs began in 2003 (Mung'ongo et al., 2003; USAID, 2013) after a comprehensive assessment of the challenges of conservation and solutions for sustainable management of wildlife (Leader-Williams et al., 1996; Wildlife Sector Review Task Force (WSRTF), 1995a). The justification for the adoption of WMAs in Tanzania was ascribed to pilot studies done in selected ecosystems in Tanzania (Leader-Williams et al., 1996; WSRTF, 1995b); and the extent of success reported in other areas that were facing similar challenges, including Uganda (Mugisha, 2000), Zambia (Wainwright & Wehrmeyer, 1998; Mwima, 1996; Gibson & Marks, 1995; Lewis et al., 1990), Zimbabwe (Child, 1996; Owen-Smith, 1996; Muphree, 1995) and Kenya (Lusiola, 1996).

To date, there are 38 WMAs located in various regions within Tanzania (Keane et al., 2020; USAID, 2013). Among these, only 17 have attained the authorised associations (AAs) status in wildlife management, including the Ngarambe-Tapika Wildlife Management Area (WMA) (USAID, 2013; UTR, 2007). Studies on the assessment and evaluation of WMAs within the country have shown great success of WMAs, including those of Burunge, Enduiment, Wami-Mbiki, Pawaga-Idodi, Uyumbu and Ipole: all of which have reported attaining satisfactory benefit-sharing among communities in their respective ecosystems (USAID, 2013; Sulle et al., 2011; Kaswamila, 2010). Despite successes in the co-management of biodiversity and improvements of livelihoods, WMAs in Tanzania face several challenges, including the lack of managerial capabilities among indigenous authorities, increase of human populations within WMA ecosystems, and limited awareness of wildlife management regulations (USAID, 2013). Although the status of successes, challenges and constraints have been pinpointed in several WMAs, there is a paucity of information regarding the Ngarambe-Tapika WMA.

The Ngarambe-Tapika WMA is the main refuge of wild animals shuttling from the Selous Game Reserve (Krischke et al., 1996). Despite the presence of biodiversity

hotspots for decades that influenced the establishment of the Ngarambe-Tapika WMA within the ecosystem, no comprehensive study has been done on its successes and challenges. Therefore, the objectives of this study were to determine whether the respective communities receives benefits from the existence of the Ngarambe-Tapika WMA; assess the extent of the managerial capability of the indigenous authority chosen to co-manage the WMA; and examine challenges facing the Ngarambe-Tapika WMA managerial system. The status of these aspects may enlighten local communities' willingness for biodiversity conservation, and the capacity to represent local communities in the organisational systems of WMAs. Also, the assessment of managerial capabilities may pinpoint areas of weakness in management aspects in the Ngarambe-Tapika WMA that need strengthening to enhance proper management that will foster a harmonised co-management of biodiversity and improved livelihoods.

Study Area
The Ngarambe-Tapika WMA is comprised of two villages: Ngarambe and Tapika, located in the Rufiji District in Coast Region, Tanzania (Figure 1).
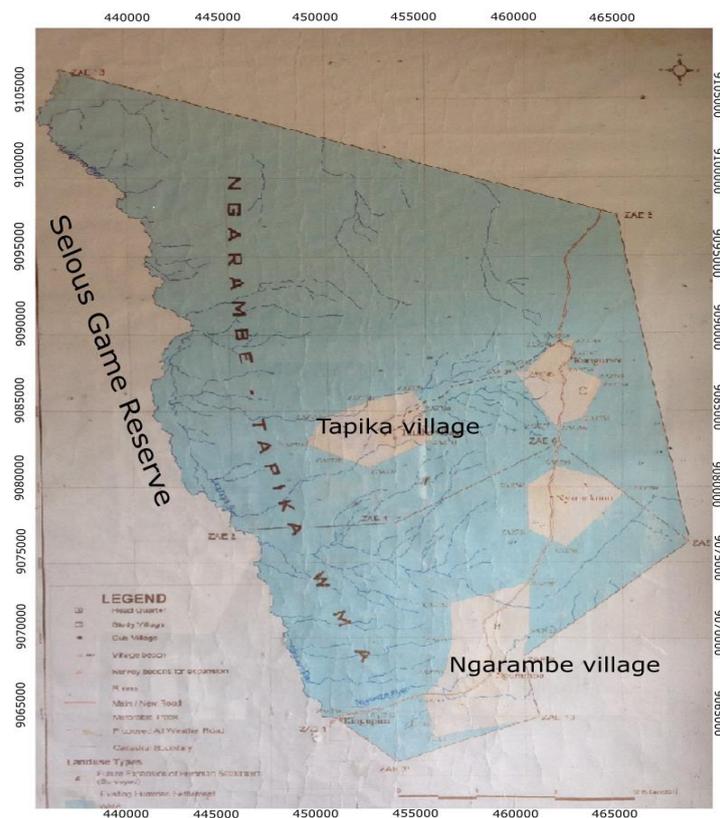

Figure 1: The Ngarambe-Tapika WMA and Its Major Constituent Villages
Source: Ngarambe-Tapika WMA Authority.

The Ngarambe and Tapika villages are located south of the Rufiji district at the southeast edge of the Selous Game Reserve (WWF, 2014). The ecosystem is home to approximately 5,700 people (NBS, 2012), whose lifestyles and cultures are tied to the conservation of biological species. The Ngarambe-Tapika ecosystem is predominantly of *Brachystegia* woodland. The Kichi hill forests, Lungo'nya plains and *Brachystegia* woodland provide a potential refuge for a range of wild mammals and avian species during the dry season (Land Use Planning, 2002). The mean annual rainfall is 750mm, whereas temperatures range from 13ºC to 40ºC, with an annual mean temperature of 25.6ºC (McGinley, 2008).

Methods
The data collection was conducted for seven days in May and November, 2019. The number of households involved in the survey was determined by the equation $N = n \times D$, whereas,

$$n = \frac{T}{b} [(1 - b)(\text{-}ROH)]$$

in which:

N = sample size (i.e., estimated households for the study); n = number of households within the ecosystem; T = estimated population size; b = mean number of people in a household ($\approx$ 5 people); D = sampling intensity (for this study = 5% (Kayunze, 1998)); ROH = (rate of homogeneity) = 0.43 (i.e., values harmonised from various studies involving human populations (Naing et al., 2006; Shirima, 2005; Daniel, 1999; Otte & Gumm, 1997; Bennett et al., 1991)). From the above, the estimated sample size for the study was $\approx$ 98 households.

A cross-sectional data collection method was employed, in which random sampling intensity of at least 5% was used to determine the sample size of the households interviewed in the ecosystem. Other researchers have used this sampling intensity successfully (Kayunze, 1998). The ROH < 0.5 was chosen, assuming participants had diverse information about the operational system of the Ngarambe-Tapika WMA. In each household, one person was selected by household members, assuming that the chosen participant had sufficient information on the functional design of WMAs. The choice of involving one participant per household was made by household members and accepted by the researchers because participants have the right to consent and give their conditions before an interview or a questionnaire survey. A questionnaire survey was administered to 50 households (i.e., 50 participants) of both sexes in each village within the ecosystem. A questionnaire survey was also conducted with indigenous leaders chosen to join the managerial system (n = 6). The selection of administrative leaders was based on their availability during the survey. The total number of interviewees for the study came to 106, which suffice data analysis on socio-economic studies in Sub-Saharan Africa (Matata et al., 2001).

Questionnaires were designed to capture historical information on biodiversity conservation before and after the establishing the WMA within the ecosystem. They also focused on direct and indirect conservation services and benefits acquired by communities. Also, questionnaires were designed to capture the shortcomings of the operating system to both the communities and their representative on the WMA managerial board. Secondary data was collected by reviewing various reports, papers, policies and regulations from documents related to the WMA ecosystem.

Data Analysis
Data were analysed using the Statistical Package for Social Sciences (SPSS Version 22.0, 2013) programme. Questionnaires and interview responses were coded and analysed using descriptive statistics and chart algorithms regarding the study's specified objectives. Results were presented as percentages. The comparison of the perceptions of communities between villages was evaluated by an independent sample *t-test* (i.e., data fitted parametric assumptions), in which α = 0.05.

Results
Benefits Acquisition
Among the respondents, 100 interviewees (i.e., non-leaders) responded that they receive benefits from the Ngarambe-Tapika WMA authority and investors. Benefits received by individual households included salt, bushmeat and school incentives such as exercise books, pencils and pens (Figure 2). Benefits aimed at social development included the improvement of infrastructures such as the construction of two wells (25%), donation of two machines for making bricks (23%), improvement of roads (19%), renovations of schools and dispensaries (14%), and renovation of mosques (9%). Among the sampled members of the Ngarambe-Tapika ecosystem, 82.91% ($n = 100$) reported receiving benefits, while 17.09% ($n = 100$) said they were not benefiting from the Ngarambe-Tapika WMA allocations. The comparison of acquisition of benefits between Ngarambe and Tapika villages were varied insignificantly ($t_{(98)} = 0.354$, $n = 100$, $P = 0.6083$).
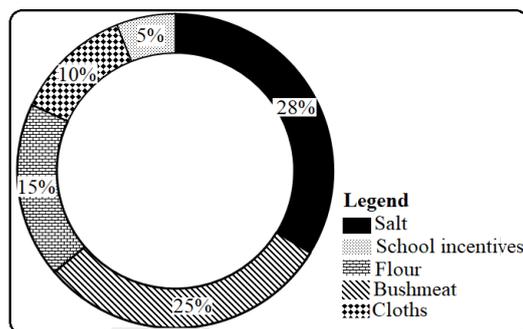

Figure 2: Percentage of Benefits Commonly Acquired by Households
Source: Data collected in May and November 2019).

Managerial Capabilities of Indigenous Authority

Local communities responded that management by the indigenous authority was very good for >85% ($n = 100$); while <10 % ($n = 100$) of the communities were unsatisfied with the management by the indigenous authority. Local communities were given several reasons for their response to whether the indigenous authority was acceptable or not (Table 1). The reaction of local communities towards the managerial capabilities of indigenous leaders between participating villages was varied insignificantly ($t_{(98)} = 0.454$, n = 100, P = 0.6357). All the indigenous leaders (100%) chosen to join the WMA managerial team responded that they were capable of undertaking the managerial tasks.

Challenges Facing Managerial System in Ngarambe-Tapika WMA

The Ngarambe-Tapika WMA managerial system faced several challenges, including the lack of sufficient managerial infrastructure (35.9 %), low exposure to WMAs regulations (24.8%), absence of training after joining the WMA managerial system (23.5%), and the lack of clear boundaries (9.3%). Among the challenges, the lowest percentages were in inadequate skills in controlling problem animals (4%) and unsatisfactory administration tokens (2.5%).

Table 1: Response of Participants Various Aspects Related to Managerial Capabilities of Indigenous Authority in Ngarambe-Tapika WMA

Aspect	Local Community Response		
	Yes (%)	*No (%)*	*Not sure (%)*
Involvement in decision making	86.6	10	3.4
Transparency on activities related to local communities	92.2	7.1	0.7
Fairness in benefits allocation to communities	85.9	13	1.1
Confidence in the presentation of local communities concerns	95	3.2	1.8
Confidence in reporting local communities violating rules and regulations of WMAs	97.8	2.2	0

Source: Data collected by authors in May and November 2019)

Discussion

The Ngarambe-Tapika WMA and investors within the ecosystem provide tangible benefits to local communities, signifying that the expected output of having the WMA focus on community-based conservation and the benefit gains have been attained. Benefits are reported to be provided mainly beforehand religious ceremonies and at the end of school holidays every year since 2009. However, to date the benefits are not guaranteed as a consequence of increasing population, which makes it costly to manage allocation to each household. This has been a challenge even in successful WMAs in which people from adjacent villages that are not within a WMA ecosystem are reported to move and live in WMA villages because there is improved social services than in villages away from WMA ecosystems (Keane et al., 2020; USAID, 2013; Wainwright & Wehrmeyer, 1998; Child, 1996; Mwima, 1996;

Owen-Smith, 1996; Gibson & Marks, 1995; Muphree, 1995). The untargeted population growth in WMAs has resulted in complaints of unsatisfactory benefit allocations when local communities compare benefits acquired during the initial stages of establishing the WMA and the current shares. This situation has been reported in several WMAs as a consequence of increased human populations, dynamics of preferences, and increased costs of supplied incentives (Kaswamila, 2010; McClanahan et al., 2006; Lusiola, 1996; Lewis et al., 1990).

Socio-economic improvement was witnessed by the operation of brick-making machines given to the youth. This has, in turn, increased youth earnings and facilitated an increase in modern buildings built with bricks rather than mud. Subsequently, villages have been equipped with better housing and related facilities, including shops and schools, at a low cost. Also, the communities of the Ngarambe-Tapika WMA have access to water from wells built to motivate their participation in biodiversity conservation. Before the establishment of WMA in the Ngarambe-Tapika ecosystem, water supply was of great concern. Moreover, the positive attitude of the local communities towards conservation has improved the exposure of the Ngarambe-Tapika WMA, which has attracted more investors and researchers to visit the ecosystem and consequently increased village earnings through entry and associated fees. Income generation from the establishment of the WMA has been observed to raise positive conservation attitudes among the local communities within the ecosystem (Sulle et al., 2011; Christophersen et al., 2000; Carney, 1998).

The highest percentage of local communities accepting indigenous authority indicates that individuals selected to join the managerial system had the capability of representing their communities in the WMA councils. The WMA managerial system comprised of 5 villagers from each village within the WMA ecosystem. These representatives were chosen by their respective villages—i.e., Ngarambe and Tapika—to bridge the interests of the local communities and those of the WMA government authority. Some members of the local communities complained about unfair representation in the WMA, but this may result from conflicts of interest or unfulfilled high expectations of some villagers that are difficult to meet. High expectations of villagers within WMAs have also been reported in other WMAs such as Waza, in Cameroon (Bauer, 2003), and in Nepal (Mehta & Heinen, 2001). It has been argued that it is difficult to meet the satisfaction of each villager within WMAs because each has its own preferences and level of satisfaction (Kidegesho 2008; Hulme & Murphree, 2003; Wapole & Godwin, 2001).

Although local communities accept the indigenous operating authority due to their effort to represent their interests, the managerial system is faced with several challenges that compromise the struggle of the managerial system to attain expected outputs (McClanahan et al., 2006; Gibson & Mark, 1995). For example, the lack of managerial tools, including patrol gear such as cars and weapons, makes it difficult to visit the ecosystem when necessary for timely control of poaching and dangerous/problem animals. As reported by the local communities, a delayed

response to such incidents has resulted in complaints that the WMA authority ignores the communities' informants within the ecosystem. In essence, it arises due to the lack of tools.

Insufficient exposure to policies and regulations guiding WMA operations (MNRT 2007, 1998) has also become a source of managerial compromise as some of the staff and council members fail to make appropriate decisions due to the lack of requisite knowledge on wildlife and land Acts related to some reported problems (Tarimo, 2016; Songorwa et al., 2000). Also, the lack of clear boundaries between the land dedicated to conservation and that of villagers is also another managerial problem. Sometimes, unfaithful villagers utilise prohibited resources within the WMA, arguing that such resources are located within their village's socio-economic apportion while fully knowing that they encroached on the WMA. On the other hand, it has also been reported that the land managed by the WMA has been increased without negotiation with villagers, resulting in conflicts between villagers and management (Mayeta, 2004). Similarly, insufficient funds have been reported to hinder effective community-based conservation in several WMAs (MBOMIPA, 2010).

Management Implication

The local communities in the Ngarambe-Tapika ecosystem receive satisfactory direct and indirect benefits from the presence of the Ngarambe-Tapika WMA. The benefits of the Ngarambe-Tapika WMA are shared equally by all participating villages, given that all influence biodiversity conservation within the ecosystem. Also, the indigenous representatives can represent their communities' interests, although they are not equally trained for managerial tasks. Thus, regular training on laws and regulations related to harmonised conservation and improved livelihoods for the concerned communities is needed.

Conflict of Interest

The manuscript has no conflict of interest whatsoever: neither among authors, nor the funder.

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