

Community Access to Livelihood Sustenance Resources in Protected Areas: A Case Study of the Makao WMA, Tanzania

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Abstract

Local community bordering protected areas bear conservation costs like crop damage, injury and loss of land despite the conservation benefits and tourism attractions situated within their localities. This paper examines the extent to which community adjacent to protected areas access subsistence resources in Makao WMA. The study was conducted in Makao Wildlife Management Area in Jinamo, Mwabagimu and Makao villages, in Meatu District, Tanzania. The data were collected from 281 heads of households using a survey design within a mixed approach. A random number generator was used to generate a random number of households to be surveyed in each study village. The study found a limited access to subsistence resources as local communities are restricted to access land for agriculture, livestock grazing, settlements, firewood, wood for charcoal production, building poles and grasses; hence limiting their livelihood supports. The study results show that limited access to subsistence resources in protected areas may, in the long-run, results to resource-use conflicts in wildlife management areas. This study recommends local community capacity building programs that enable local advocacy for sustainable wildlife conservation and ensure resources access.

Keywords: *subsistence resources, resources access, wildlife management areas*

1. Introduction

The access of local communities to subsistence resources can be traced from when conservation of nature was controlled through strict social hierarchy like families and clans (Noe, 2019). In some cases, access to natural resources like wildlife, grazing area and other natural resources were under the authority of chiefs and religious leaders (Hinz, 2003). Restrictions to access natural resources in some areas were applied as taboos against hunting and eating of certain species of animals, territoriality, royal game areas, harvest regulations and seasons, and habitat manipulations (Hinz, 2003; Kideghesho,

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2016; Kjekshus, 1996). Although rules and regulations concerning access to natural resources were not written down, they were precise and organised (DeGeorges & Reilly, 2009).

Regarding the exclusion of local communities in resource conservation, mainly in developing countries, conservationists began integrating local people through economic development projects around protected areas (Bluwstein, 2017). Biosphere reserves were the first to employ indirectly linked approaches of conservation and livelihood (UNESCO, 2016). In biosphere reserves, spatial zones were defined and local people were permitted to use conservation resources based on specified zones. A core zone was designated where local community consumptive use of resources was prohibited. Buffer zones were then formulated to allow use within limits that ensure the protection of the core zone (Bluwstein, 2017). The main attribute of the buffer zone strategies was that it enabled local communities to meet their livelihood needs, while at the same time protecting species and habitats (Salafsky, 2011). This enables local communities to develop other livelihood activities, hence minimizing dependence on natural biodiversity. Yet, alternative livelihood options have also been difficult as the motive has not been linked with changing conservation behaviours, and hence local communities have continued using prohibited resources in the core areas, resulting in an unsustainable harvesting of conserved resources, and the attendant conflicts (Keane et al., 2019; Kideghesho, 2016; Kiss, 2004).

From the 1990s conservationists introduced a new approach—community-based conservation—with the assumption that local community needs will be met, and thus improve conservation. The main objective was to have a direct linkage of subsistence resources and natural biodiversity (Adams & Hutton, 2007). Through this approach, local communities thought they would get opportunities to benefit from biodiversity and thus improve their livelihoods as they highly depended on services from nearby natural resource areas to meet their needs of such items as fodder, firewood and bushmeat for their livelihoods, and even for the sale of such products (Measham & Lumbasi, 2013; Timko et al., 2010). However, this ideal led to antagonisms because this perception by local communities on the use of natural resources was eternally contrary to that of the state and external groups. The resultant conflicts between the demands created by livelihood activities and conservation objectives have been the centre of discussion for several years (Salafsky, 2011; Roe & Elliot, 2006).

The United Republic of Tanzania (URT) has further decentralised wildlife management through the introduction of wildlife management areas (WMAs), which are defined as new categories of protected areas for community-based

wildlife management (URT, 2011). A WMA is an area of communal land set aside for conservation of wildlife and recreational activities involving wildlife. According to Bluwstein et al. (2016), WMAs are a form of common property regimes (CPR), whereby communities are expected to sustainably manage and benefit from wildlife resources. Currently, Tanzania has 38 WMAs at different stages of development (Kiwango et al., 2015); the Makao WMA being one of such areas. Launched in 2007 and gazetted in 2009 (URT, 2012), it is of high conservation importance to Tanzanian protected areas as it acts as a wildlife corridor between the Maswa Game Reserve, Ngorongoro Conservation Area, and the Serengeti National Park (URT, 2012). Makao is considered as a fast-growing WMA, and generates substantial revenues attributed to its location. However, information on local access to wildlife resources in the WMA is conversely lacking.

It is imperative to determine how the creation of WMAs is affecting local peoples' access to subsistence resources. This paper examines the extent to which communities adjacent to protected areas access subsistence resources in the Makao WMA, explicitly by answering the following questions: (i) What are the local community livelihood strategies in the Makao WMA? (ii) How does the local community access subsistence resources in the WMA?

1.1 Theorizing Conservation and Community Livelihoods

This paper adopted the social exchange theory, which explains stability and social change as a method of discussing exchanges among different groups (Mutanga et al., 2015). This theory explains exchange of activities between parties that can be rewarding or costly during participation (Mogomotsi, 2019). This means people prefer options from which they expect most earnings than those with fewer earnings (Mutanga et al., 2015). When the costs are equal for different options, people will select options with the maximum rewards; and when rewards are equal (Cook et al., 2013), they will select alternatives with little costs (Mogomotsi, 2019). The assumptions of the social exchange theory are built on human nature and the nature of relationships existing between parties, that: (i) people try to find rewards and avoid penalties; (ii) humans are coherent individuals; (iii) the way humans evaluate costs and benefits vary over time, and from one individual to another; (iv) relationships are interdependent; and (v) relational life is a process (ibid.).

The social exchange theory involves a subjective cost-benefit analysis made by individuals on whether to engage in an interaction compared to other alternatives (Cook et al., 2013). According to Mogomotsi (2019), the balance of relationship exchange is not always equal. The theory shows how an individual feels about a relationship with other species depending on the balance between what s/he puts into the relationship, and what s/he gets out; the chance of having a better relationship with one another; and the kind of relationship s/he

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deserves (Cook et al., 2013). This theory is in line with this study as communities bordering protected areas bear conservation costs such as the destruction of crops, killings, evictions, and are denied access to resources (Kideghesho, 2016).

It is estimated that about 1.6bn people in the world depend on natural resources for their livelihood support (Roe & Elliot, 2006). According to Kideghesho (2016) and Babulo et al. (2008), dependence on natural resources is higher in poor communities; and rises with increases in poverty levels. Factors that control the degree to which households depend on natural resources include wealth, household size, distance, infrastructure, and the level of education of the members of a household (Measham & Lumbasi, 2013; Makupa, 2013; Timko et al., 2010). Distance from a conservation area will mostly dictate whether a household depend almost fully on conservation resources for its needs. Makupa (2013) argued that poorer households depend totally on conservation resources due to limited access to alternative sources of income, while wealthier households mainly use conservation resources for large commercial activities (Wang, 2006).

The extent to which the levels of reliance on natural resources results in degradation is still contentious. According to the Convention on Biological Diversity (CBD) (2012), the land of local communities that rely on natural resources for their survival is increasingly being converted into protected areas in most developing countries. This is associated with costs that are in the form of displacement to pave way for conservation areas; prohibited access to land and natural resources; increased human-wildlife conflicts arising from crop damages, livestock losses, and threats to human life; injuries, fear, and sleepless nights while guarding crops from wildlife; conflicts that arise from PA law enforcement activities; and changes in land tenure (Kideghesho, 2016; Coad et al., 2008). According to West et al. (2006) the creation of protected areas restricts access by local communities to subsistence resources, which in turn limits community development opportunities in their area, and leads to increased poverty.

The establishment of WMAs have, in most cases, resulted to the denial and dispossession of local peoples' needs and opportunities that were essential for their survival and development (Kiwango et al., 2015; Kicheleri et al., 2018). This has resulted into exposing local communities to high risks of living; and some have become marginalized, homeless, food insecure, jobless, and have lost environmental services (Brockington et al., 2008). Adams and Hutton (2007) posit that depriving local communities of conservation services that support their livelihood systems has resulted into some communities practising anti-conservation actions like poaching and encroachment. While WMAs have been embraced as the most ideal way of protecting natural resources in many parts

of the world, their establishment in Tanzania have taken little considerations of their impacts on community access to subsistence resources (Kajembe et al., 2016; Kicheleri, 2018; Makupa, 2015; Nelson, 2012).

2. Context and Methods

This study employed a case study research design to collect and analyse data to gain a deeper understanding of the situation in the Makao WMA. Creswell (2013) defines a case study as an empirical inquiry that investigates a contemporary phenomenon in depth, and within its real-life context. It also employed a mixed method research approach, a form of research in which the researcher converges or merges quantitative and qualitative data to provide a comprehensive analysis of a research problem (ibid.).

The study was conducted at the Makao WMA in Meatu district, Simiyu region, Tanzania. The Meatu district was purposively chosen because the Makao WMA is found there. The Makao WMA covers an area of 780km², and is composed of seven villages (Sapa, Mbushi, Iramba ndogo, Mangudo, Jinamo, Mwabagimu and Makao) in the south-western Serengeti ecosystem. The WMA covers four wards: Mwangundo, Kimali, Mwanjolo and Bukundi. Only three out of the seven villages were selected for this study, namely: Jinamo, Mwabagimu and Makao. The villages were selected purposively because of their richness in wildlife and the potentiality of human-wildlife conflicts. The Makao WMA was selected because it is the representative of WMAs in Tanzania that are rapidly growing. The WMA has been in operation for about nine years since it was officially registered as a community-based organization (CBO), known as '*Jumuhiya ya Wanyamapori ya Makao*' (JUHIWAPOMA) in 2009. The area is used as a dispersal zone by migrating ungulates between December to May each year. The area is also an important ecological link between the Maswa Game Reserve and the Serengeti National Park.

Employing simple random sampling, the study came up with a sample size of 281 heads of households, where each unit of the population had a known, equal, non-zero probability of being included in the sample (McNabb, 2002). A random number generator was used to generate random numbers of households to be surveyed in each study village. Heads of households were surveyed at each selected household at an agreed time and date. Data were analysed using the SPSS, version 21. To ensure uniformity in data entry, a frequency run was carried out for all variables to verify any values that may have been entered incorrectly.

3. Results and Discussion

3.1 Local Community Livelihood Strategies in the Makao WMA

The results in Table 1 indicate that 43.4% of all the respondents reported that crop cultivation is one of the main economic activities practiced in the study area. Jinamo village were leading in agricultural production as 51.62% reported

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engaging in agriculture. Communities practicing crop farming had the opinion that land for cultivation has considerably been reduced after the introduction of the WMA. It was revealed that villages owned small pieces of land after large chunks of their land were taken to satisfy the requirements for wildlife conservation. Most of the crops grown in area were maize, sorghum, sunflower and millet. These crops were sold to neighbouring villages, towns and visitors.

Table 1: Local Livelihood Strategies in the Makao WMA

Income Generating Activities	Frequency of Respondents			Total (N=281)
	<i>Makao</i> (n=95)	<i>Jinamo</i> (n=91)	<i>Mwabagimu</i> (n=95)	
Crop cultivation	43 (45.3%)	47 (51.6%)	32 (33.6%)	122(43.4%)
Livestock keeping	45 (47.4%)	30 (32.9%)	53 (55.7%)	128(45.5%)
Handcrafts for sale	1 (1.1%)	2 (2.2%)	1 (1.1%)	4 (1.4%)
Wage employment	3 (3.2%)	9 (9.9%)	6 (6.3%)	18 (6.4%)
Tour guide	2 (2.1%)	2 (2.2%)	2 (2.1%)	6 (2.1%)
Other	1 (1.1%)	1 (1.1%)	1 (1.1%)	3 (1.1%)

Further resultss show that maize was identified as the main produce in the study area; especially in Makao, followed by Jinamo village. Most of the community members sustained their livelihoods by selling farm produce. This reduced the burden on wildlife, and was used as an alternative in improving their socio-economic conditions. Mariki (2015) found out that agriculture is an alternative means of improving livelihoods in protected areas. Despite local community practicing agriculture as the alternative means of livelihood, crop damage was evident with no compensation. Although it is claimed the cost of crop damage is indirectly compensated through development projects, yet the local community believes that people are not fairly compensated. As farming is increasing in close vicinities to protected areas, the risk of crop raiding by elephants also increases (Makupa, 2013).

Approximately 45.5% of all respondents identified keeping livestock as an activity practiced in the study area, with the highest percentage (47.4%) being reported in Makao village, followed by Jinamo village (32.9%). Similarly, the establishment of the Makao WMA has impacted livestock keeping as local communities are denied access to grazing land. This is similar to what Mariki (2015) reported: that local communities in the Wami Mbiki WMA lost about 50% of their grazing land to the WMA, which has escalated and exacerbated conflicts between local communities and WMA authorities.

Results further indicate that 6.4% of the respondents had secured employment in the WMA. Initially, the local communities had perceived that the Makao WMA had brought substantial direct employment. This was because most of the

community members were employed in tourism-related activities, while others were employed as village game scouts (VGS) before the establishment of the WMA, and thus expected employment opportunities to increase with the institution of the Makao WMA. However, this was not the case as only a few individuals secured employment from the investors of the WMA. It was reported that most employment opportunities were taken by people from outside the area. This is similar to results by Makupa (2013): that the few individuals who secured jobs were the only members of the community who perceived direct benefits from wildlife conservation. The local community complained about investors employing only a few people from the study area; and alleged that it is elites from outside their area who pocket local opportunities.

3.2 Subsistence Resources Governance in the Makao WMA

The Makao WMA is managed by a CBO known as '*Jumuhiya ya Wanyamapori ya Makao*' on behalf of the local communities with support from NGOs and government agencies. The Makao WMA hosts prestigious livelihoods support systems that include wildlife, tourism, land for agriculture, land for livestock grazing, land for settlements, firewood, wood for charcoal production, building poles, and fodder. The CBO, through government instruments, have instituted rules that guide how, where, who and by what means a particular resource can be utilized.

The results of this study show that the great challenges that result into resource-use conflicts in wildlife management areas is centred on the local communities' access to livelihood resources. The rights of local people to access WMA resources are clearly defined in the Wildlife Conservation Act No. 12 of 1974 which, however, has not specifically elaborated the community rights to use and access resources in protected areas. The subsequent Wildlife Conservation Act No. 5 of 2009 (URT, 2011) also lacks provisions on communities' rights to wildlife resources, except for traditional communities (Section 45) (URT, 2012). Section 31 (6) of the Wildlife Conservation Act No. 5 of 2009, and the WMA Regulations 55, 56 and 57 of 2012, show that the utilisation of forest products, bee and fish resources should be in accordance with their respective Acts, the WMA General Management or Resource Zone Management Plans, and other relevant laws and regulations (URT, 2012). As a result, such basic rights as access to wildlife protein and other resources—e.g., non-timber forest products and grazing—have been either ambiguous or completely reduced (Kicheleri et al., 2018).

Further, the Wildlife Policy of Tanzania of 1998 that established WMAs (as revised in 2007), states that wildlife -- including that which is on village lands -- is a property of the state (URT, 2007). Even after perceived decentralization, the Authorised Association (AA) retains the power to manage WMAs, preventing local people from managing and exploiting wildlife on their land.

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Bluwstein et al. (2016) condemns this act by citing actions like denying locals access to water, building materials and fodder in areas they perceived as theirs, which he predicts as a source of even more conflicts in the future.

3.3 Access to Land for Cultivation

Results in Figure 1 indicate that 85.4% of the respondents reported limited access to land for cultivation. Whilst 89.5% and 84.3% of the respondents in Mwabagimu and Makao villages, respectively, reported having insufficient land for cultivation; only 82.5% of the respondents in Jinamo village reported as such. The study results shows that only 14.6% of all respondents reported to have access to land for cultivation in the study area. This implies that the local communities are restricted access to land for agriculture, hence limiting their livelihood options. The results show that about 50% of the Makao village land has been converted to a WMA land, implying that the local people continue to lose their land for conservation. This is similar to what Noe (2019) found out: that in the north, the Mungata CWMA took about 97% of total village land despite the fact that over 89% of the villagers still depend on farming as their main livelihood activity; hence rendering conservation income insignificant to the daily household needs. In the same vein, Kicheleri (2018) argues that local communities have set aside land for wildlife conservation, foregoing settlement and agriculture, and in return are not granted rights to extract substantial income from the wildlife.

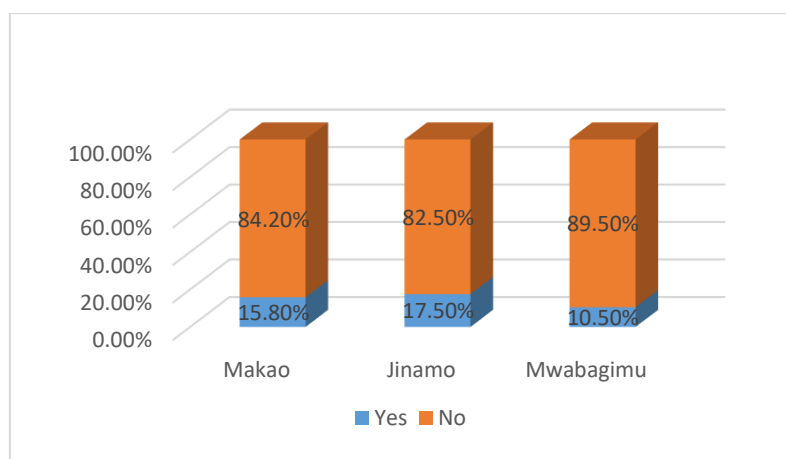


Figure 1: Community Access to Land for Cultivation

3.4 Access to Land for Settlements

The results in Table 2 indicates that 81.9% of all respondents reported to have no access to land for settlements. Mwabagimu village had the highest responses (91.6%) of not having access to land for settlement. During field visits

to Jinamo and Mwabagimu villages, it was observed that the WMA had been encroached upon by temporary houses built in it. The households that had encroached the WMA claimed that they could not understand WMA boundaries. The local community members, particularly those who live adjacent to the WMA boundaries, complained that some of the installed beacons were too small to be visible, especially during the wet season when tall grasses grow. As a result, they found themselves crossing the borders and grazing in the WMA without being aware of it. One household head said: “*Can you show us the boundary? Why do boundaries keep shifting every time? This is our land, and we will continue to be here.*” During the physical visits, we found that boundaries were not visible in some areas, which can exacerbate the encroachment of the WMA.

Table 2: Community Access to Land for Settlements

Access to Settlements	Frequency of Respondents			Total (n= 281)
	<i>Makao</i> (n= 95)	<i>Jinamo</i> (n= 91)	<i>Mwabagimu</i> (n= 95)	
NO	67 (70.6%)	76 (83.5%)	87 (91.6%)	230 (81.9%)
YES	28 (29.4%)	15 (16.4%)	8 (8.4%)	51 (18.1%)

During interviews, WMA officials admitted that in some areas boundaries and demarcations are not visible; and that this encouraged encroachment. “*WMA boundaries are inspected several times; in some areas the demarcations have been removed or hidden*” (Interview with the WMA Secretary, 2020). This suggests that, to ensure the protection and safety of the Makao WMA, there is a need for the WMA management to raise awareness about the boundaries, and ensure that visible markers or beacons are mounted to avoid encroachment and the ensuing conflicts with community members, especially livestock keepers in the study area. Noe (2019) argues that change in wildlife borders limits the possibility of local communities gaining from their participation in conservation, which is the basic motive for releasing village lands for wildlife.

Moreover, another factor that worsened conflicts over land was that, even areas that had been officially allocated as land for farming and/or settlements had been encroachment by pastoralists for grazing, contrary to village land-use plans.

3.5 Access to Grazing Land

The results in Table 3 indicate that 73.3% of all the respondents reported to have no access to grazing land. The local community in Mwabagimu village was the one reporting the highest (89.5%) insufficient grazing land, followed by Jinamo village (67.1%). Mwabagimu village is termed as a pastoralist village, so most households own large numbers of livestock; hence their majority complains over limited areas for grazing.

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Table 3: Community Access to Grazing Land

Access to Grazing	Frequency of Respondents			Total (n= 281)
	Makao (n= 95)	Jinamo (n= 91)	Mwabagimu (n= 95)	
NO	60 (63.2%)	71 (67.1%)	85 (89.5%)	206 (73.3%)
YES	35 (36.8%)	30 (32.9%)	10 (10.5%)	75 (26.7%)

Despite laws prohibiting grazing in the protected areas, some animals were seen inside the WMA area in Jinamo and Mwabagimu villages. Local community found grazing in investors' lands reported being harassed by the investor's guards:

Investors' guards (guards hired by private investors) humiliate us compared to the VGS. They sometimes push our cows to the Maswa game reserve to be fined. However, we are not afraid: this is our land (Interview with a village resident, 2020).

This indicates that there was a bad blood between pastoralist and investors.

It was also noted that some village members in Jinamo and Mwabagimu bribed VGS to be allowed to graze in the WMA. Songorwa (1999) reported similar findings in the Nazinga Wildlife Utilization Project in Burkina Faso; while Infield and Namara (2001) reported that, in Uganda, rangers demanded bribes in exchange of allowing illegal grazing and poaching in conservation areas. These results are further supported by Measham and Lumbasi (2013), and Nelson (2012), who found that rangers were accepting bribes in exchange of allowing local community to graze in the Ikorongo Game Reserve. Also insufficient and invisible beacons installed to mark the Makao WMA boundaries contributed to livestock grazing in the WMA.

In 2017 the government conducted an operation that evicted all pastoralists who were grazing inside the WMA and Maswa Game Reserve. The operation started on 4th August, 2017, but was associated with the brutalization of the local community *"We were chased away from our land without our consent and we were humiliated, our cows confiscated"* (Interview with the village resident, 2020). In this operation, about 2,000 cows were caught and held by the WMA officials for confiscation (following directives from the Ministry and District officials). Astonishingly, about 2,000 cows confiscated during the operation died in the hands of the Makao CBO. Some pastoralist refused to pay fines, others ran away, while the majority took the case to the court. The cases have consumed a lot of resources from local the community and the CBO. *"We used AA money to hire the moving court from Bariadi to Makao, which was very expensive to our CBO"* (Interview with AA Accountant, 2020). Some residences complained of selling their belongings to pay for travel expenses to attend cases *"I travel several times (regularly) to Bariadi to attend the court, I even sold my cows. Who is going to pay my money?"* (Interview with a village resident, 2020). It is not yet known what amount of money the WMA will be required to pay as compensation, should the court rule in favour of the afflicted.

Results indicate that 73.3% of the respondents reported to have no access to grazing land. They also show that the increasing number of livestock pose challenges in the study villages, including that of the shortage of grazing and farm lands. Therefore, land allocated for conservation is encroached for grazing, contrary to the village land-use plans. While the study indicates a decrease of the animal grazed in the WMA, about 2000 livestock were found grazing in the WMA in 2017/2018. In addition, results shows that in 2020 about 12 groups of livestock herds were found in the Makao WMA (Makao Financial Report, 2020). This indicates an increase in the demand for grazing land in the study area, which creates threats to wildlife conservation.

The areas around the WMA are increasingly becoming important to livestock keepers because they contain grazing reserves, despite the restrictions. This is why a majority pastoralists wished to graze in the WMA due to its vast feed for their animals. Although livestock keepers seemed to be left behind, especially in wildlife conservation activities, the communities and some NGOs recognize the importance of livestock grazing for wildlife conservation because livestock keeping allows local communities to have an alternative source of protein, which helps abate illegal hunting. Studies by Loibooki et al. (2002), Makupa (2013) and Sulle (2008) have reported similar observations: that limited alternative sources of protein is one of the reasons for bushmeat hunting by communities.

3.6 Access to Bushmeat

The results in Table 4 indicate that 97.5% of the respondent from all the study villages reported being unable to access bushmeat from the WMA. Only 2.5% of the respondents had access to bushmeat, the highest response (5.2%) being reported in Makao village. The results of this study revealed that some VGS involve themselves in illegal hunting. It was further noted that sometimes poaching in the WMA is secretly organized between some local community members and unfaithful VGSs. For example, some of these scouts were caught in Makao village with the bushmeat of an unidentified animal. This indicate that local community members have not acquired conservation behaviours, and that there is high demand for bushmeat in the study area. Restrictions for wildlife hunting are not a new phenomenon in WMAs. The Wildlife Act of 1974, and its amendment in 2002, barred wildlife hunting without permits from wildlife authorities, regardless of where it occurs (URT, 2012).

Table 4: Community Access To Bushmeat

Access to Bushmeat	Frequency of Respondents			Total (n= 281)
	Makao (n= 95)	Jinamo (n= 91)	Mwabagimu (n= 95)	
NO	90 (94.8%)	89 (97.8%)	95 (100%)	274 (97.5%)
YES	5 (5.2%)	2 (2.2%)	NA	13 (2.5%)

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The study results indicate that respondents do not consider access to bushmeat as important. This could be due to the fact that the local community has co-existed with wildlife for millennia. Most of the local communities around the Makao WMA have no consumptive use to wildlife game because they do not take bushmeat. However, it was noted that due to insufficient household income, some community members have now resorted to illegal hunting to meet their protein needs. This corroborates the argument by Meashamn and Lumbasi (2013): that insufficient household income forces communities to pursue off-farm activities such as illegal hunting and charcoal burning to add to household incomes and provide food, such as bushmeat, to household members, thus posing a threat to wildlife resources.

3.7 Access to Construction Poles and Firewood

Results in Table 5 indicates that 95.4% of all respondents reported to have no access to construction poles. This prohibition and limited access to construction poles are in line with WMA regulations: that tree-felling is prohibited in WMA areas. Despite this prohibition, some local community members still reported collecting poles illegally from the WMA. Local community had changed tactics in collecting poles from WMA restricted area: *“We go at night and collect poles in small quantities, over a period of time, until our demands are fulfilled”* (Interview with a village resident, 2020).

Table 5: Community Access to Construction Poles

Access to Poles	Frequency of Respondents			Total (n= 281)
	Makao (n= 95)	Jinamo (n= 91)	Mwabagimu (n= 95)	
NO	91 (95.8%)	87 (95.6%)	90 (94.8%)	268 (95.4%)
YES	4 (36.8%)	4 (32.9%)	5 (10.5%)	13 (4.6%)

According to the WMA regulation, tree-felling is prohibited in WMA areas. The WMA regulation states:

... any person who fells trees in a WMA commits an offence and is liable on conviction to a fine not exceeding one million Tanzanian shillings or to imprisonment for a term not less than six months and not exceeding one year or both such fine and imprisonment (URT, 2012, Section 54 (4)).

This provision in the WMA regulation further jeopardize local access to resources, contrary to the needs of surrounding areas.

Also, the study results in Table 6 show that 86.1% of the respondents had no access to firewood. The results further show that firewood is the main source of energy in the study villages. As such most households complained of being forced to use other expensive forms of energy: *“Access to firewood is essential to our life, we cannot afford to use other forms of energy”* (Interview with a village resident, 2020).

Table 6: Community Access to firewood

Access to Firewood	Frequency of Respondents			Total (n= 281)
	Makao (n= 95)	Jinamo (n= 91)	Mwabagimu (n= 95)	
NO	80 (84.3%)	75 (82.5%)	87 (91.5%)	242 (86.1%)
YES	15 (15.7%)	16 (17.5%)	8 (8.5%)	39 (13.9%)

Firewood collection is permitted in corridor-use and general-use zones through a permit issued by the CBO in charge of the WMA. One village leader from Jinamo village could not understand if local community should access permit to access dry firewood: *“Those talks (of community getting permission) are not clear to me; we were informed that no local is allowed to collect firewood in the WMA.”* Further results show that no local had ever applied for such a permit from the CBO. This indicates either a low understanding of the WMA rules and regulations, or the people are blatantly ignoring them.

According Measham and Lumbasi (2013), most rural people in developing countries depend on natural resources such as fodder, firewood, bushmeat and poles for their livelihoods. Firewood is the main source of energy in rural areas; and equally so in the studied villages. A study by Mongo (2007) had similar results: that 92% of households in three districts (Moshi Rural, Hai and Rombo), adjacent to the Kilimanjaro National Park, depend on firewood as their main source of energy. Firewood and charcoal are extensively used in rural Tanzania due to the lack of alternative sources of energy. Denying local communities access to these sources of energy is tantamount to forcing them to use alternative energy, which is expensive to afford by the rural poor. Electricity is considered to be alternative source of energy in the study area, but most areas do not have access to electricity, even if they could afford it. Because of this, they will always look for means to access fuelwood for survival: whether legally or illegally.

Consequently, the price of firewood has increased tremendously because the sellers (poor men and women) collect firewood in harsh (illegal) conditions. The lack of the availability of these products has increased the time spent and labour required for individuals seeking such resources. For example, local community members claimed to use about seven hours per day searching for firewood. Similar results have been reported in Nepal, where women walk over 20km per journey searching for firewood (Mahat, 2006). As noted, denying households access to wildlife resources from areas in which they used to get them for free, leaves them with no alternatives but to engage in squatting, encroachment and poaching to stay alive. Furthermore, restricting access to resources such as firewood without the provision of affordable alternative sources of energy has been reported to be problematic (Vedeld et al., 2007): wood-fuel provides about 70% of the energy consumed in Africa (Coad et al., 2008).

4. Conclusion and Recommendation

The study concludes that local community members are generally supportive of the concept of wildlife conservation, but as has been revealed in the establishment of the Makao WMA, these have led to restricted access by local communities to subsistence resources, which has created resource-use conflicts in wildlife management areas. Therefore, this study recommends the conducting of local community capacity-building programs that will enable local advocacy for sustainable wildlife conservation; and access to natural resources in conserved areas to ensure improved local livelihoods and also the sustainability of WMAs. Equally, there is need for new policies on the environment, development and adaptation that consider the differentiated needs of resource users. Therefore, new knowledge is needed on how WMAs influence strategies of access to natural resources as local communities adapt to increased variabilities and uncertainties.

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