Scientific Research Publishing

Open Journal of Ecology, 2023, 13, 606-620
https://www.scirp.org/journal/oje
ISSN Online: 2162-1993
ISSN Print: 2162-1985

Community Perceptions and Socio-Demographic Influence on Trophy Hunting in Rungwa Game Reserve, Tanzania

Fenrick F. Msigwa[1,2*], Felister M. Mombo[1], Peadar Brehony[3], Michael H. Kimaro[2,4]

[1]Department of Forest and Environmental Economics, Sokoine University of Agriculture, Morogoro, Tanzania
[2]Tanzania Research and Conservation Organization, Morogoro, Tanzania
[3]Department of Zoology, University of Oxford, Oxford, UK
[4]GELIFES Institute, University of Groningen, Groningen, Netherlands
Email: *fenrickmsigwa12@gmail.com

How to cite this paper: Msigwa, F.F., Mombo, F.M., Brehony, P. and Kimaro, M.H. (2023) Community Perceptions and Socio-Demographic Influence on Trophy Hunting in Rungwa Game Reserve, Tanzania. *Open Journal of Ecology*, **13**, 606-620.
https://doi.org/10.4236/oje.2023.139037

Received: July 31, 2023
Accepted: September 15, 2023
Published: September 18, 2023

Abstract

The trophy hunting industry in Tanzania plays a significant role in wildlife conservation as well as economic and community development. Trophy hunting has been conducted in Rungwa Game Reserve (RGR) for several decades; however, the trophy hunting opinions from the local communities living adjacent to the reserve are not well documented. This study aimed to assess the awareness and attitudes of local communities living adjacent to Rungwa Game Reserves toward trophy hunting. Furthermore, the study assessed factors that influenced the opinions of participants by using structural equation modeling. We used semi-structured interviews and key informant interviews in the three villages adjacent to RGR. The local communities are aware of existing hunting operations around the game reserves. The study found positive attitudes among local communities toward trophy hunting, only if local people accrue benefits from hunting operations. The community's attitudes towards trophy hunting varied across household size and occupation. Education and household position had an indirect influence on the community's attitude. Our findings suggest that socio-demographic variables are important to consider when assessing awareness and attitudes toward trophy hunting. Local communities are willing to support trophy hunting operations if the benefits obtained from hunting are significant and it can improve wildlife conservation and their livelihood. In conclusion, trophy hunting is important to local communities living adjacent to protected areas, and banning them may have a significant impact on their livelihood and wildlife conservation. Therefore, it is recommended that conservation policies and interventions consider the dual significance of trophy hunting, fostering strategies that balance socio-economic benefits for communities and wildlife conservation.

Keywords

Trophy Hunting, Rungwa Game Reserve, Community Awareness, Trophy Hunting Attitude, Socio-Demographic Variables

1. Introduction

In many parts of the world, sustainable utilization of wildlife resources including trophy hunting has been used as a means of conserving biodiversity and promoting community livelihoods [1] [2]. Trophy hunting, as a subset of sustainable utilization, can be considered sustainable when it involves hunting wild animal with specific desired characteristics under guiding regulations which include considerations of the population size, as well as the age and sex of the individual [3] [4] [5]. Many countries across the globe have designated large areas for conservation through trophy hunting. In southern African countries alone, nearly 1,394,000 km^2 of the area is reserved for trophy hunting [6].

Trophy hunting elicits contentious debates, with some arguing for the potential of trophy hunting in biodiversity conservation, and others arguing that it cannot be a sustainable form of conservation [5] [7] [8] [9] [10]. The diverse perspectives on trophy hunting have resulted in various national governments debating bans on trophy imports into their countries, and some airlines banning the transportation of trophies from countries conducting trophy hunting [11] [12] [13].

Some studies have pointed out that the people who live in areas adjacent to protected areas consider trophy hunting as an effective conservation tool to protect wildlife and improve livelihood [6] [14]. Research suggests that well-managed trophy hunting can contribute significantly to community development projects, the national economy, and conservation through the revenue generated [2] [15] [16]. Moreover, well-managed trophy hunting can have a positive impact in areas where the potential for conducting eco-tourism is limited [6] [17]. Equitable benefit sharing of revenue generated from trophy hunting can play a significant role in changing communities' perspectives toward wildlife [18] [19]. Meanwhile, those who oppose trophy hunting suggest that it can result in species population decline and animal welfare issues [9] [20] [21]. Other scholars regard trophy hunting as an extension of colonialism [22].

Tanzania has different protected areas used for both consumptive and non-consumptive purposes, and in the case of hunting, Tanzania is considered one of the prime destinations for trophy hunting [23]. More than 70% of Tanzania's protected area coverage is managed by the Tanzania Wildlife Authority (TAWA) for trophy hunting [24]. Trophy hunting in Tanzania is conducted in game reserves (GR), game-controlled areas (GCA), wildlife management areas (WMA), and village land [25]. The Rungwa Game Reserve, where this study was conducted, is a trophy hunting reserve.

The purpose of this research is to find out how much the local community knows about trophy hunting, what their attitudes are toward trophy hunting,

and what socio-demographic factors influence their awareness and attitudes toward trophy hunting. This study is crucial as it explores how the local communities living with wildlife perceive their wildlife and it evaluates their understanding and acceptance of trophy hunting.

2. Conceptual Frame Work

In Figure 1, the conceptual framework illustrates the anticipated connections between demographic factors influencing awareness and attitudes toward trophy hunting among local communities living adjacent to Rungwa Game Reserve. The arrows represent the pathways between variables, with awareness and attitudes ultimately leading to changes in conservation behaviour related to trophy hunting perspectives.

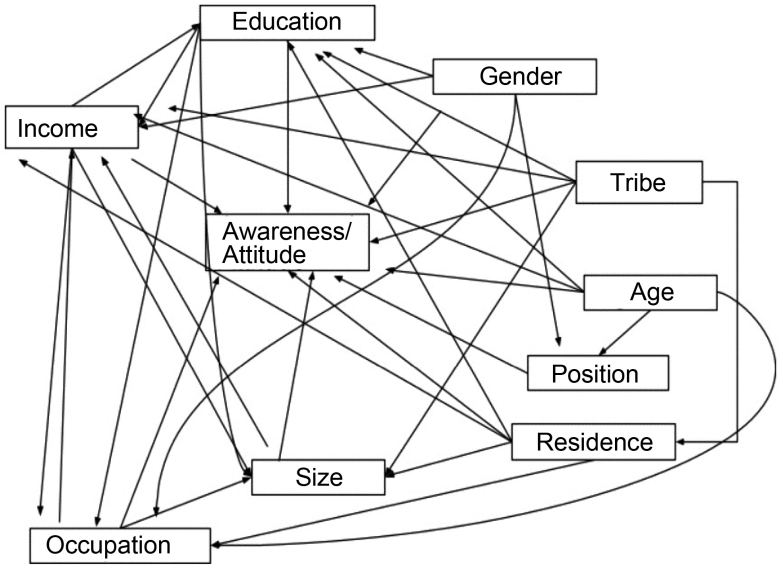

Figure 1. Conceptual model and structural equation modelling (SEM) path specifications.

3. Study Area and Methods

3.1. Study Area

This research was conducted in the Ruaha-Rungwa ecosystem located in central Tanzania, ranging from 5.6˚S to 9.0˚S, and from 33.3˚E to 36.0˚E (Figure 2). The research was carried out in villages adjacent to Rungwa Game Reserve (RGR) which is part of the Rungwa-Kisigo-Mhesi game reserves complex comprising a total of 17,320 km^2 [26]. The Rungwa Game Reserve is composed of a total of 12 hunting blocks linked together to form Rungwa Mpera, Rungwa Ikili, Rungwa Mwamagembe, Rungwa Inyonga, Rungwa West, and Rungwa East. Some blocks extend into the village land and some are located inside the game reserve [26]. The Rungwa Game Reserve is bordered by seven villages in the western part.

The study area falls in the semi-arid and arid zones of central Tanzania, both of these zones are characterized by dry seasons and unreliable rainfall [27]. The

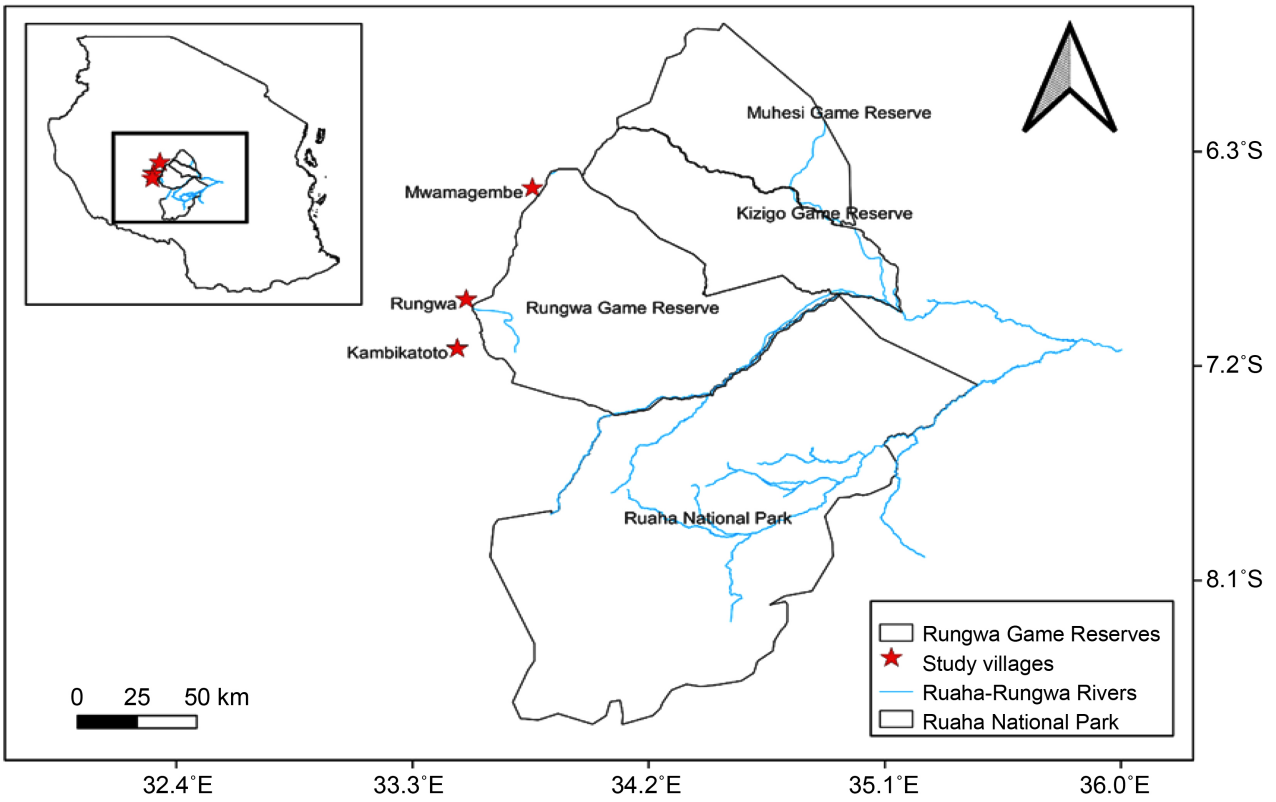

Figure 2. Map showing study villages where interviews were conducted around Rungwa game reserve.

mean annual rainfall ranges from 500 mm to 700 mm and the temperature ranges from 15 to 35 degrees Celsius [27]. People living adjacent to Rungwa Game Reserve are mainly agro-pastoralists engaging in crop and livestock farming, and beekeeping as their main economic activities [28]. Species hunted as part of a quota system in Rungwa Game Reserve include lions (*Panthera leo*), buffalo (*Syncerus caffer*), leopard (*Panthera pardus*), sable (*Hippotragus niger*), roan (*Hippotragus equinus*), eland (*Taurotragus oryx*) and greater kudu (*Tragelaphus strepsiceros*) [26]. Trophy hunting operations run from June to November each year.

3.2. Study Design and Data Collection

The study randomly selected three villages as a sampling unit which were Mwamagembe, Rungwa, and Kambikatoto. Semi-structured questionnaires were administered to 120 randomly selected households, and 30 selected key informants from the village natural resource committee, game trackers, game officers, village leaders, and hunting companies' employees.

This study adopted methods from Angula [18] to study the awareness and attitudes of local communities toward trophy hunting. Our survey tool included an introduction that explained the intent of our study topic, how the data provided by the respondent would be used, and how the respondent's identity would be protected. Respondents were requested to participate in the survey, and the choice of participating was solely their decision. If respondents agreed,

an in-person interview comprising both closed and open-ended questions was conducted.

Data collection was conducted in November 2021 and February 2022. During this period the hunting season was closed and most of the household members working in hunting companies were at home, thus it simplified our data collection process for some of the key informants. Heads of households were targeted for an interview and in situations where the head of the household was absent, we interviewed any household member who was 18 years and above. The household respondents were from different socio-economic backgrounds such as pastoralists, farmers, employees, and small business vendors. 77% of the respondents had primary education, and only 23% of the respondents had completed secondary education. The majority of the respondents (90%) had monthly incomes ranging from 30 USD to 150 USD. The questions for key informants were designed to provide qualitative data that would allow us to better comprehend the household survey data.

3.3. Data Analysis

All analyses were performed using R software [29]. We used the psych package in R to determine the correlating variable of community awareness, attitude, and demographic factors ($r < 0.7$). The variable scaled was normally distributed. Assessment of local community knowledge of trophy hunting was performed by using Chi-square tests for categorical variables, while the Structural Equation Model (SEM) was used to determine factors that influenced local community knowledge. Assessment of local community attitude was performed by using descriptive analysis, while to determine factors influencing local community attitude, the Structural Equation Model was employed.

4. Results

4.1. Awareness of the Local Community on Trophy Hunting Operations

Most of the local communities (92%, n = 110) living adjacent to the Rungwa Game Reserve were aware of the operations of trophy hunting in their surroundings ($\chi^2 = 70.56$, df = 1, $p < 0.001$). The structural Equation Model (SEM) revealed that household annual income had a direct strong influence on the local community's awareness, the awareness increased with an increase in annual income (SEM, z = 3.271, p = 0.001, **Table 1**, **Figure 3**). The study revealed that awareness of local communities in trophy hunting was indirectly influenced by gender through position head of household (SEM, z = 7.571, p = 0.000, **Table 1**), in which most of them were males (76%, n = 91, N = 120). Further, the study revealed that the education level of respondents strongly differed with years of residence, in which residents appeared to have a lower level of education than immigrants (SEM, z = −3.305, p = 0.001, **Table 1**), which eventually influenced their awareness of trophy hunting operations in their surroundings.

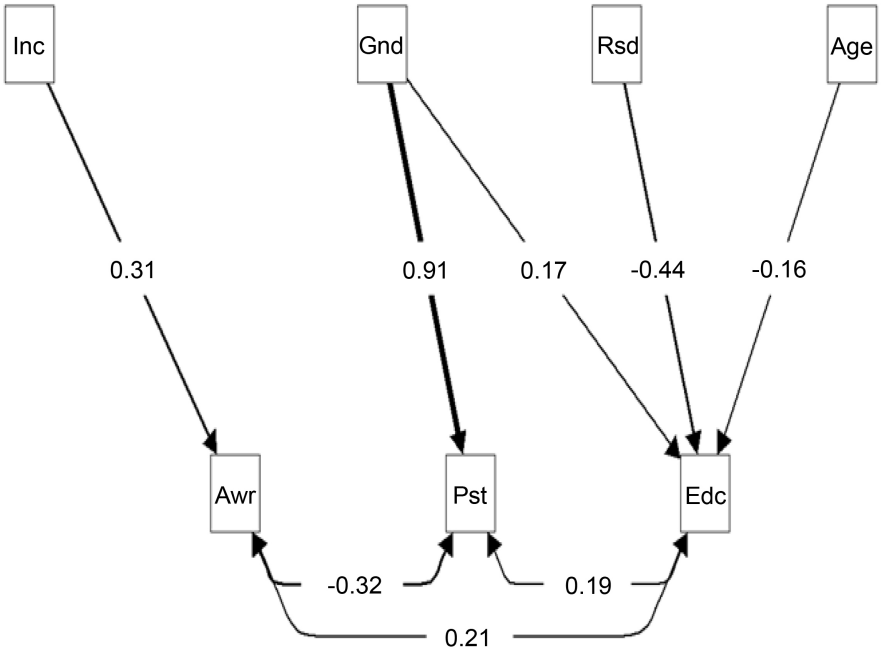

Figure 3. Structural equation model showing correlation coefficients with direction (arrowheads) and strength (correlation values) between the local community knowledge of trophy hunting and the most significant demographic factors. Data was collected through interviews in villages found adjacent to the Rungwa Game Reserve. Abbreviations are defined as follows; "Awr = Local community awareness", "Inc = Annual household income", "Gnd = Gender", "Rsd = Residence years", and "Pst = Household position".

Table 1. Coefficients generated from the final Structural Equation Model (SEM) showing the influence of demographic factors on local community awareness of trophy hunting operations in villages adjacent to Rungwa Game Reserve. SEM analysis was performed by using the lavaan package in R.

Response factor	Explanatory factor	Estimate	Standard Error	Z value	P value
Awareness	Income	0.313	0.096	3.271	0.001
Position	Gender	0.908	0.120	7.571	0.000
Education	Gender	0.172	0.113	1.516	0.130
	Residence	−0.441	0.133	−3.305	0.001
	Age	−0.158	0.143	−1.106	0.269

4.2. The Attitude of the Local Community towards Trophy Hunting

The attitude responses were scored on a 5-point Likert scale ranging from strongly disagree to strongly agree (Table 2). Generally, the attitude of local communities living adjacent to Rungwa Game Reserve towards trophy hunting had a positive mean score of 0.41 ± 0.4 SD, indicating that local communities were at a nearly neutral point of neither accepting nor denying trophy hunting operations in their surroundings. Here we present the results of each of the key questions

Table 2. The perceived mean score of local communities living adjacent to the Rungwa game reserve towards trophy hunting operations in their surroundings.

Statement	Measuring attitude statement	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)	Mean	Standard Deviation
1	"If you don't benefit from the land set aside for wildlife conservation e.g. (Trophy hunting), then you should get the land for other uses like agriculture"	55	28	6	5	3	−1.23	1.08
2	"It is good to set aside land for trophy hunting if it provides benefits to the communities around the protected area".	8	3	0	22	66	1.32	1.22
3	"Trophy hunting should be conducted in our surroundings".	8	0	0	43	49	1.24	1.09
4	"It is bad to conduct trophy hunting in our surroundings".	42	14	2	21	25	−0.35	1.67
5.	"It is important to set aside more land for trophy hunting in the village land".	2	12	0	39	45	1.06	1.17

that assessed attitudes towards trophy hunting.

***Statement* 1**: Local communities disagree with the fact that areas where hunting operations occur, should be transformed into other land use forms.

***Statement* 2**: Local communities agreed that setting aside land for trophy hunting is good, only if it generates benefits for the people.

***Statement* 3**: The communities agreed with the trophy hunting operations in their surroundings, commonly mentioning the benefits they receive from the game reserve and hunting companies. Most of them benefited indirectly and directly through mechanisms such as employment, building health services and centres, and building classrooms in villages.

***Statement* 4**: Local communities disagreed slightly with the statement that it is bad to conduct trophy hunting in their surroundings. This is supported by the key informants who were quoted mentioning various reasons such as "Trophy hunting should be conducted as it supports the improvement of social services in our surroundings", and "Trophy hunting helps to generate income to village communities as some of them get employed".

***Statement* 5**: Local communities disagreed that trophy hunting should be banned. Several key informants from Tanzanian government game officers, village natural resource committee members, village community leaders, and employees of hunting companies in particular were not happy with this statement.

These key informants believed that a trophy hunting ban would contribute to the escalation of wildlife crimes in the game reserves and village lands since trophy hunting companies support anti-poaching activities in their hunting blocks. For example, the key informant from the village natural resource committee mentioned that the village-owned hunting block known as Mwauki was encroached upon by migrants after hunting ceased in the block.

4.3. Factors Influencing Local Community Attitude

The structural Equation Model showed that household size and respondent occupation had a direct strong influence on the local community's attitude toward trophy hunting (Figure 4). The attitudinal score increased with an increase in household size (SEM, z = 3.982, p = 0.000, Figure 4, Table 3), while the attitudinal score (neutral = 0) was significantly lower to crop cultivators and pastoralists compared to beekeepers and business respondents (Agree = 1, SEM, z = −2.149, p = 0.032, Table 3). The study revealed that attitude of local communities indirectly influenced by gender through position head of household (SEM, z = 7.840, p = 0.000, Table 3), in which most of them were males (76%, n = 91, N = 120). Further, the study revealed that the education level of respondents strongly differed with years of residence, in which residents appeared to have a lower level of education than immigrants (SEM, z = −0.471, p = 0.000, Table 3), while age has a marginal effect on education (SEM, z = −1.677, p = 0.094, Table 3) which eventually both influenced their attitude toward trophy hunting operations in their surroundings.

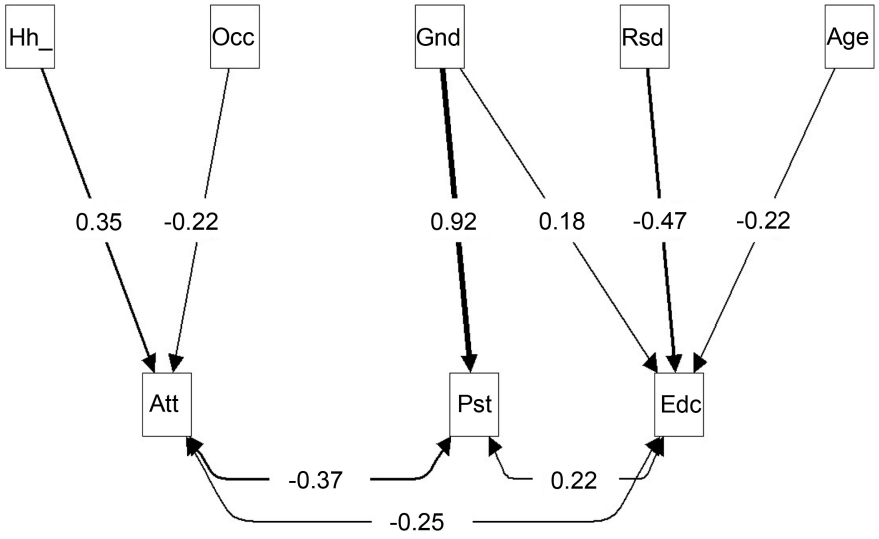

Figure 4. Structural equation model showing correlation coefficients with direction (arrowheads) and strength (correlation values) between the local community attitude toward trophy hunting and the most significant demographic factors. Data was collected through interviews in villages found adjacent to the Rungwa game reserve. Abbreviations are defined as follows; "Att = Local community attitude", "Pst = Household position", "Occ = Respondent occupation", "Hh_ = Respondent household size", "Rsd = Residence years", and "Edc = Respondent education level".

Table 3. Coefficients generated from the final Structural Equation Model (SEM) showing the influence of demographic factors on the local community attitude toward trophy hunting operations in villages adjacent to Rungwa Game Reserve. SEM analysis was performed by using the lavaan package in R.

Response factor	Explanatory factor	Estimate	Standard Error	Z value	P value
Attitude	Household size	0.352	0.088	3.982	0.000
	Occupation	−0.216	0.100	−2.149	0.032
Position	Gender	0.927	0.118	7.840	0.000
Education	Gender	0.182	0.116	1.567	0.117
	Residence	−0.471	0.128	−3.679	0.000
	Age	−0.222	0.133	−1.677	0.094

4.4. Discussion

More than 92% of interviewed people are aware of trophy hunting operations in their village lands. Local communities' knowledge appeared to be significantly influenced by income and years of residence. However, the household position had a marginal effect. In addition, local communities appeared to have a positive attitude toward trophy hunting, only if they gain benefits from hunting operations. Factors that appeared to influence the attitude of local communities were household size, occupation, and education.

Our study found income significantly influenced local communities' knowledge of trophy hunting. This finding is in line with other studies from Kilombero in Tanzania [3] and Kyrgyzstan [30]. It appeared household with less than 50 USD annual income had low awareness of trophy hunting compared to households with more than 50 USD annual income, which suggest that the involvement of poor families in trophy hunting operations is low and needs further improvement on the involvement of all communities, which might have an implication on the conservation sustainability of wildlife in their surroundings.

Our study revealed a significant influence on local communities' knowledge of trophy hunting in relation to years of residence. Immigrants appeared to have a great awareness of trophy hunting operations compared to residents. For comparison with findings from other studies, we found a scarcity of literature that linked knowledge of local communities with years of residence and trophy hunting. However, given the significant findings from this study, we suggest that this is a research topic that deserves greater attention.

This study found that communities' attitudes towards trophy hunting were largely influenced by the benefit shared by the trophy hunting operation. Inequitable distribution of benefits was highlighted as a key component that influenced people's attitudes as suggested by key informant interviews. Our findings were in line with other studies conducted in Kenya [31] and Namibia [18] which revealed that a community's attitude towards wildlife and trophy hunting is influenced by the impacts and benefits it brings to them. Communities disagreed

when it came to changing land used for trophy hunting, and they disagreed on the trophy hunting ban for a variety of reasons, including the benefits generated by trophy hunting, and the likelihood of increasing problems like encroachment from migrants. This result is similar to that obtained by other scholars from Namibia [18] and Zimbabwe [19].

Key informants from TAWA, hunting companies, and village leaders considered trophy hunting to be a benefit to communities as it provided employment opportunities, supporting community developments like building schools and improving people's livelihood. Similar findings were reported from other countries such as Namibia [18] and Zimbabwe [19]. Our results suggest that communities could have a negative attitude towards trophy hunting and wildlife conservation if wildlife does not generate tangible benefits. Therefore, for local communities living adjacent to hunting areas to support trophy hunting, the government and trophy hunting companies must continue to provide benefits to local communities.

When we assessed the influence of demographic variables on local community attitudes, we found that there was a significant variation among communities. The demographic factors that influenced the attitude of local people toward trophy hunting were household size, occupation, and education. Studies that assessed the impacts of socio-demographic factors on the local people's views towards conservation and other types of land use also support our results [32] [33] [34]. However, in studies conducted in Kilombero, Tanzania [3] and in China [35] household size and education variables were not significant.

Although trophy hunting may have its negative impacts like inequality, a sense of colonialism, and evidence of malpractices [36], we found that local people living adjacent Rungwa game reserve had a significant positive attitude toward trophy hunting and this could be due to the relationship that exists between the resident, the game reserve authorities, and operating hunting companies as it was noted during the key informant's interviews.

In our results, we found that respondents with primary education had less positive attitudes compared to those having secondary education as was noted from other studies that presented similar findings such as [3] [37] [38]. This could be because people with primary education have little involvement in socio-economic activities including being employed by the hunting companies, and if they get employed the jobs may not be as satisfactory as it is needed. A more positive attitude was observed in respondents with secondary education which could be due to direct or indirect benefits generated from trophy hunting to them. Furthermore, the key informant's interviews suggest that trophy hunting operations had direct benefits for people who went to secondary education and college level. Direct benefits noted during key informant's interviews include employment of those with relevant education backgrounds such as game trackers, chefs and guides. Based on the reported findings, we suggest that the benefit generated from trophy hunting should continue to support the education systems and infrastructures which could benefit the local people both directly

and indirectly benefits and in return could play a significant role in attitude changes to all groups of people towards trophy hunting and wildlife conservation in general.

We observed increases in positive attitudes toward trophy hunting as the number of people in the household increased. This could be due to the benefit provided by the trophy hunting operation benefit the large group of communities. As it was noted during the key informant's interviews, trophy hunting operation in village communities contributes to employment, building health centres, police stations, and schools. Furthermore, the key informants who were village leaders mentioned that the village authorities have a tendency to put clear revenue generated from trophy hunting during the village meetings. Such transparency influences communities to have a positive attitude toward trophy hunting. Nevertheless, other studies from other areas found transparency and accountability to local communities from hunting companies and state authorities affected by corruption [39].

The occupation had a strong influence on the attitude of the local people toward trophy hunting. Beekeepers and businessmen had strong positive attitudes toward trophy hunting. Similar patterns were observed in other studies conducted in Namibia [18] and Kyrgyzstan [40]. This could be due to the significant multiplier effect played by the trophy-hunting companies that are the source of a market for the goods and services. The crop cultivators and pastoralists had less positive attitudes toward trophy hunting which could be due to little benefits the trophy hunting operation plays to crop cultivators and pastoralists. From our findings, we suggest the consideration of occupancy during conservation benefit sharing to communities.

5. Conclusion

Results from this study revealed that overall, the awareness and attitudes of people living adjacent to Rungwa Game Reserve were generally positive towards trophy hunting. Specifically, People's level of income, household size, and length of household residence were observed to significantly influence knowledge of trophy hunting. Similarly, people's age, length of household residing in the area, occupation, and household size significantly influenced local community attitudes toward trophy hunting. Furthermore, our findings reveal that village communities were happy with trophy hunting operations and wildlife conservation when the conservation benefits are given to them. We further conclude that when trophy hunting benefits village communities it plays a great role in changing people's attitudes towards trophy hunting. Our findings support other research in Tanzania and other parts of the world which describes trophy hunting have meaningful to local communities and to conservation only if benefits are realized [30] [41] [42].

Acknowledgements

We would like to express our gratitude to Sokoine University of Agriculture, the

Tanzania Wildlife Research Institute (TAWIRI), the Tanzania Wildlife Authority (TAWA), and the Commission for Science and Technology (COSTECH) for granting us permission to conduct this research. Special thanks go to the field assistants, Mr. Abineri and Dickson, as well as to the entire communities that participated in the survey. We sincerely appreciate the assistance provided by Mr. Tarimo and Mr. Mdoe from TAWA for their logistical support and data collection during the field study in the Rungwa Game Reserve. This study was made possible through financial support from the MSc Scholarship received from the Wildlife Conservation Network (WCN), and we greatly appreciate the support from DASCOT Limited. Lastly, we would like to express our gratitude for the academic guidance provided by Dr. Greyson Nyamoga, the Head of Forest and Environmental Economics at Sokoine University of Agriculture.

Ethical Statement

We conducted this study based on 2019 research regulations and guidelines from the Sokoine University of Agriculture. We only interviewed participants that gave free and informed consent and made all attempts to ensure their anonymity and confidentiality throughout the research process, by using codes instead of names, and securely storing all software and hard copies (*i.e.*, notes). Participants could deny participation or withdraw from the study at any time, or choose not to answer any given question.

Declaration on Conflict of Interest

The authors declare no conflict of interest. There is no influence from the funder on the design of this study, data collection, analysis, interpretation, writing manuscript, and the decision to publish the results.

References

[1] Adhikari, L., Khan, B., Joshi, S., Ruijun, L., Ali, G., Shah, G.M., Ismail, M., Bano, K., Ali, R., Khan, G., Pasakhala, B. and Ali, A. (2021) Community-Based Trophy Hunting Programs Secure Biodiversity and Livelihoods: Learnings from Asia's High Mountain Communities and Landscapes. *Environmental Challenges*, **4**, Article ID: 100175. https://doi.org/10.1016/j.envc.2021.100175

[2] Brink, H., Smith, R.J., Skinner, K. and Leader-Williams, N. (2016) Sustainability and Long Term-Tenure: Lion Trophy Hunting in Tanzania. *PLOS ONE*, **11**, e0162610. https://doi.org/10.1371/journal.pone.0162610

[3] Jew, E. and Bonnington, C. (2011) Socio-Demographic Factors Influence the Attitudes of Residents towards Trophy Hunting Activities in the Kilombero Valley, Tanzania. *African Journal of Ecology*, **49**, 277-285. https://doi.org/10.1111/j.1365-2028.2011.01260.x

[4] Lindsey, P.A., Balme, G.A., Funston, P.J., Henschel, P.H. and Hunter, L.T.B. (2016) Life after Cecil: Channelling Global Outrage into Funding for Conservation in Africa. *Conservation Letters*, **9**, 296-301. https://doi.org/10.1111/conl.12224

[5] Macdonald, D.W., Jacobsen, K.S., Burnham, D., Johnson, P.J. and Loveridge, A.J. (2016) Cecil: A Moment or a Movement? Analysis of Media Coverage of the Death

of a Lion, *Panthera Leo*. *Animals*, **6**, Article No. 26. https://doi.org/10.3390/ani6050026

[6] Lindsey, P.A., Roulet, P.A. and Romañach, S.S. (2007) Economic and Conservation Significance of the Trophy Hunting Industry in Sub-Saharan Africa. *Biological Conservation*, **134**, 455-469. https://doi.org/10.1016/j.biocon.2006.09.005

[7] Bauer, H., Chardonnet, B., Jones, M. and Sillero-Zubiri, C. (2019) Trophy Hunting: Broaden the debate. *Science*, **366**, 433-434. https://doi.org/10.1126/science.aaz4036

[8] Dickman, A., Cooney, R., Johnson, P.J., Louis, M.P. and Roe, D. (2019) Trophy Hunting Bans Imperil Biodiversity. *Science*, **365**, 874. https://doi.org/10.1126/science.aaz0735

[9] Ghasemi, B. (2021) Trophy Hunting and Conservation: Do the Major Ethical Theories Converge in Opposition to Trophy Hunting? *People and Nature*, **3**, 77-87. https://doi.org/10.1002/pan3.10160

[10] Nelson, M.P., Bruskotter, J.T., Vucetich, J.A. and Chapron, G. (2016) Emotions and the Ethics of Consequence in Conservation Decisions: Lessons from Cecil the Lion. *Conservation Letters*, **9**, 302-306. https://doi.org/10.1111/conl.12232

[11] Di Minin, E., Leader-Williams, N. and Bradshaw, C.J.A. (2016) Banning Trophy Hunting Will Exacerbate Biodiversity Loss. *Trends in Ecology and Evolution*, **31**, 99-102. https://doi.org/10.1016/j.tree.2015.12.006

[12] Parker, K., De Vos, A. and Biggs, R. (2020) Impacts of a Trophy Hunting Ban on Private Land Conservation in South African Biodiversity Hotspots. *Conservation Science and Practice*, **2**, e214. https://doi.org/10.1111/csp2.214

[13] Webster, H., Dickman, A., Hart, A. and Roe, D. (2022) Keeping Hunting Bans on Target. *Conservation Biology*, **36**, e13932. https://doi.org/10.1111/cobi.13932

[14] Harris, R.B. and Pletscher, D.H. (2002) Incentives toward Conservation of Argali *Ovis ammon*: A Case Study of Trophy Hunting in Western China. *Oryx*, **36**, 373-381. https://doi.org/10.1017/S0030605302000728

[15] Leader-Williams, N. and Hutton, J.M. (2009) Does Extractive Use Provide Opportunities to Offset Conflicts between People and Wildlife? In: Woodroffe, R., Thirgood, S. and Rabinowitz, A., Eds., *People and Wildlife*, *Conflict or Co-Existence?* Cambridge University Press, Cambridge, 140-161. https://doi.org/10.1017/CBO9780511614774.010

[16] Milner, J.M., Nilsen, E.B. and Andreassen, H.P. (2007) Demographic Side Effects of Selective Hunting in Ungulates and Carnivores: Review. *Conservation Biology*, **21**, 36-47. https://doi.org/10.1111/j.1523-1739.2006.00591.x

[17] Lindsey, P.A., Alexander, R., Frank, L.G., Mathieson, A. and Romañach, S.S. (2006) The Potential of Trophy Hunting to Create Incentives for Wildlife Conservation in Africa Where Alternative Wildlife-Based Land Uses May Not Be Viable. *Animal Conservation*, **9**, 283-291. https://doi.org/10.1111/j.1469-1795.2006.00034.x

[18] Angula, H.N., Stuart-Hill, G., Ward, D., Matongo, G., Diggle, R.W. and Naidoo, R. (2018) Local Perceptions of Trophy Hunting on Communal Lands in Namibia. *Biological Conservation*, **218**, 26-31. https://doi.org/10.1016/j.biocon.2017.11.033

[19] Dube, N. (2019) Voices from the Village on Trophy Hunting in Hwange District, Zimbabwe. *Ecological Economics*, **159**, 335-343. https://doi.org/10.1016/j.ecolecon.2019.02.006

[20] Morris, S.P. (2021) A Moral Defense of Trophy Hunting and Why It Fails. *Sport, Ethics and Philosophy*, **15**, 386-399. https://doi.org/10.1080/17511321.2020.1770847

[21] Sekar, N. and Shiller, D. (2020) Engage with Animal Welfare in Conservation. *Science*, **369**, 629-630. https://doi.org/10.1126/science.aba7271

[22] Mkono, M. (2019) Neo-Colonialism and Greed: Africans' Views on Trophy Hunting in Social Media. *Journal of Sustainable Tourism*, **27**, 689-704. https://doi.org/10.1080/09669582.2019.1604719

[23] Lindsey, P.A., Balme, G.A., Funston, P., Henschel, P., Hunter, L., Madzikanda, H., Midlane, N. and Nyirenda, V. (2013) The Trophy Hunting of African Lions: Scale, Current Management Practices and Factors Undermining Sustainability. *PLOS ONE*, **8**, e0073808. https://doi.org/10.1371/journal.pone.0073808

[24] TAWA (2020) Special Wildlife Investment Concessions Areas. Tanzania Wildlife Management Authority. https://www.tawa.go.tz/storage/app/uploads/public/631/707/a36/631707a36b95e165403249.pdf

[25] URT (2022) Wildlife Conservation Act, Chapter 283, (Government Notice No. 461).

[26] MNRT (2011) Rungwa/Kizigo/Muhesi General Management Plan.

[27] Walsh, M. (2000) The Development of Community Wildlife Management in Tanzania. *Conference on African Wildlife Management in the New Millennium*, Mweka, 13-15 December 2000, 13-15.

[28] Hariohay, K.M., Fyumagwa, R.D., Kideghesho, J.R. and Røskaft, E. (2017) Assessing Crop and Livestock Losses Along the Rungwa-Katavi Wildlife Corridor. *International Journal of Biodiversity and Conservation*, **9**, 273-283. https://doi.org/10.5897/IJBC2017.1116

[29] R Core Team (2021) R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna. https://www.R-project.org/

[30] Loveridge, A.J., Reynolds, J.C. and Milner-Gulland, E.J. (2007) Does Sport Hunting Benefit Conservation? *Key Topics in Conservation Biology*, **1**, 238.

[31] Romañach, S.S., Lindsey, P.A. and Woodroffe, R. (2007) Determinants of Attitudes towards Predators in Central Kenya and Suggestions for Increasing Tolerance in Livestock Dominated Landscapes. *Oryx*, **41**, 185-195. https://doi.org/10.1017/S0030605307001779

[32] Heinen, J.T. and Shrivastava, R.J. (2009) An Analysis of Conservation Attitudes and Awareness around Kaziranga National Park, Assam, India: Implications for Conservation and Development. *Population and Environment*, **30**, 261-274. https://doi.org/10.1007/s11111-009-0086-0

[33] Shibia, M.G. (2010) Determinants of Attitudes and Perceptions on Resource Use and Management of Marsabit National Reserve, Kenya. *Journal of Human Ecology*, **30**, 55-62. https://doi.org/10.1080/09709274.2010.11906272

[34] Zhou, X., MacMillan, D.C., Zhang, W., Wang, Q., Jin, Y. and Verissimo, D. (2021) Understanding the Public Debate about Trophy Hunting in China as a Rural Development Mechanism. *Animal Conservation*, **24**, 346-354. https://doi.org/10.1111/acv.12638

[35] Tomićević, J., Shannon, M.A. and Milovanović, M. (2010) Socio-Economic Impacts on the Attitudes towards Conservation of Natural Resources: A Case Study from Serbia. *Forest Policy and Economics*, **12**, 157-162. https://doi.org/10.1016/j.forpol.2009.09.006

[36] Barchett, F. (2021) Examining Sustainable Practices and Opportunities for a Sustainability Certification Scheme for Trophy Hunting in Sub-Saharan Africa.

[37] Haule, K.S., Johnsen, F.H. and Maganga, S.L.S. (2002) Striving for Sustainable Wildlife Management: The Case of Kilombero Game Controlled Area, Tanzania. *Journal of Environmental Management*, **66**, 31-42.

https://doi.org/10.1006/jema.2002.0572

[38] Störmer, N., Weaver, L.C., Stuart-Hill, G., Diggle, R.W. and Naidoo, R. (2019) Investigating the Effects of Community-Based Conservation on Attitudes towards Wildlife in Namibia. *Biological Conservation*, **233**, 193-200. https://doi.org/10.1016/j.biocon.2019.02.033

[39] Nelson, F. and Agrawal, A. (2008) Patronage or Participation? Community-Based Natural Resource Management Reform in Sub-Saharan Africa. *Development and Change*, **39**, 557-585. https://doi.org/10.1111/j.1467-7660.2008.00496.x

[40] Nordbø, I., Turdumambetov, B. and Gulcan, B. (2018) Local Opinions on Trophy Hunting in Kyrgyzstan. *Journal of Sustainable Tourism*, **26**, 68-84. https://doi.org/10.1080/09669582.2017.1319843

[41] Störmer, N. (2016) A Survey of Values and Attitudes towards Wildlife in Communal Conservancies in Namibia. Friedrich Schiller University Jena, Jena.

[42] Naidoo, R., Weaver, L.C., Diggle, R.W., Matongo, G., Stuart-Hill, G. and Thouless, C. (2016) Complementary Benefits of Tourism and Hunting to Communal Conservancies in Namibia. *Conservation Biology*, **30**, 628-638. https://doi.org/10.1111/cobi.12643