Contribution of Wildlife-based Tourism to Household Income and Income Inequality: A Case of Burunge Wildlife Management Area in Tanzania

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Abstract: This study investigates the contribution of wildlife-based tourism to household income, employment, and income inequality in villages surrounding Burunge WMA. The study used cross-sectional design, focusing on four villages namely Olasiti, Mwada, Minjingu and Sangaiwe. Primary data collection involved a household survey that covered 272 randomly selected households. The questionnaire addressed issues of household social-economic characteristics, main income-generating activities and tourism-related employment. The study employed the Gini coefficient to measure income inequality. The study reveals that wildlife-based tourism provides income opportunities at household level but its contribution to the overall household income is low because only about 15% of sampled households depended on wildlife-based tourism as their main source of income. Agriculture and livestock activities overshadow tourism-related income sources, contributing to significant income inequality within the tourism sector. Recommendations for enhancing economic impact of wildlife based tourism include awareness creation, supporting existing investors, providing targeted sector support, income distribution and encouraging income source diversification.

Keywords: Community-based; natural resource management; wildlife-based tourism; household income; income inequality; Wildlife Management Area.

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Introduction

All around the world, protected areas have been established to preserve biodiversity and safeguard ecosystems for present and future generations (Shoo & Songorwa, 2013). These areas are anticipated to benefit those living nearby and contribute to sustainable development (Blom, 2010; Shoo & Songorwa, 2013). To attain mutually beneficial results that both preserve natural resources and improve the well-being and

livelihoods of local communities, there is an increasing adoption of community-based natural resource management (CBNRM), especially in tropical developing countries (Lonn et al., 2018).

CBNRM, employed in various Southern African nations, is a governance system designed to protect natural resources such as forests, wildlife and their habitats. Its aim is to facilitate coexistence between local communities and nature while ensuring the sustainable management of these resources (Mgonja, 2023). Extensively applied in East and Southern African countries, CBNRM is evident in initiatives like Zimbabwe's Communal Areas Program for Indigenous Resource Management (CAMPFIRE), Namibia's CBNRM, Zambia's Administrative Management Design (ADMADE) and Kenya's Conservancies (USAID, 2013). The primary tenet of the community based wildlife management (CBWM) strategy is that, providing local communities with access to economic benefits from wildlife-related businesses will raise their living standards and encourage them to support wildlife conservation plans (Shoo et al., 2016). The establishment of the Wildlife Management Areas (WMAs) in Tanzania drew inspiration from the CBNRM strategy (Mgonja, 2023).

One of the most common and rapidly expanding activities in Tanzania's Protected Areas is wildlife-based tourism. Wildlife-based tourism is regarded as a conservation and economic strategy that encourages people's support to safeguard Protected Areas. Tanzania has promoted tourism as a way to improve the conservation of its Protected Areas and to help with initiatives to increase the local population's economy and standards of living (Shoo & Songorwa, 2013). Burunge WMA is a crucial natural area for wildlife tourism and protection. In this WMA, people engage in wildlife-based tourism activities like game drives, walking safaris and hunting. The reserve is still in danger from habitat loss because of habitat fragmentation, degradation and conversion to agriculture and livestock rearing; despite the government's long-running conservation measures that have assisted in protection.

Early studies conducted in Burunge WMA have not adequately demonstrated the contribution of wildlife-based tourism to local households' economic objectives. For example, a study by Kicheleri et al. (2018) correlated the local reality in Burunge WMA to the expected and officially intended outcome of Tanzania's decentralized wildlife management and concluded that local involvement in establishing as well as upkeep of the WMA was minimal and riddled with conflict. Locals did not see the worth of or benefit from the WMA to their livelihood, even though benefits were realized at the communal level. Studies by Moyo (2016) and Wilfred (2010) centered on the WMAs' establishment, governance, and conservation impacts. Mgonja, (2023) and Mgonja and Uswege (2022) focused on attitude and factors that affect perception of the community towards wildlife based tourism. The findings suggest that although community members accept WMAs, they are not happy with the benefits of WMA. As a result, their opinions toward WMA were neither positive nor negative.

There is an information gap regarding the extent to which wildlife-based tourism contributes to the household income of local people in villages surrounding Burunge WMA. Philemon (2016) wrote a dissertation on the economic viability of a few income-generating activities. In the study, the authors examined the costs and benefits related to a few Income Generating Activities (IGAs), including dressmaking and handcrafting. The authors extensively discussed how wildlife-based tourism could serve as a sustainable source of income for communities. This approach aims to encourage environmental preservation rather than harm, aligning economic activities with conservation efforts. Consequently, this study sought to establish the contribution of wildlife-based tourism to household income, employment, community development projects and income inequality to local people and their willingness to cherish and protect the biodiversity around Burunge WMA.

Literature Review

This section explores theoretical foundations and frameworks underpinning the study. It begins by examining tourism theories, addressing their role in development. The alternative development theory of tourism is introduced as the guiding framework. Shifting focus to wildlife-based tourism, it defines goals, explores global economic impacts and highlights relevance in Tanzania's tourism industry.

Theoretical Background

Theories related to tourism primarily address two fundamental and essential questions: firstly, can tourism play a role in fostering development? Secondly, if it can, what are the mechanisms through which it does so? (Chifon, 2010). Numerous

theories have been put forth to examine this phenomenon, including the theory of access, tourism and modernization theory, tourism and dependency theory and the alternative development theory of tourism. This study adopted the alternative development theory of tourism as its guiding framework. The theory of access underscores the importance of resource accessibility. Tourism and modernization theory, originating in the mid-20th century, posit that tourism drives societal modernization (Melita et al., 2013). Tourism and dependency theory, emerging in the 1960s, examines the potential pitfalls of tourism, including economic dependency (Harilal et al., 2021). The alternative development theory of tourism was born out of critiques of mainstream tourism paradigms, emphasizing sustainable development and community empowerment (Dick, 2021). The study's adoption of the alternative development theory signals a deliberate choice to prioritize community engagement, local empowerment and sustainability, aligning with the positive dimensions of wildlife-based tourism under investigation. This theoretical orientation underscores the study's commitment to exploring tourism's potential as a catalyst for inclusive and sustainable community development.

Alternative Development
The alternative Development Theory of tourism presents a different perspective on tourism development, aiming to move away from conventional approaches. This theory advocates for a more sustainable and inclusive model of tourism that emphasizes finding a balance between economic, social and environmental factors. The goal is to ensure that tourism brings benefits to local communities, protects environments and fosters long-term sustainable growth (Annison, 2011). The theory suggests that indigenous communities are not solely affected by tourism but have the potential to actively engage with it through entrepreneurial endeavors (Chifon, 2010).

The theory emphasizes the active involvement of local communities in decision-making, planning and management of tourism initiatives. It underscores the significance of respecting the needs, values and traditions of communities, empowering them to shape the tourism development (Sharpley, 2009). Equitable economic benefits for local communities are emphasized, aiming to create employment opportunities, improve livelihoods and enhance the overall economic well-being (Budeanu et al., 2016).

This is achieved through supporting local entrepreneurship, promoting community-based tourism and retaining a significant portion of tourism revenue within the local economy.

In terms of environmental practices, the theory promotes sustainable approaches such as conserving natural resources, protecting biodiversity and minimizing negative environmental impacts. This includes measures to reduce waste, conserve energy, manage water responsibly and preserve delicate ecosystems. Rather than relying solely on mass tourism, the theory encourages diversification by developing niche markets, cultural tourism and ecotourism. This approach fosters the growth of small-scale, locally-owned businesses, ensuring a more equitable distribution of tourism benefits (Sharpley, 2009).

The theory recognizes the importance of preserving and respecting local cultures, traditions and heritage. It promotes tourism practices that facilitate meaningful interactions between visitors and communities, encouraging cultural exchange and mutual understanding (Budeanu et al., 2016). Cultural commodification is to be avoided to safeguard the integrity of local identities. Responsible tourism education plays a vital role in the theory, highlighting the importance of educating tourists, communities and stakeholders about sustainability, cultural sensitivity and environmental conservation. This education empowers individuals to make informed decisions and engage in responsible travel behaviors (UNWTO, 2018).

The alternative development theory advocates for a holistic and inclusive approach that prioritizes the well-being of local communities, the preservation of natural and cultural resources and the long-term sustainability of tourism destinations. It aims to move away from profit-driven and exploitative practices in tourism development (Chifon, 2010).

Wildlife-Based Tourism and Economic Impacts
Wildlife-based tourism, also known as nature-based tourism or wildlife tourism, involves travel and recreational activities centered around observing and experiencing wild animals in their natural habitats (Egresi & Prakash, 2019). Wildlife-based tourism includes visiting protected areas such as national parks, wildlife reserves and sanctuaries to view and appreciate wildlife species, including mammals, birds, reptiles and marine creatures. This form of tourism aims at providing tourists with opportunities to engage with and appreciate the

natural world while promoting conservation efforts, sustainable practice, and the well-being of the wildlife and their habitats (Higginbottom, 2004).

Tourism industry holds a prominent position globally in terms of size and economic prosperity, contributing significantly to income generation and employment opportunities (Okello, 2014; Okello & Yerian, 2009). With its vast scale, the tourism sector accounts for approximately 9% of the world's gross domestic product (GDP), generating employment for approximately one out of every eleven individuals worldwide. Moreover, it annually exports goods and services worth USD 1.3 trillion, equivalent to 6% of global exports, thereby serving as a crucial driver of job creation, economic advancement and overall growth in numerous countries (Okello, 2014).

Tanzania is experiencing rapid growth as a tourist destination, both in Africa and globally. The country's tourist industry contributes significantly to the GDP of the nation and is currently expanding. In 2017, tourism accounted for more than 17% of Tanzania's GDP (Dick, 2021). Compared to other sectors of production, Tanzania's tourism industry shows greater promise (Mariki *et al* 2011). Tanzania's tourism industry holds greater potential than other producing sectors due to its substantial contribution to the country's GDP and foreign exchange revenues. The growing amount of money made and the number of tourists visiting the nation demonstrate the industry's potential for expansion. Moreover, the government's sustained allocation of funds towards tourism infrastructure and marketing initiatives signifies a dedication to the growth and prosperity of the sector (William, 2021).

Measuring Inequality
Inequality is characterized as the disparity or variation in income levels. It refers to the differences in income distribution or welfare attributes within a given population. To assess income inequality, various metrics are employed, including Poverty lines, Poverty index, Theil's entropy index, Theil's second measure, Lorenz curve, the Gini coefficient, Gini index, Relative poverty line and Relative income criteria. These measures provide insights into the contribution of different sources of income to the overall inequality observed in the total income (Stanley, 2016).

The Gini coefficient, also referred to as the Gini index, is a widely utilized indicator of inequality. It is commonly employed and recognized due to its graphical representation as the ratio between the segment bounded by the perfect equality line and the Lorenz curve and the entire area beneath the perfect equality line. The Lorenz curve serves as a cumulative frequency plot (Lusambo, 2016).

When there is competition for resources such as housing or land, inequalities in income have significant implications for welfare outcomes. Individuals with lower incomes face limitations in their ability to match the financial capabilities of others, which can result in exclusion or marginalization (Stanley, 2016). The measurement of individuals' command over resources commonly includes their income and wealth. Income represents the continuous flow of resources, encompassing wages, salaries, bonuses, investments, interest, pensions and rent (Lerman & Yitzhaki, 2011). On the other hand, wealth refers to the accumulated stock of resources that individuals possess. While wealth inequalities are often greater than income inequalities, literature predominantly focuses on income as a more reliable welfare indicator. This is because income captures various sources of monetary inflow derived from employment, such as wages, salaries, bonuses, investments, interest, pensions, and rent, providing a comprehensive reflection of individuals' financial circumstances (Kar & Jacobson, 2012).

Methodology
Research Design
The study employed the cross-sectional design due to its cost-effectiveness and ability to provide a momentary snapshot of the population. This design is well-suited for identifying patterns, correlations, and incidence rates within a community, enabling effective description of the population and the establishment of cause-and-effect links.(Given, 2008).

Population and Sampling
The study focused on four purposively selected villages: Olasiti, Mwada, Minjingu and Sangaiwe. The decision to include these villages was influenced by an analysis conducted by Kaswamila (2012), revealing their abundance in wildlife resources and various tourist attractions such as Lake Burunge. The survey comprised a total of 272 households, selected through a combination of random and purposive sampling techniques.

Table 1: Distribution of selected households among the villages surveyed

Village	Minjingu	Mwada	Olasiti	Sangaiwe	Total
Frequency	55	90	63	64	272
Percentage	20.2	33.1	23.2	23.5	100

Table 2: Social Demographic Characteristics of the Respondents

Social Economic Characteristics		Frequency	Percent
Age of the respondent	18-30	62	22.8
	31-40	73	26.8
	41-50	74	27.2
	51-60	33	12.1
	61-70	17	6.3
	Over 70	13	4.8
Sex	Female	156	57.4
	Male	116	42.6
Education levels	No formal education	32	11.8
	Primary education	183	67.3
	Secondary Education	49	18.0
	Diploma /Bachelor degree	8	2.9
Marital status	Not married	23	8.5
	Married	198	72.8
	Divorced	17	6.3
	Widow/Widower	34	12.5
Duration of stay	More than 10 years	231	84.9
	Between 5 to 10 years	16	5.9
	More than 1 but less than 5 years	18	6.6
	Less than a year	7	2.6

The researchers selected the villagers based on their significance in terms of wildlife resources, ensuring a representative and diverse sample for the study.

Instruments
The researchers collected data through a household questionnaire, administered to participants residing in households selected through random sampling. The questionnaire comprised of closed and open - ended questions.

Validity and Reliability
The study demonstrated a commitment to establishing robust validity by implementing a meticulous research methodology. This involved careful selection of appropriate variables and measurement instruments, crucial components in ensuring the reliability of the study's findings. By addressing internal validity, the researchers considered factors such as the accuracy and representativeness of income data, thereby enhancing the credibility of their results. The inclusion of relevant variables, along with the control of potential confounding factors, further strengthened the internal validity of the instruments. Additionally, external validity was addressed with a representative sample, indicating the researchers' effort to ensure that their findings could be generalized to the broader population.

Statistical Treatment of Data
The study employed Microsoft Excel for the analysis of income inequality using Gini coefficient index and SPSS software for conducting descriptive statistics and multiple regression analyses in order to address the research questions.

Results and Discussion
Social Economic Characteristics
In Table 2, findings show that majority of respondents aged between 31 and 50, making the total of 54% of the sample. The findings also show that 57.4% of respondents were females, which made them to be the majority than their men counterparts.

The education levels of the respondents were diverse, with the majority having primary education (n=183, 67.3%), followed by secondary education (n=49, 18.0%), a smaller proportion having no formal education (n=32, 11.8%) and diploma/bachelor's degree (n=8, 2.9%).

Research Question 1: Does wildlife-based tourism contribute to employment?

As seen in Table 3, 85.3% of the surveyed households were crop producers, making agriculture the area's most common Income generating activity. Additional information from the questionnaire indicated that a greater number of residents grew food crops like maize and beans than did cash crops like sunflower and sesame. Ngwara beans, green gram and millet were additional cash crops that were all-important sources of income for households. Furthermore, the majority of households kept livestock as an income-generating activity, which was mostly done on a transhumance basis. Livestock keeping was practiced by 59.2% of the total households.

Table 3: Main Income Generating Activities in the Study Area

Income generating activities	Frequency	Percentage
Agriculture	232	85.30%
Livestock keeping	161	59.20%
Tourism related activities	41	15.10%

Table 4: Tourist Income Generating Activities around WMA Areas

Tourist related activities	Responses (N)	Percent of Cases
Working in the hotel (chef, maid)	8	20.5
Working as a tour guide	8	20.5
Working as a driver in tour company	4	10.3
Selling souvenir to tourist	4	10.3
Working in the hunting company	3	2.6
Playing drams to tourist	4	10.3
Working as security guard in the WMA	10	25.5

The number of people employed in the tourism sector was used to examine the contribution of wildlife-based tourism to household income in the study area. Wildlife-based tourism ranks third behind agriculture and livestock keeping. According to the findings, just 15.1% of the households examined were involved in wildlife-related tourism activities. This implies that only a small percentage of residents make a living through wildlife-based tourism. One cause could be a lack of education and knowledge about wildlife-based tourism prospects (Gupta et al., 2023).

The results of the study reveals various tourism income generating activities in the study area. The most common activities reported by the respondent's included employment in tourist hotels as chefs or maids (n=8, 20.5%), working as tour guides (n=8, 20.5%) and working as security guards in the Wildlife Management Area (WMA) (n=10, 25.5%). A smaller proportion of respondents reported engaging in other tourism income generating activities, such as selling souvenir to tourists (n=4, 10.3%), playing drums to tourists (n=4, 10.3%), working as drivers (n=4, 10.3%) and working in hunting companies (n=3, 2.6%).

The results reveal that agriculture and livestock keeping are the top income generating activities practiced by majority of the residents. They both contribute significantly to household income. These findings are consistent with previous studies that have found that agriculture and livestock production are important sources of income for rural households in many countries, including Tanzania (Simtowe, 2015). The agricultural and livestock sectors are vital to Tanzania's rural population because the majority of the country's residents live in rural areas and rely on them for food and money (Koei, 2021).

Research Question 2: Does wildlife-based tourism contribute to household income?

With the p-value of .956, the study found no significant relationship between the numbers of household members involved in wildlife-based tourism employment and transformed total household income. This suggests that although wildlife-based tourism may create employment opportunities for local residents, these opportunities may not translate into significant income gains at the household level.

With the p-value of .277, transformed income from tourism-related activities did not have a relationship with transformed total household income. This finding suggests that while income from tourism-related activities can contribute to household income, it may not be a significant source of income for households in the study area.

Table 5: Regression Analysis Showing Contribution of Wildlife-Based Tourism to Household Income

Independent Variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
Household member involved in the wildlife based and tourist employment	-.001	.020	-.002	-.056	.956	.875	1.143
Sex of the respondent	.001	.019	.001	.048	.961	.977	1.024
Transformed income from livestock	.419	.035	.554	11.835	.000	.325	3.077
Transformed income from agriculture	.581	.023	.713	25.698	.000	.925	1.081
Transformed income from tourist related activities	.041	.037	.052	1.091	.277	.309	3.232
Education level	.010	.016	.018	.642	.522	.939	1.065
(Constant)	.200	.174		1.153	.251		

The results indicate that transformed income from livestock and transformed income from agriculture have positive significant relationships with transformed total household income, with the p-value 0.000. This finding suggests that households that generate more income from livestock and agriculture tend to have higher total incomes.

Demographic factors such as sex (p-value = .961) and level of education of the head of household (p-value =.522) had no significant relationship with the transformed total household income.

Similar findings have been reported by Shoo and Songorwa (2013) in their study that examined the impact of tourism on household income at Amani Nature Reserve (ANR) in Muheza District, Tanzania. The study concluded that the engagement of individuals in ecotourism activities within the nature reserve is limited and its contribution to the annual income of households is meager. Similar findings are reported by Mojo et al. (2020) in Kenya's Maasai Mara National Reserve.

Research Question 3: Is there equal income distribution among community members?

The Gini Index involves understanding its numerical representation in the context of income or wealth distribution. Ranging from 0 to 1, a Gini Index of 0 signifies perfect equality, where every individual or household shares the same income or wealth. In contrast, a Gini Index of 1 denotes perfect inequality, an extreme scenario where one entity possesses all the resources, and others have none. A Gini Index between 0 and 0.3 suggests relatively low inequality, with a more even distribution of resources. When the index falls between 0.4 and 0.5, moderate inequality appears, acknowledging existing disparities. The range from 0.6 to 1 signifies high inequality, with a substantial concentration of resources in a limited portion of the population (Park & Kim, 2021).

Figure 1 shows the Lorenz curve for tourism income the study area. The Gini Index for tourism income is 0.651 (Figure 1), indicating a relatively high level of income inequality within the tourism sector.

This suggests that a small proportion of individuals within the tourist sector are earning a disproportionately large share of the income while the majority of individuals are earning a relatively low income. In a situation of high-income inequality, relatively small proportion of the population, leading to a pronounced gap between the rich and the poor.

Figure 2 shows the Lorenz curve for overall household income distribution in the study area. In contrast, the Gini Index for non-tourism income (agriculture and livestock keeping) appears to be 0.503, indicating a lower level of income inequality within this sector compared to tourism income. This suggests that income is more evenly distributed among individuals who are not directly involved in the tourism industry compared to those involved in tourism industry.
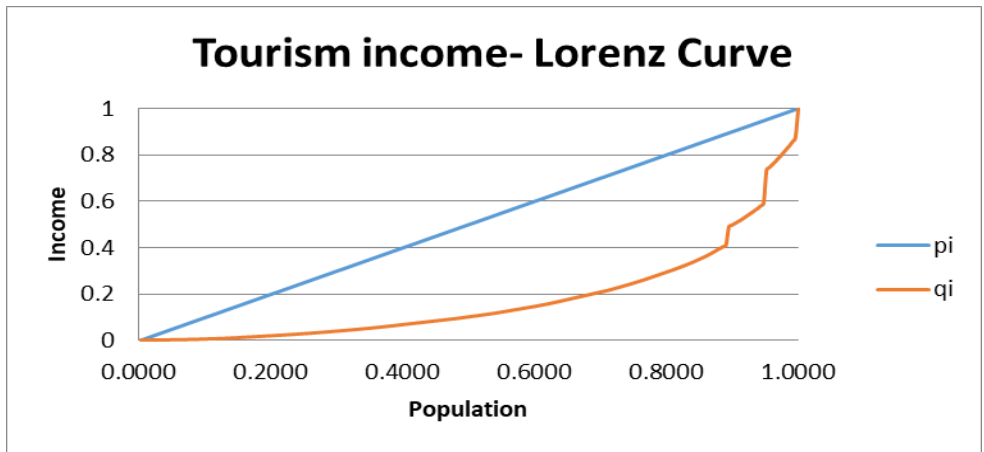
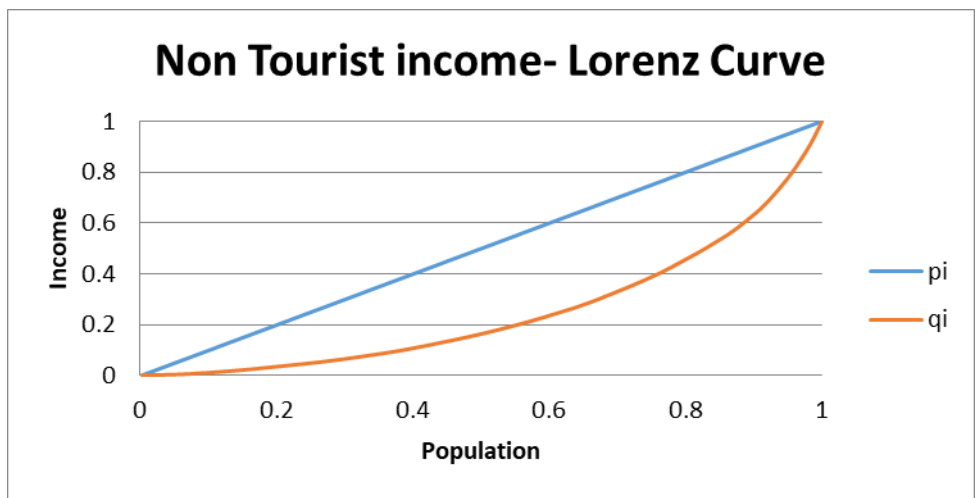**Figure 1: Lorenz Curve for Tourism Income**

Figure 2: Lorenz Curve for None Tourism Income

The Gini coefficient for overall household income inequality appears to be 0.514 (Figure 3) which indicates extreme level of income inequality in the study area. This suggests that income is not equally distributed among households in the study area, but the level of inequality is not as high as it is within the tourism sector alone. Figure 3 shows the Lorenz curve for overall household income distribution in the study area.
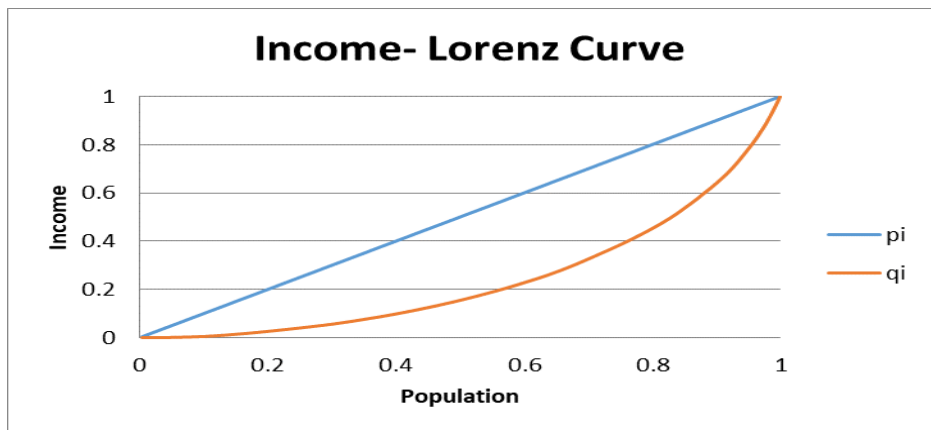

Figure 3: Lorenz Curve or Total Household Income

The findings indicate extreme income inequality in the study area and hence not everyone benefits from the existing income-generating activities. Some people earn more than others do. There was minimal difference in the overall Gini coefficient (0.514) and the non-tourism income Gini coefficient (0.503) when omitting the tourism income. This suggests that tourism income does not have a significant impact on income inequality in the study area.

These results support those of Lonn et al. (2018) who stated that compared to agricultural, non-agricultural and non-timber forest product (NTFP) sources, ecotourism income inequality was higher in a study conducted at Chambok CBET Program in Cambodia. Similar findings were obtained by Stanley, (2016) who assessed tourism revenue distribution in Serengeti District, Tanzania and concluded that tourism income increased household income inequality.

Conclusion and Recommendations
Conclusions
The study surrounding Burunge WMA indicates that while wildlife-based tourism creates income-generating opportunities for some villagers, its overall contribution to household income is limited. This suggest a minor role of wildlife-based tourism in the economic landscape, offering few employment opportunities and economic advantages. This limited impact diminishes motivation among locals to support long-term biodiversity conservation objectives. The Gini coefficient, both with and without wildlife-based tourism income, underscored significant income inequality in the villages near Burunge WMA. However, this disparity does not necessarily correlate with high poverty levels; rather, it results from a substantial gap between the top and bottom of the income range.

Recommendations
To harness the full potential of wildlife-based tourism in the study area, several key recommendations emerge. Firstly, there is a critical need for an intensive campaign to create awareness. This involves elevating understanding about opportunities presented by wildlife-based tourism and implementing comprehensive training programs. These initiatives are pivotal in empowering residents, fostering deeper engagement and encouraging broader participation in the sector.

Acknowledging and celebrating the contributions of current tourism investors is paramount. By recognizing their efforts and highlighting success stories, the community can instill a sense of pride and motivation, encouraging continued support for local development initiatives. This approach creates a positive atmosphere that enhances the prospect of sustained backing from investors in the tourism sector. Moreover, targeted support for the tourism sector is crucial for its enhancement. Policymakers and stakeholders should channel efforts towards capacity building, providing marketing assistance and investing in infrastructure development. These targeted interventions will not only fortify the tourism sector but also contribute to job creation, economic growth and overall community well-being. Addressing income inequality within the tourism sector is imperative. Strategies aimed at income redistribution, including fair wage distribution and improved working conditions, should be explored and implemented. This approach ensures that the benefits derived from wildlife-based tourism are more equitably distributed, fostering a sense of inclusivity and fairness. Lastly, to reduce dependency on specific sources, there is a need to promote diversification of income among residents. Supporting alternative livelihoods beyond agriculture, livestock keeping or tourism is vital for creating a resilient economic base. This diversification strategy not only contributes to a more sustainable economic landscape but also mitigates the impact of potential fluctuations in specific sectors.

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