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Local Perceptions on Community Forests Conservation: Lessons from Namtumbo District, Tanzania

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Abstract

This paper intended to gain insights on how local communities perceive the conservation of community forests (CFs). It draws from a study that aimed to explore how communities perceive conservation efforts, and uncover the manner through which contextual factors shape these perceptions. Data for this paper were generated through a triangulation of methods, whereby a structured questionnaire was administered to 200 households, and unstructured questionnaires to 43 households. In addition, 7 key informant interviews (KIIs) and 5 focus group discussions (FGDs) were conducted with forest experts and village leaders to provide further insights and interpretation of the data. We used qualitative and quantitative methods to analyse data on local perceptions of the conservation of CFs. Content and micro-interlocutor analysis was used for qualitative data analysis, while descriptive statistics and Probit regression were used for quantitative data. According to the results, most respondents (85.25%) viewed the conservation of CFs positively. The study indicated that factors such as age, land ownership, conservation benefits, spill-over effects, policy and regulations, and involvement in decision-making processes positively impacted perspectives. However, occupation and conservation costs were unfavourable factors that influenced their viewpoints. Despite the community's positive attitudes, conservation efforts have not succeeded due to the lack of motivation and conflicts of interest, which align with the social exchange theory. We argue that to achieve effective conservation, it is crucial to adopt various strategies such as creating economic opportunities through CFs, modernizing agriculture, and issuing certificates of customary right of occupancy (CCRO).

Keywords: *community forest, conservation, perceptions, theory of planned behaviour, social exchange theory*

1. Introduction

Globally, forest conservation has been a centre of attention since forests contribute approximately 20% of greenhouse gases (GHGs) in the atmosphere, and their total economic mitigation potential is about 1.1 to 5.5 giga tonnes of equivalent carbon dioxide emission (CPF, 2008; Lütken et al., 2011; Tilburg et al., 2011; FAO, 2016; Castro-Nunez, 2018). At the 26th Conference of the Parties (COP26), world leaders committed to conservation by promising to reverse and end deforestation by 2030 (Rannard & Gillett, 2021). The destruction of forests is vast with a global net loss being 129m ha between 1990 and 2015 (FAO, 2016). Deforestation rates are alarmingly high worldwide, with Tanzania losing 469,000ha annually, of which

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35% occurs in community forests (FAO, 2020). Forest covers about 55% of Tanzania's land surface, of which 64% is under the CFs scheme (Pinto et al., 2016; Katani et al., 2019). Deforestation in Tanzania is caused by land-use changes, illegal logging, town expansion, and forest fires. Other factors are poverty, high agricultural commodity prices, and poor governance.

Tanzania's conservation efforts face technical, financial, coordination, and community participation challenges (Mwanga, 2014; URT, 2014; Kweka et al., 2015; Gizachew et al., 2020; Tremblay & Lowry, 2023). In Tanzania, particularly in the Namtumbo district, communities are advocating for changes in land use. They argue that conservation efforts have led to the loss of livelihoods, food insecurity, and an increase in land conflicts (Kangalawe & Noe, 2012; Noe & Kangalawe, 2015; Zafra-Calvo & Moreno-Peñaranda, 2017). There is a growing concern about the inability to meet conservation goals; and how to engage communities effectively to achieve the ultimate goal of conserving CFs, while at the same time ensuring sustainable development. The way people perceive things in their community can affect how open they are to adopting, practicing, and learning about conservation. This perception also plays a role in decision-making; including intentions, actions, and motivation towards conservation efforts. Ultimately, this influences how policies are implemented, and how community forests are managed (Yang et al., 2015; Inanç, 2017; Hariohay et al., 2018; Linuma & Tang'are, 2018).

Factors influencing peoples' perceptions can be grouped into socio-economic, psychological, structural, and geographical categories (Saguye, 2016; Hariohay et al., 2018; Linuma & Tang'are, 2018). The norms, behaviour, interests, history, and environmental awareness of a community: all have an impact on these factors. Together, they play a crucial role in shaping individuals' perspectives on conservation (Mastrangelo et al, 2013; Abdulkarim, Yacob, & Abdullah, 2017; Castilho et al, 2018; Soe & Yeo-Chang, 2019).

The awareness of a community's perceptions is crucial to achieving success in conservation efforts (Zafra-Calvo & Moreno-Peñaranda, 2017). The effectiveness of conservation management and policies that are sensitive to community needs in Namtumbo is hindered by a lack of extensive research on how local communities perceive conservation interventions (Wilfred, 2010; Sulle et al., 2011; Noe & Kangalawe, 2015; Linuma & Tang'are, 2018). Most studies have mainly focused on analysing the benefits and drawbacks of conservation initiatives and how they affect the local communities in wildlife management areas (WMAs) regarding their poverty levels and livelihoods. However, there is limited knowledge about the attitudes of communities' toward conservation efforts in community forests (CFs) (Kangalawe & Noe, 2012; Noe & Kangalawe, 2015; Zafra-Calvo & Moreno-Peñaranda, 2017). This paper raises insights that can help its readers to understand communities' perceptions of CF conservation

efforts, and the factors influencing their willingness to adopt interventions. This information may potentially help relevant organs to develop effective initiatives that engage and involve communities for increased success and sustainability. This study uses the term 'CFs' to refer to both community forests and wildlife management areas (WMAs). Community forests are those owned and managed by a specific community.

2. Theoretical Framework

The paper is guided by the theory of planned behaviour (TPB), and the social exchange theory (SET). These theories were combined to provide a wider scope of inclusion, qualification, and explanation of the variables of interest. Since attitude is frequently used to gauge conservation behaviour, it has been argued that TPB has limitations when applied to human behaviour (Ward, Holmes & Stringer, 2018). As behaviour is often motivated by pro-social factors, understanding social interactions is likely a crucial cognitive prerequisite for initiating behaviour. As a result, the SET was included as a predictor of behaviour proximity to enhance the TPB's explanatory power, and increase awareness of the various factors that influence perceptions. This integrated approach provides a theoretical contribution to the field.

Icek Ajzen introduced the theory of planned behaviour (TPB) in the 1980s to enhance the theory of reasoned action. TPB considers perceived behaviour to improve its predictive capabilities (Ajzen, 1991). According to the TPB, an individual's behaviour is influenced by one's attitude towards the behaviour, subjective norms, and perceived behavioural control. The theory suggests that an individual's intentions reflect her/his cognitive and perceived beliefs regarding the favourability of an act. Additionally, individuals' exposure to subjective norms affects their intentions, as they consider the approval of those around them. Moreover, perceived behavioural control, or an individual's belief in the ability to perform a certain behaviour, affects her/his intentions and behaviour. TPB is useful in explaining psychological concepts related to conservation; such as awareness, behavioural control, and perceptions. To understand why individuals choose to practice forest conservation, it is important to study the predictors of such a behaviour, which is where TPB comes into play. Furthermore, TPB helps design effective interventions by identifying the most important determinants of behaviour (Ward, Holmes, & Stringer, 2018).

George Homans first developed SET in the late 1950s and early 1960s. Peter Blau and Richard Emerson later continued his work. According to the SET, individuals in social situations make choices that maximize their self-interests: they assess the benefits and costs associated with an exchange before making a decision (Homans, 1958; Emerson, 1976; Redmond, 2015; Garekae et al., 2016). Hence, this theory is also useful in understanding people's attitudes toward conservation of natural resources. It helps to identify factors that influence people's perceptions.

In this study, the focus was on the conservation of CFs, which was the dependent variable. The independent variables included social-economic factors such as age, conservation benefits, conservation costs, education level, gender, income, occupation type, and land ownership. Psychological factors like attitude, awareness of deforestation, perceived behavioural control, and spill-over effect were also considered. Additionally, geographical factors like the location of residency; and structural factors like policy, regulations and participation in rule-making were also included. The perception of a community towards CF conservation were used to measure the dependent variable, which was assessed by the question: "How do you perceive community forest conservation?" The expected possible responses was 'Important' or 'Not Important'. The selection of independent variables was based on the conflicting results from the reviewed literature; and the Ostrom framework was utilized in identifying the factors (Ostrom, 2009).

3. Context and Methods

The Study Area

The paper draws from the study that was conducted in Namtumbo district, located at latitude -10 °27'59.10" S and longitude 36 °07' 48.31" E. The district is bordered by Songea district to the East, the West by Tunduru district, the North by Morogoro region, and the South by Mozambique (Namtumbo-DC, 2020).

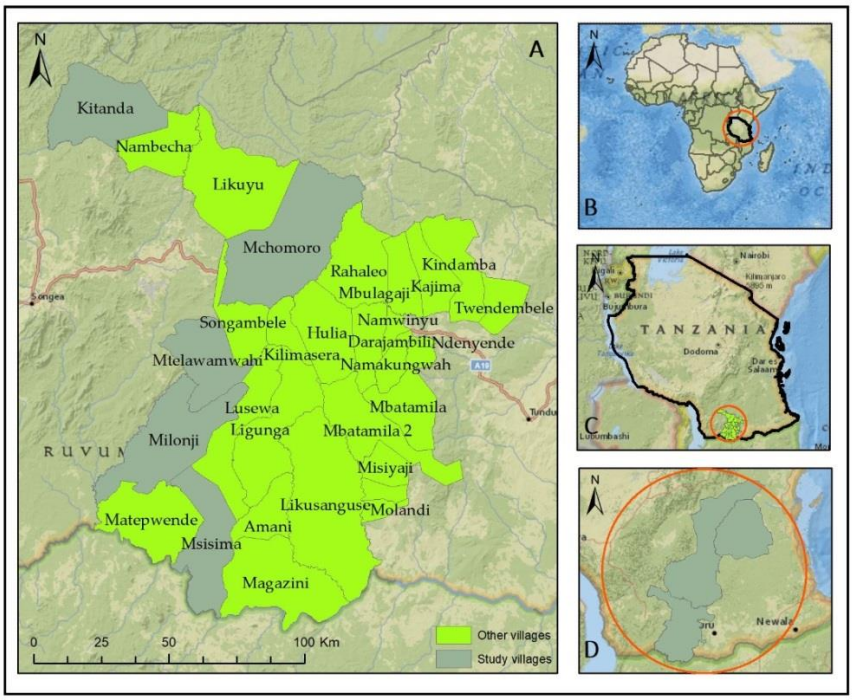

Figure 1: Map of the Study Villages (*Source*: Namtumbo DC, 2020)

Namtumbo is one of the five districts of the Ruvuma region, in southern Tanzania, with a total land area of 21,765km^2, and a total population of 201,639 (URT, 2013). Worldwide, *miombo* woodlands are among species declared under threat of extinction. Namtumbo district is covered by *miombo* woodlands in three-thirds of its total land area; which made the district an area of interest for this study (URT, 2013; URT, 2014; Kweka et al., 2015).

3.1 Research Design

The research utilized a cross-sectional design with a mixed-methods approach. Specifically, the study used the convergent parallel mixed-methods strategy, which involves collecting both qualitative and quantitative data concurrently, and combining them during data analysis and interpretation/discussion. This approach aimed to provide a more comprehensive understanding of the phenomena through the combined results of the study.

3.2 Sampling

The study focused on households in 17 villages in the Namtumbo district that have adopted land-use plans, or are part of wildlife management areas (WMAs) with community forests (CFs). Five villages were purposefully selected; considering factors such as external investments, conflict levels, and geographical locations. Kitanda and Milonji had adopted land-use plans; while Mchomoro, Msisima, and Mtelamwahi were part of WMAs. Mchomoro and Mtelamwahi had investors in the Mbarang'andu WMA, while Msisima had no investors in the Kimbanda WMA. Key informants from government authorities and village leaders were also selected for comparison purposes. Structured questionnaires were administered to 200 households randomly chosen from the 4,001 total households, and 43 households were selected for unstructured questionnaires from each village. The sample size of 5% was reasonable, considering time and resources; and greater than 30, which yielded a normal sampling distribution suitable for the probit analysis given the heterogeneity nature of the study (Boyd, Westfall, & Stasch, 1981; Kothari, 2007).

3.3 Data Collection Methods

We gathered both quantitative and qualitative data from households using 200 structured questionnaires and 43 unstructured questionnaires. We also interviewed key informants and discussants to ensure accuracy and depth of information. A total of 7 key informant interviews and 5 focus group discussions were conducted to obtain insights from forest experts and village leaders, including village government leaders (village chairperson and village councillors) and community forest leaders.

3.4 Data Analysis Methods

As mentioned earlier, the study employed a convergent parallel mixed method data analysis using the data transformation design. Content analysis was

utilized to examine qualitative data from unstructured questionnaires and KIIs. On the other hand, micro-interlocutor analysis was used to examine FGDs data. During the analysis of FGDs data, each member's contribution was noted; and the level of consensus was determined despite the group being the unit of analysis. Moreover, the enumeration of the frequencies of particular viewpoints was also done, resulting in dataset expansion and the cultivation of more meaning from the data. Additionally, FGD members who did not contribute to themes were included, and information about dissenters was also documented, allowing for descriptive and interpretive validity.

Descriptive statistics were obtained through the use of the SPSS and Microsoft Excel programs. Inferential statistics were analysed using the probit regression model in STATA to determine factors that influence a community's perceptions towards CFs conservation. This model was chosen due to the dichotomous nature of the dependent variable, and the assumption that data were normally distributed. The estimated probit model utilized CF's conservation as the dependent variable, and explained the community's perceptions towards CFs conservation through explanatory variables. The perceptions had a binary response; with a value of 0 indicating that the respondents did not perceive conservation as important, and a value of 1 indicating that they did perceive conservation as important. The generally established function of the probit model was as depicted in equation (1):

$$P = F(X'\beta) = \phi(X'\beta) \qquad (1)$$

$$\text{PERCEPTINS}_i = \begin{cases} 1 \text{ if PERCEPTINS}_i = 1 \\ 0 \text{ otherwise} \end{cases} \qquad (2)$$

Where $\phi(X'\beta)$ is the function form of the standard normal distribution, β is the vector of parameters, and X' is a vector of explanatory variables influencing PERCEPTINS_i. Equation (2) implies that, if the community perceives conservation as important, then $\text{PERCEPTINS}_i = 1$, and 0 otherwise.

4. Results

4.1 Respondents' Characteristics

Most respondents (41%) were aged between 18–35 years. A significant proportion of them (71%) had attained primary school education, while only a small percentage (2%) had advanced level education. Most respondents (82%) reported farming as their primary occupation, with 58% growing paddy as their main crop. The largest annual income group reported earning between TZS 0–900,000 (equivalent to $386.971). However, many respondents (60%) owned between 1–5 acres of land for farming; with the major crop grown being paddy. In addition, a few respondents (15%) were employed to work on other people's farms as casual labourers (*vibarua*). Table 1 presents a summary of the respondents' characteristics in the study area.

Table 1: Community Social-economic Characteristics in Namtumbo District

Characteristic		Kitanda (%)	Mchomoro (%)	Milonji (%)	Msisima (%)	Mtelamwahi (%)	Total (%)
Age	18–35	43	80	20	8	55	41
	36–49	38	15	38	38	33	32
	50+	20	5	43	55	13	27
Education level	4yrs	5	0	5	3	10	5
	7yrs	68	28	88	95	78	71
	11yrs	20	45	5	3	13	17
	14yrs	3	8	0	0	0	2
	16yrs	5	20	3	0	0	6
Land ownership	0 acres	35	33	3	13	3	17
	1–5 acres	45	60	65	48	80	60
	6–10 acres	15	8	33	28	10	19
	11+ acres	5	0	0	13	8	5
Major crops grown	Paddy	20	38	85	85	63	58
	Other crops	80	63	15	15	38	42
Occupation	Farming	73	48	95	100	95	82
	Other	28	53	5	0	5	18
Casual labourers	Casual labourers	28	15	8	10	13	15
	Non-casual labourers	73	85	93	90	88	86
Annual income	TZS 0–900,000	65	50	50	35	43	49
	TZS 900,001–2,000,000	20	25	35	30	40	30
	TZS >2,000,000	15	25	15	35	18	22
Income source	Farming	80	58	93	100	95	85
	Other	20	43	8	0	5	15

4.2 Local Perceptions Towards Community Forests Conservation

The community's perceptions of the conservation of community forests were analysed through six perception statements presented to the respondents. The responses were then used to determine the general perception of the community. Most respondents (85.25%) had a positive outlook toward CFs conservation (Table 2).

Table 2: Community Perceptions towards CFs Conservation in Namtumbo District

Village		Kitanda	Mchomoro	Milonji	Msisima	Mtelamwahi	Total (%)
Responsibility to protect the CFs	Agree	95	97.5	97.5	97.5	100	97.5
	Neutral	2.5	2.5	0	2.5	0	1.5
	Disagree	2.5	0	2.5	0	0	1
Conservation necessary for present and future generations	Agree	97.5	97.5	95	92.5	100	96.5
	Neutral	2.5	2.5	5	5	0	3
	Disagree	0	0	0	2.5	0	0.5

Conservation initiatives unnecessary	Agree	12.5	2.5	30	50	22.5	23.5
	Neutral	10	25	5	7.5	0	9.5
	Disagree	77.5	65	50	42.5	77.5	67
Restriction measures necessary for conservation	Agree	85	77.5	95	92.5	82.5	86.5
	Neutral	7.5	20	0	5	12.5	9
	Disagree	7.5	2.5	5	2.5	5	4.5
CFs conservation curb economic opportunities	Agree	10	2.5	22.5	42.5	15	18.5
	Neutral	10	7.5	7.5	5	0	6
	Disagree	80	90	70	52.5	85	75.5
How do you perceive CFs conservation?	Important	95	95	80	77.5	95	88.5
	Not important	5	5	20	22.5	5	11.5
Average percentage of the community that have positive perceptions towards CFs conservation							**85.25**

4.3 Factors Influencing Community Perceptions of CFs Conservation

Probit output was used to estimate the factors influencing community perceptions toward CFs conservation. Table 3 shows the results.

Table 3: Parameter Estimates of the Probit Regression Community Perceptions Model

Independent Variables	PROBIT REGRESSION		MARGINAL EFFECT	
	Coefficient	Standard Error	Coefficient	Standard Error
LOCATION				
Mchomoro	-1.271	1.076	-0.110	0.090
Milonji	0.687	1.043	0.041	0.061
Msisima	-0.513	1.112	-0.039	0.0854
Mtelamwahi	1.548	1.217	0.077	0.053
AGEGROUP				
36–49	1.150	0.957	0.086	0.066
50+	2.771**	1.121	0.155**	0.054
GENDER	0.320	0.685	0.024	0.050
FAMILY SIZE				
4–6	-1.063	0.927	-0.062	0.044
7+	-1.013	1.026	-0.059	0.051
EDU_LEVEL	0.395**	0.197	0.029**	0.013
OCCUPATION	-5.049***	1.718	-0.370***	0.108
CASUAL LABOR	-1.602*	0.972	-0.118*	0.068
INCOME_GROUP				
900,001–2,000,000	0.282	0.744	0.020	0.051
>2,000,000	0.291	0.810	0.021	0.055
INC_SOURCE	0.898	1.041	0.066	0.075
ANIMALS	0.908	0.980	0.067	0.071

LAND				
1–5 acres	1.690*	0.930	0.146*	0.075
6–10 acres	1.844*	1.053	0.155*	0.082
>10 acres	2.408	2.167	0.182	0.104
CROPS	-2.383**	0.944	-0.175**	0.062
CONS_BENEFITS	2.195***	0.789	0.161***	0.050
CONS_COSTS	-0.861	0.826	-0.063	0.059
ATTITUDE	1.196	0.808	0.088	0.057
ADE	0.715	0.791	0.052	0.058
PERCEIVED	-1.150	0.738	-0.084	0.052
BEHAVIOURAL CONTROL				
SPIL_OVER1	2.492***	0.934	0.183***	0.060
POLY_REGUL	1.295*	0.695	0.095*	0.049
INCL_RULE	-0.648	0.652	-0.048	0.047
DECISION_M	2.565***	0.937	0.188***	0.060
Constant	-3.326	2.552		
Observations				200
LR chi2(29)				89.85
Prob > chi2				0.0000
Log likelihood				-26.445487
Pseudo R2				0.6295

Note: ***represents significance at 1%; **represents significance at 5%; *represents significance at 10%.

The goodness of fit of the model was significant, LR chi2 = 89.85, with Hosmer and Lemeshow's goodness of fit test, resulting in a large probability value of 0.9984. Also, about 63% of the variation in CFs conservation was explained by the explanatory variables (Pseudo R square = 0.6295), which indicates the integrity of the model. According to the results, several factors have a statistically significant positive impact, including age (2.771), conservation benefits (2.195), land ownership (1.690 for 1–5 acres, and 1.844 for 6–10 acres), spill-over effect (2.492), policy and regulations (1.295), and participation in rule-making (2.565). However, negative factors include occupation (-5.049) and conservation costs, as represented by the type of crop grown (paddy) (-2.383) (Table 3).

5. Discussion

5.1 Community Perceptions Towards Community Forests Conservation

Results indicate that, generally, the community positively perceives conservation efforts of CFs. Older individuals tend to prioritize conservation due to their greater environmental knowledge and experience with the negative impacts of deforestation and degradation. However, the younger generation was often unaware of conservation rules and regulations, leading to negative perceptions when rules are broken. Despite this, many younger individuals work as casual labourers and may encroach on CFs while undertaking their activities.

The perceived benefits of encroachment fuel intentions to do so, aligning with the SET prepositions. Overall, there are both positive and negative perceptions toward CFs conservation within the community. Other studies have found that older people have positive perceptions of conservation, viewing it as a gift for future generations (Soe & Yeo-Chang, 2019). Our results support this, but also suggest that conservation education should be inclusive of all age groups. Additionally, promoting eco-friendly economic activities, particularly among younger generations, could be beneficial.

Conservation plays a crucial role in achieving sustainability and reaping the benefits of CFs. The level of conservation awareness within a community was closely linked to its understanding of CFs' functions, benefits, and the impact of forest destruction. Previous studies, such as Abdulkarim et al. (2017), have shown that awareness is essential for making informed conservation decisions, leading to positive behavioural intentions and conservation actions. However, our study found that perceived behavioural controls negatively affected perceptions, ultimately decreasing conservation intentions. This suggests that certain factors may hinder behaviour and defer the theory of planned behaviour. This finding is consistent with Mastrangelo et al.'s (2013) study, which found that perceived behavioural control did not influence behaviour.

Despite communities claiming responsibility for conserving CFs, their efforts have not resulted in effective conservation on the ground. The persistence of destruction suggests that motivation may be lacking, or conflicts of interest may discourage participation in conservation activities, consistent with the SET. Similar studies in Tanzania have found that awareness alone was insufficient to drive positive perceptions, as conflicts between livelihoods and conservation can arise (WWF, 2014; Kangalawe & Noe, 2015; Linuma & Tang'are, 2018). In Ethiopia, even awareness of the necessity of conservation had failed to cultivate positive attitudes towards it due to conflicts of interest (Tesfaye, 2017). However, while these results align with the SET, they contrast with studies such as Garekae et al. (2016), which found that households appreciated conservation as paramount to their well-being and were motivated by perceived benefits.

According to the results, while some respondents believed that conservation efforts do not hinder their economic opportunities, others expressed a belief that conservation can impede their economic growth. Specifically, individuals who practiced traditional paddy farming or worked as casual laborers (*vibarua*) often viewed conservation interventions as an obstacle to their economic well-being. Additional studies conducted in Namtumbo found little evidence to support the notion that conservation initiatives create more job opportunities for communities (Kangalawe & Noe, 2012). In some WMAs, such as Kimbanda, the absence of investors has resulted in the underutilization of CFs due to

operational rules that have been established. On the other hand, surrounding communities had been promised economic benefits from conservation projects associated with WMAs since 2008. The failure to deliver these benefits has led to negative perceptions, consistent with the SET. To ensure that conservation efforts are supported by the community at the grassroots level, it is essential to foster a sense of ownership and accountability (Persha et al., 2011; Rose et al., 2014; Phongkaranyaphat et al., 2017).

When individuals feel like they have lost control and autonomy, and when rules are enforced with hostility and brutality: all these may develop negative attitudes toward managing community resources. To address this issue, it has been suggested that community members participate in rule-making to help restore a sense of ownership, accountability, and positive perceptions. The results also highlight the importance of adopting inclusive and bottom-up approaches to avoid non-compliance with conservation rules. By empowering communities to plan, develop, and carry out conservation initiatives based on their unique environment, while receiving support and funding from other stakeholders: this may improve community awareness, perceptions, and participation in conservation activities.

5.2 Factors Influencing Community Perceptions of CFs Conservation

The study results revealed age as a significant factor in shaping perceptions towards conservation, with older individuals valuing conservation activities more. Negative perceptions among the youth stemmed from their unfamiliarity with conservation regulations, often resulting in legal consequences. Previous studies have shown that such punishments can also lead to negative attitudes toward conservation (Hariohay et al., 2018; Soe & Yeo-Chang, 2019). Moreover, many young people work as casual laborers, and due to the lack of land ownership, engage in farming activities through encroachment. This further contributes to their negative perceptions as access restrictions and rules impede their efforts. These findings align with those of earlier studies conducted by Kideghesho et al. (2007) and Kangalawe and Noe (2012).

Perceptions among the youth are influenced by perceived benefits, which drive their intention to behave in a conservation-friendly manner. While the TPB may not be a significant predictor of intention and behaviour, the SET is a driving force behind it. Rather than social norms, personal norms have a more direct impact on behavioural intention. Studies have shown that as people age, they acquire more environmental knowledge and have first-hand experience of the negative effects of deforestation and degradation, leading to positive attitudes and perceptions towards conservation (Tesfaye, 2017; Soe & Yeo-Chang, 2019). Conversely, some studies have found that the youth are more inclined to conservation since they rely less on forests for their livelihoods (Garekae et al., 2016; Hariohay et al., 2018).

The TPB allows for the identification of key factors that influence behaviour, which can inform targeted interventions. Our research indicates that emphasizing the benefits of conservation is particularly effective in motivating community members to participate. Community values align with the SET, meaning that, to be successful, conservation efforts must provide tangible benefits that outweigh other alternatives. For example, farmers in Haiti who supported the conservation of forest reserves believed that their farming activities would benefit from the conservation efforts' positive impact on soil quality (Dolisca et al., 2007). Failure to realize conservation benefits may result in sustained destruction of the environment. To ensure the sustainability of conservation efforts and support for conservation activities, it is necessary to provide benefits (both financial and environmental) that incentivize participation. Therefore, it is crucial to have an integrated plan that increases economic opportunities, while emphasizing conservation benefits.

It is worth noting that owning farmland of up to 10 acres had a positive impact on people's perceptions. Upon a thorough examination, the results revealed that the non-significant influence of owning more than 10 acres of land was attributed to the fact that such owners tend to have larger families. Some landowners with over 10 acres hesitated to distribute their land due to having large families of 7 or more members. This led to a shortage of land for each family member, resulting in some members receiving very little or no land at all. Studies have shown that owning land can decrease the likelihood of encroachment into CFs, as a scarcity of land often leads to increased encroachment. Additionally, research has suggested that having more land can result in fewer incidents of riots caused by land scarcity; further supporting conservation efforts (Kangalawe & Noe, 2012; Mukama et al., 2012; Ratsimbazafy et al., 2012). Hence, perceptions are also influenced by family size, as larger families face more competition for land. This often leads to a greater need for agricultural land, resulting in increased encroachment and protests for changes in land use policies by the government (Tadesse & Teketay, 2017; Soe & Yeo-Chang, 2019). These actions are driven by the desire to make the best choices, as explained by the SET (Homans, 1958; Garekae et al., 2016).

Providing certificates of customary right of occupancy (CCROs) was crucial for promoting conservation efforts by discouraging practices such as shifting cultivation and nomadic pastoralism, while also instilling a sense of ownership among individuals. The study revealed that the traditional method of farming, which involves valley-bottom farming, has been associated with negative perceptions. This is because many farmers tend to encroach on CFs to gain access to fertile land. Similarly, the cost of farming operations, such as in the use of industrial fertilizers, acted as both a hindrance and a driving force for encroachment as farmers seek to avoid expenses. This correlates with a study

conducted in Namtumbo, which discovered that paddy farmers had unfavourable attitudes to conservation due to conflicts of interest arising from their farming practices (Kangalawe & Noe, 2012). Further, some community members hold negative perceptions due to the limitations on CF access, fines for trespassing, and harsh punishments for illegal trespassing. Restrictive measures were initially put in place to protect the CFs. These have now been found to negatively impact forest-dependent communities—such as paddy farmers—leading to negative perceptions amongst them (Kangalawe & Noe, 2012; Hariohay et al., 2018).

Ongoing disputes between local communities and forest managements, especially in WMAs, resulting from aggressive enforcement of rules and regulations (such as using brutality), have been linked to the development of animosity towards CF resources and management (Kangalawe & Noe, 2015; Castilho et al., 2018). Implementing innovative solutions that take into account the livelihood options of these communities would foster support, and lead to a change in behaviour, consistent with the SET. For example, beekeeping could reduce dependency on agriculture and foster the direct use of CFs for sustenance, since successful beekeeping business is interdependent with forest ecosystems, hence forest conservation. Furthermore, incentives for conservation should also be introduced to encourage people to preserve CFs as a source of livelihood. This suggestion is in line with the findings of Sabuhoro et al. (2020); and supported by SET prepositions.

Regarding community perceptions towards conservation, the only psychological factor that was found to have a significant impact was spill-over effects. The TPB explains environmental behaviour through attitude, subjective norms, and perceived behavioural control. However, in this study, attitude and perceived behavioural control did not explain people's behaviour clearly, which is consistent with findings from other studies (Mastrangelo et al., 2013; Meijer et al., 2015). The impact of conservation efforts has played a pivotal role in shaping social norms. These norms reflected the perceived pressure from others to behave in a certain way and were demonstrated through spill-over effects. Even without strong pressure from the community, people were more willing to engage in conservation activities due to the benefits they could accrue. Additionally, receiving information from others about the benefits of conservation—known as 'spill-over effect'—had a direct impact on conservation intentions.

While spill-over effects had a positive influence on perceptions, there were still some challenges hindering their full potential for utilization in conservation success. These challenges included biased and double standards in rule application, and the lack of proper conservation education shared among community members. This explains why communities had limited information that could be shared for positive conservation results. Also, a fair and strict exercise of conservation rules and regulations would help safeguard CFs.

However, the lack of accountability by village leaders and double standards in rules observation were correlated with non-conformity to existing rules and regulations. In contrast, a study by Byerly et al. (2019) established that, providing information about the participation of others in conservation may reduce interest of participation among some individuals; this was related to non-conformity norm, free-rider syndrome or external pressure crowding intrinsic motives, hence loosing involvement interest. Therefore, if heeded, the provision of conservation education, fair observation of rules and regulations, and good governance: all would help foster conservation by winning community support and motivate them to engage in conservation practices, and hence the attainment of CFs' conservation goals.

In this study, it was discovered that policies and regulations may reduce the desire to encroach on CFs and promote positive attitudes toward conservation. Unlike other studies where implementing rules and regulations led to negative attitudes towards conservation, this study found that doing so could actually foster positive perceptions (Kangalawe & Noe, 2012; Linuma & Tang'are, 2018). Effective policies and regulations were vital for safeguarding CFs, but often they were not implemented properly. This was due to the fact that communities were often excluded from the formulation of CF policies and regulations. This study has shown that involving communities in decision-making processes is a key factor in driving behavioural intention. Other studies have also demonstrated that participation in rule-making and decision-making can lead to greater satisfaction and positive motivation (Persha et al., 2011; Rose et al., 2014; Phongkaranyaphat et al., 2017). Therefore, involving local communities and enforcing fair regulations could improve decision-making, encourage compliance with conservation rules, reduce the risk of encroachment, and ensure successful conservation efforts.

Furthermore, the findings have shown that excluding communities from decision-making could result in resistance and anger toward management and conservation efforts, as noted by Ward et al. (2018). In contrast to previous studies, behavioural intentions are found to be linked to community involvement in decision-making processes, rather than being solely influenced by attitude, as suggested by Abdulkarim et al. (2017) and Ward et al. (2018).

Despite a negative correlation between perceptions towards conservation and the cost of conservation, the type of crops grown—specifically paddy farming—was found to have a significant impact on perceptions. Conservation costs, on the other hand, were deemed insignificant. The system of paddy farming in the study area included valley-bottom shifting cultivation, which has been identified as a contributing factor to deforestation and degradation. To gain the support of paddy farmers for conservation efforts, interventions that have a direct impact on their occupation would likely be more effective. One way could be through introducing modern seeds that require less water but produce higher yields, which would in turn discourage encroachment.

It is clear from the foregoing that when it comes to personal costs, people tend to choose the option that benefits them the most. For example, in Haiti, farmers believed that a forestry program would protect the soil and ultimately benefit their agricultural activities; so they supported it (Dolisca et al., 2007). Similarly, in Botswana, the local communities' positive perception of forest conservation was linked to the perceived advantages of conservation, which they deemed essential for their well-being (Garekae et al., 2016). Hence, the study findings revealed that communities had negative views towards conservation due to conflicts of interest arising from the costs associated with conservation, which aligns with a previous study by Kangalawe and Noe (2012).

To gain the support of paddy farmers for conservation efforts, interventions that have a direct impact on their occupation would be more effective. One way could be by introducing modern seeds that require less water but produce higher yields, which will discourage encroachment. Encouraging community members to pursue higher education, such as college and university studies, also could reduce the overdependence on CFs for livelihoods, and increase the likelihood of successful conservation efforts (Garekae et al., 2016; Tadesse & Teketay, 2017).

Overall, the combination of the TPB and SET resulted in enhanced explanatory power, effectively elucidating pro-social and self-driven behavioural intentions and actions. Based on our research, social interactions play a crucial role in stimulating behaviour; and serve as a fundamental requirement for comprehending other factors that influence attitudes toward conservation. Additionally, the study has recognized the possibilities and restrictions of implementing the TPB. While the TPB provided a valuable understanding of the drivers that shaped community's views on conservation, it failed to encompass certain factors that were emphasized through qualitative data, such as attitudes and behavioural intentions. According to some studies, the TPB may not fully account for behaviour (Mastrangelo et al., 2013). However, our research has discovered that by combining the TPB with the SET, we can significantly improve our understanding of human behaviour and behavioural intentions.

5. Conclusions

The paper's results clearly suggest that positive perceptions toward conservation among the sampled community were insufficient to guarantee successful conservation efforts. Despite the community's optimistic views, CFs continue to suffer destruction. It was evident that relying solely on community perceptions was inadequate to ensure successful conservation practices, since the lack of necessary motivations or conflicts of interest prevent the community from participating in conservation efforts. Successful conservation efforts can be achieved through inclusive, bottom-up policy approaches prioritizing the sharing of information about conservation, and developing strategies to increase economic opportunities through CFs. Additionally, it is essential to provide CCROs to support these efforts.

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