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Assessing the effectiveness of local community leaders in managing forest resources in the Mole National Park

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Abstract

Purpose: Protected areas remain an indispensable haven for wildlife resources, and fringe communities must participate in protected area management. Conflicts do arise amongst stakeholders and to resolve these conflicts and to get the best result out of protected areas, the co-management approach is apt, and community leaders play a major role in this direction. However, the focus of this paper is to explore how effective community leaders are in the co-management process.

Research methodology: Mixed method approach was used in this study. For data collection, Questionnaire administration, Focus Group Discussions, and Key Informant Interviews were used in gathering the data. Data analysis was performed using SPSS where results were presented as descriptive statistics supported by content analysis.

Findings: The study revealed that the fringe communities endorse their leaders as the most effective in protected Area management. The study also showed that both the surrounding communities and the Mole national park benefit positively from collaborative management.

Limitations: Some of the community people who were sampled for the question administration were skeptical and reluctant in giving an audience to the researcher with the fear of being cited with contempt of interfering with the work of wildlife staff, but this was later resolved. In addition, the geographical scope of the study was limited to only three communities due to funding challenges.

Contribution: The study could engender the development of benefit-sharing schemes in protected areas and could also lead to the discovery of eco-tourism potentials of some of the fringe communities.

Keywords: Collaboration, Effectiveness, Participation, Stakeholders

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1. Introduction

Wildlife resources are essential natural strongholds for human livelihood across Ghana and the world, despite the fact that disputes between users and managers of the resources are common (Tiimub et al., 2019). Nonetheless, developing efficient forest management techniques is a problem, particularly in locations where the forest is a source of livelihood for the people living close to the forest resource (Marques et al., 2014; Hays, 2017). The practice of protecting national parks while restricting biodiversity use by neighboring localities fosters discontent and creates a divide between communities and protected area managers. Ghana, like many other countries, has legislation and regulations in place regarding natural resource ownership, access, usage, and management. Primarily, Ghana's constitution

explicitly devolves ownership and control of natural resources to the President in the trust of the Ghanaian people (Oduro et al., 2012). The state has created a number of policies and legislation to ensure sustainable utilization and conservation of forest and wildlife resources, in order to minimize overexploitation and unlawful harvesting. These policies and legislative outlines are allegedly state-centric and do not address the demands of the local people in terms of forest and wildlife resource management (Baruah, 2015; Baker et al., 2018). Furthermore, the execution of these policies has long been fraught with difficulties (O'Connor et al., 2021). As a result of this, numerous decentralized, and multifaceted approach and systems to protect area management is required so as to minimize if not zero down these conflicts in forest management have been proposed as alternatives to top-down and state-centered approaches to alleviate the threat of deforestation and forest degradation (Baker et al., 2018; Yahaya, Zakaria & Boasu, 2021). It is impossible to overestimate the importance of incorporating local communities in natural resource management. By involving local communities in forest and wildlife management, the Community Resource Management Area (CREMA) approach is an essential participatory model capable of generating the proper circumstances for sustainably managing forest and wildlife resources. According to relevant studies, proper natural resource governance requires integrating and empowering local people to manage their natural resources (Baruah, 2015; Baruah et al., 2016). Therefore, effective local leadership methods and active participation of the local people are required to capture their perspectives and improve local decision-making and maximize the value of social and economic benefits (Baker et al., 2018; Prakoso, Pradipto, Roychansyah & Nugraha, 2020). This is because local officials must engage in a comprehensive discourse with various interest groups about the potential effects of removing community tourism and related activities from the equation of protected area management (George, 2021).

Yahaya et al., (2021) indicate that community leadership and local management strategies in protected area management exist in communities surrounding the Mole national park. Nevertheless, there is still a lot to be done concerning community participation in the management of protected areas since earlier studies have focused on only the schemes for ensuring effective forest management in northern Ghana. The concern is determining how to assess the effectiveness and full participation in park management. The study's goals are to determine how local community leaders are involved in park resource management. This was aimed at investigating the effectiveness of local leaders in park resource management, and examining the relationships between local community leaders and park officials in park management.

2. Literature review

Since the summit in Brazil-1992, community participation in forest resource management has received widespread support and engagement (Bennett, 2016; Mutanga et al., 2015, 2016), because it is expected that all stakeholders in forest flora and fauna resource management bring diverse management systems from their backgrounds on board to holistically manage the resources. Joint forest management, for example, has been investigated in India (D'silva & Nagnath, 2002); in Mexico, Conservation forest management (Bray et al., 2003); in Malaysia, a study of Regional awareness of Cameroon Island (St Jacques, 2009); in Cambodia, Monk community forest management (UNDP, 2012b); in China, Kanghua community development Centre (UNDP, 2013); as well as in Botswana, CBNRM in Okavango Delta (Mbaiwa, 2012). All these studies indicated that community participation in the management of forest resources at all levels was effective. Also in Tanzania, community participation in the management of the Saaki spring was limited to only community leaders at the decision-making level (Mokiwa, 2015). Nevertheless, studies in Nepal, CBNRM in Annapuma and Makalu – Barun (Kellert et al., 2000); in Kenya, Kimana community wildlife sanctuary (Kellert et al., 2000); and in Zimbabwe, the impact of CAMPFIRE on local community Wildlife management (Mutandwa and Gadzirayi, 2007) indicated the concept was a paper-work since communities and their leadership was not involved in the management of forest resources.

The Mole National Park, like other Ghanaian game reserves, is underfunded to prevent poaching and other non-beneficial activities, thus community leaders will be needed to urge their followers to help manage forest flora and wildlife resources (Shaw, 2018). Co-management has been highlighted as a novel way to sustainable forest management, particularly in communities in both developed and

developing countries where human activities put considerable pressure on forest flora and fauna resources (Stevenson, 2006). Several efforts have been deployed around the world since the 1970s to solve the challenges of biodiversity protection and poverty reduction among people in surrounding communities of protected areas (Clay, 2016; Green, 2016; Ouko, 2018). In Ghana, Community Resource Management Areas (CREMAs) were formed as a substitute for the limited and centralized style of protected area management and to relieve the burden on protected areas so as to involve the people in the management of these protected areas (Foli et al., 2018). The Ghanaian model is also constrained by a diverse set of stakeholders with differing interests, goals, insights, and prospects for protected areas (Agyare et al., 2015). Anthropogenic activities of man such as logging, poaching, mining, bush burning, and unsustainable farming practices are the main problems that local communities and institutional actors operating in protected areas face, and collaborative management is essential to nip these problems in the bud (Reed et al., 2020).

Local community leaders have a good impact on wildlife management that should never be underestimated; since they foster calm and sustained interaction among stakeholders in and around protected areas (Emanuel & Ndimbwa, 2013), this goes a long way toward encouraging development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity, and innovation, as well as foster enterprise formalization and growth (Walkowski et al., 2019). Adapting the concept of community watchdog as one of the ways of managing forest flora and fauna resources, it is expected that overexploitation and abate emerging and prevailing clashes amongst stakeholders will reduce minimally (Gbimire, 2019; White & Ward, 2011), but this comes with its own set of challenges, such as community leadership interfering in measures taken against reprobates (Ameyaw et al., 2015). In this situation, enforcing legal procedures to maintain natural ecosystem integrity becomes extremely challenging. For example, despite legislative bans on illegal rosewood logging, some village chiefs appear to allow logging in their communities, because the wield power that shields them from legal action (Reed et al., 2020).

3. Methodology

Study Area

Mole National Park, Ghana's largest reserve with a current area of 4,840 km^2 is located in Damango in the Savannah Regional capital (Reed et al., 2020). Kwame Nkrumah founded the park as a hunting reserve in 1958, and it was designated as a national park in 1971 (Apagrimchang, 2018). It stretches between Tamale and Wa, and is found between 9^o 1' and 10^o 10'N and 1^o 22' and 2^o 13'W (Mole National Park Management Plan, 2011). The region's climate is dominated by two distinct seasons: The wet season has an unpredictably early start and typically lasts from April to October, with a peak in June. 1144 mm of rainfall is reported as a yearly average (Ghana Statistical Service, 2012). The rainstorms are torrential, with 300 mm of rain falling per hour at times. During the rainy season, more than 90% of the rainfall is recorded, although time and location is unpredictable (Braimoh & Vlek 2005; Bouché 2007). Temperatures average 27 degrees Celsius on a monthly basis. The average annual temperature is 28 degrees Celsius, with temperatures ranging from 26 degrees Celsius in December to 31 degrees Celsius in March. The average temperature difference between day and night is 13 degrees Celsius. In March and April, temperatures can reach 40 degrees Celsius, making it uncomfortable to be outside. During the dry season, the relative humidity for night and afternoon is 50 percent and 20 percent, respectively, whereas, during the rainy season, the relative humidity for night and afternoon is 90 percent and 70 percent, respectively (Mole National Park Management Plan, 2011).

Sackey & Hale (2008) outlined some trees that could be found in the park including deciduous acacias and other trees such as the Baobab, Dawadawa, Silk Cotton, Burkea Africana, Lannea acida, Ebony tree, and Shea tree. Feretia apodathera, Flueggea virosa, Tinnsea spp., Urginea spp. were among the shrubs (Sobey, 1978). Abutilon ramososum, Aneilema umbrosum, Atylosia scarabaeoides, Btepharis maderaspatensis, Desmodium velutinum, Mariscus altemifolius, Ruelia, Sida urens, Triumfatta pentadra, and Wissadula amplissima were among the herbaceous plants identified. Andropogon spp., including Andropogon gayanus var squamulatus (a tall grass), Brachiara spp., Loudetiopsis kerstingic, Sporobolus pyramidalis, and Setaria barbata were among the grasses found (Kuuder et al., 2013b). Elephant, roan antelope, patas monkey, baboon, green monkey, several reptiles and amphibians, and

numerous resident and migratory birds are among the wild animals regularly spotted in the park (Owusu-Ansah, 2018). Figure 2 shows the study villages on a map of Mole National Park.

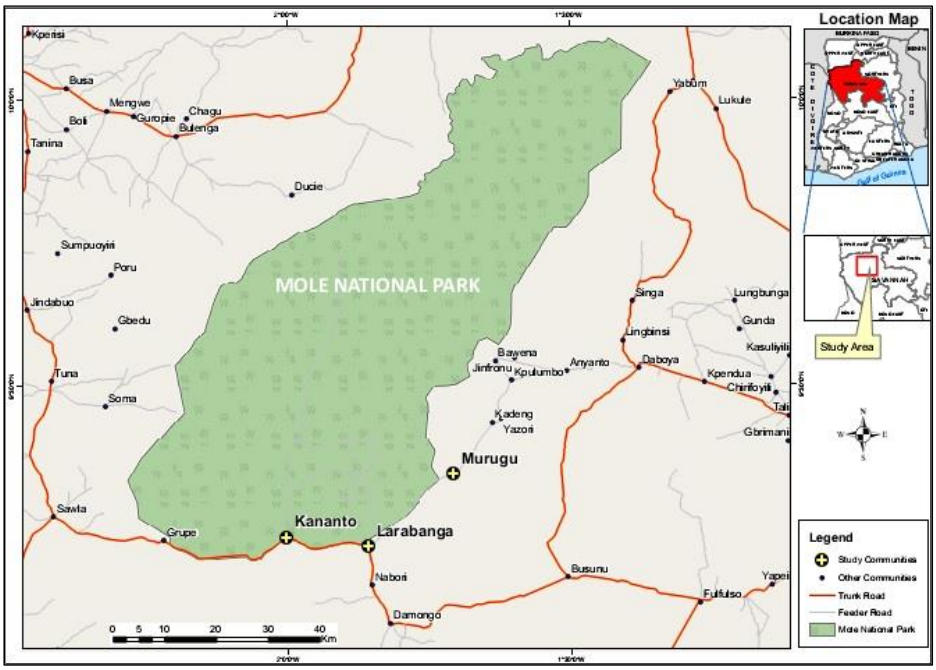

Figure 1. Map of Mole National Park

Socio-Economic characteristics of study communities

The communities selected for this study have either implemented the Community Resource Management Area (CREMA) initiative or are into tourism-related activities in and around the fringe communities. The socio-economic characteristics of the communities from which data were collected are as follows:

Larabanga community

The Larabanga community is situated in the Western part of the country, fifteen kilometers drive from the Savanna Regional capital, and 0.2 kilometers drive from the park's headquarters. Although there are various minority tribes in the area, it is primarily a Kamara community. The people of the town rely heavily on farming activities for a living. Ceramics, basketry, wood carving, making hoe handles and catapults, blacksmithing, rope weaving, processing medicinal herbs, honey, and Shea butter processing are just a few of the local jobs the people are engaged in. Apart from the aforementioned, Larabanga is open to community tourist activities due to the existence of the historic mosque and the magical stone (Museums and Monuments Board, 2009).

Murugu community

Murugu community is located on the park's south-eastern border and is part of the West-Gonja Municipality of Ghana's Savannah Regional capital. The Park's headquarters is 16 kilometers drive from the community. Murugu community is primarily a Hanga hamlet, with around 90% of the inhabitants being Hanga. The Gonja, Dagaaba, Fulani and Kamara are the minority groups in the Murugu community. In Murugu, farming is subsistence-based and controlled mostly by women (A Rocha-Ghana, 2006).

Kananto community

Kananto community is located along the Larabanga-Sawla route at coordinates 9º 14' 0" north and 2º 0' 0" west. Although the community is Gonja, ethnic groups such as Kamara and Fulani can be found there. The majority of the population is involved in livestock rearing, and cereal crop farming. A few Kananto residents are engaged in charcoal production (A Rocha-Ghana, 2006).

Methodology

The research considers the research design, data sources, sampling methods, data collection methods, and data analysis and presentation procedures.

Design of the study

The study employed a mixed-method approach in collecting, analyzing, and presenting the results. This strategy allowed for the use of both qualitative and quantitative methods in the research process (Agresti & Finlay, 2009). Qualitative and quantitative methodologies should both be used in groundbreaking research (Trochim, 2006) since the two methods complement each other by making up for the deficiencies in the other.

Sources of data

Data from the field were collected through interviews with chiefs from the three study communities, two Mole National Park personnel, one member of the CREMA executive committee, and one officer from Arocha-Ghana who served as key informants for this research. Primary data was also collected using household questionnaires in the three communities selected for the research and Focus Group Discussions. The study's data was gathered from a variety of sources, including Park profiles, published papers, and other pertinent materials that showcased relevance to the study.

Sampling

Target population

The study's data came from Larabanga, a town with a population of about 4,308 people, Murugu, with about 1,220 individuals, and Kanato, with about 586 persons (GSS, 2012).

Sample size

A sample size of 98 people was considered for questionnaire administration in the three communities selected for the study. This was calculated with a 90 percent confidence interval using Yamane's algorithm from 1967. Following the output from the formula: 69 people responded to the questionnaire for Larabanga community, 20 people for Murugu community, and 9 people responded for the Kanato community. Key informants, including two officers from the Mole National Park, one member of the CREMA executive committee, an officer from Arocha-Ghana, and a chief from each of the communities, were interacted with in addition to the calculated sample size. Focus Group Discussions were held with a mix of males and females who were interested in forest flora and wildlife conservation.

Sampling techniques

Both probability and non-probability sampling procedures were used in this study to collect data. The approaches of purposeful sampling and simple random sampling were applied particularly. The three research villages were chosen from among the 33 localities that surround the Mole National Park using purposeful sampling. Larabanga Community was regarded to be the nearest to the Mole National Park and an eco-tourist destination due to the presence of the mystical stone and the medieval mosque. Visitors of the Mole National park usually stopover in the Larabanga community to engage in some community tourism activities by visiting the mosque and the stone where visitors are taken through the rich history and happenings regarding the community. Murugu community was also chosen because of the community's active participation in the CREMA initiative's operations.

The Murugu community falls under one of the vibrant CREMAs in the Mole landscape, which is the Murugu-Mognori CREMA. Apart from the community people involved in park management activities, they have also fully rolled out livelihood alternative opportunities for themselves which are fully sponsored by A Rocha, wildlife society, Tree aid, North code, and the Mole national park. People in this community are also engaged in gari processing, shea butter processing, and honey making. They have also established for themselves as part of their CREMA activity, the Mognori eco-village, and boat safari. Because of its location between the Mole National Park and the 'Kenikeni' forest reserve, the community of Kananto was chosen for the study.

The people of Kananto community feel cheated and forgotten. The Kananto's agricultural endeavors are impeded by its geographical location. They cannot advance their farmlands towards the forest nor can they move towards the park since they are settled right on its boundaries. Selecting these three communities for the study gives the best response on the readiness of communities to collaborate in park management and how this could be effective in these communities considering the different scenarios they exhibit. Purposive sampling was also used to select participants who had a lot of information for interviews. Simple random selection was used to choose houses for questionnaire distribution in the three research communities, with household heads being targeted. The random number table was used to construct the simple random sample. It means that the sample chosen is representative of the population from which it was collected in a fair manner (Ghauri & Gronhaug, 2005).

Data collection methods and tools

In this study, household questionnaires were distributed to household heads to elicit their response on how effective community leaders are in the management of forest flora and fauna in the Mole national park, key informant interviews were conducted with the leadership of the three communities selected for this study and that of organizations so pronounced in protected area management and focus group discussions held at the community level. A set of household questionnaires distributed to household heads collected information on how community members participate in flora and fauna management, the effectiveness of local community leaders in administering resource management, and the linkages between communities and the Mole National Park in the quest to manage forest resources. Management staff from the Park, a representative from A Rocha- Ghana, a member of the CREMA executive committee, and a chief from each of the communities were interviewed using semi-structured interview guides. In Focus Group Discussions, males and females were equally represented in each study community.

Analysis and presentation of data

Data were analyzed using descriptive statistics, a component of SPSS version 20, and displayed in tables, frequencies, and percentiles for easy understanding. The data were also subjected to inferential analysis in the form of analysis of variance (ANOVA) to see if there were any statistically significant differences in responses to the various parameters being measured and if so, what contributed to that. To supplement the descriptive statistics, qualitative data was inserted into a few texts and displayed as quotations using content analysis.

4. Results and discussions

Demographic characteristics of respondents

This study involved individuals with diverse socio-demographic features aimed at gathering relevant information on the effectiveness of community leaders in the management of forest resources in the park. The following demographics were considered; sex, age, occupation, and educational level of the respondents. These socio-demographic variables were considered because they could have a toll on the findings of the research since one's sex, educational background, age, and occupation can be a determining factor in how he/she can comprehend and actively participate in protected areas management activities.

Sex of respondents

Data obtained from the study were based on information from 98 respondents. With regard to sex, the survey recorded 71 (72.4%) male respondents and 27 (27.6%) female respondents from the three selected communities considered for the study, which are represented in Table 1. This means forest flora and fauna management is usually in the hands of the males, who usually head the local community institutions. Local management strategies are made and enforced by the heads of clans, chiefs, 'kasawule-wura' (land priest), and or the rainmakers, which are all male-dominated positions in the northern part of Ghana, especially the three communities from which data were collected for the study. That is to say, heads of clans, Chiefs, 'Kasawule-wura' (land priest), and or rainmakers protect, preserve and effect punishment where necessary on people who perpetuate illegalities with regard to the conservation of the natural resources in the fringe communities of the Mole National Park.

Table 1. Distribution of respondents by sex

Gender	Frequency	Percent (%)
Male	71	72.4
Female	27	27.6
Total	98	100

Source: Field study

Age of respondents

The study considered respondents twenty (20) years and above for data collection, respondents within these age groups are considered mature and could make informed decisions independently and are thus, considered household heads. Table 2 shows the distribution of respondents by age 21 (21.4%) respondents were in the 20-30 years age group, 31 (31.6%) respondents were in the age range of 31-40 years, 23(23.5%) respondents were of the age of 41-50, 14 (14.3%) representing respondents within the age range of 51-60 years and respondents above 60 years were 9 presenting 9.2% of the sample size.

It can be appreciated from the data that most of the respondents were within the economically active population, which is from 20 to 50 years who are engaged in biodiversity-related activities in the various communities. However, those above 50 years still engage in biodiversity-related activities by enforcing traditional management strategies and sanctions when the need arises in the fringe communities of the park. These groups of people have experience and much knowledge about the park, as well as existing traditional strategies in the forest flora and fauna management, and guide the enforcement of such strategies to the latter.

Table 2. Age distribution of respondents

Age	Frequency	Percent (%)
20-30	21	21.4
31-40	31	31.6
41-50	23	23.5
51-60	14	14.3
> 60	9	9.2
Total	98	100

Source: Field study

Occupation of respondents

Data obtained from the study on occupation indicated that many of the respondents were farmers. That is, 59 out of the 98 respondents representing 60.2% were farmers whose farms are very close to the boundary line of the park and sometimes battle with wild animals raiding their farms. The remaining 39.8% represented the other occupations including firewood producers, hunters, traders, and those involved in other economic activities. This means that the fringe communities are farming communities and the people rely heavily on subsistence farming. Because the majority of the respondents are farmers, their daily activities are much affected by the existence of the park and the activities of wild animals. Table 3 is supported by the following assertion in a Focus Group Discussion.

"We are so constraint with land to farm and the small area we have for our farming activities, elephants and other animals cross over to raid our farms, and management of the park only come to assess the extent of the damage but no compensation is given to us" (FGD, Kananto).

Table 3. Distribution of respondents by occupation

Occupation	Frequency	Percent (%)
Farming	59	60.2
Firewood producers	4	4.1
Hunting	4	4.1
Trading	20	20.4
Others	11	11.2
Total	98	100

Source: Field study

Educational level of respondents

One's level of education is vital in determining his or her acceptance, involvement, and beliefs about the effectiveness of local (indigenous) institutions and traditional management strategies on biodiversity conservation. For this reason, the study disclosed the educational background of the respondents, and this is indicated in Table 4. It is revealed that 66 (67.3%) respondents are without formal education, and 16(16.4%) of the respondents had basic (primary and JHS) education. The data also showed that 12 out of 98 respondents representing 12.1% had secondary/middle school education, and about 4(4.2%) respondents out of the 98 have attained post-secondary certificates and university degrees. From the above, it means that the vast majority of those polled had no formal schooling, and for that matter, had some respect for local institutions and management strategies and thus adhere to directives of these institutions. However, due to a lack of formal education, they find it difficult to streamline these institutions with those mandated by the constitution such as the forestry service division, the game, and wildlife division, and other auxiliary bodies in the management of biodiversity in the landscape. The illiteracy rate is high such that many efforts are put by such bodies but little results is achieved in the quest to develop alternative livelihoods for fringe communities of the Mole National Park.

Table 4. Level of Education of respondents

Educational Level	**Frequency**	**Percent (%)**
University	2	2.1
Post-secondary	2	2.1
Senior high school	12	12.1
JHS	8	8.2
Primary	8	8.2
Illiterate	66	67.3
Total	98	100

Source: Field study

Institutional linkages in forest flora and fauna management

Institutional partnerships are seen as direct engagements through different links with the aim of supplying information and or physical resources to the management of forest flora and fauna resources

(Adger et al., 2004). Formal institutions, managing the same sector, usually would have to interact among themselves horizontally and at the same time vertically with other informal institutions at the local level so as to allow for full implementation of decisions reached by both the formal and informal institutions.

Linkages between Mole National Park and local community leaders in the management of MNP
The study explored how Mole National Park's forest flora and fauna are managed through a partnership with the fringe communities. The communities from which data were collected for the study have attested that Mole National Park and their respective partners such as the forestry service division, A Rocha, Tree Aid, and Wildlife society have links with the communities and the results are shown in Table 5. It is evident from the Table that 77(78.6%) of the respondents agreed that local community leaders and the Mole National Park and other development partners collaborate in the management of Mole national park. The remaining 21(21.4%) of the respondents think otherwise and this is due to frictions the people in the communities have with the park management in areas of boundary lines, poaching, and crop raids.

During a key informant interview, an official from the park had this to say;
"Mole as the principal entity in protecting and conserving the reserve has established a community collaboration unit to link with the communities fringing the park to educate and address members of the communities on the need to participate in forest flora and fauna resource management and also to take in concerns of the fringe communities as partners in management" (KII, MNP).

In a study by Seixas (2006), it is indicated that while informal institutional partnership might be an example of unofficial grounds for information sharing, the fringe communities have the opportunity to have education on how to put into practice new management strategies and share the knowledge with other communities thereby serving as a trainer of trainees.
In a key informant interview, a participant had this to say;

"We are teaching and empowering our friends in our neighboring villages to adopt the CREMA system and in fact, they are more than willing to learn and implement what we tell them since the benefits of the initiative are evident enough" (KII, CREMA).

Table 5. Linkages between Mole National Park and local community leaders in resource management

Response	**Frequency**	**Percent (%)**
Yes	77	78.6
No	21	21.4
Total	98	100.0

Source: Field study

In the quest to ascertain the commonality of responses pertaining to linkages between Mole National Park management staff and leaders of the fringe communities, an analysis of variance was carried out. Analysis from the ANOVA Table below indicates $p<.05$ signifying a statistically significant difference in responses on the linkages between Mole National Park and local community leaders in forest flora and fauna management, [$F(2, 95) = 3.646$, $p = 0.030$]. This means that the communities have varying views on whether there are linkages and if there are any but not for the management of forest flora and fauna. The results are presented in Table 6.

Table 6. ANOVA results of linkages between Mole National Park management staff and local community leaders in the management of MNP

Source variation	Sum of Squares	Df	Mean Square	F	P-value
Between groups	1.176	2	.588	3.646	.030
Within groups	15.324	95	.161		
Total	16.500	97			

Source: Author's calculation via SPSS

A Tukey post hoc test was conducted to ascertain what triggered the difference in responses in areas of linkages between park staff and fringe communities. The test revealed that the statistical significance arose from the significant difference between the Murugu and Larabanga populations (p =.022), as evidenced by one-way ANOVA (F (2, 95) = 3.646, P =.030) in Table 6. There was no statistically significant difference between Murugu and Kananto (P =.356) or Kananto and Larabanga (P =.926) villages. The reason for this difference is that Larabanga community has had issues with the mole national park over the years due to illegal hunting and boundary line issues. Thus, they are unlike the Murugu community that is in the 'good books' of the park for their active involvement in park management activities. The people of Murugu community through the CREMA initiative have a community watchdog that patrols the boundary line of the park and sometimes makes an arrest for the park. Murugu community is one of the fringe communities that has been resettled during the creation of the park and still has access to the sacred grounds and performs yearly sacrifices on those grounds within the park without any hindrance.

Table 7. Tukey post hoc test for linkages between Mole National Park and local community leaders in the management of MNP

Between communities		Mean difference between communities	Std. Error	P-value
Murugu	Kanato	−.222	.161	.356
Murugu	Larabanga	−.275*	.102	.022
Kanato	Larabanga	.53	.142	.926

Source: Author's calculation via SPSS

Effectiveness of the local community leaders in forest flora and fauna management

For cooperative natural resource governance, effective local institutions for collaborative action are required (Lockwood et al., 2010). The majority of the various local institutions in various fringe communities in the mole landscape and in the sub-region are categorized as status quo institutions (Stroud et al., 2006) but this current study reveals otherwise. This contrary finding is attributable to the good and active leadership role in the fringe communities of mole national park. Results of the effectiveness of the local community leaders in the management of forest flora and fauna in the MNP are shown in Table 8.

The goal of the study was to determine how efficient local community leaders are in partnering with Mole National Park management staff in the conservation of forest flora and animal species. Local community leaders are effective in their mandate in conserving and assisting park management in conserving natural resources, according to 62 (63.3%) of respondents, and very effective in their mandate in conserving and assisting park management in conserving natural resources, according to 26 (26.5%) of respondents. However, 10.2 percent of respondents said that local community leaders are ineffective in managing forest flora and wildlife in the MNP. Overall, community leaders are assisting

and ensuring that community members participate in forest flora and fauna management in the MNP and within their own jurisdiction.

During a focus group discussion, a group has this to say;
"The chief together with his elders reminds the community people of the commitment and need to protect the park for the enormous benefits we stand to enjoy from the park if we adhere to rules and regulations regarding natural resources conservation" (FGD, Kananto).

Table 8. level of effectiveness of the community leaders in the management of forest flora and fauna

Level of effectiveness	**Frequency**	**Percent (%)**
Not Effective	10	10.2
Effective	62	63.3
Very effective	26	26.5
Total	98	100.0

Source: Field study

Results from the ANOVA in Table 9 indicate that there are no statistically significant differences between responses on the effectiveness of the community leaders in forest flora and fauna management at $p>.05$ from the three communities [$F(2, 95) = 0.116$, the p-value is 0.890]. This means that majority of the respondents have agreed that community leaders in the fringe communities were effective in helping the staff of Mole National Park in managing forest flora and fauna. This justifies the 62(63.3%) and a cumulative 88(89.8%) of the respondents in Table 8 agreeing that the community leaders are effective in forest flora and fauna management in the Park.

Table 9. ANOVA Table on the effectiveness of the community leaders in the management of forest flora and fauna

Source of variation	Sum of squares	Df	Mean Square	F	P-value
Between Groups	.081	2	.041	.116	.890
Within Groups	33.306	95	.351		
Total	33.388	97			

Source: Author's calculation via SPSS

The impact of collaboration between the community leadership and mole national park management staff

The study probed to establish if their existing collaboration in the management of forest flora and fauna species yields any positive impacts to both the park and fringe communities. The findings are presented in Table 10. The results in Table 10 reveal that 2(2.0%) strongly disagreed, 18(18.4%) disagreed, 12(12.2%) neither agreed nor disagreed, 36(36.7%) agreed, and 30(30.6%) of the respondents strongly agreed, overall, about 66(67.3%) of the respondents indicated that the existing collaboration in the conservation of forest flora and wildlife species at mole national park yields positive impacts to both the park and fringe communities.

Table 10. Existing collaboration yields impact to both park and fringe communities

Response	**Frequency**	**Percent (%)**
Strongly disagree	2	2.0
Disagree	18	18.4
Agree	36	36.7
Strongly agree	30	30.6
Total	86	87.8
Missing System	12	12.2
Total	98	100.0

Source: Field study

In a quest to determine the commonality in responses among the participants as to whether the collaboration yields any impact for both the Mole National Park and the fringe communities. The ANOVA results from Table 11 indicate no statistically significant difference in responses on the positive impacts of the collaboration between community leadership and Mole National Park in forest flora and fauna management at $p>.05$ with [$F(2, 83) = 0.080$, $p = 0.923$].

During a focus group discussion in Kananto, a participant had this to say;
"We were given beehives, honey harvesting clothing, and training on how to extract honey without using fire, which was only made possible owing to the work of an NGO in conjunction with Mole National Park" (FGD, Kananto).

Table 11 ANOVA results on existing collaboration impact to both park and fringe communities

Source of Variation	Sum of Squares	Df	Mean Square	F	P-value
Between Groups	.107	2	.053	.080	.923
Within Groups	55.149	83	.664		
Total	55.256	85			

Source: Author's calculation via SPSS

Age of respondents and how they participate in the management of forest flora and fauna
Using cross-tabulation of the two variables in SPSS, the age distribution of respondents based on how they participate in the management of forest flora and fauna in the Mole National Park was displayed, and the findings are provided in Table 12.

It is revealed from the results that 26(26.5%) of the respondents across all the age groups participate in forest flora and fauna management in the park as guards formally employed or serving on the community watchdog, where a majority of them are within the age bracket of 31-40 years representing 12(12.2%) out of the 26(26.5%). Results from the cross-tabulation emerged that 28(28.6%) of the respondents have it that they participate in forest flora and fauna species management in the park by obeying the rules and regulations of the Mole National Park and the by-laws set by communities themselves, 18(18.4%) participate by providing voluntary information on suspected cases, 10(10.2%) participate in forest flora and fauna management by enforcing customary laws and 16(16.3%) of the respondents said they participate in forest flora and fauna management by partaking in decision-making on how to protect the park.

Table 12 Cross-tabulation between age of respondents and how they participate in forest flora and fauna management

	AGE					
	20 -30	31 -40	41- 50	51 -60	60+	Total
Employed as guards	7(7.1%)	12(12.2%)	4(4.1%)	3(3.1%)	0(0%)	26(26.5%)
Obeying rules and regulations	5(5.1%)	8(8.2%)	7(7.1%)	4(4.1%)	4(4.1%)	28(28.6%)
Volunteering information on suspected cases	5(5.1%)	4(4.1%)	5(5.1%)	3(3.1%)	1(1.0%)	18(18.4%)
Enforcing customary laws	1(1.0%)	2(2.0%)	3(3.1%)	2(2.0%)	2(2.0%)	10(10.2%)
Participating in decision making	3(3.1%)	5(5.1%)	4(4.1%)	2(2.0%)	2(2.0%)	16(16.3%)
Total	21(21.4)	31(31.6%)	23(23.5%)	14(14.3%)	9(9.2%)	98(100%)

Source: Author's calculation via SPSS

5. Conclusions

The findings show that many stakeholders' leadership facilitates customs and traditions aimed at safeguarding the Park's resources. The stakeholders are in charge of enacting local laws and enforcing them against anyone who disobeys them. If these community leaders had not existed, no rules and compliance for forest resource management would have existed, according to the study. There's also evidence that locals and park employees have coexisted amicably because they consider themselves as partners in conservation.

The Mole National Park's management should continue to collaborate with environmental non-governmental organizations (NGOs) that focus on community development in order to help the park enhance the capacity of neighboring communities in alternative livelihood programs. With the help of these NGOs, potential community-tourism destinations can be built, providing economic opportunities for the people.

Limitations and future research

Some of the community people who were sampled for the questionnaire administration were skeptical and reluctant in giving audience to the researcher with the fear of being cited with contempt of interfering with the work of wildlife staff, but this was later resolved. Also, the geographical scope of the study was limited to only three communities due to scarce funding opportunities. Even though the management of the Mole National Park, NGOs in environmental conservation, and the local leadership have agreed to partner in the management of forest flora and fauna in the park. Future studies can look at institutional linkages, giving attention to gaps that may result from formal and informal operational frameworks and ways of reconciling the two.

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