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Impact of Baboons' Raiding on Students' Learning in Fringe Communities of the Shai Hills Resource Reserve, Ghana

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Abstract: The study researched on impact of Baboon's raiding on learning in fringe communities of the Shai Hills Resource Reserve, Ghana. The study utilized the descriptive research design. The population included farmers, teachers, students and other residents who lives around the 100 m radius of the protected area. Stratified random sampling determined 250 residents. Qualitative data was collected through semi-structured interviews and focus group discussions while quantitative data was collected through surveys and observation. Data analysis involved descriptive statistics and thematic approach. Observed activities of baboons included movement, socializing, resting and feeding, occurring at various times throughout the monitoring periods. Notably, feeding accounted for the majority of observed activities. The baboons spent fewer hours in the reserve during the daytime, most likely due to scarcity of suitable food, which is a crucial resource for wildlife. During school hours (between 8:00 am and 3:00 pm), the baboons interrupted the teaching and learning activities. Their struggle for survival, co-existing with humans in the same space for food and water heightened conflicts, particularly within the fringe communities of the SHRR. The study recommends that research and conservation efforts are necessary to mitigate potential conflicts between wildlife and human communities in the studied area. Challenges of wildlife-human coexistence call for further efforts in managing conflicts to address both wildlife and human interests.

Keywords: Baboons; Education; Pupils; raiding; Shai Hills Resource Reserve.

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Introduction

Various primates exhibit noteworthy dietary range and elasticity as they alter their feeding patterns when food accessibilities vary (Naughton-treves ett al., 2003; Mekonnen *et al.*, 2010; Chaves et al., 2011; Grueter *et al.*, 2013). These alternances

further incite modifications in primates' foraging and activity budgeting. Generally, primates utilize more time in movement and feeding during the dry season and otherwise in the wet season (Grueter *et al.*, 2013; Lewis & O'Riain, 2017). Over 70 species of primates have been reported to raid crops and other resources in communities (Hampel et al., 2016). Of these, species of cercopithecine such as macques in Asia and baboons in Africa are common raiders (Lee & Priston, 2005).

Primates such as chimpanzee (*Pan troglodytes*), olive baboons (*Papio anubis*), blue monkeys (*Cercopithecus mitis*) and black-and-white colobus (*Colobus guereza*) are popular raiders in Uganda (Hill, 2000). Research by Sitati and Walpole (2006) in Masai Mara, Kenya shows that wildlife-crop raiding incidents averaged about 300 per annum which resulted in 25 deaths and 57 injuries to humans due to physical wildlife attacks on humans (Walpole *et al.*, 2003).Characteristics such as terrestrial adaptations, large-bodies, broad habitat tolerance and possession of cheek pouches to frequently grasp food renders Cercopithecus good raiders. Their rapid learning abilities, opposable thumbs, social and dietary flexibility and territoriality are other good adaptive features of baboons. These, however, result in heightened human-wildlife conflicts in their host communities (Hill, 1997; Hill, 2000; Tweheyo et al., 2005; Monney et al., 2010; Wiafe & Sam, 2014).

Baboons and other primates serve as significant tourist attractions in almost all the savanna wildlife reserves (Mole National Park, Shai Hills and the Gbele Resource Reserve) in Ghana and other parts of Africa (Hill, 2000; Tweheyo et al., 2005; Ochieng *et al.*, 2020). This creates tangible benefits (revenue) and intangible merits (pleasures, relaxations and ecological balance) to facility managers and tourists (Walpole *et al.*, 2003). Nonetheless, baboons (*Papio papio and Papio anubis*) have been reported to damage crop fields and cause injuries to humans especially to farms and rural communities near protected reserves (Hill, 2000; Ochieng *et al.*, 2020). These conflicts keep increasing due to the competition for limited resources between humans and wildlife, the conversion of safe habitats of wildlife by humans for other purposes (farming, housing and leisure) and climate change effects.

Common activities of baboons visiting nearby homes, schools, churches in search for food and water exist in host communities. These incidences heighten fears in communities, especially to children and women, which demands mitigation actions like shooting, trapping and chasing away of baboon. In some communities, times are spent on farms controlling marauding animals or shouting at them when they approach crop fields or human-interested territories. Nonetheless, these further breed tension between humans and wildlife (Hill, 2000; Wiafe & Sam, 2014).

Apart from crop raiding activities, antagonisms between humans and wildlife competing for resources can results into physical injuries and deaths. Other indirect social consequences may include disturbance to academic environment of fringe communities thereby affecting quality of education. A study by Walpole *et al.* (2003) is among few studies conducted to establish the effect of human-wildlife interactions on academic performance. In their studies, they reported poor student performance among school children of Trans-Mara District in Kenya as a result of interference with elephants from the Masai Mara National Reserve. In their studies, they established that, fear of elephant attack was enough to deter the punctuality of pupils, teachers and/or their families. This study sought to enumerate the daily routine activities of baboons and how that affect teaching and learning at basic schools near protected areas in Ghana.

Methodology

Study Area

Shai Hills Resource Reserve is located at Doryumu (latitude 5°53'30" N and longitude 0°3'38" E in Ghana) as indicated in figure 1. The protected area is about 48 km^2 and is managed as a Game Production Reserve by LI 710 of Ghana. There exist rocky mountainous ridges with the highest peak rise of 290 m, dominating grasslands and limited trees. Moderate temperatures, high humidity and low rainfall are characteristic climatic features of the area. The area forms the western end of the Dahomey Gap. The hills are covered by a mixture of forest, thickets and grassland with unique low stature dry forest being mainly found in the intervening canyons. The hills are surrounded by savannah-covered plains at about 60 m elevation. There are no permanent rivers or streams in the reserve. Characteristic animals commonly seen in Shai Hills include Kob *(Kobus kob*) Olive Baboons *(Papio anubis),* Green Monkeys *(Cercopithecus aethiops),* Spot-nosed Monkey (*Cercopithecus petaurista),* bushbuck *(Tragelaphus scriptus),*

Demidoff's Galago *(Galagoides demidoff) and* Tree Hyrax (*Dendrohyrax dorsalis)*. Other species are grass cutter (*Thryonomys swinderianus*), Crested porcupine (*Hystrix cristata*), Slender mongoose (*Galerella sanguinea*), Antelopes (*Tragelasphus spps*) and diverse species of birds (Lieberman *et al.*, 1979; Larbi *et al.*, 2020).

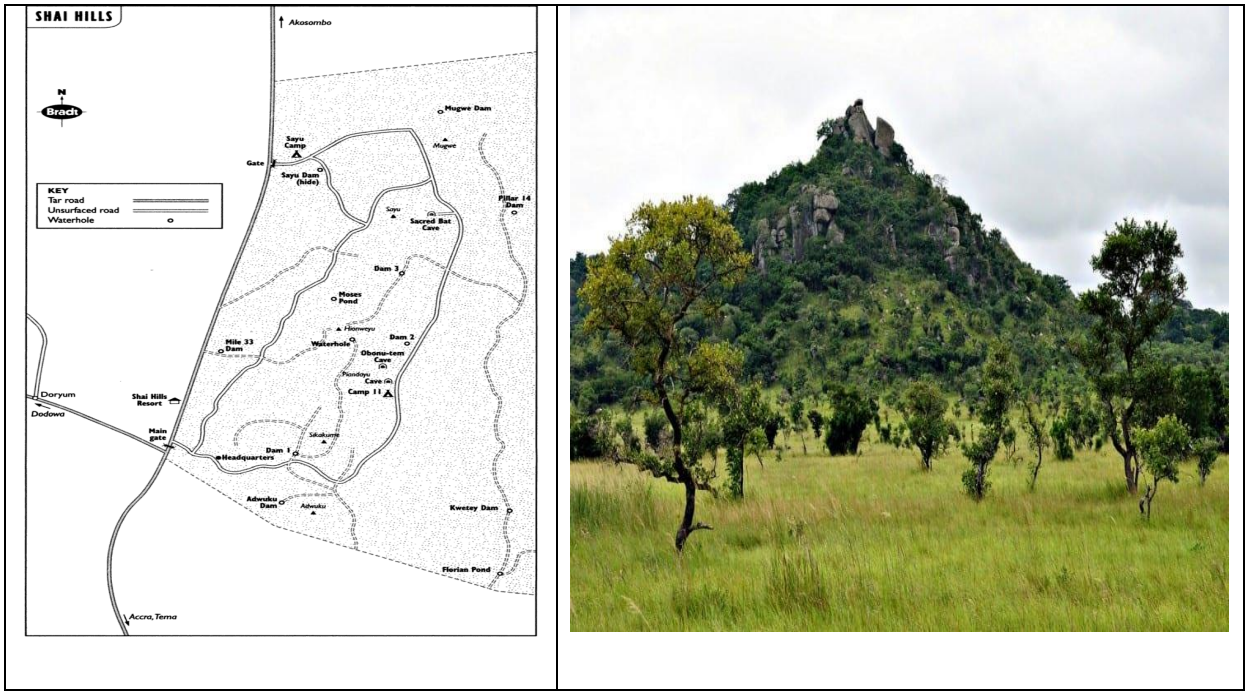

Figure 1: Map and Photo of the Shai Hills Resource Reserve in Ghana

Design

The study utilized the descriptive research design in terms of wordings, frequencies and percent of responses given.

Population and Sampling

The study population comprised of residents found around the Shai Hills Resource Reserve (SHRR). The population included farmers, teachers, students and other residents who lives around the 100 m radius of the protected area. A stratified random sampling technique was used to select 250 residents from the communities fringing the SHRR. The respondents must have lived in the community for at least two year which qualified the persons to participate in the study. Again, respondents should have attended at least basic school (though successful completion was not a requirement). All baboon groups in the surrounding area were included in the study.

Data Collection

Qualitative data was collected through semi-structured interviews and focus group discussions. Quantitative data, on the other hand, was collected through surveys and observation. Baboon sightings were done at four strategic locations namely: Sayu junction, Camp site, Sayu camp and Mauvi plains camp of the reserve. Later, the baboon groups at the campsite were trailed daily. Recording of baboon activities was done at hourly intervals from 05:00 am to 05:00 pm daily from October 2019 to April 2020. Data analysis involved descriptive statistics and thematic approach.

Validity and Reliability

The instruments used for the study were scrutinized through experts to determine their appropriateness. The instruments were piloted within some schools in the study area. The schools selected for such an exercise were randomly selected and did not form part of the targeted population. The outcome of the pilot survey was used to improve the instruments prior to data collection.

Ethical Considerations

The study begun by writing formerly to the management of Shai Hills Resource Reserve (SHRR) about the purpose of study. After permission was granted, an Informed Consent Form was designed and attached to the questionnaire. The form was to establish respondent's permission to participate and also to assure them of the confidentiality. The participants were made to understand that the research was only for academic purpose and therefore information shared would be treated under strict confidentiality.

Results and Discussions

Demography of Respondents

Two-hundred questionnaire sheets were analyzed. The remaining 50 questionnaire sheets were either incompletely filled or were not submitted. The respondents comprised of 110 females representing 55 % of the total respondents and 90males, representing 45% of the total sample as appears in table 1. On their age groups, 80 respondents (40 %) were less than 30 years, 110 (55 %) were between 30 and 60 years whereas 10 (5%) were older than 60 years. All respondents had attended at least basic school and had an occupation. Farming was found to be the predominant occupation in the study area. However, most farmers engaged in other economic activities to provide additional incomes for their families.

Table 1: Respondents' demographics

Demographic factors	Parameters	Percentage (%)
Sex	Female	110(55%)
	Male	90(45%)
Age	Below 30 years	80(40%)
	30 - 60 years	110(55%)
	Above 60 years	10(5%)
Occupation	Farmer & Trader	14(7%)
	Trader & Farmer	74(37%)
	Farmer & Artisan	82(41%)
	Teacher and farmer	20(10%)
	Student & Farmer	20(10%)
Ethnicity	Native	140(70%)
	Non-native	60(30%)
Religion	Christian	120(60%)
	Muslim	40(20%)
	Traditional	40(20%)
Level of education	Basic	90(45%)
	secondary	50(25%)
	Tertiary	201(10%)
	Vocational	40(20%)
Length of stay		
	2-5 years	30(15%)
	5-10 years	70(35%)
	10 years above	100(50%)

Table 2: 12-hourAactivity Budget of Baboons at the Shai Hill Resort Reserve

ACTIVITY/ TIME	5-6 am	6-7 am	7-8 am	8-9 am	9-10 am	10 -11 pm	11 Am-12 pm	12 -1 pm	1-2 pm	2-3 pm	3-4 pm	4-5 pm
MOVING		*						**	**			*
FEEDING		*	*	**	**					**	**	
RESTING	*											
SOCIALIZING						**	**					

(*= forest/ farm areas, **= school and home premises).

Activity Budget of the Baboons observed during the study period

Table 2 presents the activity budget of baboons monitored during the study period. The daily activities of monkeys were monitored during the periods of 5:00 am to 5:00pm as presented in the table. Groups of baboons were observed to compose of 10 to 30 individuals. Averagely, the observed activities included movement 30.8%, socializing- 15.4%, resting 7.7% and feeding 46.1%. All these occurred at different times within the monitoring periods. The baboons were observed to spend less hours in the reserve during daytime probably because of scarcity of suitable food which is an important resource for wildlife. Hence, the baboons at Shai Hills were seen advance slowly into nearby farms of the conservation area, the buffer vegetation and homes of fringe communities.

Baboon Raiding

From Table two, 61.53% of the daily baboon activities were spent within school and human settlement areas or environments whereas the remaining time periods (38.47%) were largely spent within the enclaves or nearby farms of the protected area. In Ghana, the reporting time for schools is between 7:00 am and 8:00 am whilst lessons occur between 8:00 am and 3:00 pm daily at the basic school level. It is within these times when interruption of teaching and learning mainly occur. Between 8:00 am and 10:00 am and 1:00 pm and 3:00 pm, the search for foods from pupils and homes were much popular by the baboons. Their missions were accomplished in groups by snatching foods from pupils and invading kitchens and food vendors. Scavenging in waste bins (Figure 2) and refuse dump sites were also observed.

Figure 2: A Baboon Scavenging for Food in a Waste Bin at the School Compound

Even when feeding and movements were reduced, baboons still took their socio-rests within 100 m range near the school premises between the hours of 10:00 am and 12:00 pm. Thereafter, movements and feeding continued until after 4:00 pm when baboons receded into the forests. As wildlife re-adjust, adapt and struggle for survival, the act of co-existence within same space with mankind for food and water later results in repelling relationships. These heightened conflicts were observed between humans and baboons within the fringe communities of Shai Hills resource reserve. This remains more eminent considering the continual destruction of natural habitats by humans and encroaching or eradication of original foods for the mammals (Mengak, 2013; Ochieng *et al.*, 2020). Baboons accessed readily available foods from pupils and homes. This was consistent with reports that sometimes primates compliment their feeding with human foods (Lee & Priston, 2005; Tweheyo et al., 2005; Lewis & O'Riain, 2017). This could be through direct raiding from crop fields (Lewis & O'Riain, 2017) or cooked food from humans which is rich in nutrients, easily accessible and relatively more abundant (Hill, 1997; Naughton-treves et al., 2003).

Foraging times varies with habitat quality and season. However, the 50% foraging time for *Papio anubis* had similarities with that of *Papio cynocephalus* in Kenya where more than 50% of foraging times were spent on subterranean foods during the dry seasons (Lewis & O'Riain, 2017). The relatively less traveling times of the baboons in this study are mainly attributed to factors such as

closeness of the Shai Hills reserve to fringe communities and the tolerability of the host communities to baboons.

While the study of Galán-Acedo et al. (2021) attributed tree species as good indicator of forage availability and quality for primates, the Shai Hills reserve had rather dominant grassland with spares trees and shrubs. This indicates the scarcity of forage for the baboons in the area. This may explain the situations where baboons spent about just 2 hours of foraging times of the early mornings on the fields and proceeded to fringe communities for supplementary feeds. Thus, the baboons adjusted their feeding patterns to survive the scarcity of forages in their home range. Again, social rest within the host communities was a way to reduce movements and conserve energy due to scarcity of preferred forage in the reserve (Lewis & O'Riain, 2017; Galán-Acedo et al., 2021).

Table 3: Effects of Baboon raiding on school attendance

Effects	Respondents *(N=200)*	Percentage (%)
Loss of instructional hours	120	60
Lateness	50	25
School Dropout	10	5
Truancy	20	10

Table 4: Potentials for School Dropout as a Result of Baboon Attacks

Potential effect	No. of Respondents (N=200)	Percentage (%)
Experience of Baboon victimization		
Yes	130	65
No	70	35
Opinion on School dropout		
Male	40	20
Female	160	80

Effect of Baboon Attacks on Pupil's Education

Majority of respondents (80%) held the views that the baboons aimed at searching for food rather than mere attacking (20%) pupils and other community members. All interviewees held strong and common views that classes got disrupted as pupils run out, shouted, screamed or panicked upon seeing the baboons at their school premises. This reduced productive teaching and learning hours at schools. The effects included loss of instructional hours (60 %), truancy (10%), lateness among students (25%) and school dropout (5%) in attempts to escape human-baboon conflicts as shown in table 3.

Again, majority of the respondents (65%) reported to have been directly victimized by the baboons at least once in their lifetime when they were students in the community. The remaining 35% reported that they never encountered any occurrence of such effect. On the potential threats of baboon attack toward dropout, findings show that baboon raids caused no significant school male dropout compared to female students' dropouts.

Attempts by pupils to escape the raiding effects resulted in lateness, truancy or dropout. Other risks from the intense baboon- human interactions is the susceptibility to anthropo-zoonotic transmission of diseases like *A. lumbricoides*, hookworm and *T. trichiura* (Drewe *et al.*, 2012; Larbi *et al.*, 2020) as well as lack of good sanitation in the fringe communities. The possibility of more female pupils dropping out of school for reasons of fear of baboons as indicated in table 4 has the potential to constrain enrolment, disturb effective studying during school periods and endanger successful completion of girls in basic schools. Even if there existed possibilities to re-adjust schooling periods in the attempt to exclude the baboons' negative impacts, this study found no guarantee that baboons may not equally adjust in same fate for survival reasons. Similar findings were reported by Chaves *et al.,* (2011) who established similar findings where the spider monkeys in the tropics had adjusted and made changes to their living patterns to adapt forage availability.

Conclusions and Recommendations

In conclusion, the observed activities of baboons included movement, socializing, resting and feeding, occurring at various times throughout the monitoring periods. Notably, feeding accounted for the majority of observed activities. The baboons spent fewer hours in the reserve during the daytime, most likely due to scarcity of suitable food, which is a crucial resource for wildlife. They ventured slowly into nearby farms in the conservation area as well as the buffer vegetation and homes of fringe communities. During school hours (between 8:00 am and 3:00 pm), the baboons interrupted the teaching and learning activities.

Their struggle for survival, co-existing with humans in the same space for food and water heightened conflicts, particularly within the fringe communities of the SHRR. The interference led to a significant reduction in productive teaching and learning. The reported effects include loss of instructional hours, increased truancy, student lateness and school dropout.

The study recommends that research and conservation efforts are necessary to mitigate potential conflicts between wildlife and human communities in the studied area. Challenges of wildlife-human coexistence call for further efforts in managing conflicts to address both wildlife and human interests.

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