



HUMAN-MONKEY CONFLICT IN AND AROUND LEKKI CONSERVATION CENTRE, LAGOS, NIGERIA

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ABSTRACT

As human and wildlife habitats become more spatially close, the resource requirement overlaps and conflicts are inevitable. This study determined the incidence and nature of conflicts caused by the monkeys in Lekki Conservation Centre (LCC). One hundred and fifty structured questionnaires were administered to the staff of, and visitors to LCC, and community members around LCC. Descriptive statistics was used to analyze the data. Cross tabulation and Pearson Chi-square test were used to determine the effects of personal data of respondents on their assessment of human-monkey conflicts. All respondents indicated sighting monkeys on daily basis, in both wet and dry seasons. Most (91.5%) of the respondents showed that the monkeys were not hunted, 80.0% indicated the monkeys caused harm, 53.8% was stealing of goods, while 26.2% was destruction of properties. The harm caused by the monkeys was significant ($P < 0.05$) among respondents based on age ($n=129$), status ($n=127$), and educational levels ($n=130$). Non hunting of monkeys was significant ($P < 0.05$) among respondents based on status and educational levels. Non reduction in the population of monkeys was significant ($P < 0.05$) based on status of respondents. Human-monkey conflict was established in LCC with neighbouring residents and visitors suffering the negative effects. The carrying capacity of the monkey population that could be sustained within LCC without causing harm to neighbouring communities and visitors should be determined.

Keywords: Human-monkey conflict, Lekki Conservation Centre, mona monkey, Strict Nature Reserve

INTRODUCTION

Human-wildlife conflict (HWC), a situation where wildlife needs and behaviour negatively affect human activities or livelihoods or vice versa (Dickman, 2010). It is an age-long issue especially where they share the same landscapes and resources (Lamarque *et al.*, 2009; Hoffman and O’Riain, 2012). As wildlife habitats are fast becoming dominated by humans. The wild animals are continuously compelled to exploit resources used by humans in order to survive (Castro and Nielsen, 2003; Strum, 2010). This result in encroachments of human and/or wildlife requirements on each other, and the attendant cost implications on either or both sides (IUCN, 2004). The consequences of HWC affect both humans and wildlife. The conflicts between humans and wildlife occur in all climes, developed and developing countries. It is however,

more severe in developing economies due to increase in human population and rapid urbanization which destroys wildlife habitats (IUCN, 2004; Lamarque *et al.*, 2009; Fairet and Maguy, 2012).

Human-Primate Conflict is a subset of HWC that can broadly be defined as “any human-primate interaction which results in negative effects on human social, economic or cultural life, primate social, ecological or cultural life or the conservation of primates and their environment” (Hockings and Humle, 2009). More primates worldwide are creating problems when supplementing their natural diet with food stolen from people or with garbage found around forest reserves, picnic sites and suburban areas. It has been found that monkeys living in close proximity to built areas have become

fearless and sometimes aggressive towards humans (Sharma *et al.*, 2011).

The conflict is compounded by cultural and traditional beliefs that promote the existence of wildlife in sacred groves and/or sanctuaries. For example, in eastern Nigeria, the Sclater's monkey (*Cercopithecus sclateri*) is regarded as 'sacred monkeys' in Akpugoeze (Enugu State) and Lagwa (Imo State). They are protected through cultural means due to their connection to the local deity (Baker *et al.*, 2009). In Ejemekwuru and Inyi, eastern Nigeria, the mona monkey is also considered sacred and has been protected by a deity (Baker *et al.*, 2009). The locals experienced damages the animal caused to their crops and zinc roofs, and the monkeys were surreptitiously killed by them (Baker, 2006; Baker *et al.*, 2009). In Tafi Atome, Ghana, the mona monkey is a sacred grove species that has been protected by the villagers for centuries (Ormsby, 2012). The white-thighed colobus (*Colobus verallosus*) and Lowe's monkey (*Cercopithecus lowei*) are traditionally not killed and are harboured in the Boabeng-Fiema Monkey Sanctuary (Agyei *et al.*, 2019). In India, the Hindus regard monkeys as sacred. Therefore, regardless of the damage the monkeys make, they ought to be revered and protected (Distefano, 2005; Hill, 2015).

Monkeys are not accepted in areas of massive agriculture, horticulture and other plantations since they damage the crops and orchards. In such areas they are considered as pests (Hill, 2005; Dittus *et al.*, 2019). There are economic losses associated with such conflicts. This occur when damage caused by wildlife species negatively affects a stakeholder's income (Decker *et al.*, 2002). In some situations, monkeys have become commensals and competitors of human being in and around villages, towns and cities. In such cases, they are seen as "urbanized monkeys" (Rajpurohit *et al.*, 2006). Many of the major human infectious diseases are similar or identical to diseases of other wild primate populations (Wolfe *et al.*, 2007) and diseases could be transmitted from wildlife to livestock and vice versa and then to humans.

The protection of the Sclater's monkey in two critical sites for the conservation of the species Igboland resulted to increase in their population.

This outcome, though laudable could increase human-monkey conflicts with associated socioeconomic effects (Baker *et al.*, 2014). The nature of the conflicts with monkeys differ based on the location, whether farms or residential areas around their habitats. Farm raids with crop destruction have been associated with the former scenario. The culprits include baboons, green, Lowe's, mona, patas, tantalus, and white-thighed colobus monkeys (Warren *et al.*, 2007; Bukie *et al.*, 2018; Agyei *et al.*, 2019; Wiafe, 2019). Home raids and destruction of gardens and properties have been reported in villages and urban settings in Nigeria (Baker *et al.*, 2006; Nwufoh, 2011; Olaleru, 2015; Olaleru *et al.*, 2020).

There is need to ascertain what the situation is in peri-urban population of monkeys that are under protection, as is the case in LCC. Olaleru *et al.* (2020) reported an increase in the population of mona monkeys over that reported by Odewumi and Ogunjemite (2016) in LCC. New births contributed to the population increase. Non extraction of the monkeys through prohibited hunting, low death rate and absence of natural predators will result to continued population increase. The consequences of the increase in the mona monkey population within the confined Reserve that is surrounded by human settlement could lead to conflicts with neighbouring households or even visitors to the Reserve as the monkeys range and seek for food. This study determined the incidence and nature of human-monkey conflicts in Lekki Conservation Centre and its nearby community.

MATERIALS AND METHODS

Study area

This study was carried out in Lekki Conservation Centre (LCC) a Strict Nature Reserve owned by the Nigeria Conservation Foundation (NCF) a Non-Governmental Organization. It lies on latitude 6°25'45"N to 6°26'30"N and longitude 3°32'0"E to 3°32'20"E (Fig. 1). The Reserve is located on the coastal environs covering an approximate land area of 78 hectares, extending from Kilometer 19 along the Lagos-Epe Expressway and ends up very close to the Atlantic Ocean near Okun Ibeju Village, Eti-Osa Local Government Area in the Eastern district of Lagos State (Osinubi, 2008).

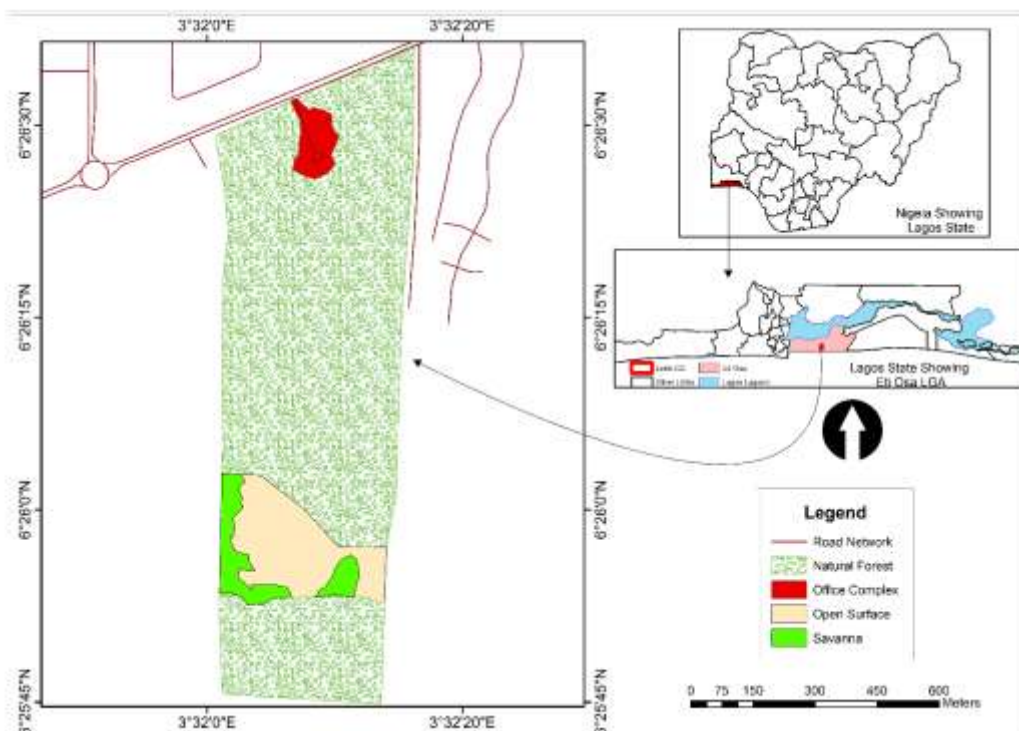


Fig. 1: Map of Lekki Conservation Centre

Data collection and analysis

Data was obtained from respondents through the administration of structured questionnaire. A total of 150 copies of questionnaire were purposively administered to respondents made up of staff of and visitors to LCC, and members of the community on the eastern side of LCC (The western border of the Reserve is being developed by Chevron). The questionnaire contained 19 questions designed to investigate the incidence and nature of human-monkey conflict in and around LCC.

The responses from the questionnaires were analysed using descriptive statistics. These were summarized as numbers and percentages, and presented in Tables. Cross-tabulation and Pearson Chi-square test were used to determine the association of the respondents’ biodata (gender, age, educational level, and category) and their responses on hunting and population reduction of, and if harmed by monkeys.

RESULTS

Biodata of Respondents

Only 130 questionnaires were retrieved, giving a retrieval rate of 86.67 %. The biodata of respondents presented in Table 1 showed that 52.3 % were males while 46.9 % were females. Age bracket 31-40 years had the highest number (50.0 %) of respondents. All respondents had formal education except 11.5 % that did not have. The staff of LCC/NCF made up 19.2 %, visitors to LCC, 23.8 %, while members of the community around LCC made up 43.8 % of the respondents.

Frequency, Season and Time of the day of Monkeys were Sighted in and around LCC

Table 2 showed the frequency, season, and time of the day when mona monkeys were sighted. All the respondents (100%) indicated that they have sighted monkeys around the environment and that was on a daily basis. The monkeys could be sighted during both wet and dry seasons (96.9 %), and the morning time was when 74.6 % of the respondents sighted the monkeys.

Table 1: Socio-demography of the respondents on human-monkey conflicts around Lekki Conservation Centre

Variable (N = 130)	Frequency	Percentage
Gender		
Male	68	52.3
Female	61	46.9
Not Specified	1	0.8
Total	130	100
Age (years)		
21-30	49	37.7
31-40	65	50.0
41-50	14	10.7
51-60	1	0.8
Not Specified	1	0.8
Total	130	100
Level of Education		
No formal education	15	11.5
Primary School Level	10	7.7
Secondary School Level	33	25.4
Graduate	63	48.5
Postgraduate	9	6.9
Total	130	100
Status of Respondents		
LCC/NCF Staff	25	19.2
Students	11	8.5
Civil Servants	3	2.3
Visitors	31	23.8
Community people	57	43.8
Not Specified	3	2.3
Total	130	100

Period of sightings and sociality of monkeys

The results in Table 3 showed that non festive period was the best time to sight monkeys as indicated by 96.9 % of the respondents. Most respondents (97.7 %) indicated that the monkeys were sighted more in troops than singly.

Harm and forms of harm by monkeys The incidence and nature of harm monkeys inflicted on

respondents was in Table 4. Most respondents (80.0 %) agreed that monkeys harmed them, 20.0 % showed they were not. The prevalent form of harm reported by 49.2 % of respondents was house raiding. This was followed by physical attack which was reported by 43.9 % of the respondents. Plate 1 showed a monkey feeding on plantain chips snatched from a visitor.

Table 2: Sighting, frequency, season, and time of the day respondents sighted monkeys

Response criteria	Frequency	Percentage
Have you sighted monkeys in this area?		
Yes	130	100
No	0	0.00
Total	130	100
Frequency of sighting monkeys		
Daily	130	100
Total	130	100
Season when the monkeys were easily sighted		
Wet season and dry season	126	96.9
Dry season	4	3.1
Total	130	100
What time of the day do you sight them?		
Morning	97	74.6
Afternoon	7	5.4
Evening	1	0.8
Morning and Afternoon	17	13.0
Morning, Afternoon and Evening	8	6.2
Total	130	100

Table 3: Period of sightings, and sociality of monkeys

Response criteria	Frequency	Percent
Period the when monkeys were easily sighted		
Non festive period	126	96.9
Festive Period	3	2.3
All the time and festive periods	1	0.8
Total	130	100
Sociality of monkeys		
Troops	127	97.7
Single	3	2.3
Total	130	100

Table 4: Harm and forms of harm by monkeys

Response criteria	Frequency	Percent
Do the monkey harm you?		
Yes	104	80.0
No	26	20.0
Total	130	100
Nature of harm by monkeys		
House raid	64	49.2
Physical attack	57	43.9
Shop raid	8	6.2
Crop raid	1	0.8
Total	130	100

Negative actions of monkeys

The highest negative action of monkeys indicated by respondents as shown on Table 5 was stealing of goods (53.8%). The respondents indicated more than a single negative action. Stealing of goods and destruction of properties was 26.2%.

Occurrence and reasons of monkeys being hunted

Table 6 showed the result on the hunting and reduction in the population of mona monkeys. Most of the respondents (91.5%) indicated that the monkeys were not being hunted. The monkeys were hunted for food (42.8 %). Most respondents (97.7%) indicated that the mona monkey population has not reduced over the years in Lekki Conservation Centre.

Table 5: Negative actions of monkeys in and around Lekki Conservation Centre

Negative Impacts caused by monkeys	Frequency	Percent
Stealing of goods	70	53.8
Destruction of properties	7	5.4
Injury	2	1.5
Transmission of diseases	1	0.8
Stealing of goods and destruction of properties	34	26.2
Stealing of goods and injury	5	3.8
Destruction of properties and injury	2	1.5
Transmission of diseases, stealing of goods and destruction of properties	1	0.8
Stealing of goods, destruction of properties and injury	8	6.2
Total	130	100

Table 6: Occurrence of monkeys being hunted, and reduction in their population

Response criteria	Frequency	Percent
Are monkeys being hunted?		
Yes	4	3.1
No	119	91.5
Not sure	7	5.4
Total	130	100
Reasons for the monkeys being hunted		
Food	3	42.8
For sale	2	28.6
Other purposes	2	28.6
Total	7	100
Any reduction in population of monkey over the years?		
Yes	3	2.3
No	127	97.7
Total	130	100



Plate 1: Mona monkey eating plantain chips snatched from a visitor to Lekki Conservation Centre

Cross tabulation and Chi-square tests on monkeys being hunted, population reduction and their causing harm

The responses on whether monkeys were hunted or not, population reduced or not, or monkeys harmed people were not significantly different at $P < 0.05$ on gender basis. Age, Educational level and the Status of respondents did have significant effects on their views on killing and reduction in monkey population, and whether or not the monkeys harmed them.

Effect of Age of Respondents on their Experience of being Harmed by Monkeys

Table 7 showed the crosstab and Chi-square values of the respondents' experience on harm by monkeys based on their age categories. There was a significant difference ($\chi^2 = 10.649$, $P = 0.014$, $n = 129$) between those that agreed the monkeys harmed them and those

that did not. The difference was between ages 31-40 and other age groups.

Effect of Status of Respondents on their Assessment of monkeys being hunted, reduction in monkey population, and being harmed by monkeys

Table 8 showed the crosstab and Chi-square values of the respondents' assessment of monkeys being hunted ($\chi^2 = 32.329$, $P = 0.001$, $n = 127$), reduction in the population of monkeys ($\chi^2 = 32.402$, $P = 0.001$, $n = 127$), and monkeys harming them ($\chi^2 = 72.090$, $P = 0.001$, $n = 127$). Those that did not agree that monkeys were hunted, and their population were decreasing were significantly different from those that agreed. These meant that the monkeys were not hunted nor their population declining. A significant number of respondents from the Community people agreed that the monkeys harmed them.

Table 7: Crosstab and Chi-square test of respondents' Age on 'Do the monkeys harm you?'

Response	21-30 yrs	31-40 yrs	41-50 yrs	51-60 yrs	Total	Chi-square	df	Sig.
Do the monkeys harm you?								
Yes	32 _a	57 _b	13 _a	1 _a	103	10.649	3	0.014
No	17 _a	8 _b	1 _a	0 _a	26			
Total	49	65	14	1	129			

Each subscript letter denotes a subset of Age categories whose column proportions do not differ significantly from each other at the .05 level. Different subscripts within a row are significantly different at the .05 level.

Each subscript letter denotes a subset of Category of Respondent categories whose column proportions do not differ significantly from each other at the .05 level. Different subscripts within a row are significantly different at the .05 level.

Effect of Educational level of Respondents and their opinion on Hunting of, and Harm by monkeys

Table 9 showed the effect of educational level of respondents on their opinion on hunting of monkeys ($\chi^2 = 20.442$, $P = 0.009$, $n = 130$), and their being harmed by monkeys ($\chi^2 = 19.051$, $P = 0.001$, $n = 130$). The undergraduates were the significant group that did not agree that monkeys were hunted but agreed that the monkeys harmed them.

Table 8: Crosstab and Chi-square test of respondents' category status on hunting and reduction in population of, and harm by monkeys

Response	LCC Staff	Students	Civil servants	Visitors	Community people	Total	Chi-square	df	Sig.
Are the monkeys being hunted?									
Yes	2 _b	0 _b	1 _b	1 _a	0 _a	4	32.329	8	0.001
No	18 _a	9 _a	2 _a	30 _b	57 _b	116			
Not sure	5 _a	2 _a	0 _a	0 _a	0 _a	7			
Total	25	11	3	31	57	127			
Has there been reduction in the population of monkey?									
Yes	0 _a	3 _b	0 _a	0 _a	0 _a	3	32.402	4	0.001
No	25 _b	8 _b	3 _a	31 _a	57 _a	124			
Total	25	11	3	31	57	127			
Do monkeys harm you?									
Yes	11 _a	1 _b	3 _a	29 _c	57 _c	101	72.090	4	0.001
No	14 _a	10 _b	0 _a	2 _c	0 _c	26			
Total	25	11	3	31	57	127			

Table 9: Education level and opinion of respondents on hunting of, and harm by monkeys

Response	No formal education	Pry. Sch.	Sec. Sch.	UG	PG	Total	Chi-square	df	Sig.
Are monkeys being hunted?									
Yes	0 _a	2 _a	0 _a	2 _a	0 _a	4	20.442	8	0.009
No	15 _a	8 _a	33 _a	56 _a	7 _a	119			
Not sure	0 _a	0 _a	0 _a	5 _a	2 _a	7			
Total	15	10	33	63	9	130			
Do monkeys harm you?									
Yes	15 _a	10 _a	31 _b	43 _c	5 _c	104	19.051	4	0.001
No	0 _b	0 _b	2 _b	20 _c	4 _c	26			
Total	15	10	33	63	9	130			

UG = undergraduate; PG = Postgraduate. Each subscript letter denotes a subset of Level of Education categories whose column proportions do not differ significantly from each other at the .05 level. Different subscripts within a row are significantly different at the .05 level.

DISCUSSION

The number of male respondents was more than the females. This could be due to the ecotourism nature of LCC. Bôas *et al.* (2004) reported that males constitute the majority of ecotourists in Brazil. Similar results where male respondents were more than females in conservation related studies were reported by Olaleru (2016) in University of Lagos, Lekki Conservation and Okomu National Park, Adetola and Adetoro (2014) in Cross River National Park, and Khatun *et al.* (2013) in a human-langur conflict in Bangladesh. Perhaps the males are more predispose to attend to researchers than the women. Agyei *et al.* (2019) was of the opinion that this was so because in Africa, the male as household heads are more willing to give out information than the females. Age bracket 21-40 years constituted the bulk of the respondents. Ogunjinmi (2015) observed the same trend in groups that visited national parks in Nigeria. This group seems to be the ones that patronize LCC often. Most of the respondents had formal education. This would have informed their keen sense of observation of the monkeys' activities. It also meant that the staff of, visitors to, and residents around LCC were people with at least one level of formal education. People with formal education seem to appreciate nature more and are willing to pay for the ecotourism costs. Bôas *et al.* (2004), Adetola and Adetoro (2014), and Ogunjinmi (2015) all recorded high number of respondents with secondary and tertiary education.

The fact that all respondents sighted monkeys and that on daily basis during both wet and dry seasons would mean the animal was abundant in the Reserve and/or they come very close to residential areas. Morning time was when monkeys were sighted most. This could make for easy sighting by visitors, and a boost to ecotourism. Festive periods made the monkeys less easily sighted. This would mean that when people made noise during these periods, the monkeys tended to move away from such festive celebrations.

There were no direct evidences of hunting of monkeys and findings showed that they were not being hunted and their population did not decline over the years. The monkeys within the Reserve are under protection due to the fact that the LCC is a

Strict Nature Reserve with zero tolerance to hunting. Neighbouring community members were not likely to kill the monkeys openly. Even if they are hunted surreptitiously, the mona monkey have been reported to be tolerant to hunting pressure (Linder and Oates, 2011). Olaleru *et al.* (2020) reported that the population of mona monkeys in the LCC increased when compared to the findings of Odewumi and Ogunjemite (2016), and that the increase was through births during the months of November and December, 2018. Okekedunu *et al.* (2014) reported that in Ibodi Forest, Nigeria, the population of the mona monkey was declining rapidly due to habitat loss and hunting pressure for the bushmeat trade. The same mona monkeys are known to suffer the threat of persistent, intensive and severe hunting for bushmeat in Afi Mountain Wildlife Sanctuary (Bukie *et al.*, 2016). Only few respondents indicated that the monkeys were killed and these were for food and not bushmeat sales.

Stealing of goods and destruction of properties were the major harm respondents encountered from the actions of the monkeys. The residents suffered raids by the mona monkeys which on most occasions stole their goods from shops, food from houses, fruits from gardens, and destroyed such properties as antenna, roof sheets and window nets. Agyei *et al.* (2019) reported that destruction of properties was the second most important causes of human-monkey conflicts in Boabeng-Fiema Monkey Sanctuary in Ghana. Being a Reserve located in the peri-urban area that shared border with human habitation, the monkeys did source their food from the community. This was similar to the findings of Rajpurohit *et al.* (2006) who stated that monkeys have become commensals and competitors of human being in and around villages, towns and cities. Baker (2006) reported on the disadvantage of having monkeys around the Lagwa community as raiding of households for food items and destruction of zinc rooftops. Olaleru *et al.* (2020) reported on similar destructive actions by mona monkeys in the urban areas of Lagos. The monkeys sometimes snatched snacks from unwary visitors. This could endanger their lives and safety. Threat to life and safety of residents was reported as a conflict cause in Ghana (Agyei *et al.*, 2019).

The monkeys did harm humans when raiding. This corroborated with findings by Woodroffe *et al.* (2005) and Hockings and Humle (2009) where human-wildlife conflicts resulted in negative effects on human social, economic or cultural life. When wildlife raid homes and farms for food, the animals may be wounded or killed by humans in retaliation (Conover, 2002; Dickman, 2010). This was not the case here where most respondents indicated monkeys were not killed, and should they be killed at all, it was for food and not for retaliatory reasons. Other guenons like Sclater's monkey (*Cercopithecus sclateri*) were being killed in Igbo communities in eastern Nigeria when they raided farms and destroyed crops and that the people killed the monkeys surreptitiously (Baker, 2013). These human-monkey conflicts were forecasted to be on the increase with the increase in the population of Sclater's monkeys (Baker *et al.*, 2014). In this study there seemed to be no such incidence. Retaliatory killings may likely happen in the future if the raids and quantum of damages caused by the monkeys increase.

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CONCLUSION

The monkeys in the Lekki Conservation Centre were not being poached upon by the neighbouring community members. The non-harvesting of monkeys in the Reserve could have led to their increase in population and the incidence of conflicts. Different forms of human-monkey conflicts such as raiding of homes and shops, and harming of respondents were established in the study. There is the need to determine the ideal population of monkeys that could be sustained within the Reserve without any harm or disturbance to the neighbouring communities. Informing visitors to beware of the antics of the monkeys could help in reducing incidence of attacks. For good neighbourliness and continued non-hunting of the monkeys by residents, the management of the LCC could introduce a compensation scheme for community residents whose properties have been evidentially damaged by monkeys. The population of the monkeys could be maintained at established carrying capacity levels through sustainable harvesting.

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