

RESEARCH ARTICLE

Study on Human-Monkey conflict in the Nagaon district of Assam: local mitigation measures

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Abstract

Human-monkey conflict is a serious issue that causes a negative impact on both human and the conservation of primates. A study was conducted from January 2023 to May 2023 in Nagaon and Kaliabar subdivision of Assam, India to assess the cause and consequences of human-monkey conflicts. Data were collected by interviewing local people with structured questionnaire set followed by focused group discussion. Attitudes of locals towards crop damage inflicted by the monkeys were assessed and recorded. The local deterrent methods for reducing crop damage and the management strategy adopted by the local people was also assessed. This study indicates that macaques in rural areas affect people's daily lives and income. The study showed the quantum of harm done to human due to macaques mainly in the areas of Nagaon and Kaliabar subdivision of Assam, and people's perceptions of the severity of warfare. A wide range of protection measures was used by people to protect their gardens or homes from macaques. Guarding was the most frequent strategy, and the differences in the time spent by macaques in gardens/farms when people were present were much lower than when they were absent. However, people felt that guarding was a taxing method as it meant that someone had to be present all the time, and this affected their day-to-day lives. Controlling the increase of macaque populations became an alternative that the villagers thought could be an important measure of decreasing the magnitude of the problem. However, individuals had been unsure as to how this can be executed and didn't see the government or wooded area branch taking any foreseeable steps on this course. Moving macaques to forest reserves become what humans favoured as a mitigation strategy and strongly believed that macaques in their villages ought to be relocated elsewhere in the wildlife sanctuary.

Keywords: Monkey; Human; Conflict; Destruction; Kaliabor; Nagaon; Assam

1. Introduction

According to IUCN, the *Rhesus macaque* is one of the least concerned primates in the world (Timmins, 2008). Rhesus monkeys are both arboreal and terrestrial. They eat fruits, leaves, roots, seeds, flowers, buds, soil, insects, and other small animals (Rowe, 1996). Primates are problematic because controlling measures are usually not successful (Strum, 1994). The competition between human and non-human primates is a major problem in some areas where they are sharing the same food resources. Globally, primates are being problematic because of stealing food from human settlements or garbage found around forests and urban areas to supplement their natural diet. Further, monkeys are reported to be more aggressive toward humans (Sharma, 2011). The main reason behind the human-monkey conflict is the massive cutting of fruit trees and plantation of exotic commercial species which do not supply food to monkeys. This compels the monkeys to enter into human residential areas and crop fields (Ahsan, 2014). When it is a short supply of natural food, high-quality and easily digested human food becomes alternative nutrition for monkeys, which is the most important cause of crop raiding (Horrocks, 1994).

Conflicts between human and primates are increasingly emerging as people transform primate habitats into agricultural fields and because of many other anthropogenic activities occurring around the habitats of these species. To date, crop raiding by wildlife including primates has received a great deal of attention in and around protected areas across Asia and Africa (Agetsuma, 2007; Chhangani, 2004; Hill, 1997; Naughton-Treves, 1998; Pirta, 1997; Riley, 2007; Sarker, 2010; Sarker, 2011; Strum, 1994; Tweheyo, 2005; Webber, 2007). Crop raiding is an essential component of the ecology of primates inhabiting human settlements, but it makes their ability to cope with humans more difficult (Naughton-Treves, 1998). When natural food is in short supply, high-quality and easily digested human food is a good alternative form of nutrition for primates, which could be the most important cause of the intensity of crop raiding (Horrocks, 1994).

Behavioural adaptability, intelligence, the nature of being opportunistic and frugivorous and the general diets of some primates might enable them to exploit agricultural crops successfully in many tropical countries (Chivers, 1986; Gautier, 1994; Marsh, 1987). The species that are flexible in behaviour and able to adapt to human-induced habitats are often compelled to come into direct competition with humans for food and shelter and are perceived as significant crop pests (Siex, 1999). The habit of crop raiding, therefore, reduces tolerance towards the crop pests in question and might add another dimension of threat for species that are already endangered (Campbell-Smith, 2010). The state of Assam is located in northeast India, a biogeographical zone that has been classified as a "Biodiversity Hotspot" (Myers, 2000). The state has high primate diversity with up to 8 species being found in the area (Gupta, 2001). Of these, the *Rhesus macaque* is perhaps the most common, found throughout towns, villages, temples, and forests in the state. It is a federally protected species in India, listed under Schedule II of the Wildlife (Protection) Act, 1972, and is categorized as "least concern" under the IUCN red list assessment (IUCN, 2010).

2. Methodology

2.1 Study area

The study was conducted in the Subdivision of Nagaon District (Kaliabar, Nagaon), Assam for a period of five months (January, February, March, April, and May) in the year 2023. The study on conflict between human and monkeys was conducted in the following regions of the Kaliabor and Nagaon subdivisions of Assam:

1. Teliagaon Village of Nagaon Sub Division.
2. Majarati Village of Nagaon Sub Division.
3. Hatimura Archaeological Site of Kaliabor Sub Division.

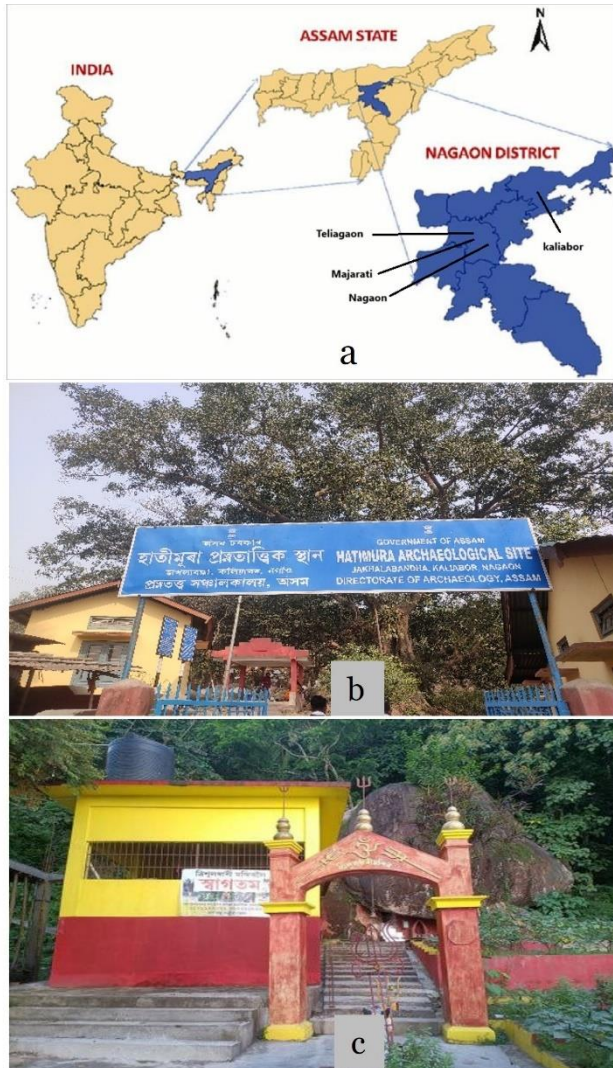


Figure 1 (a). Map of Nagaon district; **b.** Hatimura archeological site; **c.** Trishuldari temple.

4. Trishuldhari Temple (Archaeological Site) of Kaliabor Sub Division.

The above-observed place harbours a viable and observable Rhesus Macaque populace and the problems of human-monkey struggle inside the region. There has been a severe problem of the battle between humans and monkeys in the previous couple of years. The two districts - Kaliabor and Nagaon fall within 26.5344° N, 93.0923° E and 26.2997° N, 92.6984° E respectively. The coordinates of the specific study sites are mentioned below:

1. Hatimura Archaeological Site: $26^{\circ}36'36.4''$ N and $92^{\circ}59'45.1''$ E
2. Trishul Dhari Temple: $26^{\circ}37'09.6''$ N and $92^{\circ}57'09.9''$ E
3. Teliagaon Village: $26^{\circ}23'25''$ N and $92^{\circ}47'52''$ E
4. Majarati Village: 26.2697295 N and 92.6540754 E

2.2 Vegetation and climate

The vegetation pattern of the study site is mainly an alluvial plain area, mostly dominated by grasses viz *Imperata cylindrica*, *Saccharum spontaneum*, *Sterostachya fusca*, *Vertiveria zizanioides* etc, deciduous trees like *Albizia procera*, *Bombax ceiba*, *Lagerstroemia reginae*, *Trewia nudiflora* etc. The climate is tropical in Nagaon while winter experience less rainfall than in summer and the average annual temperature is 26.1° C in Nagaon. This climate is considered to be Aw according to the Köppen-Geiger climate classification. The rainfall is around 2466 mm|97.1 inch per year. The Nagaon is situated close to the equator, making summers difficult to define.

2.3. Materials used

Following are the list of materials used:

1. Garmin GPS
2. Pen, Pencil etc.
3. Camera

4. Previous Research Paper
5. Binocular etc.

2.4. Method of study

The following methods were employed during field study:

2.4.1. Population survey

A populace survey was conducted to find out the whole population of Rhesus macaques inside the above-cited location by total count method (Bibby et al., 1992). It is a direct method of population estimation by visual count, to collect the required samples representing the entire population size for a period of time. During the survey period, the monkeys were observed directly using binoculars and naked eyes.

2.4.2. Collection of records

Facts concerning the assault of macaques on humans were collected as per the pre-organized question sheet (Appendix I). Household surveys had been performed and the individual villagers were interviewed randomly.

2.4.3. Group discussion

Cognizance institution discussion was carried out within the observed location with the aid of representing all classes of informants. The primary problems regarding warfare, the reaction of involved authorities, and resolving strategies were discussed inside the focus organization discussion.

2.4.3.1. Informal discussions

Informal discussions were finished with one-of-a-kind key

2.4.3.2. Informants

Executive committee members, instructors, elder folks, nearby leaders and social workers were interviewed to get the overall information at the human-Rhesus macaque conflict and verify the information accumulated in the attention organization discussion.

2.4.3.3. Secondary discussion

Secondary sources of data including posted papers, thesis, and reports were reviewed.

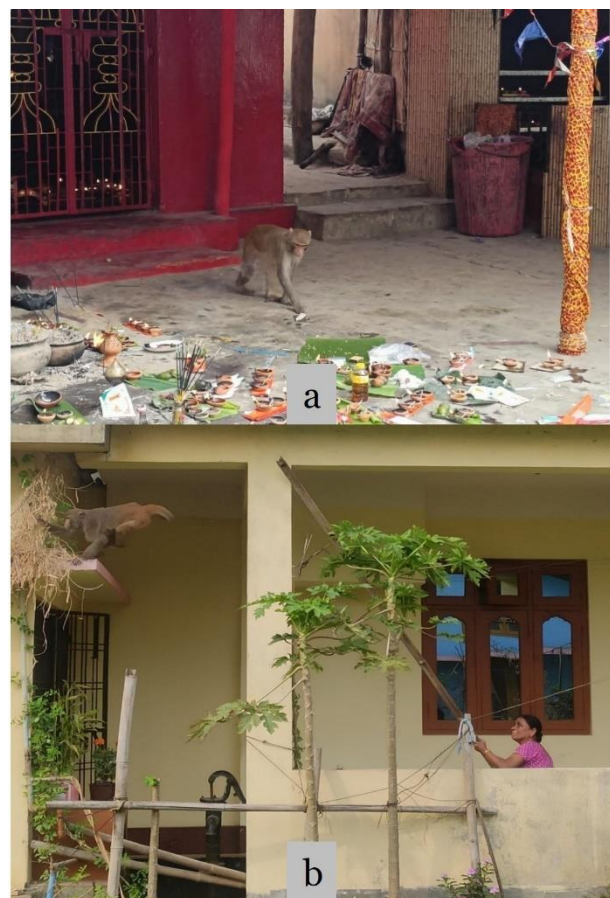


Figure 2 (a). Destruction of Monkeys in temple; **b.** Human-Monkey conflict at home;

Table 1. Population of Rhesus macaques (*Macaca mulatta*) on the basis of age and sex at the zone of Hatimura.

Group	Adult male	Adult female	Juvenile	Infant	Total
I	15	23	29	19	96
II	28	24	17	24	93
III	29	19	13	13	74
IV	27	13	16	11	67
Total	59	79	65	67	330

Table 2. Population of Rhesus macaques (*Macaca mulatta*) on the basis of age and sex at the zone of Trishuldhari.

Group	Adult male	Adult female	Juvenile	Infant	Total
I	20	25	20	23	88
II	19	27	18	23	87
III	10	18	16	14	58
IV	17	26	14	18	75
Total	66	96	68	78	308

Table 3. Population of Rhesus macaques (*Macaca mulatta*) on the basis of age and sex at the zone of Majarati.

Group	Adult male	Adult female	Juvenile	Infant	Total
I	18	26	22	22	88
II	20	25	18	25	88
III	10	20	14	15	59
IV	18	15	17	13	63
Total	66	86	71	75	298

Table 4. Population of Rhesus macaques (*Macaca mulatta*) on the basis of age and sex at the zone of Teliagaon.

Group	Adult male	Adult female	Juvenile	Infant	Total
I	21	18	20	16	75
II	14	26	18	17	75
III	15	19	23	20	77
IV	20	26	15	13	74
Total	70	89	76	60	301

Table 5. List of food plant species and its parts eaten by Rhesus macaque in the study area.

SN	English Name	Scientific Name	Parts eaten
1	Rice	<i>Oryza sativa</i>	Seeds
2	Banana	<i>Musa sp.</i>	Leaf, fruits
3	Mango	<i>Mangifera indica</i>	Fruits, flower, seeds
4	Guava	<i>Pisidium guajava</i>	Leaf, fruits
5	Jack fruit	<i>Artocarpus heterophyllus</i>	Fruit
6	Potato	<i>Solanum tuberosum</i>	Whole
7	White mulberry	<i>Morus alba</i>	Fruits, leaf, bud
8	Carrot	<i>Daucus carota</i>	Whole
9	Papaya	<i>Carica papaya</i>	Fruits flower
10	Sugarcane	<i>Saccharum officinarum</i>	Whole
11	Jujube	<i>Zizipus jujuba</i>	Fruits
12	Pineapple	<i>Ananas comosus</i>	Whole
13	Tomato	<i>Solanum lycopersicum</i>	Whole
14	Litchi	<i>Litchi chinensis</i>	Fruits
15	Indian plum	<i>Flacourtia jangomas</i>	Fruits
16	Kadam	<i>Neolamarckia cadamba</i>	Leaf, seeds, fruits
17	Sisso	<i>Dalbergia sissoo</i>	Leaf, seeds
18	Indian gooseberry	<i>Phyllanthus emblica</i>	Fruits
19	Pumkin	<i>Cucurbita maxima</i>	Leaf, fruits
20	Ridge gourd	<i>Luffa acutangula</i>	Flower, fruits

2.5. Aims of study

This study was conducted with followings aims and objectives: to quantify the extent of the conflict; estimate the level of crop damage; investigate the people's attitudes towards langurs; to find out the possible causes of the prevailing human – monkey conflict; to find out possible measures to minimize the problem in the study area.

3. Result and discussion

3.1. Nature of conflicts

The survey conducted during our study resulted that the monkeys raided most in human house, temple, archeological site and more on agricultural crops (Figure 1a-c and Figure 2a-b). The population

of Rhesus macaque (*Macaca mulatta*) recorded from four study sites – that is, Hatimura (330), Trishuldhari (308), Majarati (298), and Teliagaon (301) is presented in Table 1 – 4 with total population count of 1237 individual. These Monkeys cause devastation to almost 20 agricultural crops which is presented in Table 5. According to the respondents, mostly monsoon crops (rice) and vegetables (potato, cabbage) were raided most. Most of the respondents agreed that the most raided crop was rice (Figure 3). As per the statements made by local informants, monkeys raids on crops the most (Figure 4). As per the survey monkeys cause problems at a rate of 10 to 15 times in a month in most of the places (Figure 5-6). As per the respondents, they use various methods to get rid of monkeys but the most common one is guarding (Figure 7).

APPENDIX

Questionnaire used for data collection during the survey

1. Is there any problem created by the monkeys? If **YES** then, what are the problems
 - a.
 - b.
 - c. etc.
2. They came in groups or single?
3. If they came in groups, then how many monkeys came in a group?
4. Is the group led by a single dominant male or by a group of males?
5. Is there any specific time for their arrival?
6. From where do they come?
7. Are there any particular items that they generally target? If **YES** can you specify it?
8. Under what circumstances do the monkeys tend to harm and bite humans?
9. Which gender of monkeys tend to attack more often to human beings?
10. What are the possible causes of the invasion of the monkeys in the area?
11. Can you assist by providing any signs?

3.2. Causes of the Man–Monkey conflict

Over the last few decades, there was a constant and steep boom in the population of Rhesus macaque (*Macaca mulatta*) typically known as a monkey. The population of monkeys has grown at an alarming rate during the last decade. There had been 50 million monkeys in India which has resulted in their migration from the forest areas towards cities and additionally to the cultivated regions.

Habitat destruction: Illegal encroachment of woodland for housing and agricultural purposes, big cutting of wooded area bushes, and plantation of exclusive tree species in place of herbal meals flora pressured the Rhesus macaques to invade in the area.

Overpopulation: Growth in the variety of the monkey populace leads to the shortage of food and safe sanctuary for the monkeys, consequently growing the battle.

Food provisioning by the residents: Besides habitat destruction and overpopulation, food provisioning by local residents is also one of the major reasons of conflict.

Cropping pattern: Changing cropping patterns and cultivation of favourite crops attract wild animals such as monkeys to farmlands.

Improper disposal: Improper waste disposal attracts the monkeys to the human settlement and causes conflict.

Others: Human population growth, Land use change, Fragmentation, Increased access to nature reserves, Climate factors.

From the population survey it was found that the total number of Rhesus macaque population count was 1237 in the above-mentioned study sites. According to the respondents, mostly monsoon crops (rice) and vegetables (potato, cabbage) were raided most. Most of the respondents agreed that the most raided crop was rice (Figure 3). As per the statements made by local peoples, monkeys drop raids on crops the most. The graphical representation of all kinds of damages and hampers caused by monkeys in common public is shown in Figure 4. From the following data it is clear that crop raid is highest among all the problems caused by the monkeys. According to the respondents, time of arrival of monkeys varies in different places (Figure 5). But it is also noticeable that there is no fixed time of arrival of the monkeys in all the places. Although as per the survey monkeys mostly arrive during the morning time. A graphical representation is prepared to understand the time of arrival of the monkeys which is presented in Figure 5. According to the respondents, frequency of problems caused by monkeys varies in different places. As per the survey monkeys cause problems at a rate of 10 to 15 times in a month in most of the places. A graphical representation is shown in Figure 6 clarified frequency of problems caused by monkeys in a month. As per the respondents, they use various methods to get rid of monkeys but the most common one is guarding. A graphical

representation to understand the protection measures used to push away monkeys or to get rid of them is presented in Figure 7.

3.3. Consequences of conflict and mitigation measures

Although the Rhesus macaque is widely distributed in Assam, their abundance in certain areas is relative to the local topography, forest types, vegetation patterns and agricultural practices. Extensive cutting of forest trees, illegal encroachment of forest lands and plantations of exotic commercial plants seem to have forced the monkeys to invade human settlement areas for their own survival. Due to their intolerable activities, people now view them as a vermin species rather than a species of conservations. Long term studies in selected habitats are needed to monitor the rates of populations increase among the monkeys in different areas. To understand the depth of damage caused by monkeys, we need to conduct a long, comprehensive study with specific focus on the level of monkey abundance in different geographical and agroclimatic regions and most importantly, on the community participation programme for the monkey management and habitat management and habitat conservation programme in areas with high economic damage.

The results of this study support erstwhile observations that human-macaque conflict is a serious issue in rural areas of Assam (Medhi, 2007). The need for people to

be present in the house has congealed social costs over and above the tangible damage caused by macaques (Ogra, 2008). Although cultural values of primates are believed to work in favour of their conservation status in India (Medhi, 2007), this study shows that many of these values may be eroded when there is conflict.

The lack of clear-cut local solutions and communities' general unwillingness to participate in macaque conservation have multiple roots. They partly stem from poor institutional governance in wildlife management, especially in non-reserve areas where the forest department's jurisdiction ends. Although the management of all wildlife Human-macaque conflict in Assam (India) falls under the responsibility of the forest department, their authority does not extend to civil areas. There is thus a need for intra-governmental collaboration and cooperation (especially with civil authorities) whilst intervening in the issue (Barua, 2014). Compensation schemes in India are plagued by poor delivery, lack of payments as well as high transaction costs incurred by applicants (Saberwal 1994; Ogra, 2008). The removal of problem animals and their release in other places have occurred in many parts of India, sometimes without the consent or awareness of people living near the locality of release (Athreya, 2006), or without following appropriate rehabilitation protocols. The major disadvantage of relocation is that it could lead to a transfer of conflict and affect human lives near the site of release. Conservationists thus argue that it might be better to find in situ solutions to conflict rather than use the relocation as a mitigation tool (Linnell, 1997).

4. Conclusion

India needs a combination of strategies, from a new institutional mechanism to adopting new technological solutions. First, the management of monkeys as a species needs to be brought under the Union list of the Constitution, which will enable a national program to monitor, control their population, and plan for effective strategies. The basic reason for man -monkey conflict in the Nagaon area is the rapid increase of the monkey population, habitat destruction and encroachment of human, changing of cropping pattern, climatic change, and improper disposals are the important causes of the increasing man-monkey conflict.

Relocation has been an option, and a group of people in the study village tried to relocate a macaque troupe on their own accord. The success of the relocation was limited. Village (panchayat) governance systems and government-aided microfinance schemes are extant in all the study sites, and these local institutions are potential candidates for collaborative intervention for relocation. Further study is thus required to find effective solutions to the problem, as the human-macaque overlap continues to increase. There is a need for an intervention-based project that directly tackles issues through practice. This will not only add to existing academic work but would contribute to an overall project of

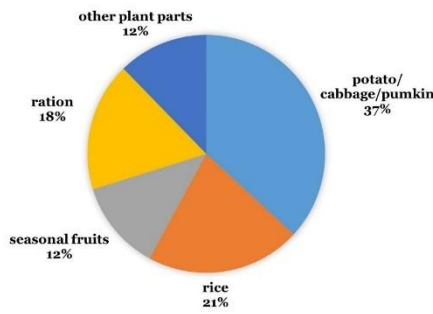


Figure 3. Percentage of Monkey raiding recorded.

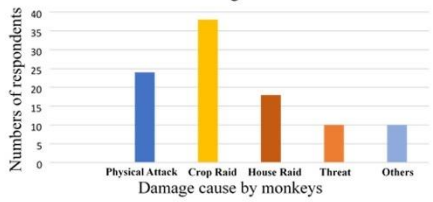


Figure 4. Exposure to various aspects human-macaque conflict (n=57).

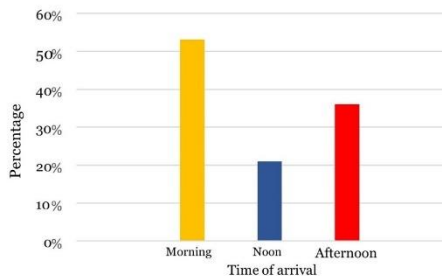


Figure 5. Responses to the question "Time of arrival of monkeys" (n=57).

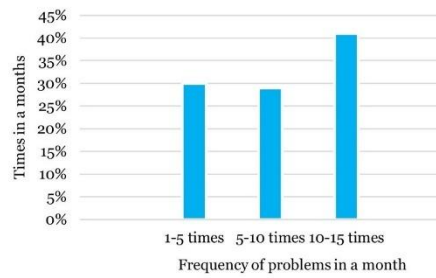


Figure 6. Responses to the question "Frequency of problems in a month" (n=57).

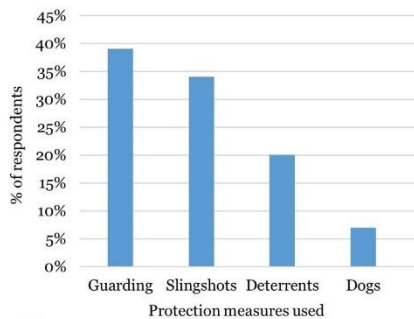


Figure 7. Responses to the question "Protection measures used" (n=57).

fostering peoples' tolerance and acknowledging the presence of macaques as part of the fabric of social life.

A few recommendations to mitigate the intervention of monkeys in the residential provinces are:

Sealed small packets of boneless dry fish pieces can be kept around the field. The practice of driving them away by beating drums and using well-trained dogs, throwing bananas and biscuits mixed with red chili powder in front of them. Use of loud-speakers to play the sound of 4-5 dogs barking. Covering the fruit trees around the house with mesh material to prevent attracting the monkeys. Growing Monkey Puzzle Tree (*Araucaria araucana*) a slow growing tree with unique foliage and one of the hardest of the conifer family, originally found on the lower slopes of the Chilean Andes which grow to a height of 40 meters scares the monkeys. The main approach in resolving human-monkey conflict is to forcibly trans-locate monkeys to a nature reserves and wildlife sanctuaries. However, unless proper care is taken in providing food and water for the monkeys in that area, this creates problems in the new area.

References

Agetsuma N. 2007. Ecological function losses caused by monotonous land use induce crop raiding by wildlife on the island of Yukushima, Southern Japan. *Ecological Research* 22: 390-402. <http://dx.doi.org/10.1007/s11284-007-0358-z>

Ahsan FM and Mazbah MU. 2014. Human-Rhesus monkey conflict at Rampur village under Monohardi Upazila in Narsingdi District of Bangladesh. *Journal of Threatened Taxa* 6(6): 5905-5908. www.threatenedtaxa.org.

Athreya V. 2006. Is relocation a viable management option for unwanted animals? The case of the Leopard in India. *Conservation and Society* 4(3): 419-423.

Barua M, Thakur J and Ahmed RA. 2014. Mutiny or clear sailing? Examining the role of the Asian elephant as a flagship species. *Hum. Dimension of Wildlife* 145-160. <https://doi.org/10.1080/10871200903536176>

Campbell-Smith G, Simanjorang HVP, Leader-Williams N and Linkie M. (2010). Local attitudes and perceptions toward crop-raiding by orangutans

(*Pongo abelii*) and other non-human primates in Northern Sumatra, Indonesia. *American Journal of Primatology* 72(10): 866-876. <http://dx.doi.org/10.1002/ajp.20822>

Chhangani AK and Mohnot SM. 2004. Crop raid by hanuman langur *Semnopithecus entellus* in and around Aravallis, (India) and management. *Primate Report* 69:35-47.

Chivers DJ 1986. Feeding and ranging in gibbons: a summary. In: Preuschoft H, Chivers DJ, Brocklerman W, and Creel NM, (Eds.), *The lesser apes: evolutionary and behavioural biology*. Edinburgh University Press. Pp. 267-281

GautierJP and Biquand S. (1994). Primate commensalism. *Revue d'Ecologie: la Terre et la Vie* 49(3): 210-212.

Gupta AK. 2001. Non-human primates of India: An Introduction. *Envis Bulletin: Wildlife and Protected Areas*. 1(1): 1-29. <https://doi.org/10.1007/s10329-003-0060-x>

Hill CM. 1997. Crop-raiding by wild vertebrates: the farmer's perspective in an agricultural community in Western Uganda. *International Journal of Pest Management* 43(11): 77-84. <http://dx.doi.org/10.1080/096708797229022>

Horrocks JA and Baulu J. 1994. Food competition between vervets (*Cercopithecus aethiops sabaeus*) and farmers in Barbados: Implications for Management. *Revue d'Écologie (La Terre et La Vie)* 49: 281-294. <https://www.persee.fr/collection/revue>

IUCN. 2010. *Macaca mulatta*. In: IUCN Redlist of Threatened Species, Version 2010.4 www.redlist.org [Retrieved: 14 February 2010]

Marsh CW and Mittermeier RA. 1987. Primate conservation in the tropical rain forest. *Monographs in Primatology. Journal of Tropical Ecology* 6(1): 121-122

Medhi R, Chetry D, Basavdatta C, Bhattacharjya PC. 2007. Status and diversity of temple primates in northeast India. *Primate Conservation* 22: 135-138. <https://doi.org/10.1896/052.022.0114>

Myers N, Mittermeier R, Mittermeier C et al. 2000. Biodiversity hotspots for conservation priorities. *Nature* 403: 853-858. <https://doi.org/10.1038/35002501>

Naughton-Treves L, Treves A, Chapman C. and Wrangham R. 1998. Predicting patterns of crop damage by wildlife around Kibale National Park, Uganda. *Conservation Biology* 12(1): 156-168.

Linnell JDC et al 1997. Translocation of carnivores as a method for managing problem animals: A review. *Biodiversity and Conservation* 6: 1245-1257.

Ogra MV and Badola R. 2008. Compensating human-wildlife conflict in protected area communities: ground-level perspectives from Uttarakhand, India. *Human Ecology* 36(5): 717-729. DOI:10.1007/s10745-008-9189-y

Panwar HS and Mishra M. 2004. *The money and the Lion*. Zoo's Print. 9:12.

Pirta RS, Gadgil M, and Kharshikar AV. 1997. Management of the rhesus monkey, *Macaca mulatta* and hanuman langur *Presbytis entellus* in Himachal Pradesh, India. *Biological Conservation* 79:97-106. [http://dx.doi.org/10.1016/0006-3207\(95\)00131-X](http://dx.doi.org/10.1016/0006-3207(95)00131-X)

Rowe N. 1996. *The Pictorial Guide to the Living Primates*. Charlestown, Rhode Island: Pogonias Press.

Riley EP. 2007. The Human-Macaque interface: conservation implications of current and future overlap and conflict in Lore Lindu National Park, Sulawesi, Indonesia. *American Journal of Primatology* 109: 473-484. <https://dx.doi.org/10.1002/ajp.20798>

Saberwal VK. 1994. Lion-human conflict in Gir Forest, India. *Conservation Biology* 8(2): 501-507.

Sarker AHMR and Røskaft E 2010. Human attitudes towards conservation of Asian elephants (*Elephas maximus*) in Bangladesh. *International Journal of Biodiversity Conservation* 2(10): 316-327.

Sarker AHMR, and Røskaft E. 2011. Human-wildlife conflicts and management options in Bangladesh with special reference to Asian

elephants (*Elephas maximus*). International Journal of Biodiversity Science, Ecosystem Services & Management 6(3): 164-175.

<https://doi.org/10.1080/21513732.2011.554867>

Sharma G, Ram C and Rajpurohit LS. 2011. Study of Man-monkey conflict and its management in Jodhpur, Rajasthan (India). Journal of Evolutionary Biology Research 3(1): 1-3. <http://www.academicjournals.org/jebr>

Siex KS and Struhsaker TT. 1999. Ecology of the Zanzibar red colobus monkey: Demographic variability and habitat stability. International Journal of Primatology 20(2): 163-192.

<http://dx.doi.org/10.1023/A:1020558702199>

Srivastava A. 1999. *A Text Book on Primates of North East India, Rajasthan*. Megadiversity Press. Pp. 1-202.

Strum SC.1994. Prospects for managements of primate pests. Revue d'Écologie (La Terre et La Vie) 49(3): 295-306

Timmins RJ, Richardson M, Chhangani A and Yongcheng L. 2008. *Macaca mulatta*. The IUCN Red List of Threatened Species 2008.

Tweheyo M, Hill CM, and Obua J. 2005. Patterns of crop raiding by primates around the Budongo Forest Reserve, Uganda. Wildlife Biology 11(3): 237-247.

[http://dx.doi.org/10.2981/0909-6396\(2005\)11\[237:POCRBP\]2.o.CO;2](http://dx.doi.org/10.2981/0909-6396(2005)11[237:POCRBP]2.o.CO;2)

Webber AD, Hill CM, and Reynolds V 2007. Assessing the failure of a community-based human-wildlife conflict mitigation project in Budongo Forest Reserve, Uganda. Oryx 41(2): 177-184.

<http://dx.doi.org/10.1017/S0030605307001792>

