

OPEN ACCESS

The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.



Journal of Threatened Taxa

Building evidence for conservation globally

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

COMMUNICATION

PEOPLE'S ATTITUDE TOWARDS WILD ELEPHANTS, FOREST CONSERVATION AND HUMAN-ELEPHANT CONFLICT IN NILAMBUR, SOUTHERN WESTERN GHATS OF KERALA, INDIA

C.K. Rohini, T. Aravindan, K.S. Anoop Das & P.A. Vinayan

26 May 2018 | Vol. 10 | No. 6 | Pages: 11710–11716

10.11609/jott.3487.10.6.11710-11716



For Focus, Scope, Aims, Policies and Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-0>

For Article Submission Guidelines visit <http://threatenedtaxa.org/index.php/JoTT/about/submissions#onlineSubmissions>

For Policies against Scientific Misconduct visit <http://threatenedtaxa.org/index.php/JoTT/about/editorialPolicies#custom-2>

For reprints contact info@threatenedtaxa.org

Partners



صندوق محمد بن زايد
للمحافظة على
الكائنات الحية
The Mohamed bin Zayed
SPECIES CONSERVATION FUND



zoo!
ZÜRICH

Member



Publisher & Host





ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 May 2018 | 10(6): 11710–11716

PEOPLE'S ATTITUDE TOWARDS WILD ELEPHANTS, FOREST CONSERVATION AND HUMAN-ELEPHANT CONFLICT IN NILAMBUR, SOUTHERN WESTERN GHATS OF KERALA, INDIA

C.K. Rohini¹, T. Aravindan², K.S. Anoop Das³ & P.A. Vinayan⁴

OPEN ACCESS



^{1,2} Post Graduate Department of Zoology and Research Centre, Sree Narayana College, Thottada P.O., Kannur, Kerala 670007, India

³ Centre for Conservation Ecology, Department of Zoology, M.E.S. Mampad College, Mampad College P.O., Malappuram, Kerala 676542, India

³ Wildlife Research and Conservation Trust, Anupallavi, Chungathara P.O., Malappuram, Kerala 679334, India

⁴ Pandanchery House, Vemom P.O., Mananthavady, Wayanad, Kerala 670645, India

¹ rohinick4@gmail.com (corresponding author), ² atharemmal@yahoo.com,

³ daska@gmail.com, ⁴ pa.vinayan@gmail.com

Abstract: Conflict with elephants and subsequent economic losses negatively affect residents' tolerance towards wild elephants. It is important to understand people's attitude towards wildlife, especially Asian Elephants with an endangered status. A questionnaire survey was undertaken with 510 forest fringe residents of Nilambur North and South Forest Divisions, Kerala, to understand residents' attitudes towards elephant conservation and Human-Elephant conflict. The majority of the villagers experienced psychological stress and fear associated with movement restriction and chances of encounters with elephants. Crop damage was perceived as the most serious issue, followed by injury or death by encounters with elephants. Elephants show a higher preference for raiding Jackfruit and Plantain than other crops. The conflict was caused more frequently by solitary elephants than by elephant herds. Elephants were mainly found near farm areas during late night (22:00–02:00 hr) and early night (20:00–22:00 hr). More than half of the residents were in favour of forest conservation owing to its ecological value. One-fourth of the respondents favoured forest conservation due to its extraction benefits such as collection of fuel wood and cattle grazing. Almost equal proportions of people have positive and negative attitudes towards elephants. In such instances, the possibility for a drastic shift towards negative attitudes following spontaneous elephant conflict events can be expected. Ecological awareness, interaction among stakeholders, and participatory maintenance of mitigation methods will possibly reduce conflict and contribute towards the coexistence of people and elephants in this human-dominated landscape.

Keywords: Attitude, conservation, crop damage, Elephant conflict, Kerala, Nilambur, Western Ghats.

DOI: <http://doi.org/10.11609/jott.3487.10.6.11710-11716>

Editor: Heidi S. Riddle, Riddle's Elephant and Wildlife Sanctuary, Arkansas, USA.

Date of publication: 26 May 2018 (online & print)

Manuscript details: Ms # 3487 | Received 12 May 2017 | Final received 07 May 2018 | Finally accepted 12 May 2018

Citation: Rohini, C.K., T. Aravindan, K.S.A. Das & P.A. Vinayan (2018). People's attitude towards wild elephants, forest conservation and Human-Elephant conflict in Nilambur, southern Western Ghats of Kerala, India. *Journal of Threatened Taxa* 10(6): 11710–11716; <http://doi.org/10.11609/jott.3487.10.6.11710-11716>

Copyright: © Rohini et al. 2018. Creative Commons Attribution 4.0 International License. JoTT allows unrestricted use of this article in any medium, reproduction and distribution by providing adequate credit to the authors and the source of publication.

Funding: Kerala State Council for Science, Technology and Environment (KSCSTE), Government of Kerala.

Competing interests: The author declares no competing interests.

Acknowledgements: Kerala State Council for Science, Technology and Environment (KSCSTE), Thiruvananthapuram, Govt. of Kerala, is acknowledged for the financial support. The authors extend their gratitude to the principal, faculty and researchers of Zoology Department of Sree Narayana College, and MES Mampad College for their support. RCK acknowledge Kannur University for providing the opportunity to conduct this research work. We thank Dr. Amruth. M, KFRI, Peechi for his inputs. Sincere thanks to Dr. Ashok Kumar M and Dr. Sunanda of Kerala Veterinary and Animal Sciences University, Pookode, for the valuable statistical inputs. Many thanks to Mr. Ramith M, Project Officer, WTI, India and Mr. Sony R.K of ATREE who assisted in developing the work. RCK thank Parvathy, Shadiya, Javed and Favaz who assisted in the field during the survey. We also thank the staff of the forest department, Nilambur North and South Forest Divisions and all villagers for their support throughout our work. We acknowledge DST – FIST (Govt. of India) for setting up the research laboratory.



INTRODUCTION

Elephant invasion into human habitations affects people at different levels, causing economic, social, cultural, and psychological impacts. For the long term integrity of conservation areas, support from local residents is essential (Struhsaker et al. 2005). Efforts to ensure wildlife conservation will fail unless residents' concerns are resolved (Conover 2002). The assessment of people's attitudes and perceptions towards conservation has become an important aspect in many studies of wildlife conservation (Newmark et al. 1993).

Human-Wildlife conflict (HWC) is often a manifestation of underlying Human-Human conflict (HHC) such as between authorities and local people who are in the midst of Human-Wildlife interactions (Hart & O'Connell 2000; Dickman 2010). The endangered status of elephants and the huge damage caused per conflict incident adds to the significance of HHC management, particularly in the case of elephant conflict. People who are victims of elephant conflict increasingly perceive elephants as agricultural pests, and this threatens their survival (Fernando et al. 2005). Whether farmers regard a species that causes damages as problematic or acceptable is determined by cultural differences in perceptions towards the particular species (Fernando et al. 2005). As the cultural and ecological factors vary worldwide this information is likely to be site-specific. It has been recognized that major challenges in the management of human-elephant conflict (HEC) are greatly influenced by the human component (Hart & O'Connell 2000).

The increasing political interest as well as media coverage of elephant related issues is higher when compared to other wildlife species. This demands studies on elephant conflict from the people's point of view. The knowledge of people's attitudes is useful for developing awareness programs that specifically target misconceptions that people hold towards wildlife and conservation initiatives. Moreover, it can make people aware of the current status and ground level realities involved in natural resource conservation (Lee 2004).

Wildlife conservation issues are least addressed in areas outside protected areas (Macura et al. 2011). The Nilambur Forest Reserve forms a part of the Western Ghats, home to the largest elephant population in Asia, and experiences conflict of various degrees throughout the range but the local issues are not well addressed here though there are few studies on other aspect of HEC (Rohini et al. 2016, 2017). Hence an attempt was made to understand people's attitude in the North and South Forest Divisions of Nilambur, Kerala. The

present study provides baseline information about people's attitude towards conservation issues, reveals people's misconceptions, and thereby enables suggested potential focus areas while formulating policies for improving tolerance by means of participatory activities and environmental education programs.

METHODS

This study was conducted in the Nilambur forests which form the Eastern sector of the Malappuram District and include a major range in the southern Western Ghats, one of the world's biodiversity hotspots (Mittermeier et al. 2005). The Nilambur Forest Reserve is under the administration of the North and South Forest Divisions and is part of the Nilgiri Biosphere Reserve (NBR). Nilambur forests are part of Elephant Reserve No. 8, the Nilambur Elephant Reserve, under Project Elephant (Sukumar & Easa 2006). The Nilambur Valley is popular for teak plantations and the area is home to the oldest teak plantations in India.

The attitude of people towards conservation issues was assessed by using an individual level questionnaire survey from February to May, 2016. Questions were asked directly by the first author to the forest fringe residents through interviews. The questionnaire survey was carried out in 17 selected villages abutting the forest ranges of Vazikadavu and Karulai to assess the conservation attitude of local people.

The whole area sharing boundaries with Vazhikadavu and Karulai forest ranges was divided into grids (0.5km x 0.5km). A buffer of one kilometer in length was given to the forest, and then all the grids touching the buffer within the study villages were selected. From each grid, located close to the forest boundary, five houses were selected to conduct the survey. The survey included both open ended and close ended questions (Appendix 1).

The questionnaire sought detailed information on the extent of elephant conflict, the most serious issue of conflict, pattern of conflict, attitude towards forest conservation and elephant conservation. A total of 510 residents in 17 forest fringe villages were interviewed. People's responses were assessed by percentage analysis.

RESULTS

Extent of conflict

The majority of the residents (42.5%) experienced psychological stress associated with conflict, such as

free movement restriction and fear associated with frequent encounters with elephants. Crop damage was experienced by 28.7% of respondents, and property damage by 15.1%. Incidents of injury by an encounter with elephants were reported by 4.8% of respondents. There were no issues experienced due to conflict with elephants for 8.9% of respondents. Significantly more people suffer fear and stress due to elephants followed by crop damage (Fig 1).

Most serious issue of elephant conflict

Crop damage was perceived by respondents as the most serious issue (47.66%) followed by injury or death by an encounter with elephants (38.48%). Fear and restriction of free movement due to the presence of elephants were mentioned as the most serious issues only by 7.55% of respondents. Fewer respondents mentioned the damage caused by elephants to properties as the most important problem (6.29%). Significantly more people perceived crop damage as the most serious issue of elephant conflict, followed by injury by elephant attack (Fig. 1).

Pattern of conflict

Elephants showed a higher preference for raiding jackfruit (43.85%), followed by plantain (37.4%), coconut (32.1%), arecanut (22.3%), rubber saplings (1.96%), and other crops such as paddy, pineapple, teak (0.78%); however, 6.6% of respondents perceived that there is no crop preference of elephants when they raid. A few of the residents were not aware of elephant preferred crops (1.56%). The majority of the respondents observed a significantly higher preference for jackfruit followed by plantain (Fig. 2).

The conflict caused by solitary elephants was observed by 42% of respondents, and 33.13% of respondents reported it was caused by elephant herds. Both solitary elephants and elephant herds caused conflict (24.31%). Less than 1% of respondents were unaware of the number of elephants causing the conflict. Significantly higher crop raiding was observed by solitary elephants than the elephant herd. Elephant herd with 3–6 individuals were sighted by more respondents. The sighting of large elephant herd was comparatively less (Fig. 3).

More than half of the residents (52.7%) reported that elephants were found more during late night (22:00–02:00 hr), 27.6% of respondents reported elephants mainly in early night (20:00–22:00 hr), 11.37% of respondents reported their presence in evening (17:00–19:00 hr), and 6.86% of respondents stated that the conflict was higher

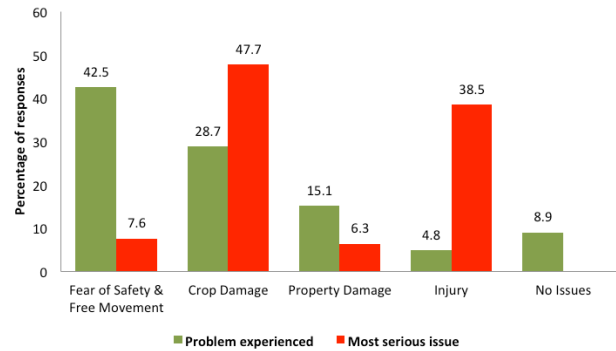


Figure 1. Extent of conflict and the most serious issues of conflict in the fringe villages of Vazhikadavu and Karulai Forest Range

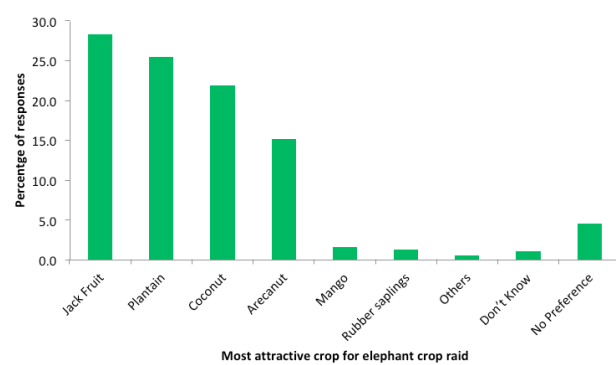


Figure 2. Preferred crops raided by elephants as perceived by local respondents (Others include Paddy, Pineapple and Teak)

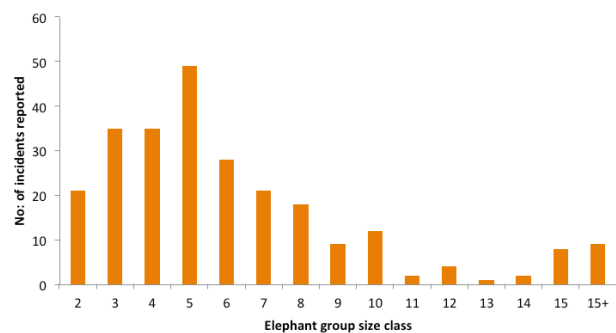


Figure 3. Number of elephants involved in crop raiding according to respondents

during dawn (04:00–05:00 hr). Less than one percent of people observed that conflict occurred in the day time.

Attitude towards conservation of the forest reserve

The majority of the respondents (87.52%) were in favour of conservation of forests, whereas 11.87% did not favour conservation, and very few people (0.60%) had neutral responses regarding forest conservation. More than half of the residents (64.1%) appreciated the conservation of forest ecosystems due to an awareness

of its ecological values, i.e., the forest provides a healthy environment, good climate, rain and pure water which are essential for the existence of humans. About one-fourth of the respondents (25.6%) felt that forest conservation is essential due to the extraction benefits, i.e., collection of fuel wood, cattle grazing, and extraction of bamboo for making fences. Fewer respondents (7.02%) appreciated the aesthetic value and mentioned that the forest area is nice to look at as it is beautiful with greenery all around and hence it must be conserved. Very few people (3.2%) stated that it is important to protect forests for the survival of wildlife (Fig. 4). Negative attitudes towards forest conservation were associated with the economic loss and stress experienced by wildlife conflict.

Elephant conservation attitude

About half of the respondents had a positive attitude towards elephants, were 54.75% in favor of elephant conservation and 45.24% of the total respondents opposed the same. Of those who supported elephant conservation, 67.6% expressed compassion towards elephants, and felt they had a right to live in the wild, and 14.4% considered elephants a property of the forest. About 7% of respondents regarded elephants as an asset of the nation and regarded them as public property to be conserved, whereas 5.5% of respondents regarded elephants as deity and appreciated their presence in the forest. Few respondents were reluctant to mention anything bad against elephants as it was as a sin to mention anything bad against elephants, according to their religious views. According to 3.38% people, ensuring the conservation of elephants in the wild will reduce the level of conflict. It was associated with the perception that elephant conflict is an outcome of habitat disturbance and human activity. Only a few respondents regarded elephant conservation as important as it will

promote income generation through tourism activities (1.27%), and elephants can be captured and used for human purposes (0.84%) (Fig. 5). The dislike towards conservation is attributed to conflict incidences and associated economic and social impact.

DISCUSSION

The majority of the surveyed residents experienced difficulties associated with elephant conflict. Lack of safety, fear or stress due to the presence of elephants near people's residences, fear to go outside the house from early night, and lack of sleep due to the notion of danger by elephant attacks were the most common problems due to conflict. Occasionally, the fear of elephant conflict has badly affected the health of residents leading to medical conditions such as hypertension. Sutton (1998), in his studies in Africa, found that the costs of elephant damage include psychological stress from anticipating nocturnal raiders and alteration in the daily working schedule. During the study, it was observed that fear persisted in a fringe village after the loss of life of a tribal woman by elephant attack, and, following this incident people did not cooperate with the forest department even to extinguish a forest fire near their houses. This was similar to the result from studies by Ngunjiri (1995) and Wilson et al. (2013) that the rapid circulation of news about injury or death due to elephant attack generates fear among people and this will negatively affect the local support for elephant conservation.

Crop depredation by elephants has been identified as the most critical HEC issue in India (Sukumar & Gadgil 1988) and also in Africa (Sitati 2003; Stephenson 2004). In this study, though crop damage was experienced by nearly one-third of respondents, it was perceived as the

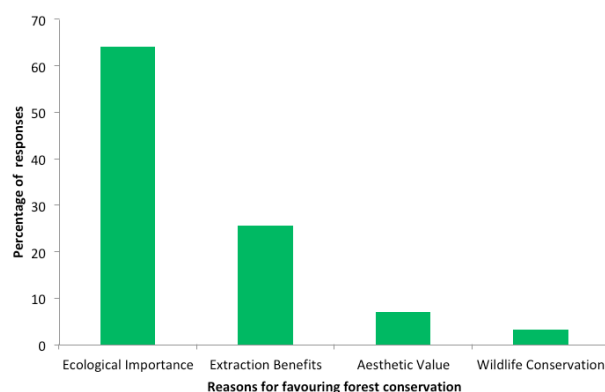


Figure 4. Various reasons for favouring forest conservation by forest fringe residents of the Nilambur Forest Reserve

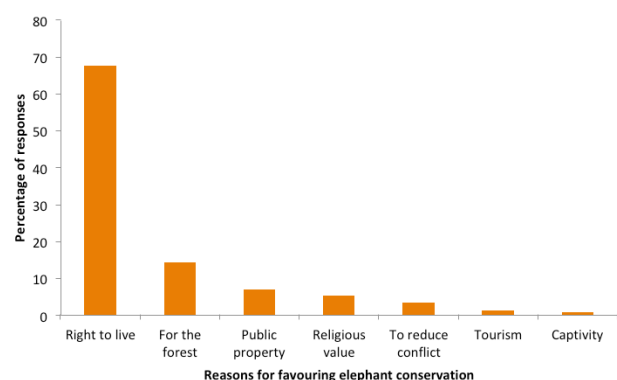


Figure 5. Respondents' attitude towards factors associated with the necessity of elephant conservation

most serious issue of elephant conflict by nearly half of the residents.

Although injury by an elephant encounter was very rare, it was regarded as the second most serious issue of elephant conflict after crop damage, followed by fear and restriction of movement, and property damage. Fear associated with the presence of elephants and restriction of free movement was the least serious form of conflict, though it has been the most frequently experienced form of conflict. Damage to property by elephants was reported by a few of the respondents. Recurrent damage to water pipelines was the most common issue of property damage. Apart from this, damage to water tanks, wells, water pump sets, gates and fences were observed. In contrary to the present study, property damage was found as the most common type of damage around Chitwan National Park and Parsa Wildlife Reserve in Nepal, where crop damages were found to be much less (Pant et al. 2015).

In the current study, the most attractive crops for elephants include jackfruit, followed by plantain, coconut, and arecanut trees. Several villagers chopped off jack trees from their courtyards due to fear of elephants coming near their houses during the jackfruit season. Villagers perceived that the rubber saplings were attractive to elephants due to the frequent incidence of massive damage to rubber saplings in some regions. Other elephant-preferred crops include pineapple, paddy, and teak, but the cultivation of these was comparatively less in fringe areas. A few of the respondents argued that none of the crops attract elephants. These responses may be out of suspicion that following specification of particular preferential crops by villagers, the authorities will discourage the cultivation to manage conflict. More individual elephants were involved in conflict incidents than elephant herds. This may signify the presence of habituated crop raiders in this area as observed in other studies (Sukumar 1990; Easa & Sankar 1999; Das et al. 2012). Whenever an elephant herd was involved in crop damage, it was as a small group mostly ranging from 2–5 individuals; however, larger elephant group size was also found occasionally in the area. Generally, elephants entered the farms only after sunset and left before sunrise. The same pattern was observed with a higher percentage of respondents mentioning that crop damage was higher at late night followed by early night. Other studies have shown that crop raiding by elephants is almost exclusively a nocturnal activity (Bell 1984; Thouless 1994; Hoare 1995). Where elephants are exceptionally bold, crepuscular raiding activity may be encountered (Hoare 1999).

In the midst of conflict-related issues, the majority of the people living around the Forest Reserve had a positive attitude towards forest conservation, similar to studies by Newmark et al. (1993) and DeBoer & Banguetem (1998). Residents appreciated the conservation of forest ecosystems as it provides water, and sustains a healthy environment and good climate. The role of non-economic values in maintaining people's relationship with the conservation areas was significant here and similar to studies by Raval (1994) and Kuriyan (2002). According to studies by Infield (2001), the non-economic values play a critical role in long-term conservation of forests. The extraction benefits obtained from the forest reserve certainly have a crucial role in building the attitude towards conservation. It was observed by Kiss (1990) and Hill (1998) that a negative attitude towards conservation was remarkable if people did not receive benefits, yet they bear the costs of living with wildlife. Fewer respondents mentioned aesthetic benefits as the reason for a favourable viewpoint towards forest conservation. People appreciated the aesthetic value and perceived that the area is beautiful as there is greenery all around. Very few respondents believed that the conservation of forests was essential as it is the habitat of wild animals. People living near the forest reserve may have positive (Badola 1998) or negative attitudes (Walpole & Leader-Williams 2002) towards the conservation area. Balancing these trade-offs and understanding factors that support positive attitudes is critical to long-term sustainability of these places (Newmark et al. 1993).

Despite losses due to the conflict in their daily life, more than half of the respondents in this study expressed positive attitudes towards elephant conservation. In other regions people appreciate elephant conservation in spite of their losses, including in Manas National Park, India (Nath et al. 2015), the Terai Arc Landscape, India (Jasmine et al. 2015), and the Shew-U-Daung Wildlife Sanctuary, Myanmar (Allendorf et al. 2015). Negative attitudes towards the elephants were formed due to direct or indirect impacts of HEC. In Africa, farmers who lost a crop to elephants were more negative in the Maputo Elephant Reserve than non-victims (de Boer & Baquete 1993). Apart from disliking wildlife, crop damage has been given as the main reason for disliking protected areas in several studies in Africa (Parry & Campbell 1992; Newmark et al. 1993). In the present study it was also observed that people responded negatively towards forest conservation due to conflict related losses and lack of economic benefits from the forest.

A favorable opinion towards elephants was mostly due to the sympathy of villagers towards the elephants

for their right to live in their own natural habitats. This signifies the cultural tolerance in India, which ensures the continued coexistence between humans and wildlife (Karanth et al. 2009, 2010). Rural people value elephants in spite of the frequent conflict and this was reflected through their ability to consider the elephant as an integral part of the forest ecosystem. Similar studies in the Terai Arc Landscape of Uttarakhand indicate that local residents recognize the ecological value of elephants and perceive that their presence indicates a healthy ecosystem (Jasmine et al. 2015).

Elephants were regarded as important public assets by some respondents to emphasize its conservation value. Positive attitudes were also due to the belief that elephants were the manifestation of God. Such beliefs can have a major impact on elephant conservation universally (Santiapillai et al. 2010). Only 5% of residents around the Nilambur Forest Reserve perceived the necessity of elephant conservation owing to religious values. According to a few respondents (3%), ensuring the conservation of elephants within the forest will lead towards reduced conflict. They emphasized the lack of appropriate interventions to sustain elephant conservation within the forest reserve.

There was no significant difference in residents' attitude towards elephant conservation. Almost equal proportions of people had positive and negative attitudes towards elephants. In such instances, the possibilities for a drastic shift towards negative attitudes following spontaneous elephant conflict events can be expected. Another study has shown that in such instances, most local farmers would eliminate elephants from their environment if given a choice (Hill 1998).

Local residents living around forest areas were directly affected by the cost associated with conservation initiatives. The perceptions and attitudes of residents living near the forest areas will ultimately make a difference to biodiversity conservation (Ninan et al. 2007). In the present study, it was noted that people were largely unaware of the ecological importance of elephants and the role in sustaining forest ecosystem, although they were aware about the ecological importance of forests. Therefore, it is necessary to improve conservation attitudes of people by making them aware of the ecosystem services rendered by elephants such as seed dispersal, energy transfer in the food chain, and ultimately in the existence of forest ecosystems. Ecological awareness, interaction among stakeholders, and participatory maintenance of mitigation methods could reduce conflict and contribute towards coexistence of people and elephants in this human-dominated landscape.

REFERENCES

- Allendorf, T., K.K. Swe, M. Aung, P. Leimgruber & M. Songer (2015). Mitigating human-elephant conflict near Shwe-U-Daung Wildlife Sanctuary, Myanmar. *Gajah* 42: 22–29.
- Badola, R. (1998). Attitudes of local people towards conservation and alternatives to forest resources: a case study from the lower Himalayas. *Biodiversity and Conservation* 7: 1245–1259.
- Bell, R.H.V. (1984). The man-animal interface: an assessment of crop damage and wildlife control, pp. 387–416. In: Bell, R.H.V. & E. Mcshane-Caluzi (eds.). *Conservation & Wildlife Management in Africa*. US Peace Corps, Malawi.
- Conover, M.R. (2002). *Resolving Human-wildlife Conflicts. The Science of Wildlife Damage Management*. CRC Press, Lewis Publishers, New York.
- Das, J.P., B.P. Lahkar & B.K. Talukdar (2012). Increasing trend of human-elephant conflict in Golaghat District Assam, India: issues and concerns. *Gajah* 37: 34–37.
- de Boer, W.F. & D.S. Baquete (1993). Natural resource use, crop damage and attitudes of rural people in the vicinity of the Maputo Elephant Reserve, Mozambique. *Environmental Conservation* 25: 208–218.
- Dickman, A.J. (2010). Complexities of conflict: the importance of considering social factors for effectively resolving human-wildlife conflict. *Animal Conservation* 13: 458–466; <http://doi.org/10.1111/j.1469-1795.2010.00368>
- Easa, P.S. & S. Sankar (1999). Study on man-wildlife interaction in Wayanad Wildlife Sanctuary. Kerala KFRI Research Report 166.
- Fernando, P., E. Wikramanayake, D. Weerakoon, L.K.A. Jayasinghe, M. Gunawardene & H.K. Janaka (2005). Perceptions and patterns of human-elephant conflict in old and new settlements in Sri Lanka: Insights for mitigation and managements. *Biodiversity and Conservation* 14: 2465–2481; <http://doi.org/10.1007/s10531-004-0216-z>
- Hart, L.A. & C.E. O'Connell (2000). *Human Conflict with African and Asian Elephants and Associated Conservation Dilemmas*. Center for Animals in Society in the School of Veterinary Medicine and Ecology, University of California, Davis, USA.
- Hill, C. (1998). Conflicting attitudes towards elephants around the Budongo Forest Reserve, Uganda. *Environmental Conservation* 24: 244–250.
- Hoare, R.E. (1995). Options for the control of elephants in conflict with people. *Pachyderm* 19: 54–63.
- Hoare, R.E. (1999). Determinants of human-elephant conflict in a land-use mosaic. *Journal of Applied Ecology* 36: 689–700.
- Infield, M. (2001). Cultural values: a forgotten strategy for building community support for protected areas in Africa. *Conservation Biology* 15: 800–802; <http://doi.org/10.1046/j.1523-1739.2001.015003800.x>
- Jasmine, B., D. Ghose & S.K. Das (2015). An attitude assessment of human-elephant conflict in a critical wildlife corridor within the Terai Arc Landscape, India. *Journal of Threatened Taxa* 7(2): 6843–4852; <http://doi.org/10.11609/JoTT.o3914.6843-52>
- Karanth, K.K., J.D. Nichols, J.E. Hines, U.K. Karanth & L. Christensen (2009). Patterns and determinants of mammal species occurrence in India. *Journal of Applied Ecology* 46:1189–1200; <http://doi.org/10.1111/j.1365-2664.2009.01710.x>
- Karanth, K.K., J.D. Nichols, U.K. Karanth, J.E. Hines & N.L. Christensen (2010). The shrinking ark: large mammal extinctions in India. *Proceedings of the Royal Society of London B* 277: 1971–1979.
- Kiss, A. (1990). Living with Wildlife. Draft report of World Bank Environment Division, The World Bank, and Washington, DC.
- Kuriyan, R. (2002). Linking local perceptions of elephants and conservation: Samburu pastoralists in northern Kenya. *Society and Natural Resources* 15: 949–957.
- Lee, P.C. (2004). Who wins? Human primate conflict in the context of conservation, development and gender. *Primate Eye* 84: 15–16.
- Macura, B., F. Zorondo-Rodriguez, M. Grau-satorras, K. Demps, M. Laval, C.A. Garcia & V. Reyes-Garcia (2011). Local community attitude towards forests outside protected areas in India. Impact of

- legal awareness, trust, and participation. *Ecology and Society* 16: 10.
- Mittermeier, R.A., R.P. Gil, M. Hoffman, J. Pilgrim, T. Brooks, C.G. Mittermeier, J. Lamoreux & G.A.B. Fonseca (2005). *Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions*. Published by Cimex, Mexico.
- Nath, N.K., B.P. Lahkar, S.K. Dutta & J.P. Das (2015). Human elephant conflict around Manas National Park, India: Local people's attitudes, expectations and perceptions. *Gajah* 42: 15–21.
- Newmark, W.D., N.L. Leonard, H.I. Sariko & D.G. Gamassa (1993). Conservation attitudes of local people living adjacent to five protected areas in Tanzania. *Biological Conservation* 63: 177–183.
- Ngure, N. (1995). People-elephant conflict management in Tsavo, Kenya. *Pachyderm* 19: 20–25.
- Ninan, K.N., S. Jyothis, P. Babu & V. Ramakrishnappa (2007). *The Economics of Biodiversity Conservation: Valuation in Tropical Forest Ecosystem*. Earthscan, London.
- Pant, G., M. Dhakal, M.N.B. Pradhan, F. Leverington & M. Hockings (2015). Nature and extent of human–elephant *Elephas maximus* conflict in Central Nepal. *Oryx* 50: 724–731.
- Parry, D. & B. Campbell (1992). Attitudes of the rural communities to animal wildlife and its utilization in Chobe enclave and Mababe Depression, Botswana. *Environmental Conservation* 3: 245–52.
- Raval, S.R. (1994). Wheel of life: perceptions and concerns of the resident peoples for Gir National Park in India. *Society & Natural Resources* 7: 305–320.
- Rohini, C.K., T. Aravindan, K.S.A. Das & P.A. Vinayan (2017). Status of conflict mitigation measures in Nilambur, Western Ghats of Kerala, India. *Journal of Threatened Taxa* 9(12): 11025–11032; <http://doi.org/10.11609/jott.3465.9.12.11025-11032>
- Rohini, C.K., T. Aravindan, K.S.A. Das & P.A. Vinayan (2016). Patterns of Human-Wildlife Conflict and People's Perception towards Compensation Program in Nilambur, southern Western Ghats, India. *Conservation Science* 4: 1–10
- Santiapillai, C., S. Wijeyamohan, G. Bandara, R. Athurupana, N. Dissanayake & B. Read (2010). An assessment of the human-elephant conflict in Sri Lanka. *Ceylon Journal of Science (Bio.Sci.)* 39: 21–33.
- Sitati, N. (2003). Human-Elephant conflict in Trans Mara District adjacent to Masai Mara National Reserve. PhD Thesis. University of Kent, Canterbury, UK.
- Stephenson, P.J. (2004). The future for elephants in Africa, pp. 133–136. In: Burgess, N., J. D'Amico Hales, E. Underwood, E. Dinerstein, D. Olson, I. Itoua, J. Schipper, T. Ricketts & K. Newman (eds.). *Terrestrial Ecoregions of Africa and Madagascar: A Conservation Assessment*. Island Press, Washington, DC.
- Struhsaker, T.T., P.J. Struhsaker & K. Siex (2005). Conserving Africa's rain forests: problems in protected areas and possible solutions. *Biological Conservation* 123: 45–54.
- Sukumar, R. (1990). Ecology of Asian Elephants in south India. Feeding habits and crop raiding patterns. *Journal of Tropical Ecology* 6: 33–53; <http://doi.org/10.1017/S0266467400004004>
- Sukumar, R. & M. Gadgil (1988). Male-female differences in foraging on crops by Asian elephants. *Animal Behaviour* 36: 1233–1235.
- Sukumar, R. & P.S. Easa (2006). Elephant conservation in South India: issues and recommendations. *Gajah* 25: 71–86.
- Sutton, W. (1998). The costs of living with elephants in Namibia, pp. 57–71. In: *Proceedings from the Workshop on Cooperative Regional Wildlife Management in Southern Africa*. University of California, Davis, CA, USA.
- Thouless, C. (1994). Conflict between humans and elephants on private land in northern Kenya. *Oryx* 28: 119–127; <http://doi.org/10.1017/S0030605300028428>
- Walpole, M.J. & N. Leader-Williams (2002). Tourism and flagship species in conservation. *Biodiversity and Conservation* 11: 543–547.
- Wilson, S., T.E. Davies, N. Hazarika & A. Zimmermann (2013). Understanding spatial and temporal patterns of human–elephant conflict in Assam, India. *Oryx* 49: 140–149; <http://doi.org/10.1017/S0030605313000513>

Author Contribution: The first and fourth authors designed the study, the first author conducted the field work and carried out the scientific writing, while the other authors supervised her research work.

Author Details: C.K. ROHINI, PhD Scholar, Sree Narayana College. She is interested in socio-ecological issues, management of wildlife conflict and participatory approach towards conservation. DR. ARAVINDAN THAREMMAL, Associate Professor & Head (Retd), Sree Narayana College. He is interested in ecological as well as molecular studies. He has also headed Department of Molecular Biology, Kannur University. DR. K.S. ANOOP DAS is a faculty at M.E.S Mampad College and a visiting professor at the Leshan Normal University, China. He has a PhD degree in ornithology and interested on the responses of butterflies, insect fauna of natural tree holes, evaluation of ecosystem services and climate change effects on bird and butterfly communities. P.A. VINAYAN, Project Officer at WWF-India, Western Ghats Nilgiri Landscape. His work involves radio collaring and monitoring of conflict causing elephants, monitoring human-elephant conflict in Wayanad District. His area of interest is conservation education, eco restoration, elephant conservation, the impact of habitat fragmentation on conflict, birds, butterflies and other insects.

Appendix 1. Study questionnaire

1. Have you suffered any of the following issues due to wild elephants?
(Crop damage, Property damage, Injury by elephant encounter, Stress or other problems)
2. Of the different issues, which is the most serious issue of elephant conflict?
(Crop damage, Property damage, Injury by elephant encounter, Stress or other problems)
3. Is there any preference for crop raiding (Yes/No), which is the most preferred crop?
Arecanut, Coconut, Plantain, Jack Fruit, Others
4. How many elephants were involved in crop raiding usually?
5. When does crop raiding occur most frequently?
Early night (20:00–22:00 hr)
Late night (22:00–02:00 hr)
Dawn (02:00–05:00 hr)
Day time (05:00–06:00 hr, 18:00–19:00 hr)
6. Is it necessary to protect the forest? Yes/No/ other responses
If yes, why do you feel this way?
(Ecological values, Extraction benefits, Aesthetic values, Wildlife conservation, others)
If no, why do you feel this way (Open ended)
7. Is it necessary to protect the wild elephants? Yes/No/other responses
If yes, why do you feel this way? (Right to live, for forest, Public property, Religious value, others)
If no, why do you feel this way (Open ended)





OPEN ACCESS



The Journal of Threatened Taxa is dedicated to building evidence for conservation globally by publishing peer-reviewed articles online every month at a reasonably rapid rate at www.threatenedtaxa.org. All articles published in JoTT are registered under [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/) unless otherwise mentioned. JoTT allows unrestricted use of articles in any medium, reproduction, and distribution by providing adequate credit to the authors and the source of publication.

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

May 2018 | Vol. 10 | No. 6 | Pages: 11703–11830

Date of Publication: 26 May 2018 (Online & Print)

DOI: 10.11609/jott.2018.10.6.11703-11830

www.threatenedtaxa.org

Communications

Home range and spatial organization by the Hoary Fox *Lycalopex vetulus* (Mammalia: Carnivora: Canidae): response to social disruption of two neighboring pairs

-- Julio C. Dalponte, Herson S. Lima, Stuart Klorfine & Nelton C. da Luz, Pp. 11703–11709

People's attitude towards wild elephants, forest conservation and Human-Elephant conflict in Nilambur, southern Western Ghats of Kerala, India

-- C.K. Rohini, T. Aravindan, K.S. Anoop Das & P.A. Vinayan, Pp. 11710–11716

Analysis of regurgitated pellets of Spotted Owlet *Athene brama* (Temminck, 1821) (Aves: Strigiformes: Strigidae) from Punjab, India

-- Renuka Malhotra & Neena Singla, Pp. 11717–11724

Species diversity and abundance of birds on Bharathiar University Campus, Tamil Nadu, India

-- L. Arul Pragasam & M. Madesh, Pp. 11725–11731

On the taxonomy of the first record of rare deep-water rough shark species of Oxynotidae (Chondrichthyes: Squaliformes) in the western Indian Ocean

-- Sarah Viana & Mark W. Lisher, Pp. 11732–11742

Forest evergreenness and tree endemism in the central Western Ghats, southern India

-- Divakar K. Mesta & Ganesh R. Hegde, Pp. 11743–11752

Distribution of *Rhododendron falconeri* Hook. F. (Ericales: Ericaceae) in Yuksam-Dzongri trekking corridor of Khangchendzonga National Park, Sikkim, India

-- Aseesh Pandey & Hemant K. Badola, Pp. 11753–11759

Peer Commentary

The characteristics, representativeness, function and conservation importance of tropical dry evergreen forest on India's Coromandel Coast

-- Mark Everard, Pp. 11760–11769

Short Communications

Mugger Crocodile *Crocodylus palustris* Lesson, 1831 (Reptilia: Crocodylia: Crocodylidae) in river Saberi of Godavari system in southern Odisha, India: conservation implications

-- Subrat Debata, Swetashree Purohit, Anirban Mahata, Sudheer Kumar Jena & Sharat Kumar Palita, Pp. 11770–11774

A new record of the lesser-known butterfly Small Woodbrown *Lethe nicetella* de Nicéville, 1887 (Lepidoptera: Nymphalidae: Satyrinae) from Khangchendzonga National Park, Sikkim, India

-- Sailendra Dewan, Bhoj Kumar Acharya & Sudeep Ghatani, Pp. 11775–11779

Partners



The Mohamed bin Zayed
SPECIES CONSERVATION FUND



Member



Publisher & Host

