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| Ecosystem distribution of | requirements of hornbills and assess select Mammals in Anchunad and ad Western Ghats | s the status and Ijoining Landscape, | |
| | for the Project | | |
| India | Gol-GEF-UNDP High Range Mountain Landscape Proje | ct, Kerala | |
| | Submitted by | | |
| Sálim A (A Centre of E | Ali Centre for Ornithology and Natu Excellence under the Ministry of Enviror Climate Change, Gol) <u>www.sacon.in</u> | ural History ment, Forest and | |
| | June 20 | | |

Ecosystem requirements of hornbills and assess the status and distribution of select Mammals in Anchunad and adjoining Landscape, Western Ghats

(Project sponsored by UNDP, New Delhi)

Final Report (Draft)

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June 2020

Citation:

Balasubramanian, P., Karunakaran, P.V., Rajeshkumar, N., Prakash, L. and Yadav, P.B.S. 2020. Ecosystem requirements of hornbills and assess the status and distribution of select Mammals in Anchunad and adjoining Landscape, Western Ghats. SACON Project Report-207, Salim Ali Centre for Ornithology and Natrural History, Anaikatty, Coimbatore, Tamil Nadu.

Acknowledgements

We are deeply indebted to the Global Environmental Facility (GEF), Ministry of Environment, Forest and Climate Change (MoEF&CC) and United Nations Development Programme (UNDP)- India for funding this project. We thank the Kerala Forest and Wildlife Department for providing permission to conduct the study in the Anchunad Landscape. We thank the Chief Wildlife Warden Shri. K. Surendra Kumar, IFS for his support. We thank DFOs of Vazhachal Forest Division, Mankulam Forest Division, Munnar Forest Division, Malayatoor Forest Division, Marayoor Forest Division and Wildlife Wardens of Munnar and Idukki Wildlife Divisions. We thank Dr. K. Sankar, Director, Salim Ali Centre for Ornithology and Natural History, Coimbatore for the support and encoragement. We are thankful to the Range Forest Officers and other field staff of Chalakudy, Munnar, Mankulam, Vazhachal, Malayattoor, Thattekad, Eravikulam, Chinnar, Marayoor for their cooperation and help in the field. We thank the officials of Kerala State Electricity Board at Sholaya for providing accommodation facilities in their gust house during the field. We thank the Finance, Administrative and Library staff of SACON for the support. We are grateful to local field assistants who assisted us during the field trips. We would thank the anti-poaching watchers for their help and cooperation in our fieldwork.

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Executive Summary

Anchunad and adjoining Landscape part of the High Range Mountain Landscape of the Western Ghats is a globally significant biodiversity region. It has a complex mosaic of land uses where conservation, economic production and livelihood requirements assume equal priority and profoundly influence each other. The project landscape harbours a rich diversity of flora and fauna with high degree of endemism. UNDP India identified several priority research projects to be undertaken in the Anchunad and adjoining landscape under the GoI GEF UNDP India High Range Mountain Landscape (IHRML) project. One such project is a study to assess the ecological requirements of hornbills of Anchunad and adjoining landscape and a review on research on mammalian fauna of this landscape. The objectives of the study are as follows.

- Assess the distribution of hornbills in Project Landscape and develop a hornbill distribution map.
- Locate hornbill nesting locations and find out important nest tree species.
- Identify important foraging habitats of hornbills and find out favoured food tree species and assess the threats to habitat and species.
- Chart out the ecosystem requirements of hornbills and suggest conservation measures.
- Compile the available information on status and distribution of key mammal species of the landscape such as Leopard, Asian elephant, Tiger, Gaur, Nilgiri tahr, Nilgiri marten, Grizzled giant squirrel, and Malabar giant squirrel and identify the scope for future study and conservation of these species.

The study was carried out in various Protected Areas and Forest Divisions of Anchunad and adjoining landscape which is a highly complex landscape represented by a variety of landscape components. The study has two major components namely, i) ecosystem requirements of Hornbills, ii) review of research on mammals in this landscape.

The following data were gathered during the study period, January 2019-March 2020. Hornbill censuses were conducted in 141 transects across 11 habitat types. Breeding season diet of Malabar Grey Hornbill was assessed by two methods, i) by observing male hornbill delivering food to nest inmates ii) collection and analysis of seed middens deposited by nest inmates under the nest tree. Seed middens were collected, segregated and the seeds identified in the field itself. During the non-breeding season, instantaneous scans were done on foraging hornbills along select transects. During the foraging observations, location details, species of hornbill, number of foraging individuals and fruit tree species eaten, etc were noted.

Breeding sites and nest trees were identified by following the signs of hornbill breeding. The signs of breeding were identified by locating the seed middens in breeding sites and by following the male bird carrying food to nests. Also, local tribals guided us to some nest sites. Upon locating a breeding site and nest tree, the tree species was recorded, and attributes such as GBH, height at which the nest is located and height of the tree were noted.

The distribution and abundance of food and nest trees were assessed in major hornbill habitats such as evergreen forests, semi-evergreen forests, moist deciduous forests, high-

elevation riparian, low-elevation riparian and teak forests. Threats to hornbills and their habitats were recorded. Anthropogenic disturbances such as fire, felling, presence of development project activities were noted. In addition, signs of cutting and copice growth were noted in the vegetation plots.

The covariate data gathered on hornbill breeding and foraging sites were brought to the spatial platform using ArcGIS software. The base map was downloaded from the online sources (India Biodiversity Portal / Bhuvan). A spatial database was prepared indicating the distribution of different hornbill species, breeding sites and major foraging habitats.

To assess the impact of massive flood in Kerala during 2018 on forest trees, a 10 km long transect was walked along the Periyar river near the Thattekad Bird Sanctuary. While walking along transects, fallen trees were enumerated along with details such as species name and GBH.

In order to study the second objective, compilation of information on key mammal species of the landscape was done by collating published and unpublished literature from various sources viz., online, libraries of universities, research institutes, colleges, and NGOs.

The present study recorded three hornbill species, namely Great Hornbill (*Buceros bicornis*), Malabar Pied Hornbill (*Anthracoceros coronatus*) and Malabar Grey Hornbill (*Ocyceros griseus*) from Anchunad and adjoining landscape. During the present study, a total of 141 transects were walked in different habitats of Anchunad and adjoining landscape. A total of 226 individuals were recorded. It includes 207 individuals of Malabar grey hornbill, 16 Great hornbills and 3 Malabar pied hornbill. Indian Grey hornbill could not be recorded. All the three species of hornbills were recorded in Vazhachal Forest Division. Malabar Grey hornbills occur in several parts of Anchunad and adjoining landscape viz., Malayattoor Forest Division, Mankulam Forest Division, Munnar Forest Division, Thattekkad Bird Sanctuary and Vazhachal Forest Division. Malabar pied hornbill areas identified in Anchunad and adjoining landscape include Vazhachal Forest Division, Mankulam Forest Division, Mankulam Forest Division, Malabar pied hornbill areas identified in Anchunad and adjoining landscape include Vazhachal Forest Division, Mankulam Forest Division, Malayattoor Forest Division, Thattekkad Bird Sanctuary.

Vegetation assessment in six major hornbill habitats was done to know the distribution and abundance of hornbills' food and nest trees. Major nest and food tree species in these habitats were listed. Enumeration of ficus diversity showed the occurrence of 25 species in Anchunad and adjoining landscape. Important figs consumed by hornbills in each of the habitat were listed.

Food habits of hornbills were assessed by direct observations in the field. A total of 28 food plant species were recorded for Malabar grey hornbill. Fruits of *Macaranga peltata, Ficus exasperata, Syzygium cumini* and *Caryota urens* were favoured by Malabar Grey Hornbill. Great Hornbill flocks frequently foraged on fruits of *Myrisyica dactyloides*. The hornbill diet, for all three species combined was 22.58 % fig fruits (n=7 species), 64.52 % non-fig fruits (n=21species) and 12.90 % small animals (n=4 species). Literature review on hornbill's food plants showed that 60 different fruit species were consumed by hornbills in and around Anchunad and adjoining landscape. *Ficus* spp (*Ficus benghalensis, F. drupacea, F.*

racemosa, F. virens), Syzygium cumini, Diospyros spp, and *Strychnos nux-vomica* were found to be favoured by hornbills in Anchunad and adjoining landscape. Hornbills were found to consume insects and other small animals also. Overall, the study findings and literature review showed that figs, non-figs, and animal matter constitute the diet of hornbills. Among these, fruits constitute the major proportion of the diet, both in the breeding and non-breeding season. Figs (*Ficus* spp) are more favoured than others. Hence, conservation of fleshy-fruited plant species including ficus is important for the survival of the species.

Nesting habitat requirements of hornbills in Anchunad and adjoining landscape was assessed. Hornbills generally use natural hollows/cavities of trees for nesting. Hornbills show high nest fiedelity, the monogamous pair use the same nest tree year after year for breeding. A total of 11 active nests (tree holes used during the study period) and 10 inactive nests (old tree holes used during previous years) were recorded during the study. Nest tree species recorded included *Bombax malabaricum*, *Schelichera oleosa*, *Terminalia bellirica*, *Tetrameles nudiflora*, *Tectona grandis* and *Grewia tilifolia*. Nest trees were recorded from Vazhachal Forest Division, Thattekkad Bird Sanctuary and Malayattoor Forest Division. Active nests were found in evergreen forest and moist deciduous forest. Vazhachal Forest Division harboured three nests which were found in *Bombax malabaricum* and *Tetrameles nudiflora*. Malabar grey hornbill nest were found on *Tectona grandis*, *Schelichera oleosa*, and *Grewia tilifolia*. Literature survey indicated that hornbills utilize 59 tree species belonging to 33 plant families across the southern Western Ghats as nest trees.

The meeting of the technical agencies for the GoI-GEF-UNDP IHRML Project held at Thiruvananthapuram suggested a study on flood impact on trees was carried out in Periyar River near Thattekad Bird Sanctuary. A total of 18 fallen trees belonging to 9 known species and 5 unidentifiable species were found. Seven of the nine trees constitute hornbills' nest trees and four of them constitute food plants. Review of studies on flood impact revealed that Bachan et al. (2019) in Athirapally reported a total of 261 plant taxa were affected by the land slide and extreme flood happened during August 2018. The review showed that a total of 44 hornbill food/nest tree species were affected by floods.

Based on the study, some suggestions were made to improve the status of hornbill habitat in Anchunad and adjoining landscape. Enrichment of hornbill habitat by planting native fruit and nest trees are recommended. As hornbills show nest fidelity, protection of traditionally used nest trees are suggested. Food and nest trees of hornbills which could be grown in degraded hornbill habitat are provided. Protection of riparian forests along Chalakudy River in Athirapally for the conservation of threatened Malabar Pied hornbill.

The literature survey on mammals indicated the occurrence of 52 mammal species of eight orders and 22 families in Anchunad and adjoining landscape. Published information was available for 26 species only and for the remaining species, no information is available due to paucity of systematic studies. The taxa such as mongoose, small cats, rodents, and other mustelids were seldom represented by published or grey literature. A distribution map of Nilgiri tahr and Grizzled giant squirrel in the project landscape was prepared and presented. Based on the secondary information, certain suggestions were made for enhancing the knowledge and conservation of little known species in this landscape.