

Monitoring Migratory movements of Wildlife (Elephant and Gaur) including demaraction of Corridors in Dharmapuri Forest Division, Dharmapuri

C. Arivazhagan

Article History

Received: 20.03.2022

Revised and Accepted : 25.04.2022

Published: 25.06.2022

<https://doi.org/10.56343/STET.116.015.004.005>

www.stetjournals.com

Abstract

The migratory movement of Elephants (*Elephas maximus*) and Gaur (*Bos gaurus*) were studied in Dharmapuri Forest Division, Tamilnadu, India. Data were collected from the field and secondary investigations were carried out with local villagers and forest department staff to identify the movement of elephants in the division. The study indicates that habitat loss is the major cause for disrupting the integrity of the elephant migratory route. Major reason for habitat loss is anthropogenic pressure in two most crucial migratory routes (Vethalakkal-Badanavadi RF (Reserve Forest) and Vethalakkal-Marandahalli RF (Reserve Forest)). It is interesting to note that elephants and local people preferring the same species of plants, namely *Albizia amara*, *Dichrostachys cinerea*, *Zizyphus mauritiana* and *Albizia amara* etc. Due to loss of fodder species in the corridor area, elephants are moving to nearby villages for crop raiding. Therefore, controlling the biotic pressure in the corridor would help to manage the conflict in the Division. Planting of fodder species in the corridor is essential to manage this problem in future.

Key words: anthropogenic pressure, elephant gaur, forest corridors, habitat loss, migratory movements

INTRODUCTION

Forest corridors are narrow strips of forests connecting two viable forest patches that provide for the survivorship and movement but not natality between other habitats. According to Saunders *et al.* (1991), the major function of corridors is to facilitate exchange of genes between populations. In recent years the Wildlife corridors have received a lot of conservation attention, consequent to the reduction of contiguous habitats into islands.

The usage of forest habitats for developmental activity such as hydro electric project, mining, agriculture, settlement, fuel wood collection and cattle grazing etc., due to high growth rate of human population, resulted in people to occupy forest areas. This resulted in the fragmentation of habitats into small pieces and some places become a narrow passage. On the other hand in habitats that are surrounded by natural barriers such as steep mountains, steep valleys etc, the habitat become very narrow for animals to use.

Corridors serve two functions, firstly they act as links between the seasonal ranges and secondly they maintain the genetic link between the populations. The use of corridors by various animals depends on their ranging behaviour and the size and physical features of the corridor. Some species use the corridors effectively, while others do not (Merriam 1991). For instance, large mammals such as the Asian elephant (*Elephas maximus*), Gaur (*Bos Gaurus*) and Tiger (*Panther tigris*) use the corridors as part of their ranging activity between habitats (Johnsingh *et al.*, 1990; Desai 1991; Baskaran *et al.* 1996, Arivazhagan, 2012).

Elephant is one among the mega herbivores found in the Eastern Ghats facing mounting problems by the way of biotic interference. Poaching and Shrinkage of corridor has given a severe blow to its population, the result of which is confinement of elephants in a particular territory which was not so in the past. Habitat loss and endangerment of many species were the immediate results. The remaining forest was either fragmented or lost its connectivity between forest areas. The creation of corridors between two reserves has been proposed to minimize the genetic effects of isolation (Diamond, 1975: Dendy, 1987). Sukumar (1989) reported that loss of forest connectivity between forested areas in the Nilgiri Biosphere Reserve. The importance of corridors has been accepted widely for management of wide ranging species, only a few studies have been carried out on the impact of human interference on Habitat corridors in India (Johnsingh *et al.*, 1990). Studies on biotic interference on corridors are most important for preserving elephant population



C. Arivazhagan

email: vetpuva@gmail.com

Managing trustee, Indo American Wildlife Society, No. 70, R.E. Apartments, Ariyagowda Road, West Mambalam, Chennai - 600 033, Tamil Nadu

because the region which was once very rich in wildlife and vegetation is now badly fragmented and movement of wildlife gets confined to few pockets.

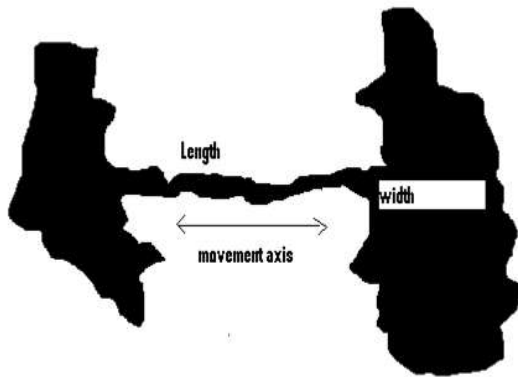


Fig.1. Schematic view of Wildlife Corridors

Biotic interference is the main problem associated with other problems in corridors. People often visit the corridors mainly for fuel wood collection, grazing, illicit cuttings of timber and Non-Wood Forest Products (NWFP) collection (Srivastava, 2002). Among the people, female population of the nearby villages depends on the corridors for fuel wood collection while the male population uses the corridor mainly for grazing their livestock. Some of the villagers use the corridors for illicit cuttings of timber and NWFP collection. Fuel wood and illicit cuttings extracted mostly from hill slopes in and around the Cauvery river and entire corridors, predominantly affecting the elephant corridors. Ramakrishnan *et al.* 1997) pointed out that biotic pressure on the corridor will affect the integrity of the corridor; and has led to the degradation of the corridors resulting in loss of forest connectivity between habitats. Other biotic factors such as fragmentation, change of floristic composition, water scarcity, highways also affect the corridors and their habitats. People use the forest up to 3.5 km distance from villages and thus there is an overlap in the habitat use by man and elephants (Srivastava, 2002). The elephants do prefer many of the plant species, which are largely collected by villagers as fuel wood. The predominant species of the area is *Albizia amara* which is the favorite species as fodder to elephant and as a fuel to man. The forests of the region are very intensively grassed. Intensive cattle grazing were observed almost all the forest ranges of the division, which is another major issue in the corridor area as this will create adverse effect on topsoil and creating scarcity of food for wild herbivores and also affect the regeneration of natural vegetation. Apart from the grazing lopping of branches for fodder for their livestock by local villagers is another major factor responsible for considerable degradation of the existing forests and destruction of the natural habitat of elephants. The present study

was carried out to investigate the present status corridors and movement of large mammals using the corridors to migrate to adjoining forest area of Dharamapuri Forest Division.

STUDY AREA

Dharamapuri is an inland district, lies as the tri-junction of Karanataka, Andhra Pradesh and Tamilnadu states of India. It is located in the north Western portion of Tamilnadu lying between latitudes N11° 47' - 12° 53' and longitudes E 77° 28' - 78° 45' (Fig.2). It has a total area of 961.9km² which is divided into three taluks, with altitude ranging from 380 to 1395 m above mean sea level. The forest of this region is coming as the part of Eastern Ghats. Gutturayan is the highest peak in the division (1395.10 m above msl). The district is surrounded by Vellore, Thiruvannamalai and Villupuram districts in the east, Salem district in the south, Karnataka state in the west, Karnataka and Andhra Pradesh states in the north. The Cauvery river bounds it on the west and is joined by the Sanatkumar nadi, which flows through the north-western portion of the district. Near the junction of these rivers are the falls of Hogenakkal or the "Smoking rock".

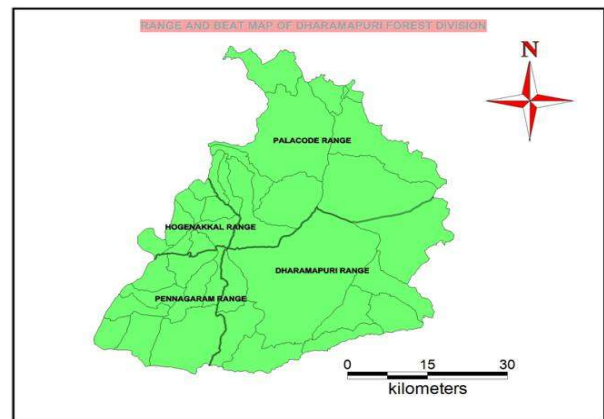


Fig. 2. Map showing the Study Area of Dharamapuri Forest Division

Dharamapuri forest division is divided into four administrative forest ranges namely Dharamapuri forest range, Pennagaram forest Range, Palacode Forest Range and Hogenakkal forest Range. Except Dharamapuri range other three ranges have elephants, and from Pennagaram Range Elephants are occasionally visiting the Dharamapuri Range.

Wildlife

Besides the Asian Elephant, the other major mammals reported from the Dharamapuri forests include the Panther (*Panthera pardus*), Gaur (*Bos gaurus*), Sambar Deer (*Cervus unicolor*), Spotted Deer (*Axis axis*), Barking deer (*Muntiacus muntjak*), Four-horned Antelope

(*Tetracerus quadricornis*), Mouse Deer (*Tragulus meminna*), Wild Dog (*Cuon alpinus*), Jackal (*Canis auerus*), Wild Boar (*Sus scrofa*), Sloth Bear (*Melursus ursinus*), Bonnet macaque (*Macaca radiata*), Hanuman Langur (*Presbytis entellus*), Indian Porcupine (*Hystrix indica*), Small Indian Civet (*Viverricula indica*), Common Mongoose (*Herpestes edwardsi*) and Indian Hare (*Lepus nigricollis*).

Objectives of the study

The present study was carried out with the following objectives

1. To identify the crucial bottleneck areas in the Dharamapuri Forest Division
2. To assess movements of Elephant and Gaur using the corridor
3. To evaluate human-elephant conflicts on the fringes of the corridors
4. To suggest measures for the better management of the corridors, thereby ensuring the long term conservation of Elephants and Gaur

METHODOLOGY

Identification of crucial bottleneck areas in the corridors

The existing corridors in the southern part of the Dharamapuri Forest Division were identified using topo sheets of 1:50,000. The surveys were carried out to find the crucial bottleneck areas. Other information such as, connectivity to other forest division were marked in the topo sheet.

Use of corridors by elephants and Gaur

The intensity of corridor usage by Elephants and Gaur was assessed by both direct and indirect methods. During the survey, sighting of animals encountered directly and indirect evidences based on the dung and feeding signs of elephant and gaur were recorded. The use pattern of elephants and gaur were identified by indirect evidences such as feeding signs, resting sites, canopy breakings, debarking, natural saltlicks and dung piles. Since the direct sightings were few due to the short duration of the study, indirect evidences have been used to identify the movement of elephants and gaur in the division. GPS locations of indirect evidences were obtained to map the distribution of elephants and gaur.

RESULTS AND DISCUSSION

Movement pattern of elephants and gaurs were identified across in Dharamapuri Forest Division. The distribution of elephants and gaur were mapped by both direct and indirect evidences (Fig. 3). During the observation we encountered 30 elephants and 6 gaur.

Based on our observation we did not encounter elephant sign in Dharamapuri Forest Range. Our observation showed that the distribution of elephants all other three ranges in the division (Fig. 4), among the three Pennagaram and Hogenakkal ranges were elephants are using intensively. Elephant from Hosur forest division migrating to Dharamapuri Forest division during particular season.

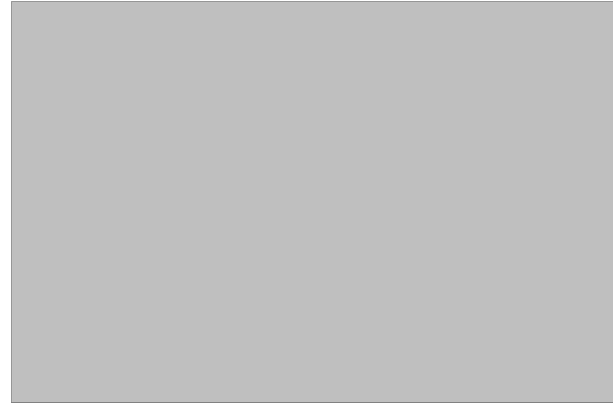


Fig.3. Map showing the distribution of Elephant and Gaur in Dharamapuri Forest Division

The movement pattern was observed between Guthirayan Reserve Forest of Hogenekkal range to Billigundu Reserve Forest in Anchetty Forest Range of Hosur Forest Division. Similar patterns were reported by Srivastava (2002), who mentioned that these elephants to cross the Anabidhalla stream, a little to the north of Anaibiddamaduvu, where the corridor reaches Anchetty Pennagaram road. Finally the corridor follows the river Chinnar in south-west direction between Woddapatty Reserve Forest and Pennagaram Reserve Forest until it cuts Pennagaram-Hogenekkal road just before dropping into the Cauvery below the Hogenakkal Falls (Fig. 5). According to a

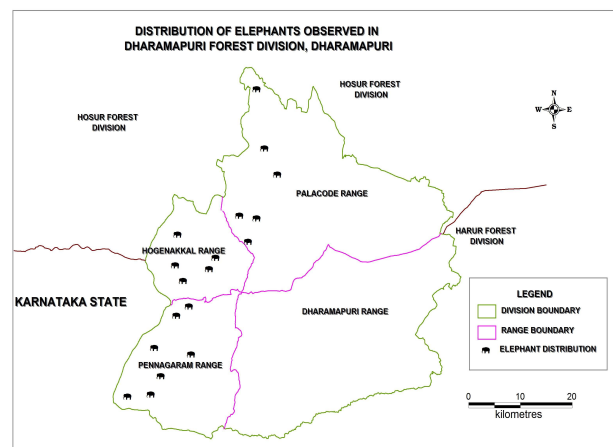


Fig.4. Distribution of Elephants in Dharamapuri Forest Division

study by Daniel *et al.* (2008), these elephants after crossing the Krishnagiri-Bangalore highway moved gradually in an eastward direction along the Eastern Ghats, passing through Maharajakadai, Veppanapalli, Pungirithi, Kurivinayanapalli, Yakalnatham and Kallikovil near Kuppam. Ramakrishnan, *et al.* (1997) suggested that Sujalkuttai-Bannari corridor and Kallar - Vedar Colony corridor are most crucial as they allow the movement of elephant populations between Western Ghats and Eastern Ghats.



Fig.5. Map showing the Movement Pattern of Elephants in Dharamapuri Forest Division

Further the elephants cross the Pennagaram-Hogenakkal road to reach Bevanur Reserve Forest and Badanavadi Reserve Forest up to Neruppur and Mettur Dam and return back. The movement pattern of elephants in Dharamapuri division shows that due to fragmentation of habitat their movements are restricted. According to Srivastava (2002), though rich fodder is available in the other parts of Eastern Ghats, due to fragmentation, the elephants are not able to cross the Thoppur Ghats to reach other parts of Eastern Ghats. The fragmentation is caused by the heavy biotic pressures such as increasing settlements, agricultural fields, quarrying in the past, fuel wood collection, fodder collection, Minor Forest Produce (MFP) collection, encroachment, human interference in virgin forests, public roads in reserve forests and transportation, etc.

According to Sukumar (1989), the isolation of elephant population is largely due to degradation of its habitats caused by human activity. Our investigation found that intensive grazing of livestock and fuel wood collection (Fig. 6 and 7) and 24 hours vehicle movement in Pennagaram - Hogenakkal road as the Hogenakkal waterfalls is an important Tourist centre in Dharamapuri District could be reason for restriction of elephant movement in the division. Arivazhagan (2012) stated that vehicular traffic act as a barrier to wildlife movement and causes injury and mortality to Wildlife. Srivastava (2002) stated that apart from vehicle movement illicit cutting of bamboo at night in

Guttirayan Reserve Forest is the major biotic factor interfering the corridor. There have led to the degradation/fragmentation of the corridors resulting in loss of connectivity between corridors. Johnsingh *et al.* (1990) reported that indigenous tree felling and high grazing intensity affect the natural tree regeneration as revealed from their studies of Chilla - Motichur in Uttaranchal. Sukumar (1990) reported possible habitat deterioration due to high density of livestock in Sathyamangalm Forest Division.



Fig.6. Fuel wood collection in the study area

Ramakrishnan *et al.*, (1997) stated that high intensity of wood cutting on the hill slopes in Kallar Vedar Colony corridors has threatened the forest connectivity between Kallar Reserve Forest and Vedar colony area as people depend on hill slopes for cutting bamboo where it is dense.



Fig.7. Livestock Grazing in the study area

Similar pattern were observed in this study, that elephants and local villagers preferring the same species which lead to losses of fodder species of elephants and drives the elephants to nearby villages for crop raiding. Therefore controlling the fodder collection and cattle grazing in this area is very important. Since this study period was very short, the information collected within the short period of time may not give full picture of elephant migratory pattern. Hence, intensive study on the movement pattern of elephants in Dharamapuri Forest Division is needed.

Management Recommendations

- ◆ Controlling of Anthropogenic Pressures (cattle grazing, woodcutting) is of utmost importance to protect the habitat.
- ◆ Acquiring of Revenue land adjoining reserve forest and converting into reserve forest to link the habitats.
- ◆ To avoid conflict, water scarcity should be fulfilled by construction of water holes/ percolation ponds etc., in the elephant migratory area.
- ◆ Awareness campaign should be conducted to create awareness amongst villagers to restrict livestock grazing/browsing in the corridors.
- ◆ Habitat improvement by the way of planting of more fodder species such as Bamboos, *Dichrostachys cinerea*, *Aegle marmelos*, *Aegle marmelos*, *Zizyphus mauritiana* and *Albizia amara* etc would help to improve the habitat and fodder for elephants

REFERENCES

- Arivazhagan, C. 2012. Impact of Tourism on Elephant Corridors in Nilgiris, Western Ghats. *J.Sci.Trans.Envirov.Technov.* 6(2): 85-91.
- Baskaran, N., Balasubramanian, M., Swaminathan, S. and Ajay A. Desai. 1995. Home range of Elephants in the Nilgiri Biosphere Reserve. Southern India. In: *Week with Elephants. Proceedings of the international seminar the conservation of Asian Elephant.* (eds. J.C. Daneil and H. S. Datye). Bombay Natural History Society, Bombay, Oxford University Press, New Delhi. P 296-313.
- Johnsingh, A.J.T., S.N. Prasad and S.P. Goyal. 1990. Conservation of the Chilla-Motichur Corridor for elephant movement in Rajaji-Corbett National Park areas, India. *Biol. Conserv.* 51: 125-138.
- Desai, A.A. 1991. The home range of Elephants and its implications for management of the Mudumalai Wildlife Sanctuary, Tamilnadu. *J.Bombay nat. Hist.Soc.* (88): 145-156.
- Daniel, J. C., Manakadan, R., Swaminathan, S., Babu, M. R., Balasubramanian, G., Desai, A., & Raj, N. M. 2008. The population, distribution, habitat and problems of the Asian Elephant *Elephas maximus* in Andhra Pradesh, India, including an assessment of the causes for their migration from the Hosur-Dharmapuri forests of Tamil Nadu into Andhra Pradesh. Final Report. Bombay Natural History Society, Mumbai and U.S. Fish and Wildlife Service, Washington, D.C.
- Diamond, J.M. 1975. The island dilemma: Lessons of modern biographic studies for the design of nature reserves. *Biol. Conserv.* 7: 129-146.
- Dendy, T. 1987. The value of corridors and design features of some and small patches of habitat Roads, road sides and wildlife conservation: A review in natural conservations (D.A. Saunders and R.J. Hobbs, eds.). Survey Beatty and Sons pty. Limited, Sydney.
- Ramakrishnan, B. Sivaganesan, N and Srivastava, R.K. 1997. Human Interference and its impact on Elephant Corridors in Sathyamangalam and Coimbatore Forest Divisions in Tamilnadu, Southern India. *Ind. J.For.*, 20 (1):8-19.
- Saunders, D.A., Hobbs, R.J., and Margules, C.R. 1991. Biological Consequences of Ecosystem Fragmentation: A Review, *Consero.Biol.*, 5 (1): 18-32.
- Merriam, G. 1991. Corridors and connectivity; animals populations in heterogeneous environments. In: D.A. Saunders and R.J.Hobbs, eds. Nature Conservation at the role of corridor, Surrey Beatty and Sons, Chipping Norton, Australia. P 133-142.
- Srivastava, R.K. 2002. Biotic Interferences and other problems faces by the elephants in the most crucial corridors of Eastern Ghats. *J. Indian For.* P 169- 178.
- Sukumar, R. 1989. *The Asian Elephant: Ecology and Management.* Cambridge University Press, Cambridge.
- Sukumar, R. 1990. Ecology of the Asian Elephants in Southern India. II. Feeding Habitats and Crop Raiding Patterns. *J.Trop.Ecol.* 6 : 33-53.