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GARUMARA NATIONAL PARK, WEST BENGAL : PROBLEMS PROSPECTS AND MANAGEMENT

N. SINGHAI* AND S. SEN GUPTA**

Introduction

Garumara National Park in West Bengal, one of the recent introductions to the National Park Map of India (declared as National Park vide Government of West Bengal Notification No. 1-For, dt: 1-1-93) had been a Wildlife Sanctuary since 2nd August, 1949 and a Reserve Forest since 1895 (vide notification No. 3147-for dt: 2nd July 1895 with corrections later on) under the Indian Forest Act (VII of 1878).

Garumara National Park acts as a gene pool reserve for the Great Indian One-horned Rhinoceros, outside Assam, Nepal and Jaldapara Wildlife Sanctuary of West Bengal. It represents Biogeographic Zone 7B (Lower Gangetic Plain). The National Park contains 12 species of vertebrates belonging to Schedule I of Wildlife (Protection) Act, 1972. The species are - Rhinoceros, Tiger, Gaur, Elephant, Sloth, Bear, Leopard, Hog Badger, Hispid Hare, Bengal Florican, Reticulated Python, Malayan Giant Squirrel and Pangolin. The National Park has 48 recorded species of mammals, 193 identified species of birds, 34 recorded species of reptiles, 2 identified species of amphibians and 30 species of fishes. Being rich in flora, Garumara also contains 326 identified species of plants having 158 species of trees, 35 species of herbs, 77 species of shrubs, 15 species of

climbers, 9 species of orchids and 32 species of grasses. Besides there are innumerable invertebrates including insects, only few of which have been identified so far.

On the basis of the composition of crop, Garumara National Park can be classified (into four major habitat types) as described in Table 1.

There are 13 revenue villages, 4 forest villages and 5 tea gardens around the National Park. The villagers mostly belonging to Scheduled Castes and Tribes are poor, illiterate and are mostly dependent upon the forests for grazing of their livestock, collection of fuelwood, small timber, fodder grasses, thatch grasses, *Bombax ceiba* floss and other Non-Wood Forest Products (NWFPs) which exert great pressure on the biodiversity. The organised labour force of tea gardens also exerts considerable pressure on the forest.

Basic objectives (Prospects) of Management

The basic objectives of management that have been identified are :

1. Conservation of biodiversity with special thrust on the conservation of Great Indian One-horned Rhinoceros (*Rhinoceros unicornis* Linn.).

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Table 1

Habitat Types of Garumara National Park

Type	Champion & Seth's Classification	Principal Localities (Block/Compt.)
Riverine Forests	Northern Dry Deciduous Seral Sal-Khair-Sissoo Association (5B/1S2)	Tondu - 1, 2, 3, 4a, 4b Selkapara - 1b
Sal Forests	Eastern Bhabar Sal and Eastern Terai Sal (3C/C1b/and 3C/C 1C)	Garumara Block, South Inderg - 1, 2, 3, Bhogolmardi Block
Wet Mixed Forests	Sub-Himalayan Secondary Wet Mixed Forests (2B/2S)	Barahati - 1, 2, 3, Central - 1, Medlajhora - 1, Dhupjhora - 1b, 2, Kakurjhora - 2
Savannah Forests	Moist Sal Savannah (3C/DS1) Low Alluvium Savannah Woodland (3/1S1) Eastern Alluvial Grassland (4D/2S2)	Jaldhaka - 1b, Dhupjhora-1a, 1b, 1c

- To develop Garumara National Park as an Elephant Reserve.
- To facilitate and consolidate people's participation in the forest and wildlife management for the conservation of biodiversity.
- To facilitate and promote scientific research of wild flora and fauna for providing technical input to wildlife management practices.
- To encourage and promote ecologically sustainable tourism activities for nature education and awareness generation amongst the people within the National Park.

Problems in achieving the objectives

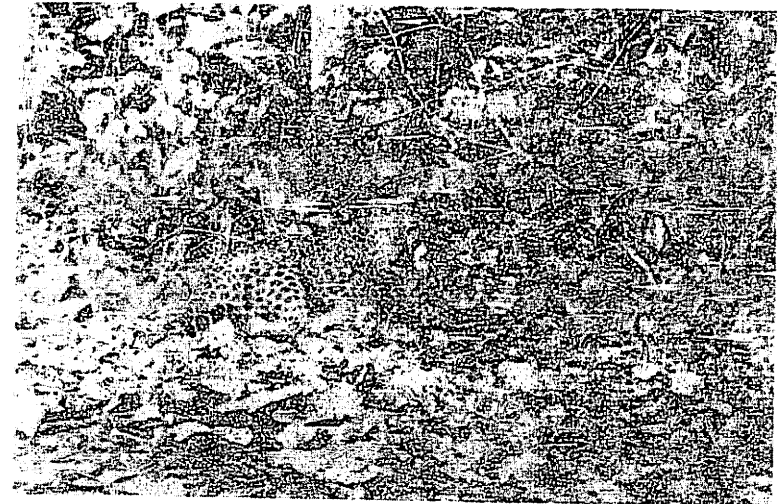
The major problems that have been

identified to act as constraints in achieving these objectives can be categorised as -

1. *Monoculture practice of Past Management*: Garumara forest area has lost some of its biodiversity values due to large scale conversion of the natural forest areas into monoculture/miscellaneous plantation blocks over the past 70 years or so. Nearly 20% of the total natural forest area of the National Park has been converted into plantations with species of commercial value.

2. *Illicit grazing of livestock by fringe villagers*: Due to the 13 villages situated around the National Park, the fringe areas are seriously affected by illicit grazing. The cattle of these fringe villages are let loose inside the National Park area due to the lack of grazing ground and non-availability of fodder in these areas, especially during

Fig. 1



Leopard in Garumara National Park (NP)

the dry season. The existing input for cattle improvement in these villages is almost nil and marginal. There is also shortage of veterinary care in these villages.

3. *Illicit felling and collection of timber*: Illicit felling in the forest for collection of timber and firewood has been a very big problem in all the Protected Areas and Garumara is also not spared. Though the extent of the problem is much less, yet some of the fringe area are adversely affected. The pressure for illegal collection mostly comes from the fringe villages like Bichabhanga, Dakshin and Uttar Dhupjhora, Hajipara, Dangapara etc.

4. *Very small population of Rhinoceros*: The present population of Rhinoceros (*Rhinoceros unicornis*) has been 19 (as per 1998 census), marginal increase from 16

(as per 1996 census). This may lead to the following possibilities in the long run :

- Continuous inbreeding may lead to genetic depression ultimately leading to the extinction of the population.
- Presence of such a small population is endangered in case of outbreak of any disease.
- Poaching of even very few animals out of this small population might make the population unviable in near future.

5. *Limitation in availability of Grassland*: Another limiting factor for conservation of Rhinoceros (*Rhinoceros unicornis*) in Garumara National Park is the serious limitation of suitable grassland habitat.

Fig. 2

Gaur herd in fodder grass plantation - Garumara NP

Out of the total 79.45 km² only 750 ha of natural grassland can be considered as suitable habitat for the Great Indian One-horned Rhinoceros *Rhinoceros unicornis*. Severe restriction of grazing area automatically limits the scope of population growth and sustainability of larger population in Garumara National Park.

Succession of tree species is another important factor for change in the grassland composition. In the natural process, depending on the climatic conditions, fertile soil and underground moisture regime, the grasslands are colonised by tree species like *Acacia catechu*, *Dalbergia sissoo*, *Bombax ceiba* and *Albizia lebbek* as a riverine succession which gradually is converting the grassland into woodland - ultimately leading to the reduction of ideal Rhino habitat.

Invasion of weeds like *Leuca* spp., *Eupatorium* spp., *Lantana camara* etc. into the grassland also help in the habitat degeneration process.

6. *Fire* : Uncontrolled wild fire is another serious limiting factor towards conservation of biodiversity. Such uncontrolled fire, often caused by illicit grazing, has serious implications as repeated burning of an area leads to suppression of certain natural species as also facilitating competition from unwanted species like weeds, thatch etc.

7. *Poaching of Rhinoceros* : The history of management of Garumara National Park does not indicate any large scale poaching of Rhino in the National Park and its surrounding areas during the last few decades. Last poaching case was reported in 1992, when a Rhino strayed out of the

Fig. 3

Bull Elephant crossing highway along Garumara NP

then sanctuary area and was killed at Kathambari, about 15 km. from Park.

However the threat of poaching can never be underestimated.

8. *Animal diseases* : In areas, where grazing pressure is high, the possibility of spreading the cattle borne disease to the wild herbivores, like Rhino, Elephant and Gaur is quite high.

9. *Soil moisture conservation* : Though the area of Garumara National Park is well drained by perennial sources of rivers and rivulets, still some areas require development of structures for soil moisture conservation to facilitate the growth of grasses and recharge ground water.

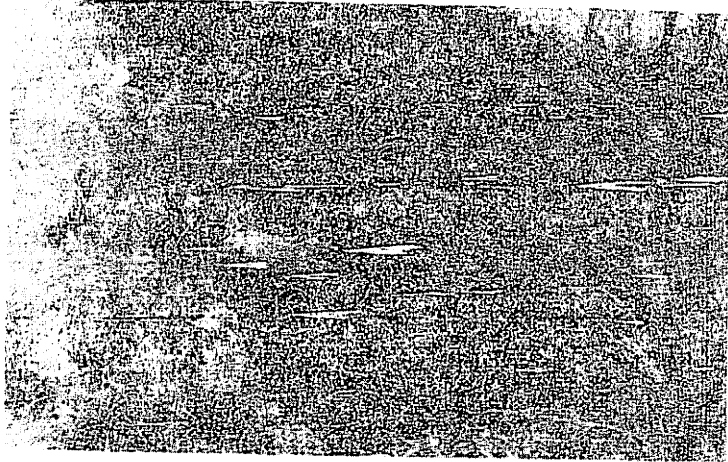
10. *Leaching of Pesticides from Tea*

Gardens : The effect of uncontrolled use of pesticides and fungicides in the tea gardens adjoining the National Park area may wreak havoc with the biodiversity, especially the aquatic fauna.

11. *Size of the National Park and presence of Tea Gardens* : The size of Garumara National Park is too small, which is a serious constraint for better management. Also the presence of organised labour force in the peripheral 5 tea gardens and absence of interface between tea garden and forest act as constraint for the management.

12. *Inadequacy of trained personnel* : Staff at the lower levels are not trained for modern protected areas management, use of firearms, captive Elephant management etc. There is also dearth of staff, particularly in the Beat Officer and Forest Guard level.

Fig. 4



Rhino mother with calf grazing in grassland of Garumara NP

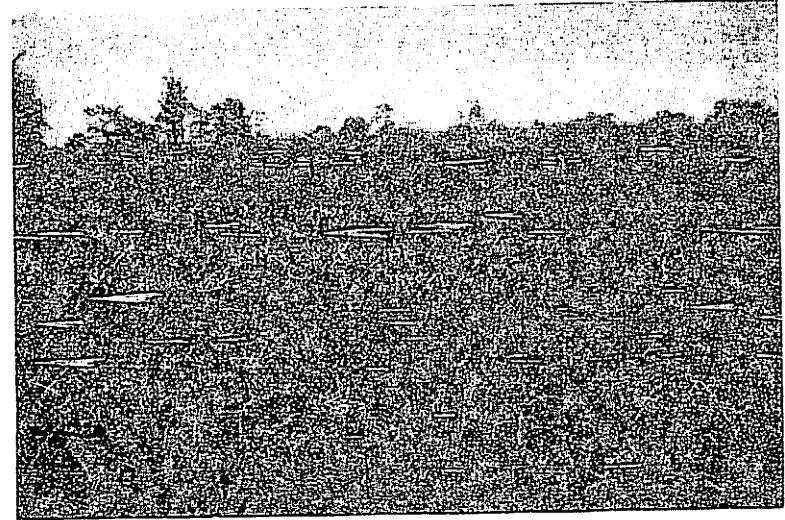
13. *Man-Animal conflict*:- Straying of wild animal from the protected area into the adjoining areas is a persistent problem. The straying of wild animals occur in the following forms -

- (i) Crop raiding by wild Elephants in the adjoining tea gardens and villages.
- (ii) Straying out and presence of Leopards in the forest fringe and tea gardens.
- (iii) Straying of Gaur out of the National Park during dry season when ground fire razes the forest.

14. *Lack of Infrastructural Support* : The National Park suffers from the following deficiencies in infrastructure :

- (i) Necessary and sufficient length of patrolling path and forest roads.
- (ii) Sufficient number of wireless sets for communication.
- (iii) Patrolling vehicles and patrolling Elephants.
- (iv) Proper accommodation for officers and staff.
- (v) Electrification in office and staff campus.
- (vi) No veterinary surgeon is there in the National Park.
- (vii) Trucks, for transport of captured animals.

Fig. 5

Fodder grass (*Alpinia* and *Saccharum*) in Garumara NP

15. *Absence of Motivated Participation in the Park Management by Fringe Area Population* : The shortcomings may be enlisted as :

- (i) Lack of clear strategies.
- (ii) Forest personnel lack motivation to involve villagers in joint wildlife management due to non-perception of direct benefits.
- (iii) Lesser extent of villagers-Forest Department personnel interaction.

16. *Lack of Scientific Research and Monitoring* : At present there is no infrastructure to take up departmental research in Wildlife Management. There is also lack of personnel for monitoring various

aspects of activities being done in and around the National Park. The National Park is an extremely important source of data base but at present, there is no procedure to systematically retrieve the data for the utilisation by the Park Management.

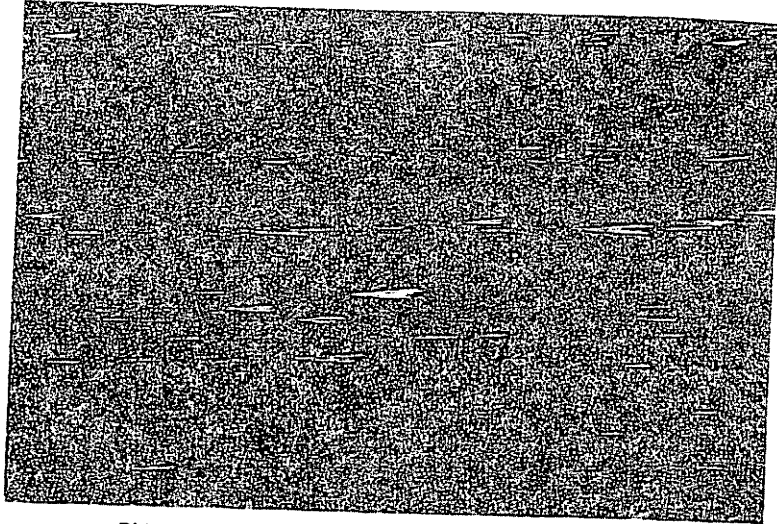
Management Strategies

To overcome the problems and to achieve the objectives certain strategies have been chalked out.

The area of the National Park has been divided into the following zones.

1. *Wilderness Zone* : The selected compartments represent all available habitat types of National Park. No works

Fig. 6



Rhino Bull inside fodder grass plantation - Garumara NP

other than protection measures are prescribed in this zone.

Area = 14.53 km².

2. *Habitat Improvement Zone* : Active managerial intervention, including habitat manipulation will be carried out in this zone.

Area = 56.61 km².

3. *Eco-tourism Zone* : It will be partly overlapping with both the other zones. Wildlife oriented eco-tourism will only be allowed, through well demarcated roads and bridle paths.

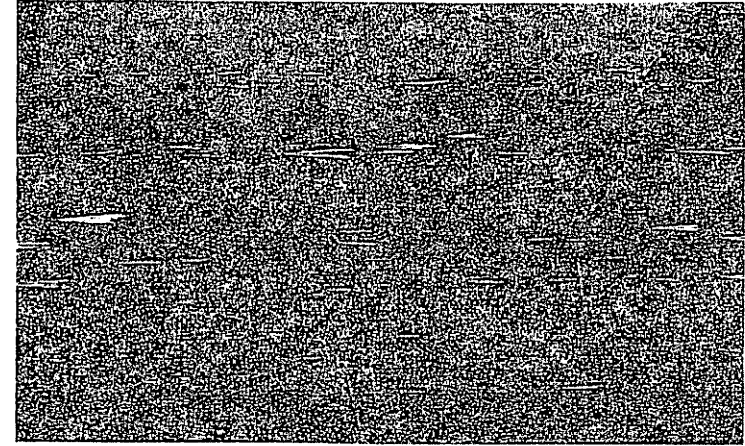
Area = 10.0 km².

Habitat Improvement

All the works of habitat improvement shall follow these basic guidelines :

- (i) While taking up habitat manipulation activities, some control plots are to be maintained for monitoring of the effects of such manipulations.
- (ii) No exotic species should be planted.
- (iii) Habitat development should be aimed towards expanding the habitat and fodder base of Rhino, Elephant and Deer.
- (iv) Special habitats like snag, den trees, caves, overhangs etc. are to be maintained as such.

Fig. 7



Transition of habitat within Garumara National Park

(a) *Overwood Removal and Fodder Plantation*

The process of overwood removal followed by artificial regeneration for maintaining grassland habitat is an extremely important component of management. It is to be done in grassland dominated areas invaded by pioneer species like Khair (*Acacia catechu*), Sissoo (*Dalbergia sissoo*), Semul (*Bombax ceiba*), Tantara (*Dillenia indica*), Malata (*Macaranga denticulata*), Sidha (*Lagerstroemia speciosa*).

No trees over 60 cm gbh should be removed, in case of *Dalbergia sissoo* and *Acacia catechu* no tree above 30 cm gbh should be removed. No fruit trees like *Emblica officinalis*, *Kuonimus Tingeus*, *Terminalia bellerica*, *Terminalia chebula*

etc. should be removed. A few *Dillenia indica* trees may also be retained as it is liked by Rhino.

Immediately after overwood removal the areas are to be planted up with indigenous fodder grasses like Daddha (*Saccharum* spp.) etc. at a spacing of 1m x 1m after thorough controlled burning of the area.

(b) *Weed Eradication and Climber Cutting*

Weeds and climbers e.g. *Leea* spp., *Cassipourea*, *Mikania* spp., *Eupatorium* spp., *Lantana camara*, *Clerodendron* spp. etc. are responsible for suppressing the ground flora and fodder grasses and changing the habitat quality in Garumara National Park. Eradication by cutting/uprooting is to be

completed before the flowering/fruited season followed by plantation of local fodder grasses.

(c) Control Burning of Old grass plantations for natural regeneration of grassland

More than 3 years old fodder grass plantations as well as the coarse natural fodder grass areas lose their importance as foraging areas as the wild herbivores do not like them. All such older grasslands are to be taken up for cut back operation (cut flush to the ground) to be followed by control burning to facilitate regeneration of young shoots. Preferably cold burning is to be done, completing the whole operation of cut back and burning by January.

(d) Control of Wild Fire

As accidental and man-made fire is quite common in Garumara National Park, it is proposed that existing fire lines to be maintained and works to be completed by January, i.e. before the fire season sets in. Patrolling paths, also acting as fire lines should be maintained similarly. Proper and continuous watch is to be kept to check man made fire and help of Eco-Development Committees should also be sought in this regard.

(e) Maintaining Special Habitats for various wildlife species

- (i) Retention of number of hollow, top drying, partially dead or fully dead (snag) standing trees.
- (ii) Retention of fallen trees.
- (iii) Retention of fruit and seed bearing trees and bamboo clumps.

- (iv) Retention of trees with deeply twisted holes, furrowed bark or peeling bark with natural cavities.

All these help in some way or other to maintain and provide specialized habitat for different species of wildlife.

Control of Grazing by Domestic Livestock

Grazing poses a great threat to the habitat. To control grazing the following strategies are proposed.

- (i) Extensive patrolling by staff.
- (ii) Sending the cattle, seized for illicit grazing, to the cattle pounds.
- (iii) Raising fodder plantations in community lands, vested lands, private lands or panchayat lands for stall feeding of cattle.
- (iv) Reduction of low yielding variety of cattle through castration of inferior bulls and artificial insemination for improvement of stock.
- (v) Regular immunisation of domestic cattle against FMD, Anthrax etc. in all villages within 5 km of Park boundary.
- (vi) Involvement of Eco-development Committees and seeking their co-operation to prevent illicit grazing of cattle in the sanctuary.

Plantation management

Some compartments of Garumara National Park contain excellent monoculture plantations of timber species.

These plantations mostly comprise monoculture of *Tectona grandis*, *Lagerstroemia speciosa* and some other species of commercial importance. Between 1960 and 1989 1118.75 ha of such plantations have been raised which need mechanical Silvicultural thinning for better growth.

If it is proposed to convert the monoculture Teak plantations into mixed plantations of Teak and Bamboo so as to develop these areas into better Elephant habitat. For this purpose Bamboo plantations will be raised at 2m x 2m spacing and fodder grasses at 1m x 1m spacing after opening up the canopy of monoculture plantations through mechanical thinning and after retaining not less than 250 Teak trees per ha.

Soil and Water Conservation Measures

Erosion of stream bank is a perennial problem, specially by the rivers Jaldhaka and Murti.

Embankment protection works are to be undertaken on the bank of Murti river near Bamni Camp and boulder sausage works on the bank of river Jaldhaka.

A few cement concrete rectangular weir structures are proposed to be constructed on the basis of contour survey in some highland areas/dry areas of the National Park to create shallow water pools for wallowing of the wild animals.

Illicit Removal of Timber, fuelwood and Non-wood Forest Produce (NWFP)

The strategies to be followed to control this problem would be as follows :-

- (i) Intensive patrolling on foot and Elephant back as well in the affected areas by the staff.
- (ii) Collection of information, carrying out surprise raids, initiate and strengthen Eco-development activities in the adjoining villages for flow of information.
- (iii) Eco-Development Committee Members are to be involved in day to day management by going out for patrolling and collection/dissemination of information about suspected activities.
- (iv) Introduction of fuelwood saving device and gobar gas plant in the fringe villages to reduce the demand of fuelwood.

Proposals to Reduce Man-Animal Conflict

The following measures are suggested :

- (i) Erection of multi-strand energised fencing around the National Park, to be maintained by the Eco-Development Committee.
- (ii) Villagers may be encouraged to go for cultivation of non-edible cash crops.
- (iii) Raising of anti depredation voluntary squads in the EDC villages as well as strengthening of Wildlife Squads of forest department.
- (iv) Ensuring quick processing and disposal of compensation claims for crop damage, house damage, human/cattle death and injury.

- (v) Awareness generation programmes are to be taken up in the affected areas.

Control of Illegal Wood-based Industries

- (i) The licensed sawmills and other wood based industries should be regularly monitored in order to ensure

compliance of the rules by these industries.

- (ii) The Eco-Development Committee members in the fringe villages should be encouraged to plant fast growing species like *Anthocephalus chinensis* etc. under farm forestry programme for producing raw materials for the local wood based industries.

SUMMARY

Garumara National Park, situated in West Bengal is important for being one of the last gene pool reserves of Great Indian One Horned Rhinoceros. It is very rich in flora and fauna besides containing at least 12 species of vertebrates belonging to the Schedule-I of Wildlife (Protection) Act, 1972. The habitat types of Garumara National Park, the basic objectives (Prospects) of Management, problems faced and the Management strategies detailing how the objectives are to be achieved, have been dealt with.

गारुमारा राष्ट्रीय उद्यान, पश्चिमी बंगाल : समस्याएँ, भविष्य और प्रबंधन
एन. सिंघल व एस. सेनगुप्ता
सारांश

पश्चिम बंगाल में स्थित गारुमारा राष्ट्रीय उद्यान एक श्रेणी गैडा के अन्तिम जीनपूल रिजर्व में से एक है। विभिन्न पेड़-पौधों और वन्य प्राणियों से भरे हुए इस संरक्षित क्षेत्र में वन्यप्राणी (संरक्षण) कानून, 1972 के अन्तर्गत शेड्यूल एक में वर्णित 12 प्रजाति के मेरुदण्डी प्राणी भी पाये जाते हैं। गारुमारा के विभिन्न हेविटेट, प्रबंधन के मुख्य लक्ष्य, प्रमुख समस्याओं और लक्ष्य प्राप्ति के लिये प्रस्तावित समाधानों का विवेचन इस अभिपत्र में किया गया है।

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HABITAT PREFERENCE OF FIVE HERBIVORES IN THE CHIMMONY WILDLIFE SANCTUARY

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Introduction

Information on the habitat preference of wild herbivores is necessary for the scientific management of protected areas. When habitats are used disproportionately to their availability, such use can be considered as selective (Johnson, 1980). In many of the protected areas in the Western Ghats of South India, herbivores use habitats selectively. Even though many studies have been carried out earlier on the habitat use of mammals (Balakrishnan and Easa, 1986; Nair and Jayson, 1988; Jayson and Ramachandran, 1996), no attempt has been made to elucidate the selective habitat use by the herbivores in the different vegetation types of Chimmony Wildlife Sanctuary.

Recently, status and distribution of larger mammals of Chimmony Wildlife Sanctuary were reported (Jayson, 1997). Apart from these, no other information is available on the herbivores from this protected area. Many studies have been conducted in North America on the habitat use of wild herbivores. Habitat use of Columbian White-tailed Deer has been reported by Suring and Vohs (1979). Mule Deer (*Odocoileus hemionus*) habitat selection patterns in North Central Washington was described by Carson and Peek (1987). Summer habitat use of

Mountain sheep was reported by Gionfriddo and Krausman (1986). Similarly, home range and habitat use of adult female Moose was studied by Cederlund and Okarma (1988). Study designs and tests for comparing resource use and availability have been reviewed by Thomas and Taylor (1990). Relative habitat preference of herbivorous mammals, namely Indian Porcupine (*Hystrix indica*), Blacknaped Hare (*Lepus nigricollis*), Asian Elephant (*Elephas maximus*), Sambar (*Cervus unicolor*) and Wild Boar (*Sus scrofa*) to their availability is discussed in this paper. Along with this, seasonal difference in habitat use during summer and monsoon months were also reported.

Study Area and Methods

Study area : The Sanctuary is situated in Thrissur District of Kerala State, India (between 10° 22' - 10° 26' N Lat. 76° 31' - 76° 39' E Long.) on the Western slopes of Nelliampathy forest. The extent of this Sanctuary is about 90 km² and is contiguous with Parambikulam Wildlife Sanctuary on the East and Peechi-Vazhani Wildlife Sanctuary on the West (Fig. 1). Elevation varies from 1126 m to 2500 m above MSL. Detailed description on the location and topography of the Sanctuary is given in Jayson (1997). The mean annual rainfall varied from 2500mm to 3000mm. Maximum