

Seasonal Feeding Ecology of the Elephants in the Udawalawe National Park, Sri Lanka:(A Geographical Survey)

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Abstract:

Elephants (*elphahas maximus maximus*) play a vital role as the *Flag ship Species* in Sri Lanka. As the study area, Udawalawe National Park (UNP) is one of the ideal national parks for elephants in the country where they are considered to be a *key stone species* of the park. The entire area of the park within the declared boundary, together with the reservoir, is 32,315 ha. The major vegetation type of the park includes primary, secondary and degraded secondary forest, grass lands, shrubs and teak plantations. The aim of this study is to explore the feeding ecology of elephants in two different seasons at the UNP, Sri Lanka.

Data for this research was obtained through primary and secondary data collection. Primary data was obtained from the east, west and south of the park in April and June through observation and discussions with park officers. Data analysis was carried out based on obtained both qualitative and quantitative data.

According to the study, east and south areas of the UNP are drier than the west and north, and the vegetation is comprised of wet monsoon forest in the north, dry monsoon forest in the south. Chenna cultivation is very obvious in the adjoining areas of the park. There are more than 90 dominant plant species belonging to 38 families in the park. Particularly, secondary forest areas and grass lands provide food for around 325 elephants in the park throughout the year. Elephants spend more than 15 hours per day on feeding. During the day time they spend inside the park and at night around 7.00 pm to 1.00 am they spend outside the park especially in March and April. They consume around 140 kilograms of food and 80 - 160 litres of water per day, and they are getting water from Udawalawe reservoir for drinking and also for the purpose of lowering body temperature.

Their diet includes different types of grasses, as well as juicy leaves which they are getting from the park and also in March and April they are feeds fruits and vegetable through croup riding outside the park. Beside this, elephants consume minerals from eating red soil which is available in the eastern part of the park, drink underground water for sodium and also eat barking teak trees in the southern part of the park to obtain the minerals from them.

Key words: *Elephants, Feeding patterns, Udawalawe National Park, Grass lands*

Introduction:

Geography provides the specific foundation for diverse kinds of exploration in the human, social and natural sciences within the spatial and time context. According to Hartshone (1939), it is not either a natural or Social Science, but it is a study of intimately mixed phenomena. The primary objective of geography is the examination, description, and explanation of Earth over space and time. The subject of geography is the fundamental interpretation of the Earth's 'spatial and temporal diversity. In fact, the explanation of spatial organization is at the core of geographic research (Hartshone, 2005).

Geography is also divided into number of subdivision, among them, Physical geography which examines the natural processes occurring at the Earth's surface that provide the physical setting

for human activities (Gabler, et al., 2007). Biogeography and Landscape Ecology are subfields in Physical geography with other subfields, which are focusing the distribution patterns of organisms at varying spatial and temporal scales¹. According to (Tivy, 1979; Robinson, 1972; Hugget, 1998), Biogeography is the study of the geographical distribution of plants, animals and micro organisms over the surface of the earth in both space and time. The spatial components of biogeography attempt to describe and explain the distribution of one or more species, its habitats on the earth surface. Therefore, the spatial organization is important to understand species interaction with space and the influences of geographical factors in species function. The interaction between space and species need to be considered in species feeding ecology. The study of biogeography especially emphasizes ‘biodiversity’, its spatial distributions, challenges and the importance of conservation of biodiversity (Huggett, 1998).

In the context of biodiversity, the elephant (*elphahas maximus maximus*) is considered one of the important animals of the animal kingdom and is a prominent symbol of wildlife conservation in Sri Lanka as a ‘flagship’ species² and one of the most important ‘biological resources’. It is also an “Umbrella” species, given that its conservation will benefit other sympatric species. The elephant is also known as a ‘Keystone’ species, to emphasize the vital role it plays in the structuring of natural communities. Thus, the conservation of the elephant will ensure the maintenance of biodiversity across large and different ecosystems. (Santiapillai, Wijeyamohan and Vandercone 2003). As a ‘flagship’, ‘Umbrella’ and ‘Keystone’ species it must be conserved with connected natural landscapes to maintain entire biodiversity and ecosystem heterogeneity.

Study Area: Udawalawe National Park

Udawalawe National Park (UNP) in the Southern wildlife region (elephant range area) has been selected as the research area for this study. According to the Department of Wildlife Conservation’s (DWC) classification, there were six wildlife regions in the country. Among them, UNP is situated in the southern wildlife region. UNP is one of the ideal national parks for elephants in the country and considered elephants as *key stone species* of the park. The entire area of the park within the declared boundary, together with the reservoir, is 32,315 ha. The major vegetation type of the park includes primary, secondary and degraded secondary forest, grass lands, shrubs and teak plantations. The average annual rainfall is about 1825 mm and the annual average temperature is about 30⁰ C. Human-elephant conflict is one of the common issue in the study area (DWC., 2011).

Research Methodology:

Research methodology was based on primary and secondary data collection. Primary data were obtained from east, west and south of the park in April and June through observation and discussions with park officers to find out Seasonal Feeding Ecology of the Elephants: this including elephant’s seasonal and day night migration pattern, feeding areas, feeding patterns including juicy leaves, fruits, underground water for sodium, red soil and barking of teak tree for minerals and average feeding hours per day in the study area. Observation on migration pattern, feeding areas and seasonal elephant’s entry to the surrounding farmlands at night hours, feeding patterns and feeding hours will be conducted in three different seasons in the study area in April and June 2012.

¹Wikipedia., 2013. [online] Available at: < http://en.wikipedia.org/wiki/Physical_geography>[Accessed 15.03.2013].

²Categorized by IUCN.

Informal conversational-type questions were asked from officers about their perception of the of the spatial and seasonal feeding ecology of elephants in the study area including: boundaries of the parks, seasonal feedings such as grazing areas, types of species, feeding hours, and also asked seasonal grazing, grazing areas and elephant movement patterns. Beside this, Data analysis was carried out based on obtained both qualitative and quantitative data.

Findings: According to the study, there are around 375 – 450 elephants living in the park especially in June and around 400 in April particularly to fed water from reservoir. More than 50 species are visits to the park in the April to fed water from Yala via Lunugamwehera National park. According to the deputy warden, 450-475 elephants are found in the park. They migrate to Yala, Buntale and other forest areas from time to time, through the ‘corridors’, and on their return they are often accompanied by a few more elephants from these areas. However secondary forest areas, grass lands and reservoir provide food and water for around 350 elephants in the park throughout the year.

East and south are drier than the west and north, and the vegetation is comprised of wet monsoon forest in the north, dry monsoon forest in the south. Chenna cultivation is very obvious in the adjoining areas of the park. There are more than 90 dominant plant species belonging to 38 families in the park. Guinea grass (*Panicum maximum*) and blady grass (*Imperata cylindrica*) are important food sources for the elephants. Common bush grass (*Cymbopogon confertiflorus*) species found in the grasslands of the park. There is a plantation of teak (*Tectona grandis*) along the southern part of the park.

The carrying capacity for the elephants inside the park was the ready availability of water in the reservoir. Besides that, numbers of species of grass are plentifully dominating that are their favored and nutritious diet.

According to the field study, elephants spend more than 15 hours per day on feeding including chewing. During the day time, both in the April and June they spend inside the park spending a long of time along the edge of the reservoir open grass area of the park. Elephants are using their trunks to pickup grass and then dusting against the fore leg in the bottom before eating. They used to chew thoroughly before swallow. During the day time, elephants used to eat different types of grass specie inside the park.

Elephants used to have dust bath using dry soil³ during the March and April and also it is consume minerals from eating red soil which is available in the eastern part of the park. In the southern part of the park, close to the grassland stand the teak trees. These trees, however, had been stripped of their bark, from the bottom to about 10-12 feet high and some trees in the row were missing because of elephants used to bark of the teak trees which are rich in minerals that the elephants need.

In the surrounding of the park, two-thirds of the people are engaged in annual chenna cultivation. They ride croup such as paddy (*Oryza sativa*), maize (*Zea mays*), gingelly(*Sesamum indicum*), banana (*Musa paradisiacal*), sugar cane (*Saccharum officinarum*), coconut (*Cocos nucifera*), rubber (*Hevea brasiliensis*), millet (*Pennisetum glaucum*), manioc - cassava (*Manihot esculenta*) sugar cane (*Saccharum*) and fruits. These are most favourable and readymade food for elephant, if it is encroached to the cultivation areas surrounding the park.

³ Common soil type is reddish-brown soil

According to the study, the elephants try to break the fences due to the irresistible smell of the chena cultivation and sugar cane plantation⁴ surrounding of the Udawalawe National Park. The southern boundary of Udawalawe National Park is being provided with an electric fence, constructed by the Sevenegala Sugar Company Ltd for the protection of the sugar cane plantation. The elephants sometimes put long logs found in the jungle onto the barbed wires and by connecting two wires together they defuse them. Some elephants also push and fell the posts on which the barbed wires are fixed and cross the fence. Other elephants push the wires with their backs. As they have become used to small shocks, they push the wire intermittently and then cross the fence.

The elephants sometimes have to roam about the park for c. 25 km per day in search of food. This, and the elephant's habit of voluntary migration in a certain period, urges them to migrate to other areas through the corridors. All around the park, maize plantations, manioc, paddy, green gram, yams, and vegetables are grown. The smell of these crops draws the elephants. At night around 7.00 pm to 1.00 am they spend outside the park especially in March and April and consumed readymade foods which are available in the surrounding areas of the park. They consume around 140 kilograms of food per day.

Beside this, elephants used to drink around 80 - 160 litres of water per day, and they are getting water from Udawalawe reservoir for drinking and also for the purpose of lowering body temperature. At the UNP, around 50-60 elephants are used to be seen feeding in Udawalawe reservoir daily during in the morning and evening. As there is ample water for the elephants and other wildlife in the park, even during drought, elephants from other parts come here during the drought season for food and water. Following feeding, all animals were seen to take a dust bath, dusting them with dry soil, before entering to the forest.

Conclusion:

Their diet includes different types of grasses which are abundantly available in the open grass area of the park, as well as juicy leaves which they are getting from the park and also during the March and April they are feeds fruits and vegetable through croup riding outside the park. Beside this, elephants consume minerals from eating red soil which is available in the eastern part of the park, drink underground water for sodium and also eat barking teak trees in the southern part of the park to obtain the minerals from them.

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⁴ Sugar cane lies on the southern border of the park

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