

ACTIVITY BUDGET OF GREAT INDIAN ONE HORNED RHINOCEROS IN ORANG NATIONAL PARK, ASSAM, INDIA

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Abstract

The present study revealed that, the Indian Rhino showed distinct variation of activity pattern in different seasons of the year. The Indian Rhino of Orang National Park spent a maximum of 46.2% time on feeding activities, followed by wallowing 18.4%, vigilance 15.1%, locomotion 9.1%, comfort 8.01% and minimum of 5.6% in other miscellaneous activities. The results indicated that, feeding was the guiding factor, which effect on time allocation in various activities, possesses by Indian Rhino. The Indian Rhino of Orang National Park allocated maximum time on feeding activities (55.29%) during winter season, followed by pre-monsoon (48.75%) and retreating monsoon (47.34%) season, whereas, it was lowest (36.96 %) during monsoon season. Again, the highest percentage of locomotion activity was observed during winter season (16.5%), followed by pre-monsoon (11.32%), retreating monsoon (5.07%) and monsoon season (3.3%). The study showed that, the variations of time allocation in wallowing activity by Indian Rhino were varies in different seasons of the year. The highest time allocation on wallowing activity was found during monsoon season (41.3%), followed by retreating monsoon (17.4%) and pre monsoon (9.1%), whereas lowest (2.2%) time was allocated during winter season in Orang National Park. The time allocation of Indian Rhino for comfort activities were varies in different seasons of the year. The highest time was allocated during retreating monsoon (14.7%), followed by winter (10.1%), pre monsoon (7.9%) and monsoon season (4.2%). They spent almost equal time on vigilance behaviour in all four seasons of the year. However, the trend of vigilance activity was increased during winter and it continued till pre-monsoon season. The Indian Rhinos spent 5.6% time in various other miscellaneous activities. During pre-monsoon season, they spent 1.9% time on miscellaneous activities, followed by retreating monsoon (1.8 %), monsoon (1.2%), and winter season (0.7%).

Key Words: Indian Rhino, Orang National Park, activity pattern, seasonal variation

Introduction

Activity budgeting of an animal denotes the allocation of time in various diurnal (or nocturnal for certain animals) activities in a specific time period. The study of activity budgeting is very

essential for a species to understand its life style characteristics and is a foundation stone for interrelating the ecology and behaviour of animal species (Struhsaker and Leland, 1979). The allocation of time in different behavioral activities and its distribution pattern in each day is very important aspect to understand the time adjustment of an animal in various feeding habitats to optimize its resource use for growth and development. This is primarily because, “time” is a hidden constraint that affects all other behaviours (Dunbar, 1992). Again, the activity budgeting is also varies depending on the numbers of ecological and biological factors, such as body size (Clutton-Brock & Harvey, 1977; Gaulin, 1979; Struhsaker & Leland, 1979), diet availability (Clutton-Brock, 1977; Zielinski *et al.*, 1983), distribution and abundance of food resources (Milton, 1980; Bhattacharya & Pal, 1982; Harvey, 1985; Mendes, 1989; Srivastava, 1989; Sarkar, 2000) and climatic factors (Bernstein, 1972; Bernstein & Mason, 1963; Chivers, 1969) of an animal.

Again, the activity is the behavioural output of an individual or group of animals of a species in response to resource availability and the other responses to climate, competition for resource, mate availability etc. It is also an important indicator of the health of a habitat, which reflects the status and distribution patterns of the resources.

Since, the activity budgeting helps to understand the species-specific and site-specific time allocation, it is used as a tool to lay out comprehensive conservation strategy for a species in a particular area. Most of the studies on activity budgeting of large herbivores has been done by several authors, such as Indian Rhino by Laurie (1978) & Ghosh (1991) and wild elephant by Sukumar (1989) etc. Again, Laurie (1978, 82) and Bhattacharya & Pal (1982) had studied the diurnal cycle of activity budgeting of Indian rhino in Nepal and West Bengal, but very little attempt was made to study the activity budgeting of Indian rhino in the Brahmaputra floodplain.

Therefore, the present study of activity budgeting of Indian Rhino was an attempt to find out the daily time allocation in different behavioural settings of the species in Orang National Park. This will help to layout the site-specific conservation strategy for the Indian Rhino, especially in Orang National Park or other similar Rhino habitats of the Brahmaputra floodplain area.

Objectives

The main objectives of the activity budgeting of Indian Rhino were such as

1. To investigate the activity pattern of Indian Rhino in Orang National Park in different seasons of the year.
2. To identify the major behavioural activities that plays a vital role in time allocation of Indian Rhino.

Study Area

The Orang National Park (co-ordinates, $92^{\circ}15'$ - $92^{\circ}27'$ E and $26^{\circ}29'$ - $26^{\circ}40'$ N) is situated in the north bank of the river Brahmaputra and within the administrative boundary of Udalguri and Sonitpur districts of Assam, India (Fig.1). The study area is located about 130 km apart from the state capital city Guwahati and included under the jurisdiction of Mangaldoi Wildlife Division, Department of Environment and Forests, Government of Assam, India.

The eastern side of the study area is bounded by Borsola area and river Brahmaputra of Sonitpur district, southern side by the river Brahmaputra, western side by the tributary Dhansiri and Bogoribari village area and the northern side is bounded by Nalbari and Rongagora villages of Darrang district.

The study area comprises of alluvial floodplains of the river Brahmaputra. In fact, the complete study area is an alluvial terrace and the entire Orang National Park could be divided into two halves i.e. lower Orang and upper Orang. The lower Orang portion is more recent origin, whereas, the upper portion to its north is separated by high bank, traversing the park from east to west. The terrain is gently sloping from North to South. The altitude of the study area ranges between of 45- 75m MSL.

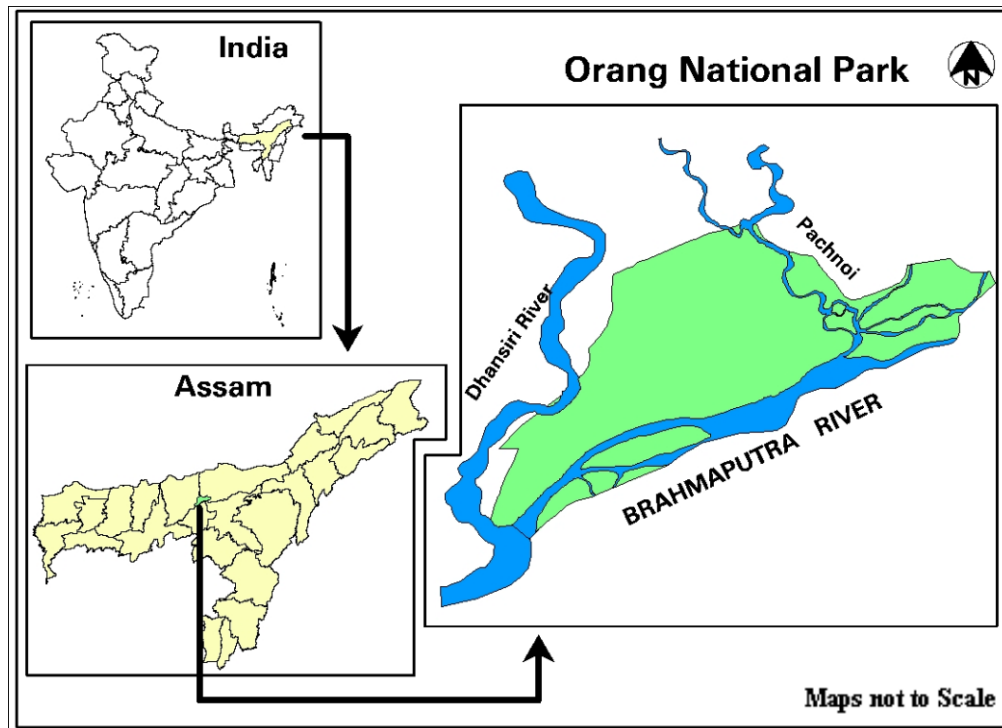


Fig-1: Location map of Study Area (Orang National Park).

The entire protected area was a human habitat area till the last decade of 19th century (Talukdar and Sharma, 1995). Prior to declaration of Orang as a 'Game Reserve' in 1915, different ethnic groups occupied the entire study area. Two large tributaries of the river Brahmaputra, namely Dhansiri and Panchnoi are associated with numbers of streams and *nullah* that criss-crosses the park and became the source of water for the entire habitat.

Methods

For convenience of study, field surveys for activity budgeting of Indian Rhinos were done during day light hours in Orang National Park. The night surveys were not possible owing to lack of sufficient infrastructure and security arrangements. Again, the night survey was also not possible due to less visibility for dense habitat condition (thick tall grasses). The following methods were adopted for the study of activity budgeting of Indian Rhino in Orang National Park.

(a) Scan sampling

The continuous follow up action of Indian Rhino, using *Focal Animal Sampling* (Altman, 1974) was not possible, owing to excessive tall grasslands (where the tall grasses overshoot the Rhino height). Hence, *Scan Animal Sampling* (Altman, 1974) was found to be suitable for sampling the activity budgeting of Indian Rhino in Orang National Park. The *Ad. Libitum Sampling* method (Altmann, 1974) was also used to record the important activities between two scans.

(b) Data collection

The study of Indian Rhino in Orang National Park was followed the "dawn to dusk" investigation methods and the observed behavioural activities were recorded in return to time spent in various activities by all individuals sighted in each 5 minutes time period. For these purposes, data sheets were prepared and carried to the field for instant data recording. The activity patterns such as feeding, locomotion, comfort, wallowing, vigilance, non-breeding play, breeding play, agnostic and all other behaviours related to its breeding and non-breeding purposes etc. were recorded in the data sheet. Apart from that, the less frequent activities sighted between two scans were also recorded in the data sheets (*Ad. Libitum Sampling*, Altman, 1974). During data collection, the uniformity was maintained to represent all age and sex compositions of Rhino.

Selectivity of time allocation for behavioural settings

The time allocation for various behavioural activities by an animal may be determined either by availability of time or habitat condition, as well as other ecological factors. To find out this

selectivity, the seasonal variation of time spent in different behaviours were compared with the overall time allocation in different activities.

The study was carried out from April, 2006 to March, 2008 in Orang NP ($92^{\circ}15' - 92^{\circ}27' E$, $26^{\circ}29' - 26^{\circ}40' N$). A total of 10 days per month was spent to visit each and every corner of the park. The field study was conducted using motor vehicles, bicycles, country boats, elephant back as well as on foot. During field visits, the sightings of Indian rhinos were recorded with their numbers, age-sex, GPS locations and habitat types, whenever sighted. The data were further analyzed to find out the daily range, home range, and habitat utilization pattern. During field visits, the vegetation samplings were done covering all the habitats on seasonal basis. Again, the sightings of Rhino dung piles and occurrences of any less frequent opportunistic behaviour (e.g. aggressive, reproductive etc.) were also recorded in each visit. Various standard methods were used during survey and analysis.

Results

Activity budget

The present study revealed that, the Indian Rhino showed distinct variation of activity pattern in different seasons of the year. The Indian Rhino in Orang National Park spent a maximum of 46.2% time on feeding activities, followed by wallowing 18.4%, vigilance 15.1%, locomotion 9.1%, comfort 8.01% and minimum of 5.6% in other miscellaneous activities (Fig. 2). The results indicated that, feeding was the guiding factor, which effect on time allocation in various activities, possesses by Indian Rhino.

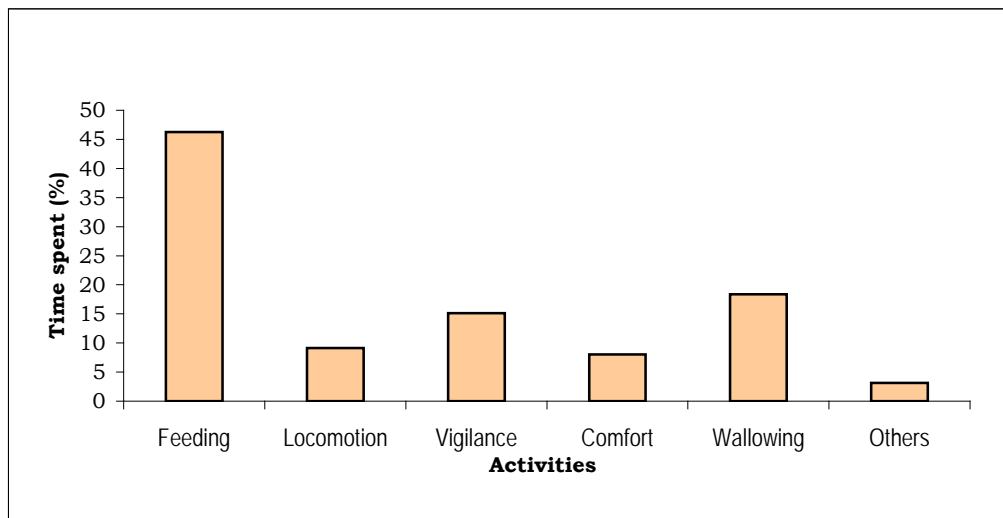


Fig. 2 Activity pattern of Indian Rhino in Orang National Park throughout the year.

a) Seasonal Variation of Feeding Activity

Study showed that, the Indian Rhino in Orang National Park allocated maximum time on feeding activities (55.29%) during winter season, followed by pre-monsoon (48.75%) and retreating monsoon (47.34%) season, whereas, it was lowest (36.96 %) during monsoon season (Fig. 3 a).

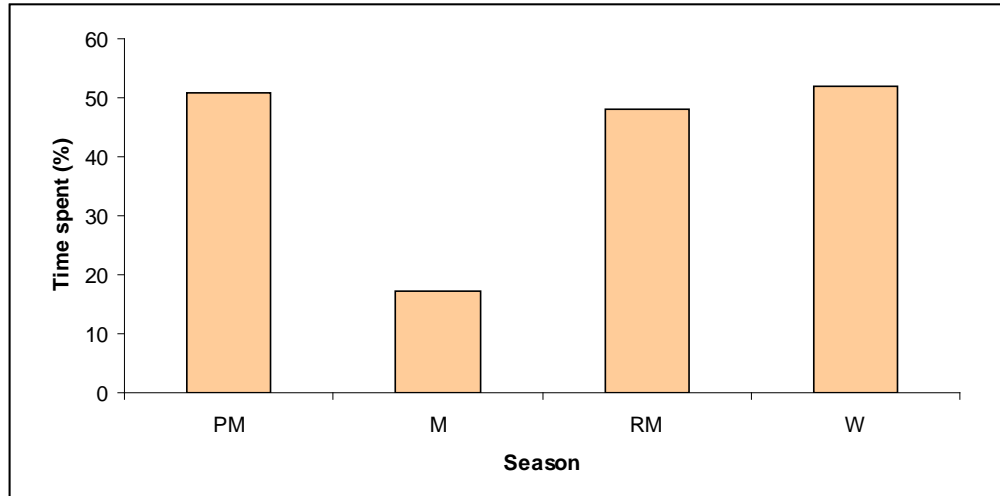


Fig. 3.a. Seasonal variation of feeding activity of Indian Rhino in Orang National Park

(b) Locomotion

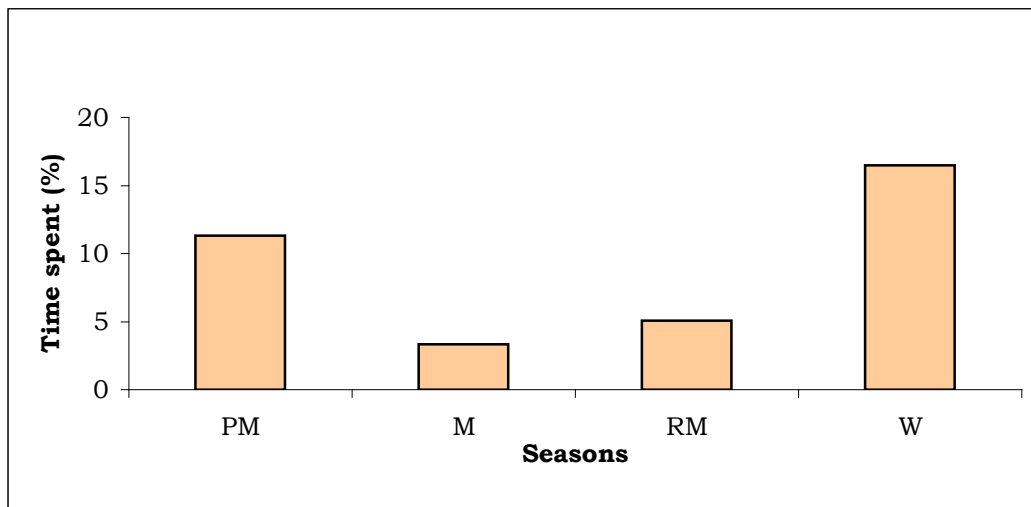


Fig. 3 b. Seasonal variation of locomotion activity of Indian Rhino in Orang National Park.

There was also a distinct seasonal variation of time allocation in locomotion activity by the Indian Rhino. The highest percentage of locomotion activity was observed during winter season (16.5%), followed by pre-monsoon (11.32%), retreating monsoon (5.07%) and monsoon season (3.3%) (Fig. 3 b).

(c) Wallowing

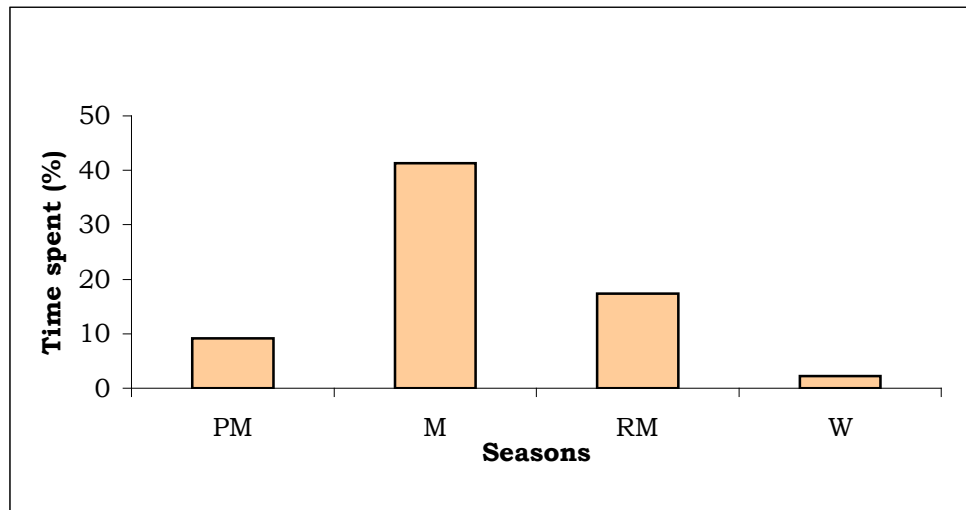


Fig. 3 c. Seasonal variation of wallowing activity showed by Indian Rhino in Orang National Park

The study showed that, the variations of time allocation in wallowing activity by Indian Rhino were varies in different seasons of the year. The highest time allocation on wallowing activity was found during monsoon season (41.3%), followed by retreating monsoon (17.4%) and pre monsoon (9.1%), whereas lowest (2.2%) time was allocated during winter season in Orang National Park (Fig. 3 c).

(d) Comfort behaviour

Study showed that, the time allocation of Indian Rhino for comfort activities were varies in different seasons of the year. The highest time was allocated during retreating monsoon (14.7%), followed by winter (10.1%), pre monsoon (7.9%) and monsoon season (4.2%) (Fig. 3d).

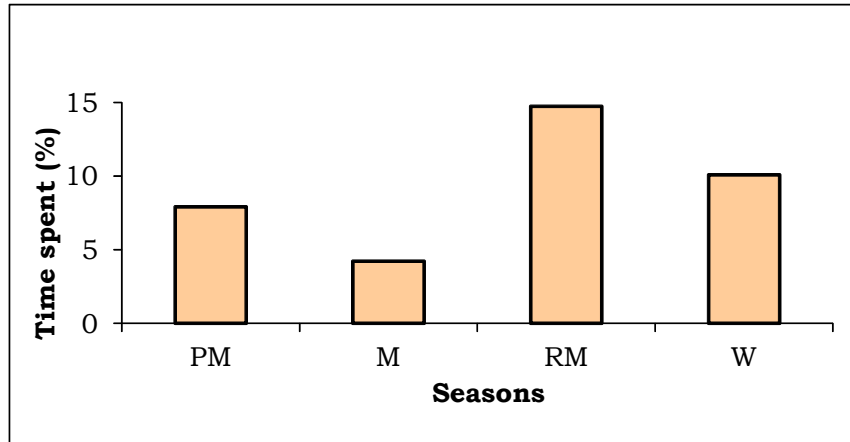


Fig 3 d. Seasonal variation of resting activity (comfort behaviour) showed by Indian Rhino in Orang National Park.

(e) Vigilance

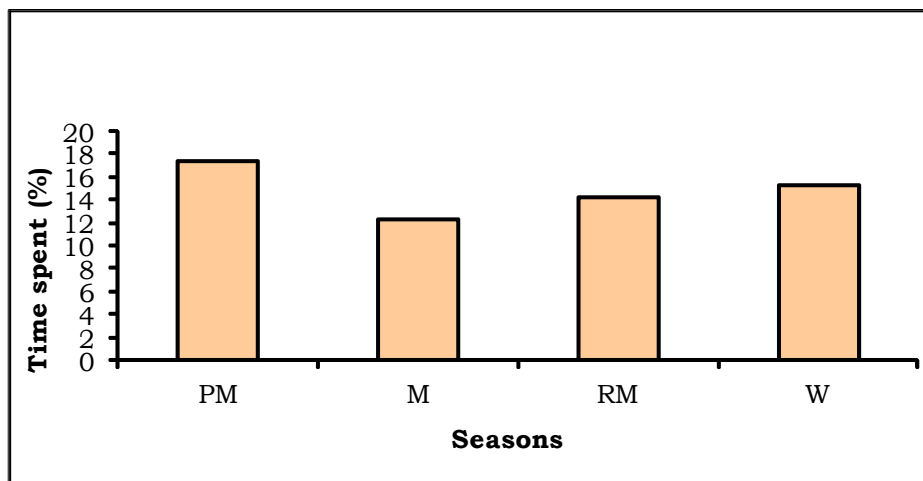


Fig. 3 e. Seasonal variation of vigilance activity showed by Indian Rhino in Orang National Park.

Study revealed that, the Indian Rhino spent almost equal time on vigilance behaviour in all four seasons of the year. However, the trend of vigilance activity was increased during winter and it continued till pre-monsoon season (Fig. 3 e).

(f) Miscellaneous activities

Study showed that, the Indian Rhinos spent 5.6% time in various other miscellaneous activities. During pre-monsoon season, they spent 1.9% time on miscellaneous activities, followed by retreating monsoon (1.8 %), monsoon (1.2%), and winter season (0.7%).



Selectivity of time allocation in behavioural activity

The analysis of selectivity for time allocation in different behavioural activities of Indian Rhino showed that, except wallowing activity, there was no selectivity in behavioural settings during pre-monsoon season. The wallowing activity was negatively selected during pre-monsoon season, in which the species spent comparatively less time in wallowing than the level of expectation (Fig.5 a).

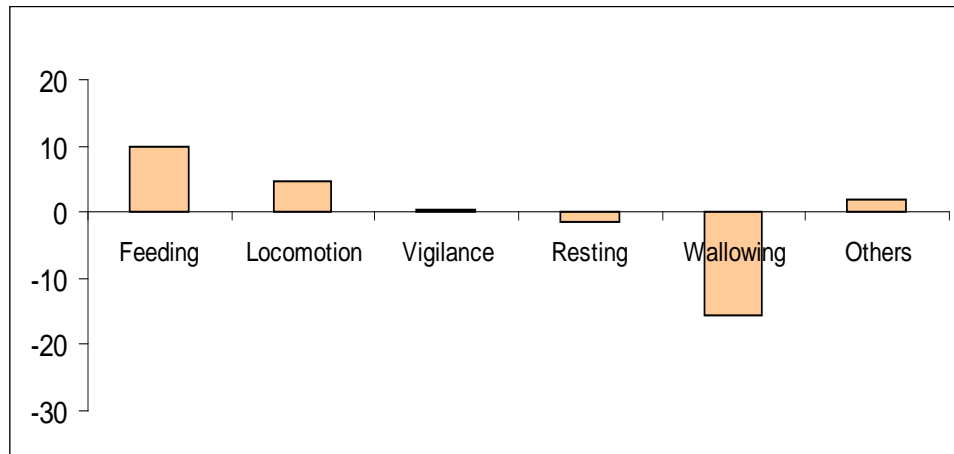


Fig: 5 a. Selectivity of time allocation during pre-monsoon season (Deviation from expectation).

Again, during monsoon season, the time allocation for feeding, locomotion, vigilance (monitoring) and comfort activities were negatively selected, while in wallowing, it was positive during monsoon season (Fig.5 b).

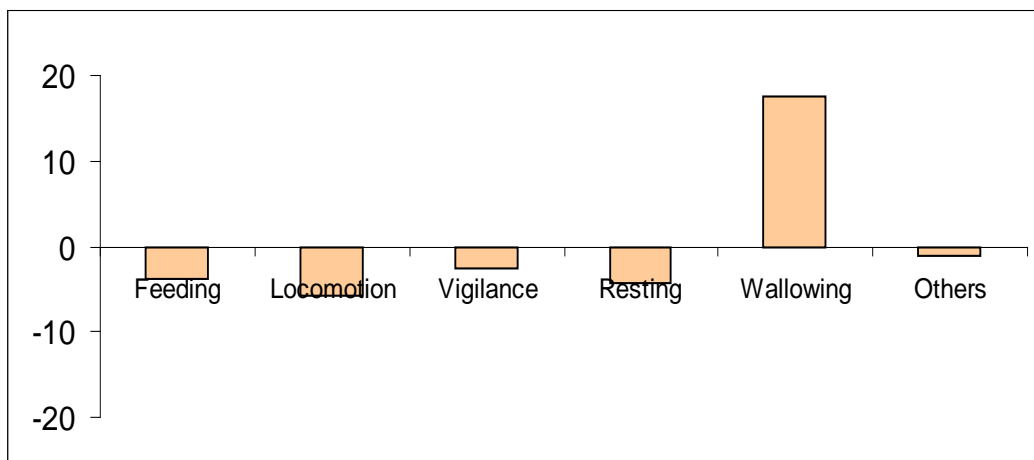


Fig.5 b. Selection of time allocation in behavioural activities in monsoon season (Deviation from expectation).

There was no major selection trend of time allocation in feeding, locomotion, vigilance and wallowing activities, during re-treating monsoon observed, whereas it was positive for comfort behaviour (Fig.5.c).

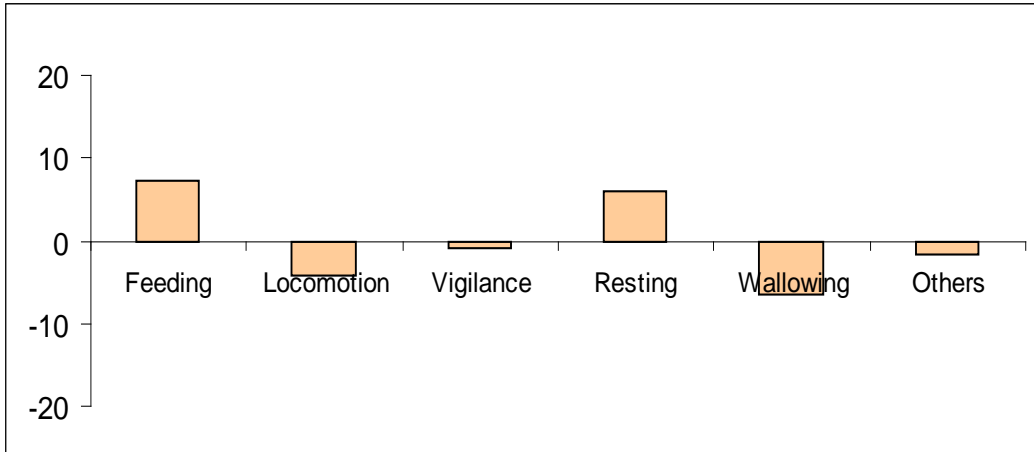


Fig.5.c Selectivity of time allocation during Retreating-monsoon season (Deviation from expectation).

(d) Winter

Study showed that, there was a distinct positive selection (10%) of time allocation in feeding and locomotion activity during winter season. But the highest of 16.2% negative selection of time allocation was observed in wallowing activity during winter (Fig.5.d).

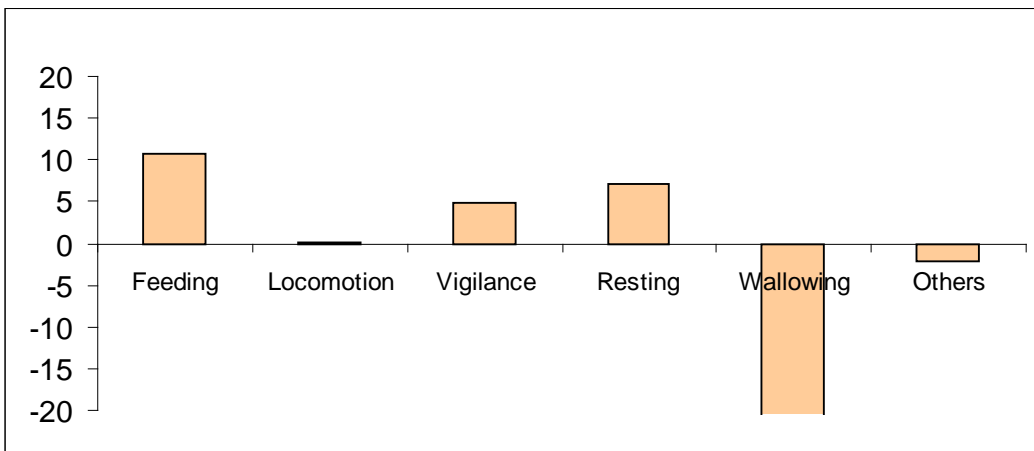


Fig.5.d. Selectivity of time allocation during winter season (Deviation from expectation).

Activities during dark

Although no systematic night surveys of Indian Rhino were done during study period occasional observation revealed that, the Rhinos remained active during night hours also. The Rhino was found to frequently move from one place to other for foraging and mating activity, during dark. Grazing was observed till midnight and in early hours of the day. Study also showed that, the frequency of mating display was higher during night hours than morning hours, which could be easily recognized from their special vocalization of “*thet-thet... thet-thet*” and metallic whistling sound. The Geophagy (the soil eating activity) and crop raiding (in fringe villages) was normally took place during night hours. But, they never found to wallow during night hours, although they frequently crossed the river, canals and *beels* (wetlands).

Discussion

The present findings of higher time spent on feeding activity by Indian Rhino across the season indicates that the feeding activity is the guiding factor responsible for variation in time allocation in different behavioural patterns. The time surplus after feeding activity is thus, sharing in all other activities like locomotion, comfort behaviour and social interactions etc. The earlier studies on activity budgeting of Indian Rhino by Laurie (1978, 82) also suggested that, activity budgeting of Indian Rhino is mainly depends on the factors like diets quality and distribution and abundance of food resources. Again, the present findings of less time spent on feeding activity during monsoon and maximum in other three seasons are the results of comparatively higher food availability in habitat during monsoon season. So, Indian Rhino in the Orang National Park lives on forage during the season of the scattered distribution of food or less available. The individual rhino has to forage more time to locate the food, resulting into higher time spent on foraging. But, when food is uniformly distributed or comparatively high in the habitat, the individual of Indian rhino spend less time in foraging, leading to less time allocation. However, when time spent on feeding is high, the individuals of Indian rhino again readjust their time in various other activities, as diurnal hours are fixed. Since, “time” is a limiting factor; the Indian rhino has to determine the cost benefit to spent time in various activities throughout the day. For the survivability and reproduction needs, proper quantity of energy and therefore, an individual never compromise with time in feeding activity.

Since, most of the time has to spend on foraging and locomotion activities, the individuals of Indian rhino have to spend a lot of energy. To balance this loss, a rhino has to spend a lot of time on comfort activity. A least time spent during monsoon must have relationship with the availability of food resource, which is reflected in the study. The time saved for comfort was spent 8.01% on resting, 18.4% on wallowing, 15.1% on vigilance and 3.1% on other social behaviour. Laurie (1978) has found that, Indian rhino spent 36.4% of their total time on resting activity in Chitwan National Park, Nepal. Vigilance (monitoring) behaviour is equally necessary

for Indian Rhino in different seasons of the year to protect themselves from enemy and hence no significant seasonal variation was observed.

Again, the wallowing activity increases more than two folds during monsoon, as compared to other two seasons. These results indicates that, the time spent on wallowing activity is mainly depends on the availability of water resources. Since, water resource is available during monsoon, so individuals of Indian Rhino select more time on wallowing during monsoon and less time during winter season. The wallowing activity during monsoon may be related to thermo regulation of the body of Indian Rhino. It is also evident from the present study that, the Rhinos are also wallowing during heavy showers of monsoon in Orang national Park and hence, contradict the reasons of thermoregulation alone. Again, the distribution of wallowing activity throughout the seasons in Orang National Park indicates that, exo-parasites like flies, ticks etc. disturbed the body of Indian Rhino and to avoid disturbances they go for wallowing. Ghosh(1991), stated that, the functions of wallowing behaviour is a part of reducing disturbing factors of ectoparasites and annoying flies. So, wallowing activity is one of the most essential behaviour of Indian Rhino for their survival.

However, the foraging costs in terms of searching, processing and nutritional benefits differ among different food items. Hence, an individual or a group of individuals manage the time allocation in feeding, moving and other activities in order to balance the foraging costs in different food items. Therefore, the time allocation in different activities, especially in foraging activity is greatly influenced by the nature of food (Clutton-Brock, 1975) and their spatial distribution in the habitat.

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References

1. Altmann J. (1974). Observational study of behavior sampling methods. *Behaviour* 49 : 227-267.
2. Bernstein, I.S. and Mason, W.A. 1963. Activity patterns of rhesus monkeys in a social group. *Anim. Behav.* 11: 455-460.
3. Bhattacharya, A. and Pal, B.C. (1982): Daily Activity Cycle of Great Indian one horned rhinoceros at Gorumara and JaJaldapara wildlife sanctuary in West Bengal. *All India Symp. Wild. Biol.* 12:1-5

4. Chivers, D.J. (1969). On the daily behavior and spacing of howling monkey groups. *Folia Primatol.* 10: 48-102.
5. Clutton-Brock, T.H. (1975). Feeding behaviour of red colobus and black and white colobus in East Africa. *Folia Primatol.* 23: 165-207
6. Clutton-Brock, T.H. and Harvey, P.H. (1977). Species differences in feeding and ranging behaviour in primates. In *Primate Ecology*, ed. T.H. Clutton-Brock. London : Academic Press.
7. Clutton-Brock, T.H., 1977. Some aspects of intraspecific variation in feeding and ranging behaviour in primates. In *Primate Ecology*, ed. T.H. Clutton-Brock. London : Academic Press.
8. Dunbar R.I.M. (1992). Time : a hidden constraint on the behavioural ecology of baboons. *Behav.Ecol. Sociobiol.* 31 : 35-49.
9. Gaulin, S. (1979). A Jarman/Bell model of primate feeding niches. *Hum. Ecol.*, 7: 1-20.
10. Ghosh, D. (1991). Studies on the Eco-Status of the Indian Rhinoceros *Rhinoceros unicornis* with special reference to altered habitat due to human interference in Jaldapara Sanctuary, West Bengal. Ph.D. Thesis, University of Ranchi, India. 1-305 Pp.
11. Laurie, W. A.(1978). The Ecology and Behaviour Of the Greater One-Horned Rhinoceros.Ph.D. Dissertation, Cambridge University 1-450pp.
12. Laurie, W. A. (1982). Behavioural Ecology of the Greater One-Horned Rhinoceros (*Rhinocerosunicornis*). *J. Zool.* 196: 307-341.
13. Sarkar, P. (2000). Ecology and dynamics of social relationships of Assamese macaque, *Macaca assamensis* (McClelland, 1839). Ph.D. thesis. Gauhati University, India.
14. Srivastava A. (1989). Feeding Ecology and Behaviour of Hanuman Langur, *Presbytis entellus*. Ph.D. Thesis. J.N.V. University, Jodhpur.
15. Struhsaker T.T. and L. Leland. (1979). Socioecology of five sympatric monkey species in the Kibale Forest, Uganda. In : *Advances in the study of behaviour*, Vol. 9 (eds. by Rosenblatt J.S.,
16. R.A. Hinde, C. Beer and M. C. Busnel), Academic press, New York.
17. Talukdar, B.N and Sharma, P. (1995) Orang- Check list of the birds of Orang Wildlife sanctuary, 2nd edition, self publication: 1-36 Pp.
18. Zielinski W.J., Spencer, W.D., Barrett, R.H. (1983). Relationship between food habit and activity patterns of pine martens. *J. Mammal.* 64: 387-396.



**ACTIVITY BUDGETING OF THE
GREAT INDIAN ONE HORNED**

RHINOCEROS

(Rhinoceros unicornis Linn.) in
**RAJIV GANDHI ORANG NATIONAL
PARK
ASSAM, INDIA**

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Feeding behaviour

The feeding or foraging behaviour was associated with the foraging movement for searching food items, consumption of food in the habitat and also techniques used for food intake in different habitat types and breast feeding by calf etc. It also included all the feeding types such as feeding on grasses, consumption of leaves or branches of trees, consuming soil, as well as drinking of water etc

Locomotion

The locomotion behaviour is the movement pattern of Indian Rhino from one place to another for their daily activities. During locomotion, the movement patterns may be performed in a normal way (0.5-20 m/min) or by running from one place to other (100 m/min.)

Comfort behaviour

The comfort behaviour includes the body postures with cessation of almost all physical activities or it is a state of motionless body postures or comfortably staying. The comfort behaviour was divided into three sub-types, such as, **resting, sleeping and wallowing.**

Feeding behaviour

The feeding or foraging behaviour was associated with the foraging movement for searching food items, consumption of food in the habitat and also techniques used for food intake in different habitat types and breast feeding by calf etc. On the basis of different feeding activities, the feeding behaviours were again categorized into six sub types, such as

- Grazing
- Browsing
- Geophagy
- Breast Feeding
- Drinking
- Dive- feeding



Locomotion

The locomotion behaviour is the movement pattern of Indian Rhino from one place to another for their daily activities. During locomotion, the movement patterns may be performed in a normal way or by running from one place to other. On the basis of their movement pattern locomotion can be divided into three sub- types such as-

- Running**
- Walking**
- Galloping**

Comfort behaviour

The comfort behaviour includes the body postures with cessation of almost all physical activities or it is a state of motionless body postures or comfortably staying.

- **Resting behaviour**

- **Sleeping behaviour**

- **Wallowing**

Wallowing:

Wallowing is a particular behavioural posture of Indian Rhino, in which the rhino lies on the water holes (mud or water-bodies) specially during day hours.

Wallowing behaviour was also divided into two types (a) Mud wallowing and (b) Water wallowing, based on substratum used.

Vigilance

Vigilance was the solitary behaviour of Rhino, without performing almost any other activities like feeding, running, walking, sleeping etc., nor they performed any social interactions. But carefully looked around and continuously watched the intruder or locate the sound. During vigilance, the Rhino erected their head and moves in and around for watching the situation.

Vigilance

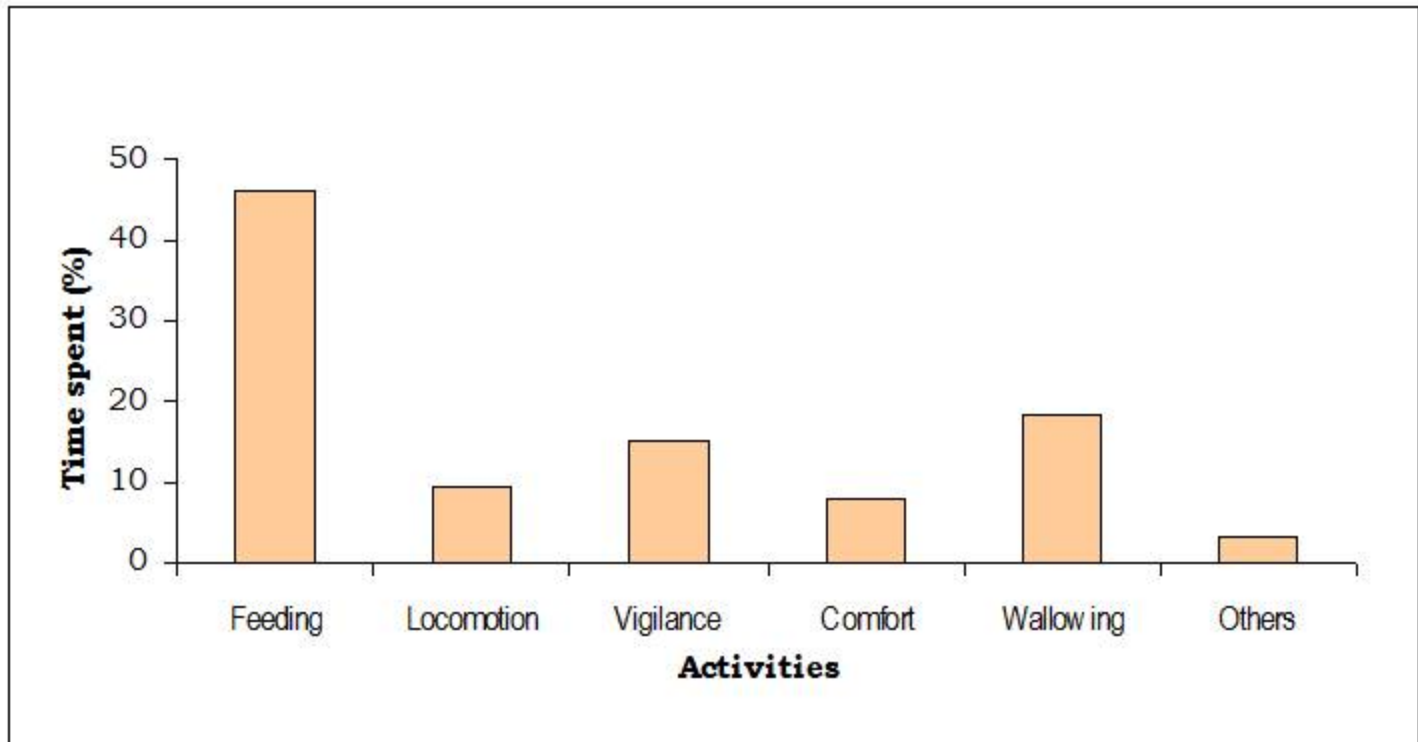
Vigilance was the individual behaviour of Rhino, without performing almost any other activities like feeding, running, walking, sleeping etc., nor they performed any social interactions. But carefully looked around and continuously watched the intruder or locate the sound.

During vigilance, the Indian rhino occasionally produced mild sound. The Rhinoceros has found to be very much-alert animal in presence of other animals, especially, the large predators. The vigilance of cow with calf was found to be very active during wallowing than other age sex class.



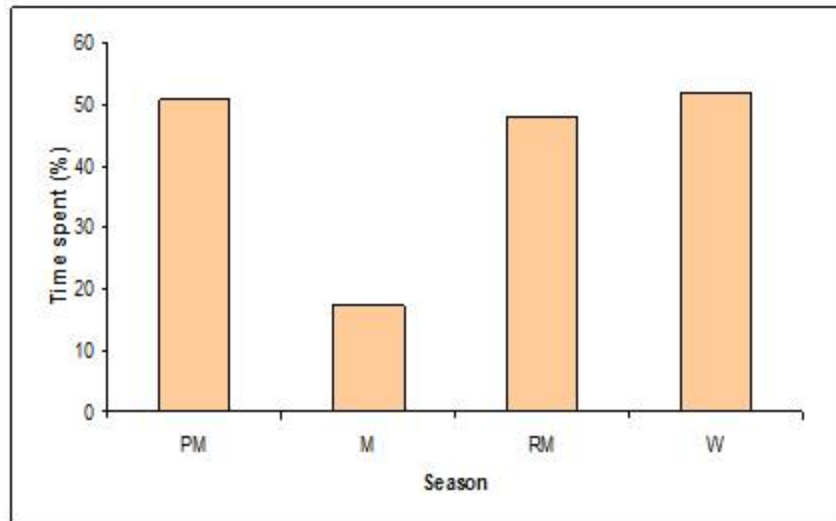
ACTIVITY BUDGETING

Annual activity budgeting

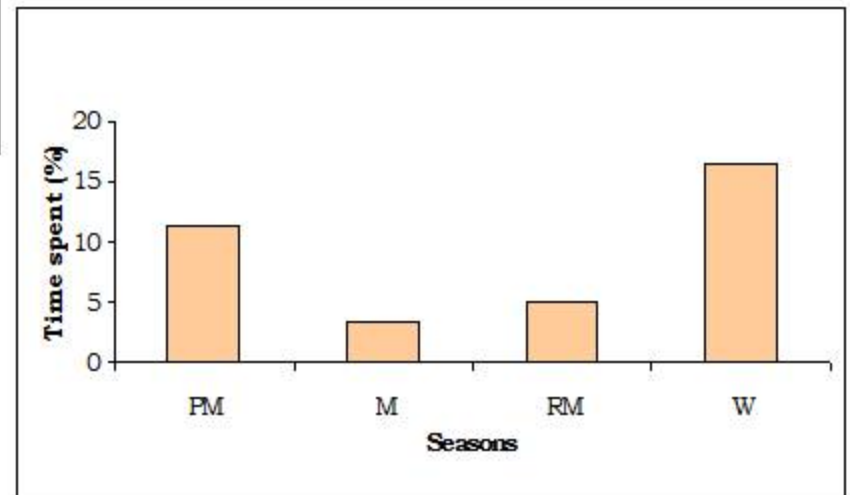


ACTIVITY BUDGETING

Seasonal variation of activity budgeting



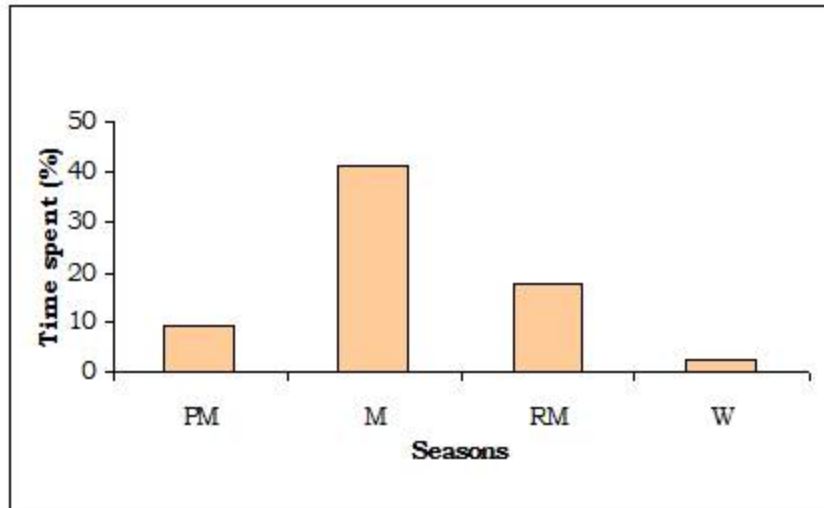
Feeding



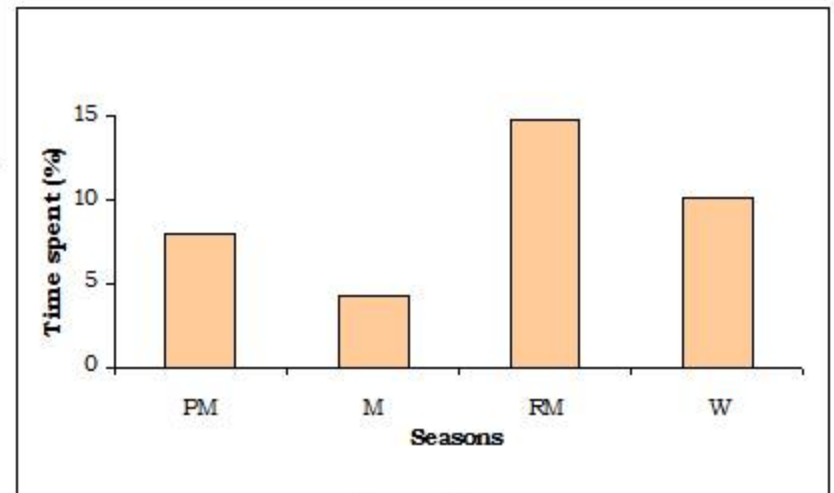
Locomotion

ACTIVITY BUDGETING

Seasonal variation of activity budgeting



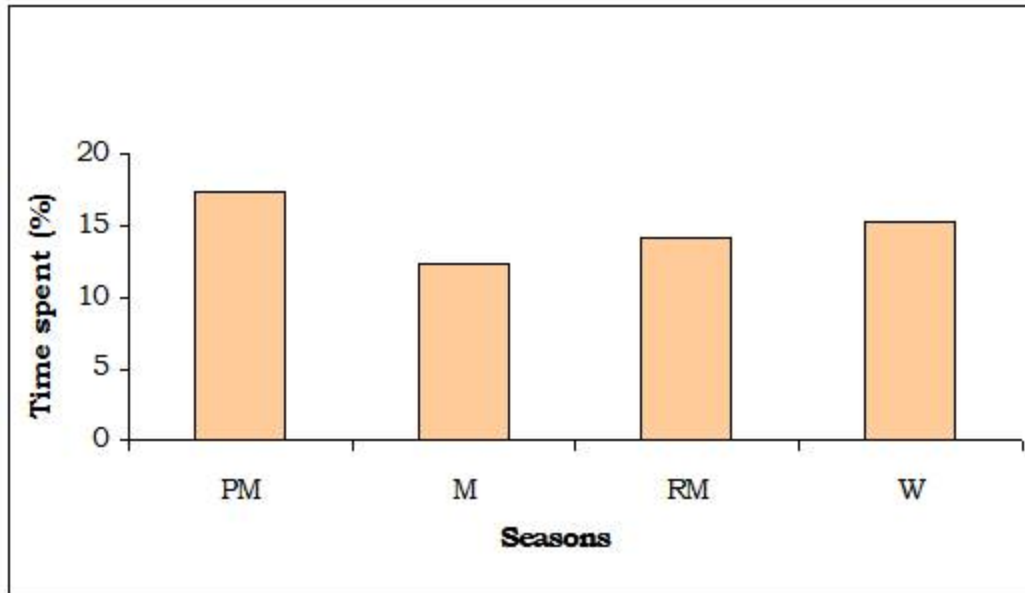
Wallowing



Resting

ACTIVITY BUDGETING

Seasonal variation of activity budgeting

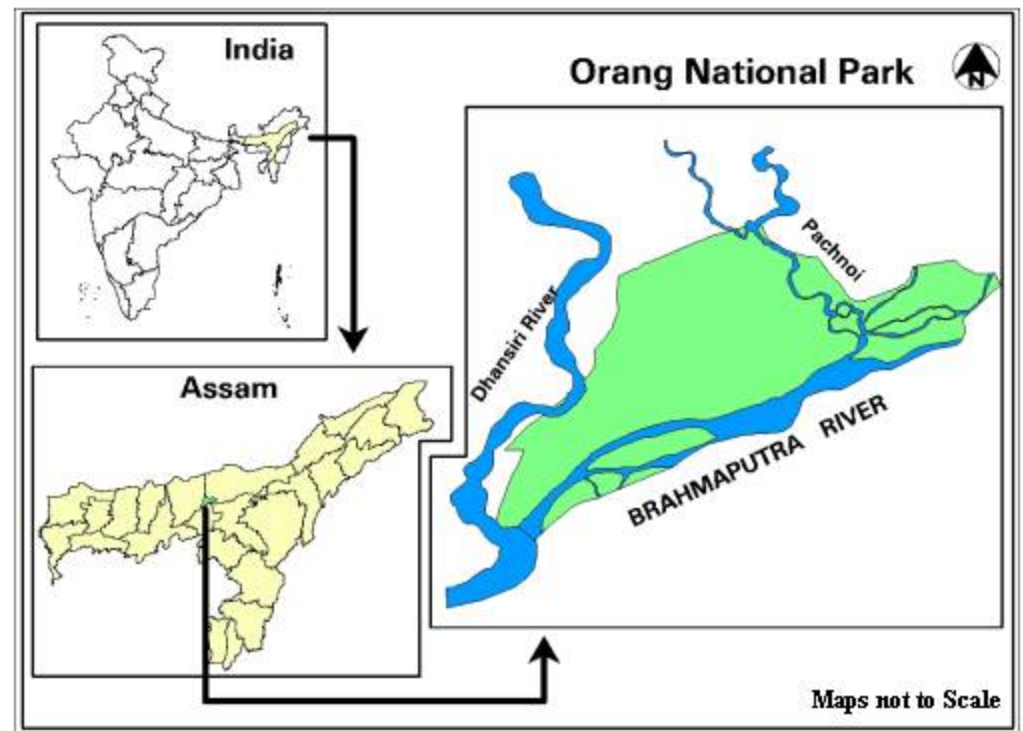


Vigilance

STUDY AREA

The RG Orang National Park (co-ordinates, $92^{\circ}15'/-92^{\circ}27'/E$ and $26^{\circ}29'/-26^{\circ}40'/N$) is situated in the north bank of the river Brahmaputra and within the administrative boundary of Darrang and Sonitpur districts of Assam, India. It was a human habitat till about 1900.

- △ Declared as Game Reserve on 31st May, 1915.
- △ Declared as Sanctuary on 20th September, 1985.
- △ Declared as National Park on 8th April, 1999.



The area of the park is 78.81 sq. Km.

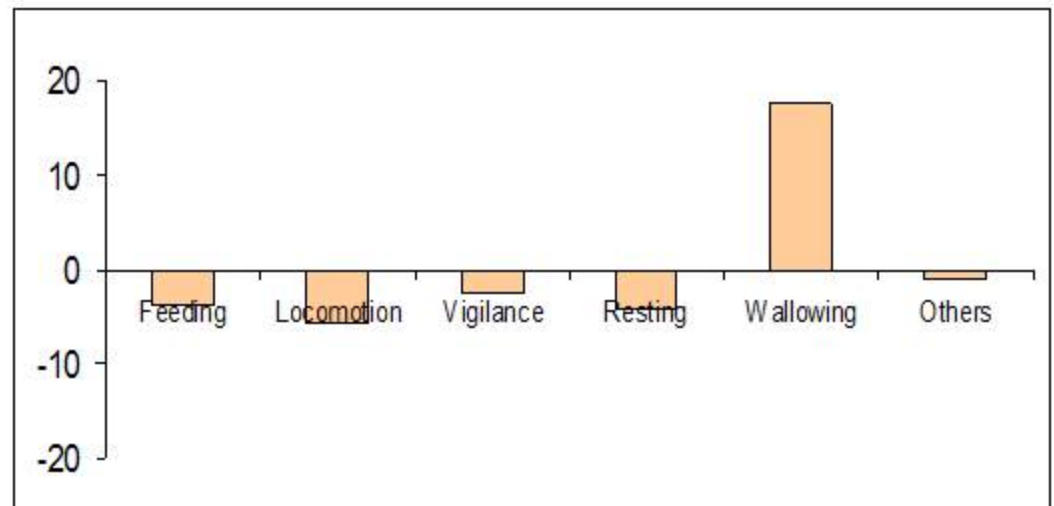
ACTIVITY BUDGETING

Selectivity of time allocation : deviation from expectation



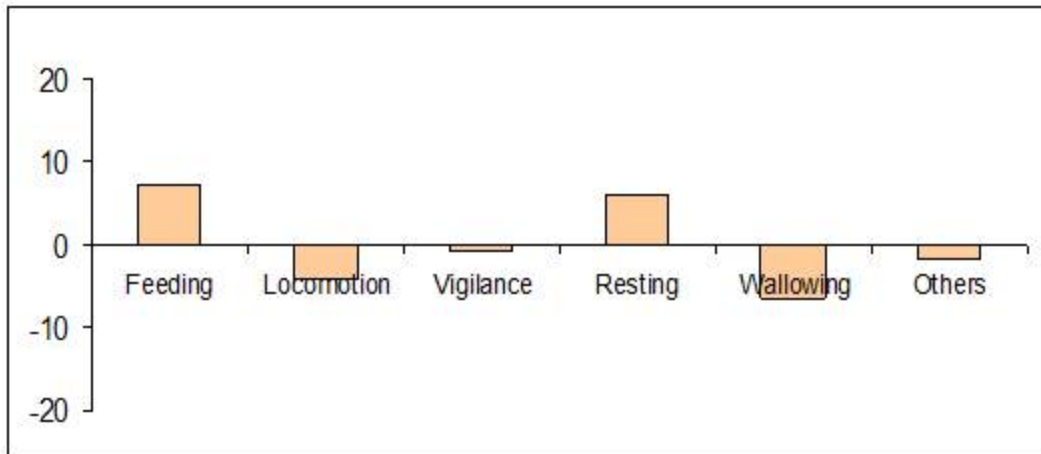
Pre-monsoon

Monsoon



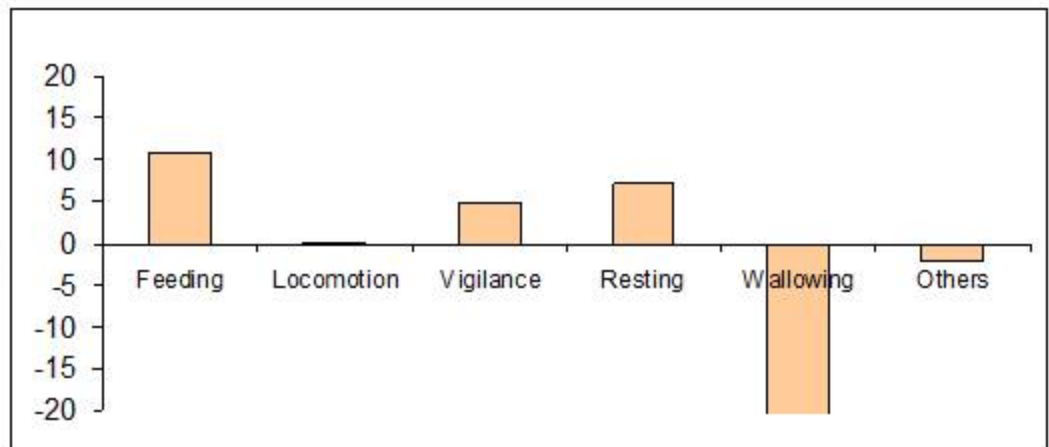
ACTIVITY BUDGETING

Selectivity of time allocation : deviation from expectation



Re-monsoon

Winter



Allocation of time

- Feeding activity is the guiding factor responsible for variation in time allocation in different behavioural patterns and activities.
- Surplus time after feeding activity is thus, shared in all other activities like locomotion, comfort behaviour and social interactions etc.
- Less time spent on feeding activity during monsoon and maximum in other three seasons are the results of comparatively higher food availability in habitat during monsoon season.





Mikenia invasion

Mimosa invasion



GLIMPSES
OF
RAJIV GANDHI
ORANG NATIONAL PARK



Miconia invasion in Rajiv Gandhi Orang National Park



Swamp Grasslands- The most favoured Habitat of the Rhinos





Thank you

STUDY AREA



Entrance to Study Area- Orang

New name- National Park RG Orang National Park



Temple Inside Orang National Park





The Great Indian One-horned Rhino (*Rhinoceros unicornis* Linn. 1758), the most primitive mega herbivore species, represents the vanishing group of ungulate, is confined to a few protected areas of India and Nepal.

- ▶ Declared as a “Vulnerable” species in 40th meeting the year 2008 by IUCN.



- ▶ Orang NP had a population of 65 rhinos in 1985. (First census)
- ▶ As per the 2009 census population has increased to 68 individuals (Latest)

STUDY AREA

- **The RG Orang NP is the representative type of the Brahmaputra floodplain grassland habitat**
- **The only protected area of the northern bank of the river Brahmaputra, where a viable population of Indian Rhino still survives.**
- **RG Orang NP also receives regular annual flood, which has an ecological significance in maintaining the grassland habitat**

STUDY AREA



ACTIVITY BUDGETING

Objectives

- To investigate the activity pattern of Indian Rhino in RG Orang National Park in different seasons of the year.
- To identify the major behavioural activities that plays a vital role in time allocation of Indian Rhino.

ACTIVITY BUDGETING

Methodology

Dawn to dusk sampling in all seasons of the year

Scan Animal Sampling (Altmann, 1974) : 5 minutes

Ad. Libitum Sampling (Altmann, 1974)

ACTIVITIES OBSERVED



Grazing



Vigilance