

THE ECOLOGICAL CARRYING CAPACITY OF PENCH NATIONAL PARK (INDIA) IN RELATION TO TOURISM ACTIVITIES

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ABSTRACT

Ecotourism has become increasingly popular in the recent years, especially the wild life tourism. This has a direct impact on the ecology of the National Park. In this context, this study deals with the Ecological Carrying Capacity (ECC) of Pench National Park (India), which is the most important component affecting the total carrying capacity of the National Park. For this purpose the estimation of ECC was done using visitors feedback on the local level indicators. The study reveals that the factors of concern were the degradation of roads and air and noise pollution inside the park. Besides the poor standard of guides and lack of nature awareness generation during the visit were of concern. Further, the overall ecological condition of Pench National Park was found to be healthy.

Key Words : Ecotourism, Ecological Carrying Capacity, Local level indicators, Biodiversity, Pench National Park

INTRODUCTION

Tourism is one of the largest industry of the world with regard to total turnover. If it were a country, it would have the second largest economy, surpassed only by United States. It accounts for 8% of the jobs worldwide¹. In four out of five countries tourism is one of five top export earners². This tourism can be of various kinds, one such type is the Ecotourism. The term Ecotourism was coined by Hectar Ceballos Lascurain in 1983. Ecotourism began in 1990s and is growing by 20% - 34% per year since then³. It is also expected to grow most quickly over the next two decades⁴. All these facts show how important ecotourism is. But since ecotourism is directly related to nature it can affect it both positively and negatively.

One area of nature which is affected directly are the National Parks. National Park, theoretically, is the ultimate level of protection that can be given to an area where no consumptive utilization of land or natural resources is permitted, except that necessary for management practices, thus at present they represent the single most important method of conserving Biodiversity Worldwide⁵.

The calculation of 'Carrying Capacities' is a method of assessing environmental impact and sustainability⁶. The carrying capacity of an area is a sum of various component carrying capacities such as ecological carrying capacity, social carrying capacity, economic carrying capacity etc.

Ecological carrying capacity is the most important component of Total Carrying

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Capacity as the ecology of the place holds most important position among all the places of concern⁷.

In this study the Ecological Carrying Capacity of Pench National Park is measured as this park is a part of Project Tiger and is important to both the visitors and forest managers. Moreover it is being developed as 'Mowgli Land' for ecotourism purpose by the Madhya Pradesh Government. Since tourism, especially nature tourism, is closely linked to biodiversity it can cause loss of biodiversity, when land and resource utilisation exceed the carrying capacity⁸. This study thus reveals the ecological condition of Pench National Park by measuring its Ecological Carrying Capacity.

OBJECTIVES

- To select Local Level Indicators affecting the ecology of the park.
- To estimate the Ecological Carrying Capacity of Pench National Park.
- Contribution of sustainable tourism in biodiversity conservation of national park.
- Monitoring impact of tourism in relation to local level indicators.

MATERIAL AND METHODS

The methodology is adopted from Limits of Acceptable Change (LAC) framework. The methodology is based on the assumption that the carrying capacity of the park was 100% before the tourism activity was initiated. The adverse impact of these activities reduces the carrying capacity (CC).

The total CC of any area comprises of five components i.e. Ecological, Social, Economic, facility and visitor's experience based carrying capacities. This paper deals with the ecological capacity, to analyse the present ecological condition of the park.

To predict the impact of tourism on ecology, appropriate indicators were identified after field visits and consultations with experts. For this purpose a total of 12 indicators were selected after repeated discussions with five

wildlife and forest experts and Pench National Park was visited twice, each visit lasting for seven days. In each trip a total of 150 visitors were interviewed on two exit points of the park i.e. the Turia gate and Karmajhiri gate. Further the Parametric Importance Unit (PIU) is also fixed for each indicator by the various experts. This value shows the relative importance of each indicator. Where experts assign the value as High importance (H), Medium importance (M) and Low importance (L) for each indicator. Further (H) was given the value-3X, (M) was given 2X and (L) was given X. A summation of ratings of the experts were then done and arithmetic mean was calculated, which will be the final PIU value for each indicator. The study then proceeds in the following manner :

- Once the indicators are selected, visitors feedback is taken on these indicators using two point LIKRT Scale i.e. agree and disagree.
- On the basis of the percentage of people agreeing to the assistance of impact on that particular indicator an Indicator Quality Unit (IQU) is assigned to each indicator. This IQU ranges from 0 to 1 and is inversely proportional to the percentage of people agreeing. That is if no one agrees, there is an impact then IQU assigned to that indicator will be 1, if 1-10% people agree then IQU will be .9, for 11-20% it will be 0.8 etc. and if 91-100% agree then IQU for that indicator will be 0. The whole theory is based on the assumption that impact is directly proportional to the number of people recognizing there is an impact.
- The IQU value of each indicator is then multiplied by Parametric Importance Unit (PIU) of each indicator, assigned to it by the experts, to get the Carrying Capacity Impact Unit (CCIU) for that indicator.
- Summation of the CCIU of all the indicators is done to get the Ecological Carrying capacity for the park.

- Further standards are set for the total impact on ecological carrying capacity by experts as follows –
 - 0-20% - Very high Impact on Ecology of the park.
 - 21-40%- High Impact on Ecology of the park.
 - 41-60% - Medium Impact on Ecology of the park.
 - 61-80% - Low Impact on Ecology of the park.
 - 81-100%- Very Low Impact on Ecology of the park .
- Compare the percentage of Ecological Carrying Capacity calculated with set standards and find out the Impact of tourism on the Ecology of the National Park.

RESULTS AND DISCUSSION

The study reveals that the Ecological Carrying Capacity of Pench National Park is 75.32. The **Table 1**, illustrates the Parametric Importance Unit for each indicator, as rated by experts. The indicators given the highest PIU values are indicator nos.-1, 3, 4, 5 and 8 which suggest the indicators effecting the ecology of the park are the Pollution i.e. Air noise and solid waste accumulation, crowding of vehicles around the tiger and on the entry gate. The **Table 2** illustrates Carrying Capacity Impact Unit and Indicator Quality Unit for each indicator. The indicators which show the impact of tourism are – indicator nos – 1, 2 and 3. Further these indicators suggest the visible

Table 1

S.No.	Indicators	Rating given by experts (L, M, H)					Final PIU
		1	2	3	4	5	
1	Crowding of vehicles on the entry gate	H	H	L	M	H	9.2
2	Degradation of roads inside the park by tourist vehicles	L	L	M	L	L	4.614
3	Air Pollution inside the park	H	L	M	M	H	8.459
4	Noise Pollution inside the park	M	M	H	L	H	9.99
5	Solid waste accumulation inside the park	H	L	M	H	M	8.459
6	Degradation of vegetation inside the park	M	M	L	L	L	5.38
7	No. of animals sighted is less	M	L	L	L	M	5.38
8	Crowding of vehicles around the tiger	H	L	M	H	H	9.2
9	Presence of elephants disturbed the tiger	M	L	H	H	L	7.69
10	Animals behaved aggressively towards tourist vehicles.	H	M	M	M	M	8.459
11	Guides interested in explaining the nature	L	L	L	L	M	4.614
12	Nature awareness is generated during the trip	M	M	H	L	M	7.69

Table 2

S.No.	Indicators	Agree	Disagree	% of agreement	IQU	PIU	CCIU =IQU XPIU
1	Crowding of vehicles on the entry gate	120	180	40%	.6	9.2	5.52
2	Degradation of roads inside the park by tourist vehicles	78	222	26%	.74	4.614	3.4
3	Air Pollution inside the park	75	225	25%	.75	8.459	6.34
4	Noise Pollution inside the park	45	255	15%	.85	9.99	8.49
5	Solid waste accumulation inside the park	0	300	0%	1	8.459	8.459
6	Degradation of vegetation inside the park	0	300	0%	1	5.38	5.38
7	No. of animals sighted is less	0	300	0%	1	5.38	5.38
8	Crowding of vehicles around the tiger	21	279	7%	.93	9.2	8.55
9	Presence of elephants disturbed the tiger	18	282	6%	.94	7.69	7.22
10	Animals behaved aggressively towards tourist vehicles	0	300	0%	1	8.459	8.459
11	Guides interested in explaining the nature	102	298	34%	.66	4.614	3.04
12	Nature awareness is generated during the trip	102	298	34%	.66	7.69	5.07

Ecological carrying capacity = 75.32%

impact of tourism in form of aggressive behavior of animals towards tourist vehicles. As there is no decrease in prey population or water availability, so the probable reason for the aggressiveness of animals can be amounted to increase in tourists.

The other issue of concern is the generation of smoke and dust emitted by the tourist vehicles. Earlier only the petrol vehicles were allowed entry into the park, but recently diesel vehicles are also permitted which resulted in increase in pollution inside the park.

The other important factor of ecological significance is the degradation of roads by tourist vehicles. Out of the total people interviewed, 26% people agree to the degradation of roads inside the park, which is a fairly large percent.

The most important factor exerting enormous biotic pressure on the ecology of the park is the crowding of vehicles. It's note worthy that both visitors and experts have given maximum score for crowding of vehicles, air and noise pollution inside the park.

CONCLUSION

The present study concludes that the ecological carrying capacity of Pench National Park is 75.32% this when compared with the standards set by experts show 'Low Impact' of tourism on the ecology of the park. Since this study is based on the assumption that greater the number of people who recognize that there is an impact, greater is the impact, thus the areas that require management interventions for betterment of the park are –

- Management of tourist vehicular traffic.
- Management of air and noise pollution inside the park.
- Maintenance of roads inside the park.

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Environment is God's gift, preserve it
