The Role of National Parks in Conservation and Promotion of Wildlife: A Case Study of Kuno National Park, Sheopur (M.P.), India

Abstract:

Kuno National Park is extended in the Vindhyan hill series, and it is situated in the Sheopur district of Madhya Pradesh within the geographical extent of 76°58'37.45" E to 77°20'7.98" E and 25°30'50.03" N to 26°05'23.19" N.[1] Kuno NP covers an area of 748.761 km² made free of all human habitation through incentivized voluntary relocation of forest settlements. The Kuno NP and adjoining buffer area are part of the Kuno Wildlife Division which covers an area of 1235 km^2. In this article, an attempt has been made to explore the concept of environmental protection and wildlife conservation particularly wild animals in Kuno NP. The exploitation of natural resources by humans has degraded the environment, endangered certain animal species, and damaged the ecosystem to a certain extent.

Keywords*: Kuno National Park; Asiatic Cheetah; Grassland; Biomass; Prey Base; Southern Tropical Dry Deciduous Forest; Savanah.*

Introduction:

There are 106 existing national parks in India covering an area of 44,402.95 km^2, which is 1.35% of the country's geographical area. India has a network of 998 Protected Areas including 106 National Parks, 567 Wildlife Sanctuaries, 105 Conservation Reserves, and 220 Community Reserves covering a total of 1,73,629.52 km^2 of the geographical area of the country which is approximately 5.28%.[2] It helps to protect wildlife and environments.

Madhya Pradesh is the second largest state in India with an area of 3,08,245 km^2 covering almost 9.38% of the geographical area of the country of which 25.14% is forested.[3,4] It has the largest forest cover 77,492 km^2 among all the Indian states. Sal, Sagun, and Sheesham, types of valuable forests are commonly found in the state forests.[5]

Kuno National Park is located at mid in Sheopur district and the district is situated in the Plateau of Central India which covers the northern part of the lower basin of the Chambal River. This area is formed by the Vindhyan rock with the Deccan trap in the south and the Bundelkhand gneiss rocks in the east. The central part of Madhya Pradesh spreads in Morena, Bhind, Gwalior, Shivpuri, Sheopur, Guna, and Mandsaur districts. The maximum height of this region is 500 m; however, the plain situated to the north and northeast has a height

between 150-300 m. Sheopur district encompasses an area of 6666.00 square kilometers and has been segregated into three tehsils and three blocks. According to the census conducted in 2011, the total population of the district is 687,861.

Objectives:

The aim of this study is to discover and analyze Wildlife Conservation with special reference to Kuno National Park. The study also intends to provide suggestions and future scopes through analysis of primary and secondary data sources for the betterment and welfare of Wildlife, particularly in Kuno. In order to explore the possibilities of conservation and promotion of wildlife with reference to the Kuno NP and to determine the optimum point of development of wildlife in Kuno National Park as well as other developments are explored through this study. This study will also prove important for the condition of shifting of the Asiatic Lion, African Cheetah, and Tiger in the future. The shifting of wildlife and other developmental activities can be carried out while also providing facilities for displaced families.

Research Methodology:

This is a descriptive and analytical study. In the first stage, the descriptive study is done using documentary evidence available through books, journals, articles, newspapers, the internet, etc., and structured interviews with the Forest Officials in Kuno National Park. The second stage of the study is analytical and involves the collection of primary data from the villages which is situated in the ESZ of Kuno NP. A field survey was conducted among 100 villages located in the sensitive zone of Kuno. The selection of these villages was done randomly.

Primary Data Collection

Primary data is data that is collected by the researcher from first-hand sources, using methods like surveys and interviews. It is collected with the research project in mind, directly from primary sources.

Secondary Data Collection

The source of secondary data is from books, texts, journals, magazines, daily newspapers, websites, and publications released by Central, State, and Local Governments, and the Forest Department.

Physiography of the study area:

The geomorphology of Kuno National Park can be attributed to several geological processes that have shaped the landscape over millions of years. These include tectonic activity, erosion by rivers and streams, and weathering. The Vindhyan Range, where the park is located, was formed as a result of intense folding and faulting during the geological past. The topography image of the Kuno National Park area shows that the altitude of this region is situated in the range of 238- 498 m above MSL. The Kuno River flows from south to north and bisects the national park into two parts i.e., east and west Kuno region. The valley of the Kuno River is located at an altitude of 238 m above MSL

The ungulate species found in the Kuno NP include nilgai, sambar, chousingha, chital, and wild pig. There is one small group of blackbucks consisting of 5-6 individuals that are present in the northeastern part of the park. Carnivores present in the area include leopards, hyenas, jackals, and foxes. The village sites left after the relocation of their human population outside the park, which now has grasslands and scrub, form an ideal habitat for the chinkara. At one such site, the only group of blackbucks inside the National Park now calls its home. Leopards are present at a rate of 8.9 (SE 1.4) per 100 km^2.[6]

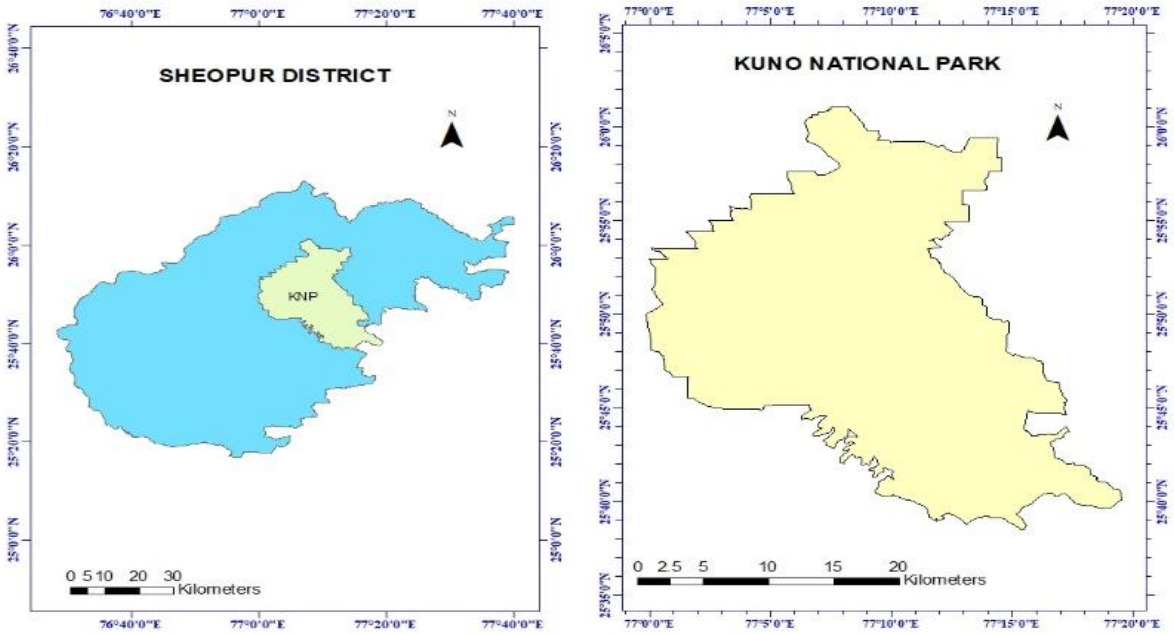

Figure 1. Location map of the study area Source: DFO Kuno NP, Sheopur

Prey Base of the Study Area:

According to the Action Plan for Introduction of Cheetah in India 2023, Prey estimates of twelve prey species were obtained from distance sampling using a line transect survey.

Table 1. Number of Prey bases in Kuno National Park, 2021

SNo.	Types of Wildlife	Density
1	Wild Boar	3768
2	Buck	655
3	Blackbuck	2774
4	Langur	9117
5	Sambhar	27808
6	Nilgai	5562
7	Chousingha	827
8	Chinkara	7585
9	Leopard	112
10	Hyaena	90
11	Sloth bear	70
12	Chital	27253

The data on the number of prey species and their densities in Kuno National Park in 2021 provide valuable insights into the park's ecological dynamics and the availability of food sources for its carnivores. Here is the analysis based on the given data:

The park has a population of 3768 wild boars, which are omnivorous and play a crucial role in the ecosystem by helping to control insect populations and serving as prey for carnivores. With a population of 655, bucks are herbivorous and contribute to the diversity of the park's herbivore population, providing food for predators and supporting the overall ecosystem balance. The park is home to 2774 blackbucks, which are important herbivores and add to the biodiversity of the area, attracting predators like cheetahs and leopards. With a population of 9117 langurs, the park has a substantial number of these primates, which are essential for seed dispersal and contribute to the park's forest regeneration. The park's population of 27808 sambars is significant as they are one of the primary prey species for large carnivores like leopards and cheetahs. The presence of 5562 nilgais, also known as blue bulls, adds to the diversity of herbivores and their food availability for predators. With 827 individuals, chousinghas are small antelope-like animals, and their population contributes to the prey base for carnivores. The park has 7585 chinkaras, another small antelope species, adding to the variety of herbivores supporting the carnivore population. The park has a population of 112 leopards, indicating the presence of this apex predator, which helps control

herbivore populations and maintain the ecological balance. With a population of 90 hyenas, this scavenger species plays an important role in the ecosystem by cleaning up carcasses and helping prevent disease spread. The park is home to 70 sloth bears, which are important for insect control and contribute to the biodiversity of the area. The population of 27253 chitals is significant as they are the preferred food source for the introduced African cheetahs.

To increase the population of Chital in Kuno NP, plans are being made to establish a Chital breeding center in the park. The park management has proposed to create a large enclosure where male and female Chital will be kept together so that as their population grows, they can be released into the open forest areas of the park. Chital is the preferred food of the African cheetahs that have been introduced in Kuno, so it is important to increase their population in the future. The plan is to maintain a healthy population of Chital in the park to ensure a sustainable ecosystem, even after predation by the cheetahs.

Ecosystem:

Kuno National Park falls under the northern tropical dry deciduous forest as per India's latest classification of forest types. The leading trees in this landscape are Anogeissus pendula and Boswellia serrata, while the middle part is dominated by Acacia catechu, Acacia leucopholea, and Diospyros melanoxylon. Zizyphus sp. makes the lowest part of the canopy cover in Kuno National Park. Shrub species encompasses of Grewia flavescens, Helicteres isora, Vitex negundo. Grass species include Heteropogon contortus, Apluda mutica, Aristida hystrix, Themeda quadrivalvis, Cenchrus ciliaris, Dicanthium annulatum and Desmostachya bipinnata. In Kuno wildlife sites there has been a complete relocation of villages from the park. These village sites and their agricultural fields inside the National Park have now been taken over by grasses and managed as savannah habitats. The forests of Shivpuri, Sheopur, and Chanderi are lush green, the districts of Bhind and Morena show ravines and xerophytic flora, while the teak forests of Guna provide shelter for a variety of plants.[7]

The ungulate species found in the Kuno NP include nilgai, sambar, chousingha, chital, and wild pig. There is one small group of blackbucks consisting of 5-6 individuals that are present in the northeastern part of the park. Carnivores present in the area include leopard (Panthera pardus), sloth bear (Melursus ursinus), striped hyaena (Hyaena hyaena), gray wolf (Canis lupus pallipes), golden jackal (Canis aureus), Indian fox (Vulpes bengalensis), ratel (Mellivora capensis), jungle cat (Felis chaus), Indian gray mongoose (Herpestes edwardsii), ruddy mongoose (Herpestes smithii), Asian palm civet (Paradoxurus hermaphroditus) and

small Indian civet (Viverricula indica). Ungulates and herbivorous mammals include chital (Axis axis), sambar (Rusa unicolor), nilgai (Boselaphus tragocamelus), wild pig (Sus scrofa), chinkara (Gazella bennettii), chousingha (Tetracerus quadricornis), blackbuck (Antilope cervicapra), northern plains gray langur (Semnopithecus entellus), rhesus macaque (Macaca mulatta), Indian porcupine (Hystrix indica) and black-naped hare (Lepus nigricollis). The leopard and striped hyena are currently the only major carnivores in the park. There are also reports of wolves in the degraded woods beyond the National Park.[8]

African Cheetah in Kuno NP:

India has plans to reintroduce cheetahs at the Kuno National Park Sheopur. This is the world's first inter-continental cheetah translocation project. Eight cheetahs landed in India on September 17, 2022, from Namibia. The Indian leopard, jungle cat, sloth bear, dhole, Indian wolf, golden jackal, striped hyena, and Bengal fox now live in the park with the cheetahs, who are made up of five females and three males and range in age from 4 to 6 years. South Africa and India have signed an MoU for the reintroduction of Cheetahs to the country. A first batch of 12 cheetahs will be transported from South Africa to India in accordance with the agreement on February 18, 2023. They joined the eight cheetahs that were brought from Namibia to India in 2022. In order to achieve a number of ecological goals, including re-establishing cheetahs in their historical range in India and enhancing the livelihood options and economies of the local communities, restoring cheetah populations is thought to be a top priority for India. This action will have dynamic and far-reaching conservation consequences. Following the February import of the 12 cheetahs, it is intended to relocate 12 more cheetahs every year for the following eight to ten years.[9] It is important to note that the two cheetah deaths reported so far (one from Namibia and one from South Africa) are within the expected mortality rates for a project of this nature.[10]

Results and Discussion:

Kuno NP has a sufficient prey base to support about 25 cheetahs and other carnivores. However, the reintroduction of cheetahs poses risks, and their movements in the initial months after release can be unpredictable. It is challenging to determine the precise carrying capacity for cheetahs in the park until they establish their home ranges. Six adult cheetahs out of the 20 translocated individuals have died due to natural causes, according to the National Tiger Conservation Authority's preliminary analysis.

The reintroduction of cheetahs, which were once native to India, aims to help them adapt to the nation's climate and habitat. The project is still in its early stages, and the success and outcome will be assessed over the long term. Currently, 11 cheetahs are under free-ranging conditions, and 5 are in quarantine enclosures, being closely monitored by a dedicated team.

Ten (10) fringe villages namely Jahangarh, Ochha, Sironi, Tiktoli, Ahera, Agara, Shahpur Khurd, Bagcha, Doondi Kheda, and Hetedi from ESZ of Kuno NP are selected for the study. Subsequently, from each of the 10 villages, 10 numbers of fringe villagers were randomly selected making the sample size of 100. For our generalization, we assumed that all the surrounding fringe villages of Kuno NP were represented by these ten fringe villages. Data are personally collected by the author.

A field survey was conducted to acquire first-hand information on the socio-economic conditions of the fringe villagers of Kuno NP. The Socioeconomic life of the people in the villages was traditionally somewhat devoid of basic amenities like education and social participation etc. An important part of the socioeconomic lives of these villages was out of the influence of urbanization. Agriculture and animal husbandry were the bases of livelihood but were more traditional than commercial. Livestock rearing was interwoven with the socio-economic and cultural lives of the people.

Livestock rearing can be an alternative livelihood for the villagers provided that there is a remunerative networked market, demand, and mass media exposure. The main crops grown are bajra, tilli, mustard, black gram, wheat, corn, and pulses. There is to be a shortage of fodders for the livestock during the dry seasons as well as during the flood. This issue needs serious attention and investigation to do the needful, as early as possible. Thus, peasants need to be made aware of the fact that livestock rearing can be a promising alternative livelihood in their socio-economic and ecological conditions along with agriculture.

The field-based survey conducted in the eco-sensitive zone of Kuno National Park provides valuable insights into the socio-economic characteristics of the rural communities residing in the area. Here are the key findings from the survey:

- Middle-Income Age Group: The survey indicates that 58% of the villagers belong to the middle-income age group. This suggests that a substantial portion of the

population is in their productive years and may actively contribute to the local economy.

- Average Family Size: The average family size of 5 members highlights that households in the area tend to be relatively large, which may impact resource distribution and livelihood strategies.
- Educational Qualifications: The majority of the villagers have received education ranging from primary to high school levels. However, the presence of 22% illiterate individuals points to the need for further efforts to improve literacy rates and education accessibility in the region.
- Economic Status: The economic survey reveals that the majority (72%) of the villagers fall into the middle-income category, earning between 1000 to 5000 rupees per month. This suggests that the economic situation of most households is moderate, though not particularly strong.
- Main Sources of Livelihood: Agriculture and animal husbandry are the primary sources of income and livelihood for 56% of the rural inhabitants. This dependence on traditional agricultural practices indicates a strong connection to the land and reliance on natural resources for sustenance.
- Other Income Sources: Some families supplement their income through daily wage labor and small businesses. However, the service sector's representation is minimal, with only 2% of the villagers engaged in it.

Overall, the survey paints a picture of a community largely dependent on agriculture and animal husbandry for their livelihoods. Education levels are mostly in the primary to high school range, with some gaps in literacy that need attention. The economic status of the villagers is characterized by a significant proportion falling within the middle-income range.

Suggestion:

Kuno National Park is a suitable place for cheetahs, but several wildlife experts have stated that its maximum capacity is around 20-25 cheetahs. Therefore, before any potential wildlife conflict arises, a second home should be prepared for cheetahs to ensure their future. Attention should also be given to addressing the challenges that may arise in establishing cheetahs in the current context, such as monitoring and addressing issues related to their

identification through caller ID. Kuno has also been chosen for the reintroduction of Asiatic lions, so the expansion plan for Kuno should take that into account as well. It is essential to conduct a thorough review of the continuous deaths of cheetahs in Kuno to ensure their conservation. By analyzing the reasons behind the deaths, appropriate measures can be implemented to safeguard their well-being. Factors such as disease outbreaks, conflicts with other wildlife or humans, and habitat issues should be carefully investigated to identify the root causes of the deaths. Additionally, monitoring the overall health and population dynamics of the cheetahs in Kuno can provide valuable insights into their survival and reproductive success.

For the tribal families residing in the buffer zone of the national park, the government should develop development plans, considering that they are the original inhabitants of the forest. Their livelihoods and basic amenities should be developed. Additionally, the social and economic conditions of displaced families should be reviewed every five years.

Considering the potential number of tourists coming to see the cheetahs, it is essential to ensure the development of the Sheopur region to prevent future inconveniences. This will help avoid any issues that might arise in the future.

One concern is the possibility of cheetahs venturing outside the boundaries of the protected area and entering human settlements, as a few such incidents have already occurred. It is crucial to address this situation to prevent conflicts between humans and wildlife. Conducting awareness campaigns can help raise awareness about such situations and ensure that necessary precautions are taken to avoid any harm to humans or wildlife. Moreover, it is essential to have an adequate number of forest staff to ensure the safety of animals in the jungle. Their presence will help prevent poaching and other unethical activities, safeguarding the wildlife in the region.

The continuous deforestation in Madhya Pradesh poses a significant challenge to wildlife conservation. Over the past five years, an average of 10 hectares of forest has been lost daily, leading to the depletion of 19,270 hectares of forests between 2018 and 2023. This trend is a cause for concern, and the government needs to pay attention to this critical issue. To address this challenge, the government of Madhya Pradesh should focus on implementing effective measures for forest conservation and wildlife protection. It is crucial to prioritize reforestation and afforestation efforts to replenish the lost forests. Additionally, stringent measures should be taken to curb illegal logging and deforestation activities. Promoting

community-based conservation initiatives and involving local communities in forest management can be instrumental in ensuring the sustainable use and protection of natural resources. Raising awareness among the public about the importance of forests and wildlife conservation is also essential to garner support for conservation efforts.

Furthermore, stricter enforcement of existing environmental laws and policies, along with appropriate penalties for offenders, can act as a deterrent against illegal activities leading to deforestation. Sustainable development practices should be promoted to strike a balance between economic growth and environmental conservation. This includes promoting eco-tourism, adopting eco-friendly agricultural practices, and encouraging responsible use of natural resources. By addressing deforestation and prioritizing wildlife conservation, the government can work towards preserving the rich biodiversity of Madhya Pradesh and safeguarding the habitat of various wildlife species.

Declaration: We declare that this manuscript is original, has never been published, and is not under consideration for publication elsewhere. We understand that the corresponding author is the exclusive point of contact for the editorial process. He is in charge of keeping the other authors updated on work, submitting modifications, and final approving proofs.

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