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A Study of Scavenger birds in some regions of Bundelkhand, India to assess the promising breeding sites for their conservation.

Mr. Rajesh Sahu

Research Scholar, Jiwaji University, Gwalior , M.P.

Abstract

This study investigates the Bundelkhand region in order to gain a better understanding of the distribution of scavenging birds and the likely breeding locations for these birds. The goal of this investigation is to improve conservation efforts for these species. The populations of scavenging birds are essential to ecosystems because they contribute to the cycling of nutrients and the control of diseases. The numbers of these animals, on the other hand, have been steadily declining due to environmental changes, conflicts between humans and wild animals, and the disintegration of their habitat. Scavenging birds call the Bundelkhand region their home. As a result of the region's diverse geology and ecosystem, these birds are presented with a variety of opportunities as well as problems. In order to identify and evaluate possible breeding areas, we conducted a comprehensive investigation across the many habitats that are found in Bundelkhand. These ecosystems included riverbanks, open fields, and woods. For the purpose of determining the current state of the ecosystem, researchers utilized a variety of methods, including satellite imaging, in-depth interviews with locals, and field observations. This was accomplished by conducting an analysis of critical criteria, which included the availability of nesting sites, food resources, and levels of human activity, in order to establish the suitability of potential breeding sites. We know, as a result of our research, that there are a variety of suitable breeding habitats for scavenging birds. These locations include places where there is an abundance of food and where there is little interference from humans. But in addition to that, there were issues such as pollution and the fragmentation of habitats. According to the findings, concentrated conservation measures are absolutely necessary in order to guarantee the long-term viability of scavenger bird populations in the region. The restoration and protection of habitats, as well as the participation of the community and the implementation of monitoring programs, should be included in these efforts.

Keywords: Scavenger birds, breeding sites, Bundelkhand, conservation.

1. Introduction

Scavenger birds are extremely important to ecosystems because of the tasks they do, which include the recycling of nutrients, the prevention of diseases, and the control of pathogens. There are a number of factors that offer significant challenges for these birds all throughout the world, but particularly in India. These factors include the destruction of their natural habitats, pollution, and confrontations between

humans and other types of wildlife. The semi-arid region of Bundelkhand, which encompasses both the central and northern parts of India, is home to a large range of bird species that are called scavengers. There is a possibility that the enormous environmental stress that this region has been subjected to may have an impact on the populations of scavenger birds, notwithstanding the ecological significance of this location.

Vultures make a substantial contribution to the environment through their role as scavengers. The removal of dead birds and animals is a significant contribution to the health of our ecosystems, despite the fact that they do not appear to be very pleasant. They eliminate the germs that are introduced into our environment by decomposing bodies, so preventing the spread of disease. All of the other necessary scavengers that were found in vertebrates have been determined to be extinct. The term "obligate scavenger" is used to characterize creatures who consume nothing but dead animals as their primary source of nutrition. Because of a physiological mechanism that has evolved throughout time, vultures are able to lower their abnormally high metabolic rate when they are resting on their roost. According to Ali and Ripley (1987), India is home to nine distinct species of old world vultures: the redheaded vulture (Sarcogyps calvus), cinereous vulture (Aegypius monachus), himalayan griffon (Gyps himalayensis), long-billed vulture (Gyps indicus), slender-billed vulture (Gyps tenurostris), white-rumped vulture (Gyps bengalensis), bearded vulture (Gypaetus barbatus), and Egyptian vulture (Neophron percnopterus).

A wide variety of ecosystems, each with their own unique climate, can be found in the Bundelkhand region. These ecosystems range from semi-arid to dry tropical forest. As a result of the wide variety of habitat types, which include everything from riverine woodlands to open fields, scavenger birds have a whole lot of different places where they could potentially nest. In light of the growing pressures that are being exerted by these factors, there is an immediate need to investigate the ways in which human expansion, deforestation, and climate change have an effect on the nesting and survival of scavenging birds in this region.

There is evidence from previous studies that points to a worldwide drop in the number of scavenging birds. The causes of this decrease include the loss of habitat, various forms of poisoning, and changes in the availability of food. The rapid extinction of a number of bird species in India, such as the Eurasian Black Vulture, the Indian Griffon Vulture, and the White- rumped Vulture, can be attributed to the circumstances that have been discussed here. Considering the significant part they play in the process of ecosystem regulation, scavengers are an ecological priority.

The primary objective of this research is to identify optimal locations in the Bundelkhand region where scavenging birds can successfully reproduce. Our purpose is to provide a comprehensive understanding of the factors that influence the effectiveness of breeding and the requirements for conservation by evaluating the state of the habitat and the potential threats that may be present. The knowledge in question is necessary for conservation efforts that are specifically targeted to meet the requirements of certain species and habitats.

Considering that the availability of carrion and other food sources is essential to the survival of scavenger birds, it is important to note that these birds are particularly susceptible to changes in their

environment. Due to the fact that they have large home ranges and specific nesting requirements, they are particularly vulnerable to habitat fragmentation and disturbance. In order to develop effective conservation measures, it is necessary to have a solid understanding of the dynamics of the breeding locations.

The nesting habitats of scavenger birds and the conservation requirements of these birds have not been adequately researched in Bundelkhand. Studies that have been done in the past have primarily focused on either species that are specific to a particular location or more general ecological surveys. This knowledge vacuum will be addressed by our research, which will concentrate on scavenger birds in Bundelkhand and the ecology of their natural breeding grounds. When it comes to the preservation and protection of ecosystems, the most effective method is to first identify significant breeding locations and then assess the state of their health.

The objective of this study is to present proposals that can be put into practice for the protection of scavenging bird populations in the state of Bundelkhand, as well as to fill in any gaps that may exist in our existing understanding of these species from a practical standpoint. In order to contribute to the preservation of scavenging birds and the health of the ecosystem, we intend to investigate the various habitats in the region and determine which of them are suitable for the birth of young within the ecosystem.

OBJECTIVE

1. To assess and identify promising breeding sites for scavenger birds within the Bundelkhand region.

MATERIALS AND METHODS

To be more particular, the research was conducted in the Bundelkhand region of India, more specifically in the cities of Shivpuri, Tkamgarh (Orcha), Lalitpur (Devgarh), Madhav, Panna, and Jhansi (Fig.1). Bundelkhand may be located by plotting the coordinates 230°35′-26′ North and 780°82′ East. There is a location for it that is to the south of the Yamuna River. It is estimated that the region of Bundelkhand that is contained within these boundaries encompasses around 70,000 square kilometers. During the summer, temperatures can reach 48 degrees Celsius, and during the winter, they can drop as low as 1 degree Celsius. This location is distinguished by weather extremes. During the month of February, the temperature begins to rise, and it reaches its peak point during the months of May and June. It is estimated that approximately 90 percent of the rainfall occurs during the monsoon season, which begins in June and continues until October. This results in an unpredictable pattern of rainfall distribution. Approximately 800 to 900 millimeters of precipitation falls annually, with the bulk of that total quantity being lost as runoff. Vultures were drawn to this region because it contained a diverse range of features, including rocky cliffs, large trees, and ancient sites. The region known as Bundelkhand was marked by its dense forest cover. Forests have experienced a reduction in both size and quality as a result of biotic interference, which has increased in line with the growth of the population and the pressures of development. There is a significant area of Bundelkhand that is covered with tropical dry deciduous woods. The following types of forests are included in this category: tropical ripple-bordering forests,

deformed phases of dry deciduous forests, ravine thorn forests, Kardhai forests, Palas forests, dry bamboo brakes, Salai forests, Babool forests, Dry Sagaun forests, Senhur scrubs, and Boswellia serrata and Boswellia serrata, respectively.

Fig 1: Map of study site (Bundelkhand region)

In the course of the investigation, the months of September and December of 2022 were included. It was necessary to collect the data in order to identify prospective hotspots for vulture sightings in the Bundelkhand region. During the morning and evening hours, vultures were counted from a vehicle as well as on foot at nesting places, roosting sites, near bodies of water, and any carcasses that were discovered outside of the road. Walking along rows of long trees and cliffs was a necessary step in the process of counting nests, which took place in the morning and evening. This was accomplished by looking for indirect evidence, such as white washes and molted feathers, which led to the discovery of vulture mating colonies. The Canon 70 D SLR camera was utilized for the purpose of taking photographs as well as recording any movement that was witnessed through the utilization of binoculars. The handbook written by Ali and Ripley was used to determine the identity of vultures.

RESULTS AND DISCUSSION

There are several different species of vultures that call the Bundelkhand region their home because of the favorable conditions for nesting that it provides. According to the findings of the study carried out in the Bundelkhand region (Table 1), thirty breeding sites were discovered. Shivpuri is the location with the highest number of breeding sites, with eight, followed by Panna Tiger Reserve, which has seven, Madhav National Park, which has six, Tikamgarh, which has five orchas, Jhansi, which has two, Lalitpur, which has one, and Karaira, which has one (Graph 2). A representation of the total number of vultures during the time period of the study can be found in figure 3.

1 Shivpuri: On Blukho Cliff in Satkewara, which is one of the thirty breeding locations in Shivpuri, a maximum of twenty-one nests were discovered. This was due to the absence of human interference and the abundance of food supplies. It was also discovered that Indian vultures were breeding on the steep rocky slopes of the Sathyamangalam Tiger Reserve and the Nilgiri North Forest Division. There is evidence that vulture nests can be found in the areas of Arjun, Peepal, Mahua, and Semal.

2 Orcha: twenty Long-billed vulture nests (Gyps indicus) have been documented in Madhya Pradesh, which is home to a number of landmarks, including temples, forts, and cemeteries. Whereas the Jhangir Mahal only had one nest, Badi Chatri and Chaturbhuj Temple both had the largest number of nests in their respective buildings. Bewa River is the name of the canal known as Ocha. The behavior of adults in Orcha is altered as a result of human activities in breeding sites, particularly during the second half of the nestling period. The Bejjur reserve in Telangana is home to vulture breeding and roosting areas, which can be located by searching for large white patches. forth order to successfully raise their young, the vultures put forth a lot of effort. In point of fact, Neophron percnopteruss are notoriously cautious when approaching the nest, and they will typically not enter the nest if they hear or observe any form of noise. Breeding birds, like other large raptors, are thought to keep a distance of 307 meters from regions where human activity could potentially influence their behavior. There is a change in the behavior of adults, particularly during the second part of the nestling period, when humans are present in breeding regions for extended periods of time. Stones are thrown at vulture professionals by local tourists who are so ignorant that they do not know any better. This causes the vultures to suffer harm for their own entertainment.

3 Panna Tiger Reserve: The Gyps indicus, which is classified as a Critically Endangered species, has 35 nests in this area. Gyps indicus, Sarcogyps calvus, and Newtus percnopterus are the types of birds. Twenty-five is the maximum number of nests that can be discovered in Sakro. Because there are so many predators who hunt their food in Panna, the region is home to a wide variety of species. In the region of Panna, Madhya Pradesh, the Ken River serves as a source of water for the vultures. In the Panna Tiger Reserve, there were a total of 179 individuals, including eight nests that were inhabited by four different kinds of vultures, and two hundred and sixty of those individuals were Indian vultures. The region of Bundelkhand is home to the majority of the vulture species that can be found in India.

4 Madhav National Park: It was discovered that there were seven different places where vulture nesting sites could be found: Chapar Ghat, Raipur Pond, Nogaja Beat, Aravan Beat, Chand Beat, and Theh Beat. A single nest of Sarcogyps calvus was documented by Amba Beat out of a total of three.

Vulture nests can be found in a variety of trees, including Tendu, Semal, Mahua, Sal, Salai, Saj, and Arjun. The Sindh River is one example of a water source that can be found in close proximity to breeding areas. The high number of predators has resulted in an abundance of food that has been left behind for vultures to consume.

5 In Lalitpur (Deogarh): To far, just one species of Gyps, namely Gyps indicus, has been recorded. The nests are constructed on rock platforms or fissures in order to provide protection for their offspring against environmental conditions. Establishing nests in close proximity to water features is advantageous for this species, as it engages in bathing after each meal and actively avoids human intervention. A solitary nest of the Gyps indicus species was discovered in Moath, but no nests were detected in Seepri, Jhansi. Within the Karaira Sanctuary, there existed a single breeding site with a total of twenty nests.

Table 1: The overall situation of the Bundelkhand Region's vulture nesting sites

Area/ District	Name of Breeding Site	GPS coordinates of breeding site	Breeding Vultures' species	Total no of Vulture	No. of Nest	Total sites
Tikamgarh (Orcha)	Laxmi temple	-	Gyps indicus	02	00	05
	Jahagir Mahal	N25°21'03.00" E 78°38'39.4"	Gyps indicus	04	02	
	Raja Ram Mandir	-	Gyps indicus	01	00	
	Chaturbhuj Temple	N 25°20'59.7" E 78°38'23.7"	Gyps indicus	18	04	
	Chatri	N 25°20'39.3" E 78°38'18.6"	Gyps indicus, Neophron percnopterus	29	14	
Shivpuri	Satanawara (Nayagaon)	N25038.428' E77045.576'	Gyps indicus, Neophron percnopterus	40	16	08
	Satkewara	N25037.205'	Gyps indicus,	54	21	

	(Blukho cliff)	E 077042.561’	Neophron percnopterus			
	Kankar	N 25032.959’ E 077041.123’	Gyps indicus, Gyps fulvus	46	-	
	Baran,	N 25036.488’	Gyps indicus	11	-	
		E 077041.567’	Neophron percnopterus			
	Karaibara	N25037’12.08” E77042’33.68”	Gyps indicus Neophron percnopterus	24	11	
	Gopalpur	N 25^0 43.170’ E $77^0$39.333’	Neophron percnopterus	03	00	
	Binega	N25°31'46.3" E77°41'46.7"	Neophron percnopterus	02	00	
	Jhirna	N25°34'59.7" E77°39'54.3"	Sarcogyps calvus, Neophron percnopterus	03	-	
Lalitpur	Devgarh	-	Gyps indicus	34	17	01
Madhav National Park	Aravan Beat	N 25034’03.3” E077048’54.8”	Sarcogyps calvus, Gyps bengalensis	05	01	06
	Chand Beat	N 25032’14.4” E077049’10.9”	Sarcogyps calvus	01	01	
	Theh Beat	N 25031’09.4” E077049’20.0”	Gyps indicus, Sarcogyps calvus Gyps bengalensis, Neophron percnopterus	19	00	

	Chaper Ghat	N 25030’14.8” E077047’49.7”	Neophron percnopterus, Sarcogyps calvus	03	01	
	Amba Beat	N25027.580 E077042567	Gyps indicus	06	03	
	Raipur Talab	25°35'22.5" 77°49'10.04"	Gyps bengalensis	02	01	
Panna Tiger Reserve	Dhudhua Seha	N 24037’30.6” E079058’20.1”	Gyps indicus	55	07	07
	Sakro	N 24037’30.6” E079058’20.1”	Gyps indicus, Sarcogyps calvus	17	15	
	Devrdev	N 24030’18.1” E079052’11.1”	Gyps indicus	02	02	
	Ghariya Ghat	N 24028.350’ E 079052.727’	Gyps indicus, Sarcogyps calvus, Gyps bengalensis	09	06	
	Balaiya Seha	N 24045’00.5” E080005’22.0”	Sarcogyps calvus, White backed vulture	03	-	
	Umravan	N 24042’50.9” E080005’45.5”	-	-	-	
	Badhor Seha	N 24040’23.4” E080003’41.6”	Gyps indicus	05	05	
Karaira	Karaira	N 25027.527’	Gyps indicus,	53	20	01

	Sanctuary	E 078014’810”	Gyps bengalensis, Gyps fulvus			
Jhansi	Seepri	-	Gyps indicus, Neophron percnopterus	13	-	02
	Moath		Gyps indicus, Neophron percnopterus	7	1	

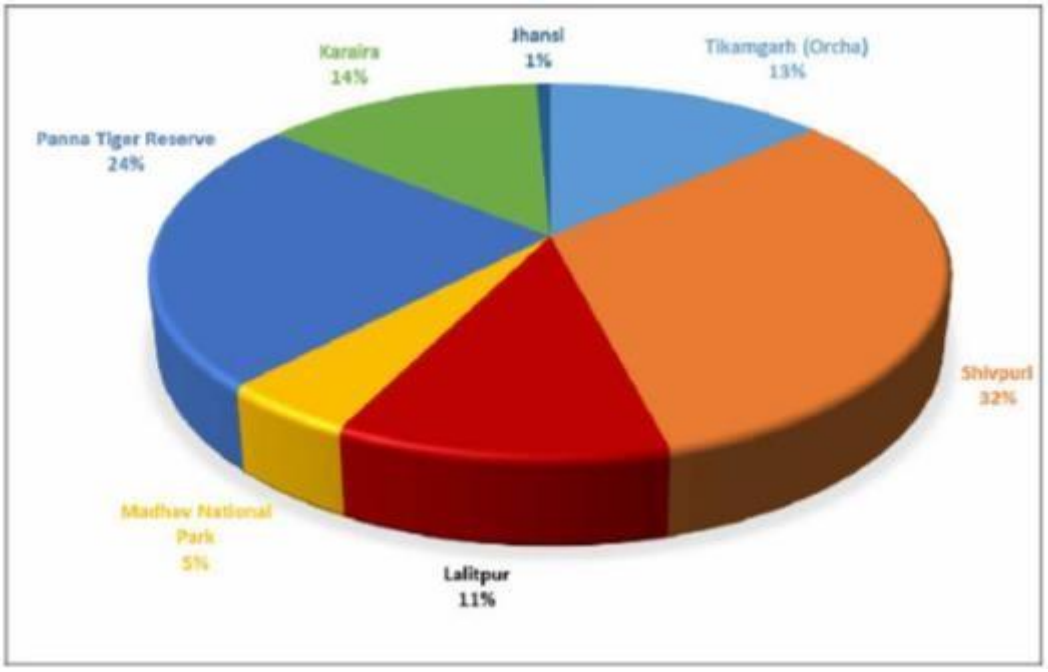

Fig 2: percentage-wise nest distribution in each Bundelkhand region research area

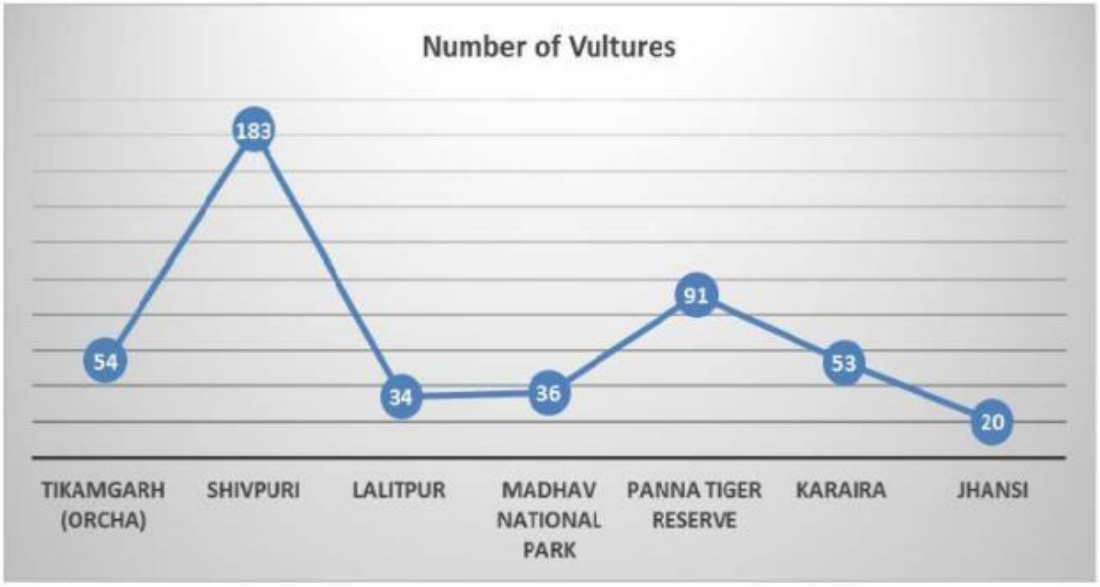

Fig 3: Total vultures in every Bundelkhand region research area

Conclusion

Due to the fact that vultures are the principal consumers, removing them from the environment might potentially upset the delicate balance that exists between other species that are responsible for scavenging or lead to an increase in the number of decomposing carcasses, which could potentially lead to the spread of contagious diseases. In light of the fact that vulture breeding colonies prefer to nest in distant areas, away from human activity, these areas ought to be declared as protected areas. Within the Bundelkhand region, there is a good possibility that vultures will be successful. This area has been transformed into a paradise for vultures as a result of diligent management and conservation efforts. It

now provides vultures with an abundance of food and a good nesting spot. The comprehensive inquiry will prepare the way for conservation activities, such as increasing public awareness and encouraging collaboration and mutual understanding between government agencies and the general people. These steps will be taken in order to protect the environment.

It is necessary to conduct additional research on vultures in order to lay a solid foundation of knowledge in the fields of landscape, breeding, pathology, genetics, molecular biology, and microbiology. At each vulture colony, there ought to be a designated group of volunteers who are willing to keep an eye out for any potential threats and report them to the local forest office as well as non-governmental organizations (NGOs) who are working in the region who are conducting their operations there. Through the use of this method, it is possible to analyze the cause of death as well as other potential threats.

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