

Threats assessment of vultures in Uttarakhand: A review note

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Abstract

Etymologically derived from Anglo-French vultur, Old French voutoir, voutre from Latin vultur, earlier voltur, and perhaps related to vellere- "to pluck, to tear"-the generic name 'vulture' does little justice to the immense ecological role that vultures play in maintaining the life support system of mother Earth. Given the wide range of topo-geographical features present in the State of Uttarakhand, all the 9 species of vultures of the Indian sub-continent are found here. However, the rapid and alarming decline in vulture population is a matter of great concern for all concerned. And therefore, there is an urgent need to identify the causes of decline and other threats that plague the vulture population in the country, especially in the State of Uttarakhand.

Keywords: Vulture; Threats; Uttarakhand; Conservation

1. Introduction

Vultures scavenge on animal carcasses and feed by 'plucking' and 'tearing' into the carrions and that is where perhaps, the generic name vulture is derived from Latin *vulture* and possibly from *vellere* "to pluck, to tear" [1]. By scavenging on carrions, they help to keep the environment clean and contain the spread diseases. Out of the 23 species of vultures found worldwide at present, 9 species nest in India and the Himalayan State of Uttarakhand is quite unique in the sense that all the nine vulture species recorded from the Indian subcontinent have been recorded from here.

Out of the 9 species of vultures reported from India, the following 4 are considered critically endangered (*Gyps bengalensis*, *Gyps indicus*, *Gyps tenuirostris* and *Sarcogyps calvus*), 1 is endangered (*Neophron percnopterus*) [2].

Right from the 1990s, a drastic decline in the vulture population in the Indian sub-continent has been observed. The decline has mostly been attributed to the adverse impact of non-steroidal anti-inflammatory drug (NSAID) including Diclofenac which are used for the treatment of livestock [3-8]. Various surveys conducted in the different parts of the country in 1991-1993 and then were repeated in 2000, 2002, 2003 and 2007 revealed that the population of the species of vulture was falling at a higher rate leading to a country wide ban on the veterinary use of the non-steroidal anti-inflammatory drug (NSAID) diclofenac in 2006 (official completion of the banning process was an extraordinary gazette notification in 2008 [Gazette of India Notification No. GSR 499(E) [8-9]. Diclofenac used to be widely used to treat cattle and the presence of diclofenac in the tissues of the carcass of such livestock was found to cause renal failure in the vultures, leading to their death. However, despite the ban on the use of diclofenac, it has been observed that population of vultures in the country is still declining. It has therefore become imperative that other causes of vulture population decline be ascertained and timely action be taken to stem the decline.

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As already mentioned earlier, there are 9 species of vulture which are generally sighted in India throughout the year, the migratory vultures and the indigenous both are recorded at higher frequency from the period of December to April. The vultures in the Indian subcontinent are termed as old-world vultures [10]. In present study we will try to list out the threats and conservation measures required for of vultures in Uttarakhand through online secondary data.

Table 1 The list of vultures founded in the State of Uttarakhand

Sr. no.	Common name	Zoological name	Alternate name	IUCN
				Present population trend
1	White-rumped vulture	<i>Gyps bengalensis</i>	White backed vulture, Indian white backed vulture	Critically endangered
				Decreasing
2	Long billed vulture	<i>Gyps indicus</i>	Indian vulture	Critically endangered
				Decreasing
3	Slender billed vulture	<i>Gyps tenuirostris</i>	-	Critically endangered
				Decreasing
4	Red headed vulture	<i>Sarcogyps calvus</i>	King vulture, black vulture	Critically endangered
				Decreasing
5	Egyptian vulture	<i>Neophron percnopterus</i>	White scavenger vulture	Endangered
				Decreasing
6	Himalayan vulture	<i>Gyps himalayensis</i>	Himalayan griffon	Near threatened
				Decreasing
7	Cinereous vulture	<i>Aegypius monachus</i>	Black vulture, monk vulture	Near threatened
				Decreasing
8	Bearded vulture	<i>Gypaetus barbatus</i>	Lammergeier	Near threatened
				Decreasing
9	Griffon vulture	<i>Gyps fulvus</i>	Eurasian vulture	Least Concern
				Stable

(Source :IUCN, 2020)

2. Methodology

In this paper the comprehensive study has been performed through electronic searches on Google to identify the available literature on the vulture present online till October 2022. In addition, the reference has been given to the articles found during the electronic search and study. From each scientific article we have extracted information on threats, conservation, and population assessments. Depending upon the keyword of study i.e. threat, the entire study was carried out. It is important to note that an article can contribute to more than one category or keyword of study. The sum of articles across all categories exceeds the total numbers which have been reviewed.

3. Results and discussion

As already emphasized above, vultures are one of the most important link in the life support ecosystem as they feed on the dead and decaying carcasses, thereby keeping the environment clean and free from communicable diseases. It is believed that till the 1980s, India had a population of 80 million vultures of the *Gypes* but today their numbers have declined to mere thousands only. Studies indicate that apart from the diclofenac factor, there are another factors that have led to the decline in vulture population which are enumerated below:

3.1. Major threats

- Poisoning due the use of aceclofenac, ketoprofen and nimesulide alternatives to diclofenac (NASIDs).
- Collision with energy infrastructure/electrocution.
- Unintentional Poisoning due to scavenging on carcasses of poisoned animals (Poison bait).
- Road kill.

3.2. Secondary/Potential threats

- Overall decline in the availability of food.
- Anthropogenic disturbance, habitat loss and degradation.
- Climate change

3.3. Major threats

3.3.1. Collateral Poisoning due the use of diclofenac and its alternative aceclofenac, ketoprofen and nimesulide (NASIDs).

This factor is one of the major threats responsible for declining the vulture population in Uttarakhand as well as other states of India. The medicine diclofenac is being misused, as is the use of aceclofenac, which metabolises into diclofenac and is far more harmful to vultures, as well as the drug nimesulide, which has been discovered to be poisonous to vultures [10-15]. Due to uses of these drug the population this novel creature has been declining rapidly.

3.3.2. Collision with energy infrastructure/electrocution

This factor is found to have emerged as another biggest threats and causes of deaths of vulture in the State. Most of the dumps for disposing of cattle carcasses are located in the forest fringe areas in the out skirts of the villages, and these are the very area over which the high voltage transmission lines pass through. The vultures either get electrocuted or get killed when they crash against the transmission lines [16-18].

3.3.3. Unintentional poisoning due to scavenging on carcasses of poisoned animals.

It has been reported that the carrions of livestock and other animals, which have died due to poisoning, are dumped near forest areas rather than being disposed-off in the prescribed manner. This has often been reported as the cause of large scale death of vultures due to unintentional poisoning [13].

3.3.4. Road kills

Being slow fliers, vultures take a while to take off from the ground. In the process, they often become victim to road hit when they try to feed on the carrions of road hit animals.

3.4. Secondary/Potential threats

3.4.1. Overall decline in the availability of food

Overall decline in the availability of food has been identified as one of the major reasons for the decline in vulture population. With rapid urbanization even in remote areas and the rise in income level, a drastic decline in cattle rearing has been experienced in the State leading to a consequential decline in the availability of livestock carcasses [12, 16 & 20].

3.4.2. Anthropogenic disturbance, habitat loss and degradation.

Despite their predatory hooked beaks and sharp talons, vultures are shy birds. They like to keep away from humans, especially when they are breeding. Rapid urbanization even in remote areas and spread of anthropogenic activities, suitable habitats for the vultures are shrinking, perhaps leading to reduced fecundity and fledging success of the vultures [12 & 21].

3.4.3. Climate change

It has been observed that the mountainous regions of the world are more vulnerable to the adverse impact of climate change and the predominantly mountainous, Himalayan State of Uttarakhand is no exception. Drastic changes in the seasonality of precipitations, changes in plant phenology and untimely and protracted dry periods, temperature variations etc. are being experienced in the State leading to perceptible and far reaching consequences in the overall ecology and environmental conditions of the State. How is climate change impacting the vulture population is a subject

of long term study but there is no denying the fact that climate change and the consequent ecological changes do have some effect on the fecundity, food availability, fledging success and health of the vultures [21].

4. Conclusion

There are problems and they will never stop and so to that we must keep finding ways to tackle these so that we can help protecting this environment. The diclofenac ban was implemented by the government but as we see there is still find the use of diclofenac and its alternatives in many parts of State as well as country, but is it really helping, no because the ban may be on the papers but it's still not on the ground and till the time it's not properly implemented on the ground we will keep on finding vultures dying with the adverse effects of diclofenac in their body. In the course of my entire study and after referring to the articles and research papers diclofenac is one of the major threats/reasons but it's not the only threat/reason responsible for the deaths of these many vultures in these years, as climate change, increase in anthropogenic activities, increase in the competition these all reasons/threats altogether compared are the reason for the depletion of vulture population in the State and the country.

So, to prevent this we try to make strong and ground level strategies with the help of forest, local NGOs and others stakeholder who devoted to conservation of biodiversity. If successful conservation strategies make and strictly followed can actually bring a change and the declining population of vultures can be prevented otherwise results will be catastrophic.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

References

- [1] Nodant 2017. Vulture; published by Hill Post. <https://hillpost.in/2017/04/vulture/108324/>
- [2] IUCN The IUCN Red List of Threatened Species 2014:e.T22695194A62658293. <https://dx.doi.org/10.2305/IUCN.UK.20142.RLTS.T22695194A62658293.en>. Downloaded on 15 July 2020.
- [3] Green RE, Taggart MA, Senacha KR, Pain DJ, Jhala Y, et al. (2007) Rate of decline of the oriental White-backed vulture *Gyps bengalensis* population in India estimated from measurements of diclofenac in carcasses of domesticated ungulates. PLoS One 2: e686.
- [4] Green RE, Newton I, Shultz S, Cunningham AA, Gilbert M, et al. (2004) Diclofenac poisoning as a cause of vulture population declines across the Indian subcontinent. J Appl Ecol 41: 793–800.
- [5] Prakash V, Green RE, Pain DJ, Ranade SP, Saravanan S, et al. (2007) Recent changes in populations of resident *Gyps* vultures in India. Journal of the Bombay Natural History Society 104: 129–135.
- [6] Cuthbert R, Taggart MA, Prakash V, Saini M, Swarup D, et al. (2011) Effectiveness of Action in India to Reduce Exposure of *Gyps* Vultures to the Toxic Veterinary Drug Diclofenac. PLoS One 6: e19069.
- [7] Prerna SB. (2018) Declining vulture population can cause a health crisis.
- [8] Prakash V, Bishwakarma MC, Chaudhary A, Cuthbert R, Dave R, et al. (2012) The Population Decline of *Gyps* Vultures in India and Nepal Has Slowed since Veterinary Use of Diclofenac was Banned. PLOS ONE 7(11): e49118. <https://doi.org/10.1371/journal.pone.0049118>
- [9] Prakash V, Galligan TH, Chakraborty SS, Dave R, Kulkarni MD, Prakash N et al. (2017) Recent changes in populations of Critically Endangered *Gyps* vultures in India. Bird Conservation International, 2017, 1-16. DOI:10.1017/S0959270917000545.

- [10] Kanauija A and Kushwaha. (2013) Vulnerable Vultures of India: Population, Ecology and Conservation, Rare Animals of India, 113-144.
- [11] Senacha KR, Taggart MA , Rahmani AR , Jhala YV , Cuthbert R , Pain DJ and Green RE. (2008) Diclofenac Levels In Livestock Carcasses In India Before The 2006 "Ban", Journal Of The Bombay Natural History Society, 105 (2), May-Aug 2008
- [12] Das SK. (2011) Status of Raptors with Special Reference to Vultures in and Around Rajaji National Park, India.https://www.academia.edu/3109620/Status_of_Raptors_with_Special_Reference_to_Vultures_in_and_Around_Rajaji_National_Park_India
- [13] Balodi KN, Pandey B, Singh A and Singh A. (2018) Population status and threat assessment of vultures species in Uttarakhand, India. Conservation Leadership Programme Project Report. https://www.conservationleadershipprogramme.org/media/2016/04/CLP-Final-Report_2907.pdf
- [14] Rahman S. (2020) Despite ban, vulture-killing drug diclofenac widely sold for veterinary use in India. Research Matters, 24th September 2020. <https://researchmatters.in/news/despite-ban-vulture-killing-drug-diclofenac-widely-sold-veterinary-use-india>
- [15] Gaurav R. (2021) Drug debacle: Endangered vulture population still under threat, 4th September 2021,<https://www.downtoearth.org.in/blog/wildlife-biodiversity/drug-debacle-endangered-vulture-population-still-under-threat-78835>
- [16] Jha KK, Campbell MO and Jha R. (2020) Vultures, their population status and some ecological aspects in an Indian stronghold. Notulae Scientia Biologicae 12(1):124-142 DOI:10.15835/nsb12110547
- [17] Madhan N. (2011) Electrocutation may be a cause for falling number of vultures. Times of India ,22nd February 2011.<https://timesofindia.indiatimes.com/city/pune/electrocutation-may-be-a-cause-for-falling-number-of-vultures/articleshow/7550506.cms>
- [18] Jha S. (2022) Drug debacle: Diclofenac was not the last threat for India's vultures, 27 March 2022, Down To Earth.<https://www.downtoearth.org.in/news/wildlife-biodiversity/drug-debacle-diclofenac-was-not-the-last-threat-for-india-s-vultures-82075>
- [19] The Pioneer. (2016) Workshop on ensuring vultures' safety today (2-16) The Daily pioneer, 16th January 2016.<https://www.dailypioneer.com/2016/state-editions/workshop-on-ensuring-vultures-safety-today.html>
- [20] Sharma R , Bhatt D, SeKthi V, Joshi VD (2007). Status and behaviour of white-backed and long-billed vultures in Rajaji National Park, Uttarakhand, India.https://www.researchgate.net/publication/228510923_status_and_behaviour_of_white-backed_and_long-billed_vultures_in_rajaji_national_park_uttarakhand_india
- [21] Threaten species of Uttarakhand. Downloaded 25th September 2022https://sbb.uk.gov.in/files/books/Threatened_Species_Book-CTP.pdf