



Slender-billed vulture. Photo: Paul Insua-Cao/RSPB

# Saving Indian Vultures from Extinction: Policy Statement

- The populations of four vulture species found in India and endemic to Asia have undergone such dramatic declines since the 1990s that they are now at the most severe risk of global extinction – ‘Critically Endangered’.
- Vultures play a key ecological role as scavengers and provide important benefits to society with human health benefits in India. Losing vultures has already had serious social, economic and environmental impacts.
- The sole or main cause of the dramatic decline in *Gyps* vulture populations was veterinary use of the non-steroidal anti-inflammatory drug (NSAID) diclofenac. This use has now been banned, but illegal sale of human diclofenac for veterinary use remains a problem in many parts of India.
- The decline in *Gyps* vulture populations has stopped or at least slowed since the ban on veterinary diclofenac, but there has been no strong recovery in India, contrasting with a marked recovery in Nepal. Illegal veterinary use of diclofenac has continued in India along with increased veterinary use of other NSAIDs, aceclofenac, nimesulide, ketoprofen, flunixin that are also proven to be toxic to vultures.
- Another NSAID, meloxicam, has already been shown to be safe to vultures and its veterinary use has expanded as a safe alternative.
- There are other threats to vultures which are currently less important than toxic veterinary NSAIDs in India but are still a cause for concern in some areas. These include accidental killing of vultures by poison baits and collisions and electrocution by power infrastructure.
- **We need to save vultures and restore their important ecological and social role. An environment for vultures that is free from toxic NSAIDs in carcasses is the overwhelming current priority.**

Priority actions to counteract the principal threats to vultures in India are assessed annually as part of updating the Blueprint [vulture recovery plan](#) of the Saving Asia’s Vultures from Extinction (SAVE) consortium. This Blueprint is the key reference and source for the Convention of Migratory Species [Vulture Multi-species Action Plan](#). For these documents and more visit [www.save-vultures.org](http://www.save-vultures.org)

The populations of four vulture species in India and endemic to Asia have undergone such rapid and dramatic declines since the 1990s that they are now listed by IUCN as being at the most severe risk of global extinction – ‘Critically Endangered’

From the early 1990s into the new millennium, populations of South Asian vultures underwent a dramatic and sudden collapse, most heavily impacting four of India’s nine species of vultures; three *Gyps* vulture species and the red-headed vulture (see table below). These four species are now recognised as Critically Endangered globally (BirdLife International 2019). Numbering tens of millions in India alone, the white-rumped vulture was considered the most abundant large raptor in the world, but now only an estimated 8,000

individuals remain, of which 6,000 are in India. The reduction in population size of the three *Gyps* species was estimated through systematic monitoring to be between 96.8% for Long-billed vulture and 99.9% for white-rumped vulture within a period of just fifteen years (Prakash *et al.* 2007). These four species might soon be extinct in the wild, both in India and globally, as the majority of the populations of all four species are found in India.

| Vulture species  | Global threat status <sup>1</sup> | Est. population in India / global   |
|--|-----------------------------------|-------------------------------------|
| Oriental white-backed (aka white-rumped) vulture ( <i>Gyps bengalensis</i> ) | Critically Endangered             | 6,000/<br>8,600                     |
| Long-billed (aka Indian) vulture ( <i>Gyps indicus</i> )                     |                                   | 30,000/<br>30,500                   |
| Slender-billed vulture ( <i>Gyps tenuirostris</i> )                          |                                   | 1,200/<br>1,800                     |
| Red-headed Vulture (aka king vulture) ( <i>Sarcogyps calvus</i> )            |                                   | no India estimate/<br>2500-10,000   |
| Egyptian Vulture ( <i>Neophron percnopterus</i> )                            | Endangered                        | no India estimate/<br>50,000        |
| Himalayan Griffon ( <i>Gyps himalayensis</i> )                               | Near-threatened                   | no India estimate/<br>300,000       |
| Cinereous Vulture ( <i>Aegypius monachus</i> )                               |                                   | no India estimate/<br>15,600-21,000 |
| Bearded Vulture (aka Lammergeier) ( <i>Gypaetus barbatus</i> )               |                                   | no India estimate/<br>1,300-6,700   |
| Eurasian Griffon ( <i>Gyps fulvus</i> )                                      | Least Concern                     | no India estimate/<br>>500,000      |



Healthy white-rumped vulture.  
Photo: Goran Ekstrom



Impact of diclofenac poisoning.  
Photo: Yedra Bayana

<sup>1</sup> This list follows the globally-recognised standard of the IUCN Red List of Threatened Species (IUCN 2012), which provides an objective framework for the classification of species according to their extinction risk. “Critically Endangered” is the highest threat status and species listed as such are considered to be facing an extremely high risk of extinction in the wild. The basis for these four species being listed as such is that their populations have undergone a reduction of more than 80% in three generations and the cause of the population decline has not ceased.

Vultures play a key ecological role as scavengers and provide important benefits to society in India. Losing vultures has already had serious social, economic and environmental impacts.

Vultures feed on dead animal carcasses, and in so doing clean up the environment. In India a key service they provided was to dispose of the millions of cattle carcasses, so cleaning up the environment. The loss of vultures has had immediate social, cultural and financial implications, which have yet to be fully quantified; cattle have had to be

disposed of in new ways and there has been a significant increase in the population of feral dogs and with it elevated risks of rabies and dog attacks (Markandya et al. 2008). With 20,000 cases of rabies in humans in India annually (World Health Organisation), any increase in dog numbers has significant implications for humans.



Vultures feeding on a carcass. Photo: Paul Insua-Cao/RSPB

The sole or main cause of the decline in *Gyps* vulture populations was veterinary use of the non-steroidal anti-inflammatory drug (NSAID) diclofenac. This use has now been banned, but illegal sale of human diclofenac for veterinary use remains a problem in many parts of India.

By 2004, several scientific publications showed conclusively that the reason for the calamitous vulture population declines was the veterinary use of the NSAID diclofenac (Oaks *et al.* 2004, Green *et al.* 2004, Prakash *et al.* 2005). This drug was and still is commonly used for treating people and millions of doses per year were used to reduce pain in cattle since the mid-1990s (Pain *et al.* 2008). Diclofenac is present in all tissues of cattle for a few days after treatment and a very small concentration renders the tissues toxic to vultures consuming them (Oaks *et al.* 2004, Swan *et al.* 2006a, Green *et al.* 2006). Scientific modelling showed that less than 1% of cow carcasses containing diclofenac would be required to cause the vulture population to decline at the rate observed (Green *et al.* 2004) and surveys of diclofenac concentrations in the tissues of cattle

available as food to vultures showed that there was sufficient diclofenac in them to account entirely for the decline.

The impact of diclofenac was so severe that a complete ban of diclofenac for veterinary purposes to remove it from the vultures' food supply was the only option available to save them. In 2006, diclofenac was banned for veterinary use throughout India under Section 26A of the Drugs and Cosmetics Act. Since 2015, the human-use form of the product is limited to vials of no more than 3 ml to discourage illegal misuse of the human formulations in veterinary practice. A cow requires about five times the human dose. This further step appears to be helping to reduce illegal veterinary use.

The decline in *Gyps* vulture populations has stopped or at least slowed since the ban on veterinary diclofenac, but there has been no strong recovery in India, contrasting with a marked recovery in Nepal. Illegal veterinary use of diclofenac has continued in India and there has been increased veterinary use of other NSAIDs, which have also been proven to be toxic to vultures.

Pharmacy and cattle carcass surveys show that diclofenac is still being used to treat cattle in India, though to a lesser extent than before, despite being illegal, and that other NSAIDs have partly replaced it. Some of those alternatives, such as aceclofenac and ketoprofen, have been proven to be toxic to vultures in similar ways to diclofenac. Others are strongly suspected to be toxic and are undergoing safety testing by the Indian Veterinary Research Institute.

This continued use of toxic NSAIDs is sufficient to explain the lack of a population recovery. A larger reduction in the use of diclofenac in Nepal was followed by a strong increase in vulture populations there. At least 12 different NSAIDs are known to be used in India for veterinary purposes, including

diclofenac (Cuthbert *et al.* 2011). A summary of the main alternative NSAIDs currently being used in veterinary practice is shown in Annex below.



Diclofenac produced by many different manufacturers.  
Photo: Chris Gomersal/RSP

One veterinary NSAID, meloxicam, has already been shown to be safe to vultures and its use has increased.

There are strong reasons for hope. The NSAID called meloxicam has already undergone safety testing and been proven to be safe to vultures (Swarup *et al.* 2007). Initial results from testing on tolfenamic acid appears to offer another safe alternative. There will likely be more safe options to come.



Uptake in meloxicam is growing as a vulture-safe alternative.  
Photo: Chris Gomersal/RSPB



Long-billed vultures  
Photo: Mandy West

There are other threats to vultures which are currently less important than toxic veterinary NSAIDs in India but are still a cause for concern in some areas. These include accidental killing of vultures by poison baits and collisions and electrocution by power infrastructure (pylons, wires, wind-turbines)

**Poison baits:** There is no evidence of vultures being deliberately poisoned in India, but there are several incidents annually of vultures being poisoned at baited carcasses, particularly in Assam. Poisoned vultures die quickly and often close to the source. The poison baits responsible are usually laid to kill feral dogs and other carnivores which killed livestock, but accidentally kill a variety of scavengers, including vultures. The rise in feral dog numbers in India as a result of the food supply not consumed by vultures, has probably led to an increase in such poisoning incidents. Outside South Asia, this is the predominant threat to vultures (Botha *et al.* 2017).

**Power infrastructure:** Vultures are being killed as a result of electrocution on pylons, and collision with wind turbines and power lines. These are likely to become an increasing threats to vultures and other soaring birds and needs addressing through pre-

emptive planning and risk mapping in relation to vulture concentrations. Nevertheless, the severity of the threat to vultures and their recovery is currently far lower than that of toxic NSAIDs.

**Food shortages:** Vulture numbers prior to the crash were high because they benefitted from the carcasses of the millions of domestic cattle disposed of every year. Although it is unlikely that they will ever return close to those levels, evidence suggests that, despite changing carcass disposal practices and other factors, there is still enough food to support far more vultures than at present. Therefore, food shortages are a matter of local rather than national concern for vultures and certainly don't account for the dramatic declines that have occurred.



Energy infrastructure, if not well planned, can be a threat to all soaring birds including vultures.  
Photo: Chris Bowden/RSPB

We need to save vultures and restore their important ecological and social role. An environment for vultures, free from toxic NSAIDs in carcasses is the overwhelming current priority. To ensure the survival of vultures in India and globally and therefore to address this priority requires these policy actions:

#### Needed now:

- Safety-testing on vultures for all currently permitted veterinary NSAIDs
- Withdrawal of approval for veterinary use of NSAIDs shown to be toxic to vultures evoking section 26A of Indian Drugs & Cosmetics Act.
- Promotion of the use of meloxicam as a veterinary drug that poses no risk to vultures through education and awareness programmes. (Note that tolfenamic acid may very soon be demonstrated as an additional safe drug)
- Ensuring that diclofenac is totally removed from the food supply of vultures - through stronger enforcement and closer monitoring, and that the unsafe drugs: aceclofenac, nimesulide, ketoprofen, flunixin & carprofen are not supplied to the government veterinary services as a first step.
- Banning of veterinary aceclofenac as it has been shown to metabolise into diclofenac and is therefore equally toxic
- Banning of veterinary ketoprofen as it has been shown to be toxic to vultures
- Establishment of vulture safe zones (VSZs) based upon agreed SAVE criteria, where the prevalence of toxic NSAIDs is low enough over a large area not to threaten the local vulture population. This will require state-level government commitment to remove vulture-toxic NSAIDs from the environment, even before they have been banned at the federal level
- Maintain vulture captive breeding programmes, with a view to reintroductions into the wild as soon as the environment has been made sufficiently safe, and the monitoring system with tracking devices is in place for the released birds.
- Proceeding with the release programme to help re-establish and augment wild populations and to monitor the ongoing safety of the environment including NSAID use and prevention of setting poison baits.
- An effective system is in place to collect dead vultures and analyse and report the causes of mortality

#### Longer-term

- Licensing system in place that permits only veterinary NSAIDs that have been cleared as safe to vultures
- Safety-testing on vultures of all new veterinary NSAIDs
- Refusal of approval for veterinary use of NSAIDs shown to be toxic to vultures
- Ascertain the impact of power infrastructure on vultures and other soaring birds and conduct sensitivity mapping to inform decision-making for development planning



Oriental white-backed vulture: Photo: Paul Insua-Cao/RSPB

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## Annex: Commonly used NSAIDs in veterinary practice in India

| Drug name       | Threat / safety     | Known effect   |
|-----------------|---------------------|--|
| Meloxicam       | Safe                | Tested and shown to be safe for vultures (Swarup D. <i>et al.</i> 2007)  |
| Tolfenamic acid | Probably safe       | Currently being tested and so far results are positive (to be fully confirmed shortly)   |
| Carprofen       | Toxic at high doses | Shown to be at toxic levels for cattle tissues around the injection site (Fourie <i>et al.</i> 2015)   |
| Flunixin        | Toxic               | Shown to be toxic to <i>Gyps</i> vultures in Spain and Italy   |
| Nimesulide      | Probably toxic      | Banned in many countries due to safety issues in humans and banned in India for under 12s. Fast becoming popular in NW India. There have been several cases of dead wild vultures with gout and nimesulide but no diclofenac |
| Aceclofenac     | Confirmed toxic     | Metabolises into diclofenac in cattle so equivalent effect to diclofenac (Galligan <i>et al.</i> 2016, Sharma 2012)  |
| Ketoprofen      | Confirmed toxic     | Trials carried out on <i>Gyps</i> vultures showed toxicity at concentrations found in treated cattle in India (Naidoo <i>et al.</i> 2009)  |
| Diclofenac      | Confirmed toxic     | Confirmed highly toxic in 2003 (Oaks <i>et al.</i> 2004), and banned as veterinary drug since 2006   |