

Diclofenac – Affirmation of Carson’s Concerns

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"In the end we will conserve only what we love. We will love only what we understand. We will understand only what we were taught". **Baba Dioum**

Perspective

12 of the 23 species of Vulture, sole scavenger amongst vertebrate birds, are classified as “near threatened” or “endangered”. Across the Indian subcontinent and South Asia there is particular concern with an observed 92 percent reduction of *Gyps* vultures.

The vulture species found in South Asian region has a scientific name given as *Gyps bengalensis*, common name is Asian White-backed vulture and the local name in the subcontinent region is *Gidh*.

Scavenging birds play a significant, often unappreciated role in regulating the energy systems of the food web [1] by recycling nutrients locked in the dead bodies of animals. As a result of the vultures’ corrosive acidic digestive systems, this group does not encounter any difficulty in digesting the decaying and dead animals [1].

Vultures are terrestrial birds known to be found in a variety of different habitats from forests to savannas, shrub lands to grasslands and may also include artificial terrestrial urban areas. The distribution of *G. bengalensis* ranges across Pakistan, India, Nepal, Bhutan, Thailand, Myanmar, Laos, Cambodia and southern Vietnam [2]. The map in Figure 1 defines the population distribution range of *G bengalensis* in South Asia.

The numbers of white-backed vultures have shown a 95% decrease in their population since 1990s in the species range of Indian sub-continent including Pakistan, India and Bangladesh. Evidence suggests that reduction in population is primarily results due to feeding on the Carcasses of the livestock which had been treated with the ‘diclofenac, Non-Steroidal Anti-Inflammatory Drug (NSAID) [3].

The new world vultures have developed some dynamic bodily systems e.g. urinating will kill the bacteria on the legs which attached to their body while feeding on carcasses [2]. It usually breeds in communities near human populations and on tall trees.

The ability of vultures to detoxify the bacterial matter of the carcasses and decomposing bodies makes their body well adapted to the kind of nutrition they feed upon. The digestive serums of vulture’s stomach rate 1 on the pH scale which not only kills bacteria but also the resistant most spores hence rendering them ineffective in causing infection [4].

Vultures are considered to be present at the apex of the food web and guard the environmental changes or reveal them more profusely like other avian species [3]. They are also referred to as bio-monitors or bio-indicators because small changes into the environment may bring drastic changes to their population sizes.

According to Begon et al., 2005, the food webs have got many precedence levels depending upon the interactions which are under discussion. The food web may include the trophic cascades, species or

community level cascades top-down or bottom-up control of food webs and strong interactors and keystone specie. In case of *Gyps* species the decline of the species in one trophic level at the apex of food web has caused a significant effect over the other species in the same trophic level [5].

Mammalian scavengers i.e. dogs are considered better scavengers but this is not true as they vulture being a bird is able to access carcasses of dead animals which might prove to be difficult for other scavengers to access. Due to the reduction in the vulture population in India an increase in number of feral dogs has been observed causing the risks of rabies as an outbreak [6].

Trophic magnification is also called food chain magnification. In this ‘one organism feeds on another’ [7], in this mechanism food particles accumulate in the body of the predator feeding upon prey. Species at the upper trophic levels are especially prone to pollutants. The pollutant effect magnifies as they travel from lower trophic levels to the higher levels with increased dosage concentration causing major harm to the predators present in highest trophic level.

Inter-specific competition and intra-specific competition occurs between individuals of different species and same species respectively when their dependence on a food resource is common and is in short supply. Because of the decline in vulture species the food resource available to dogs has increased since the 1990’s causing a significant increase in the number of dog species in the absence of inter-specific competition. The number of feral dogs has increased from 60 to 1200 over the time span of nine years recorded from 1992 to 2001 over a carcass dump site [6].

Studies on intra-specific competitions between the *Gyps* vulture species are noticeably few so it is difficult to comment on this aspect of behavior, and points out an area of research in need of attention. Therefore more ecological research should be carried out to add up adequate knowledge to the subject which will prove to be helpful in understanding the behavioral aspects of the specie. This would both inform and aid current conservation measures aimed at the reintroduction or conservation in various ecosystems.

The significance of vultures in India and Africa is related to the fact that these are the largest scavengers for removing carrion. Their meat consumption of other mammalian scavengers adds up to the equal total by the vultures. The reduction in species number has not just cause the mal function of ecological equilibrium but is also adding up to the number of putrefying bodies which may become a site of nutrition for disease carrying vectors [6].

It also leads the other scavengers to dead animals [1] and also acts as a source of sanitation by scavenging the dead bodies. Because of the continuous reduction in vulture population and a consequent increase in feral dogs the disease risk for humans and animals associated with it has also increased. In India implications related to the increased

number of feral dogs is observed with the ever increasing cases of rabies. The number of annual cases reported of rabies by the World Health Organization (WHO) is 60,000 out of which 30,000 occurs in India only [6].

The religion Parsee has the religious aspect related to not burying their dead bodies in earth instead they place it in 'Towers of Silence' to be eaten away by the vultures. Because of the decreased number of the vulture species the Parsees are looking for a resolution to this crisis [6].

Diclofenac is a Non-Steroidal Anti-Inflammatory Drug (NSAID) which has caused catastrophic decline of *Gyps* species across the Indian sub-continent [3]. The drug was used even after it was banned in 2005 by farmers for injecting their livestock. As a result of the diclofenac poisoned carcasses of the cattle the specie of vultures got reduced by more than 92% in 2000 in South Asia. The Non-Steroidal Anti-Inflammatory Drug (NSAID) proved to be poisonous for the renal function resulting in visceral gout of the vultures. This drug mainly causes the neck dropping 30 days prior to the death of an organism [8].

Complete ban has been placed on the manufacturing, purchasing and selling of diclofenac (NSAID) in affected regions. The first and foremost conservation strategy that was taken was to build a plan which took the vultures into captivity as soon as possible so to protect them from the exposure to Diclofenac [9].

The replacement of diclofenac with suitable alternatives at cheaper cost so that the low income farmer community will be willing to switch from buying diclofenac to other alternatives. Awareness and education campaigns should be launched in areas correlated with high mortality rates and low rate of success in breeding the vultures. A warning should be issued to stop the use of diclofenac to make people listen to the authoritative bodies of the area. Captive breeding farms and sheds should be increased and funded by the government.

On a positive note the ongoing Conservation plans under WWF in Pakistan and RSPB in India are working successfully. With further research and educational work in local areas about veterinary and livestock care it is with a sense of hope that the population of Asian White-backed Vulture continues to soar and circle the skies above.

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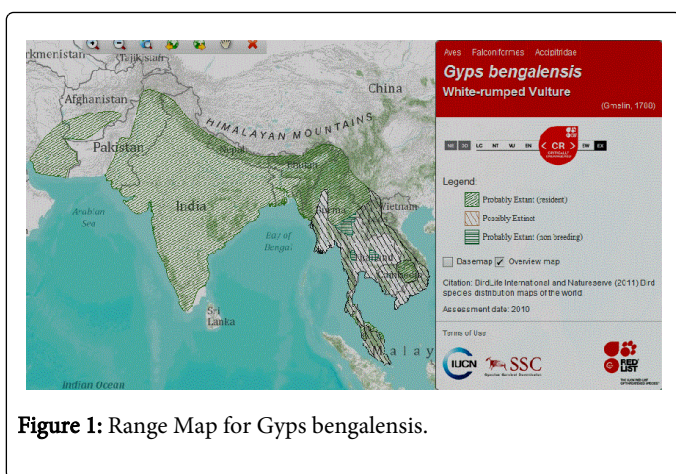


Figure 1: Range Map for *Gyps bengalensis*.