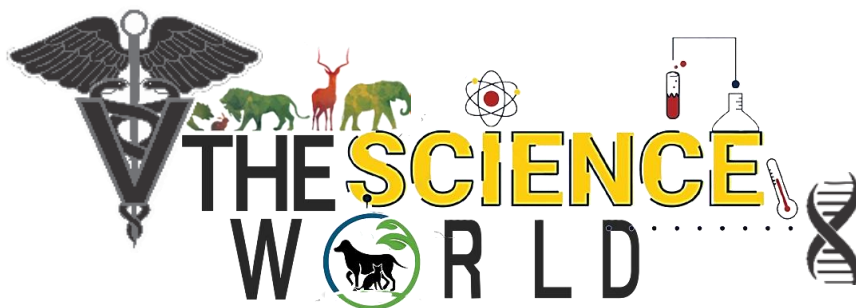




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From Carcasses to Climate Action: The Hidden Role of Vultures

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Abstract

A single carcass can contain a large amount of organic material. Vultures can locate and consume carcasses remarkably quickly, sometimes reducing a carcass to bones within a short period when many birds are present. This prevents carcasses from remaining on the ground for longer periods and transfers nutrients back into the ecosystem through the birds' bodies and droppings. Importantly, the relationship is not simply "vultures eat carcasses and therefore methane disappears."

Introduction

When we talk about climate change, we usually think of forests, oceans, renewable energy and carbon dioxide. Rarely do we talk about vultures. Although, when we think about the vultures, the first image that comes to our mind is their scavenging habit, yet these often-misunderstood birds perform an important environmental service: they rapidly remove dead animals from the landscape, thereby reducing the amount of organic material available for decomposition and helping to limit associated greenhouse-gas emissions. When we focus on human activities such as fossil fuel burning, changes in land use, livestock production, agriculture, industry etc they are some of the major sources of greenhouse gases globally. Livestock themselves contribute methane primarily through enteric fermentation and manure



management. However, carcass decomposition represents another biological process in which methane may be generated under suitable conditions.

How are vultures connected with methane?

When an animal dies, its body begins to decompose. The dead animals release greenhouse gases to the atmosphere through natural decomposition. If a carcass remains in the environment, microorganisms break down its organic matter. Under oxygen-poor conditions, this decomposition can produce methane (CH₄), a powerful greenhouse gas, along with carbon dioxide and other gases. Vultures interrupt this process by consuming carcasses quickly as they are among the most efficient terrestrial scavengers. In this sense, they act as natural waste-removal workers. The faster a carcass is consumed, the less time it remains available for prolonged decomposition. Research has therefore identified vultures as contributors to reducing greenhouse-gas emissions associated with dead animals.

Vultures as natural carcass recyclers

A single carcass can contain a large amount of organic material. Vultures can locate and consume carcasses remarkably quickly, sometimes reducing a carcass to bones within a short period when many birds are present. This prevents carcasses from remaining on the ground for longer periods and transfers nutrients back into the ecosystem through the birds' bodies and droppings. Importantly, the relationship is not simply "vultures eat carcasses and therefore methane disappears." The exact amount of methane avoided depends on environmental conditions, the type and size of the carcass, how it would otherwise decompose, and the alternative disposal method. Scientists therefore generally discuss the benefit in terms of greenhouse-gas emissions or CO₂-equivalent emissions, rather than claiming that vultures directly eliminate a fixed quantity of methane.

What happens when vultures disappear?

The decline of vultures can have unexpected environmental consequences. When vultures are absent, carcasses remain available to other scavengers and decomposers for longer periods. On the other hand if we consider that there are not scavengers present then the carcasses may remain on the ground for extended periods which can result in accumulation of decomposing organic matter, unpleasant odours, proliferation of insects, contamination of soil and water and increased exposure of other animals to pathogens. Now if we consider the same situation in an ecosystem with a healthy vulture population. Vultures will rapidly consume much of the carcass. The remaining material is considerably reduced and is subsequently processed by other organisms. Research in Kenya found that, in the absence of vultures, carcass decomposition rates changed substantially and mammalian scavengers spent more time around



carcasses. In addition, if livestock carcasses cannot be naturally consumed by vultures, people may have to collect and transport them to rendering, composting, burial or other disposal facilities. These activities require fuel and energy and can themselves generate greenhouse-gas emissions. A study in Spain estimated that replacing natural scavenging with carcass collection and transportation generated about 77,344 tonnes of CO₂-equivalent emissions per year from transportation alone. By raising awareness of vulture's ability to eliminate harmful toxins from the environment and prevent the spread of dangerous diseases in humans, conservationists can hope to boost the recovery of these critical species.

A global climate service

A global study estimated that present-day vulture populations may help avoid approximately 3.03–60.70 million tonnes of CO₂-equivalent emissions per year, depending on how carcasses would otherwise be managed. The researchers also estimated that declines in vulture populations have reduced their greenhouse-gas mitigation capacity by about 30%. These figures demonstrate that protecting vultures is not only about saving a threatened group of birds. Without vultures carcasses decomposing will occur at a slower rate, which can cause a series of problematic issues, including both increased greenhouse gas emissions and diseases.

Why vultures matter in India

India provides a particularly important example. Vulture populations declined dramatically, especially following the widespread use of the veterinary drug diclofenac, which was highly toxic to several vulture species. The resulting loss of vultures reduced their ability to naturally remove animal carcasses. Research has estimated that India's historical decline in vultures resulted in a major loss of their potential contribution to greenhouse-gas mitigation. Due to the absence of vultures, rotting carcasses in India were often buried, dumped at landfill sites, or thrown in the river, where they caused contamination of the water and resulted in odour pollution. India banned the drug for veterinary use in 2008 but a recent study found that it was still widely available and continued to pose a high risk to vultures. Therefore, conserving vultures is not simply about protecting a bird species but also to public health, livestock management, waste disposal and climate-change mitigation.

Role of Veterinarian in Vulture conservation

Judicious use of Veterinary medicines: Medicines used in by veterinarians in livestock must be selected and administered responsibly, with attention to their safety for both target animals and the wider ecosystem. They should be aware of drugs known to pose risks to scavenging birds and should follow current national veterinary guidelines and regulatory recommendations.



Adoption of methods for Proper carcass disposal: Where vulture populations are present, carcass-management practices should consider wildlife safety. Carcasses of animals treated with veterinary medicines should be managed according to appropriate veterinary and wildlife-health guidelines rather than indiscriminately left for scavengers.

Conducting Awareness Programmes for Livestock farmers: Farmers can be sensitized about the ecological importance of vultures, safe carcass-disposal practices, identification of vulture species and the importance of protecting nesting and feeding habitats

Conclusion

Vultures may not plant trees or capture carbon dioxide directly, but they perform a valuable climate-related function that is easy to overlook. By rapidly consuming dead animals, they reduce the amount of carcass material available for prolonged decomposition and can reduce emissions associated with alternative carcass-disposal systems. Thus, the vulture should not be viewed simply as a bird that feeds on dead animals. It is a natural recycler, sanitation worker and ecosystem engineer. Therefore, to preserve healthy vulture populations on all the places where they occur will be a key environmental strategy, producing several benefits for humans and the ecosystem because protecting vulture populations can help maintain healthier ecosystems while also supporting efforts to reduce greenhouse-gas emissions.

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