

Deforestation Is Causing a Great Loss in Avian Diversity in Pakistan

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Abstract: Deforestation represents one of the biggest problems in land use globally. The rapid deforestation of the world has threatened the survival of about 70% of the bird species. Deforestation harms bird population. In this study we've take a closer look at the effects of deforestation on birds. Habitat loss is one of the main environment reasons for the decline in bird diversity locally, regionally and globally. Deforestation has disrupted the ecosystem, with bird fleeing to find new places to feed and reproduce. Lack of felling of plants and trees increases the level of pollution, which poses a threat to birds and other living things. Birds have to adapt to new conditions to survive in the urban environment, otherwise they be forced to migrate. The diversity of avifauna is mainly due to the unavailability of housing and scarcity of food in tropical cold regions. It has been observed that year-round availability of food resources in winter areas has a profound effect on the number of migratory birds. Habitat destruction and human intervention have reduced bird diversity. Excessive exploitation, hunting and development work are some of the major threats to declining bird population. Birds carry many of the same diseases that human do, and they can transmit infectious agents to human and other animals. Infectious diseases are thought to have wiped out avifauna, and many are now endangered, especially the native island species. While it is clear that habitat degradation is a direct threat to many species of birds, it is unclear how these changes could affect disease transmission and susceptibility. Birds can be affected by migration and scattered habitat degradation, populations are exposed to new infection.

Keywords: Deforestation, Avian Fauna, Habitat Loss, Urbanization, Outbreaks, Food Deficiency

1. Introduction

Deforestation is the clearing or thinning of forests by humans. Deforestation represents one of the largest issues in global land use. Estimates of deforestation traditionally based on the area of forest cleared for human use, including the removal of the trees for wood products and croplands, and grazing lands. In the practice of clear-cutting, all the trees are removed from the land, which destroys the forest. In some cases, however, even partial logging and accidental fires thin out the trees enough to change the forest structure dramatically. 2.5% or about 1,902,000 hectares area of Pakistan is consist on forest [12].

Pakistan lost an average of 41,100 ha of land every year between 1990 and 2000. This equates to a 1.63 percent annual rate of deforestation. The annualized average of the

forest led by 24.4 percent between 2000 and 2005, to 2.02 percent. Pakistan lost 24.7 percent of its forest area, or roughly 625,000 hectares, between 1990 and 2005. Pakistan lost 14.7 percent of its forest and woodland habitat between 1990 and 2005, as measured by the entire rate of habitat conversion (defined as the change in forest area and change in the woodland area minus net plantation expansion) [2].

According to the World Conservation Monitoring Group, Pakistan contains 1027 identified species of amphibians, birds, mammals, and reptiles. 3.5% species are native, and 5.5 percent are endangered. Pakistan has at least 4950 vascular plant species, with 7.5 percent of them being indigenous. IUCN classifications I-V preserve 4% of Pakistan's land area. The rapid disappearance of the world's forests has put the existence of nearly 70% of all bird species

in danger. Birds call these forests their home, but Deforestation has deprived them of their natural habitat and destroyed their food source. Consequently, Deforestation has led to the extinction of vast numbers of bird species [40].

Deforestation is the elimination of canopy, trees, and vegetation on a massive scale, resulting in the entire migration of bird species or loss of habitat. Birds can find both refuge and food in these locations. Most birds like to rest and cool down in trees, especially when the humidity is low. Because of the abundance of shelter given by the dense vegetation, the area would be home to a variety of different species that serve as a source of food for birds, reducing the need for them to fly vast distances in looking for food [16].

Deforestation has several negative consequences for birds. First, it deprives them of their natural food system, causing an ecological imbalance. Second, it creates competition and exploitation for other species by leaving an empty niche. Deforestation hurts the population of birds. We shall look at the impacts of deforestation on birds in-depth in this post. The loss of food supplies is another harmful effect of deforestation on birds. Birds rely on trees for food to thrive. Distinct species hold different positions in the food chain, yet forest devastation disturbs the entire food chain. As a result, birds are left without anything to eat leading to extinction [31]. Reduced tree cover also exposes birds to other predators. Animals that hunt birds could catch them or access their nests if there wasn't enough tree cover.

Deforestation has thrown the ecosystem into disarray, leaving birds scrambling to find new places to feed and reproduce. Deforestation, on the other hand, hurts birds. It jeopardizes the ability of birds to communicate. It has a significant impact on bird behavior, and the loss of trees has altered their communication pattern [14].

According to a previous study, widespread forest degradation limits the range size of many animals and can lead to local extinctions. Low-income people are naturally reliant on forest resources, yet there are times when resource development rates outpace recovery. Because it alters or eliminates entire ecosystems and habitats, deforestation is one of the most dramatic land uses influencing migrating birds [38]. The influence of land usage on tropical forests is evident from a bird's eye view because of the high number of migrating birds that fly to and from tropical regions per year, vast sections of forest have been cleared. After birds have flown for weeks and thousands of kilometers across continents, their previous year's rainforest destinations may be degraded, badly injured, or even disappear [33].

There will also be a constant supply of plant matter for specific birds to feed on, resulting in a diverse population of bird species that live in this area. Birds' food source would be reduced if forests were cut down, and birds would have no place to call home. There will be an ecological imbalance. Birds will have to seek out new habitats to meet their daily nutrient needs. This could be an issue because there is no guarantee that the niche will be unoccupied when birds arrive [35].

Other animals may reside there, therefore food must be shared and privacy may be invaded. Some birds can handle these conditions while others cannot, so the ones who can adapt to this environment will thrive (survival of the fittest), while the others will continue to roam if they cannot find a suitable location, and their numbers will gradually decline, eventually leading to extinction due to a lack of food [26].

If too many species share the same environment, competition will result in the extinction of some species, and the habitat will be overused in a short time. Trees would be cut down, leaving the topsoil susceptible to leaching and erosion, as well as devoid of any meaningful life. This means that birds who serve as pollinators will no longer be able to do so, leaving the area desolate. Re-growth may take a long time. Various species would build microhabitats in well-established habitats in which to continue their functions such as mating and reproduction [4].

Birds cannot lay eggs if they do not have a place to call home, and their population will suffer as a result. They are also much more vulnerable to predators because they would have fewer hiding areas, increasing their chances of becoming endangered. Birds in this scenario would have no social life because they would have to continue to travel and acclimate to new species, even if it was a benefit for their maintenance in the past. The habitat will also become inappropriate for mating because there will be no acceptable location for wooing due to a scarcity of fundamental resources [27].

In terms of nesting, there'll be insufficient materials to build a comfortable nest in which the young can live. They will be more vulnerable to predators when their mother goes in search of food to feed them because they will be unable to flee or defend themselves by flying high in trees. After all, there will be none, and they will not be good enough to give a warning call or produce a sound that will scare predators away, so they will be feasted upon. Since they have lost all of their dwelling and eating area, there will be no territories to designate. As a result of tampering with nature and influencing life forms in forested areas, the land becomes dry and desolate over time [24].

Land becomes unusable because it is no longer productive. It can be advantageous in some circumstances of natural deforestation. It removes the vegetation cover, but it also rejuvenates the forest by introducing other nutrients that can help the area become more hospitable to a new set of species. It provides ecosystem variability over some time. Artificial deforestation alters the ecosystem's balance and the lifestyle of birds. It depletes the soil and encroaches on animals. It weakens a forest's ability to withstand exploiting of its resources and predation [7].

Hunting and habitat damage are threatening several species of galliform birds that distribute seeds in Central Amazonia. The protection of these birds is currently necessary due to deforestation. If they aren't in their normal habitat, they have a hard time reproducing. In a regrown forest, they have a good chance of surviving [34].

There are a large number of vulnerable bird species in

Southeast Asia. This is owing to widespread deforestation, which was supposed to help the countries develop. Only endemic birds, he believed, would be threatened with extinction. According to the data he gathered, there was a fluctuation between a growth and a decline in the number of species. He concluded that deforestation has an impact on species with limited ranges, as well as bird species that are on the verge of extinction, which is quite similar to those labeled as threatened [13].

A survey of comparable bird species in Australia found that these birds adapted effectively to alterations in a few spots in their occupied forested area. They were able to live comfortably without having to make any lifestyle modifications. Because these birds are little and can travel large distances, they may easily adapt [39].

2. Habitat Loss

Winter visits and passage migrants in Pakistan include the swans, ducks, flamingo and Siberian cranes. The removal and deterioration of vegetated wetland habitats have reduced the number of these birds. Humans exploit wetlands and other migratory bird habitats at Mangla Dam, which are largely used for irrigation and agricultural purposes [36]. Yellow-eyed pigeon, Indian spotted eagle, black-tailed Godwit and black-bellied Tern are among the rare bird species whose populations are dwindling. The lack of habitat and anthropogenic effect on the Mangla wetland are linked to their demise [5].

During the years 2000-2001, 59 bird species were documented along both sides of the rivers Neelum and Jhelum in Muzaffarabad, with 10 of them being uncommon. Anthropogenic activities like as habitat disturbance, shrub removal or fragmentation, and livestock grazing are the leading causes of bird population and species decline [6].

From 2005 to 2007, surveys were done to assess the avifauna of Hingol National Park. 204 species were seen, of which 72 were winter visits, 15 were passage migrants, 16 were summer breeding visitors, 6 were summer visitors, 4 were year-round visitors, and 3 were vagrants. The population has decreased as a result of disturbance, deforestation, habitat degradation, and human population pressure. Because most birds are vulnerable to these changes, urbanization and deforestation are the main causes of the reduction in bird populations, both in terms of abundance and variety [18].

A total of 52 bird species were identified throughout the winter, with 11 (21.1 percent) of them being winter migratory species and 4 (7.6 percent) being summer breeders [29]. When a habitat is destroyed, the carrying capacity of native birds and other species is reduced, and populations dwindle, sometimes to extinction. Habitat loss is the biggest hazard to species and biodiversity. According to Temple (1986), 82 percent of endangered bird species are threatened by habitat destruction. Endemic bird species with limited ranges suffer the most from habitat loss because they are found nowhere else in the world and hence have a poorer chance of recovery.

Many endemic bird species have extremely specialized survival needs that can only be met inside a unique habitat, leading to extinction [25].

Extinction debt occurs when a species becomes extinct several years after habitat destruction. Habitat destruction can also limit the distribution of some organism populations [21].

Habitat loss is one of the primary environmental causes of decreased bird diversity on a local, regional, and global scale. Many individuals feel habitat fragmentation is a hazard to biodiversity, while others consider habitat loss the main concern. Specialized landscapes form as the number of viable habitats declines, consisting of isolated pockets of acceptable habitat spread across a hostile environment/matrix. This happens mostly as a result of habitat loss and fragmentation [17].

Pure habitat loss refers to changes in the composition of the landscape that result in fewer individuals. The phrase "fragmentation effects" refers to the accumulation of negative consequences caused by habitat changes. The dynamics of species richness can be harmed by habitat loss [20].

The impact of habitat fragmentation on animal populations is enormous. Because it deprives animals of their natural habitat. The species is isolated, the amount of territory they may occupy is reduced, and new biological limits are established. In certain studies, changes in abiotic and biotic traits have been shown to have a greater influence on ecology than habitat loss. They concluded that packing a species into a tiny space leads to extinction [32].

Degradation and fragmentation of natural habitats are presently the leading drivers of species extinction. This is the case because habitat loss and fragmentation result in considerably smaller populations. Population size reductions raise the risk of extinction [32].

3. Predators Affect the Population of the Prey

The loss of habitat is not always the primary cause of extinction; other variables can play a role in the extinction of species. If an ecosystem's only predator became extinct, prey populations would grow, perhaps leading to overpopulation. Any species with a larger population may consume too many resources. Because many species rely on limited natural resources, their environment will ultimately be depleted, and they will die extinct [37].

Alien predators are widely considered more harmful to prey populations than native predators [30].

4. Urbanization

The variation of rural fields to metropolitan regions is a critical hindrance and wellspring of natural surroundings debasement for bird species. Pollution levels rise because of a lack of flora and tree chopping, posing a hazard to birds and other living things. Birds must adapt to new conditions to survive in urban settings, or they will be forced to migrate.

With the construction of highways and buildings, the expansion of the metropolitan area has resulted in patchy regions that function as barriers between appropriate habitats, even for highflying animals. The environment design of bird fauna has essentially changed on account of these reestablished conditions. Numerous species are helpless, jeopardized, or have low populace thickness thus this significant biodiversity is lost in the encompassing locales [9].

5. Hunting

Local populations are diminishing as a result of heavy hunting and capture for eating and sport in Pakistan but the species' overall condition is considered stable. Non-domesticated birds have always formed a significant part of human meals. Predation has reduced migratory bird numbers. The population of many bird species like Indian skimmer, cheer pheasant a winter visitor to Pakistan, has declined due to over hunting. Similarly, the Siberian crane is a year-round migratory visitor to Pakistan who faces a high danger of being killed and habitat damage, mostly due to drainage and agriculture in their foraging and nesting areas [1].

The painted stork is a popular winter visitor in Pakistan, but its number is declining owing to overhunting. Many migratory species, such as geese, coots, and ducks, are also threatened by illegal hunting. The bar-headed geese are severely hunted [28].

During the winter season, a large number of migrating birds flock to the Mangla Dam and are heavily hunted (waterfowl population). It was found a significant decrease in migratory bird populations in the Uchalli Wetland Complex each year. Overhunting and trapping have drastically reduced animals in the AJK. The avifauna of the Taunsa Barrage wetland includes 110 species, 34 of which come solely in the winter and two in the summer. 109 bird species have been recorded in Jiwani Coastal Wetland, with 77 of them being migratory [23].

Due to habitat devastation and illicit poaching, many animals are in grave danger of extinction. Around 347 bird species have been recorded in Mangla and its environs (Roberts, 1991). 153 (breeding), 115 (wintering), 15 (summer), 39 (passage), and 14 (occasional) species were found among the 336 species. It is an important breeding and wintering location for Shorebirds, Anatidae, and Piscivorous birds. It was found a similar reduction in 141 bird species at Mangla Dam, highlighting the concern of avifauna loss [3].

Overgrazing and fires have reduced grasses and exploited wood supplies that serve as a habitat for migrating birds in the forest sections around the Mangla dam, according to the report. Because of habitat degradation, migratory bird numbers have declined significantly. At Rasool Barrage, Jhelum, a ten-year survey was done to assess the avifauna. Waterfowl populations were declining as a result of habitat deterioration, netting, fishing, cattle grazing, and illicit hunting. Low water levels and unlawful hunting were the major causes of the drop [8].

6. Food Deficiency

The diversity and dynamics of migratory birds are highly influenced by the availability of food as an essential aspect. According to studies, the biomass of insects—the major source of food for the majority of tropical countries' winter migrant birds—decreased in the late winter dry season. The lack of habitat in the tropical wintering zones and the scarcity of food contribute most to the decline in avifauna diversity. The quantity of migrating birds has been seen to be strongly influenced by the year-round availability of food supplies in the wintering zones [11].

7. Human Activity

Important indicators of a sustainable ecology and habitat include birds. Bird diversity has been decreasing due to habitat degradation and human interference. The greatest dangers to the diminishing trend of birds include overexploitation, hunting, and construction projects. The water features of District Sanghar, Sindh, Pakistan are related to the variety of birds there [22]. 14 bird species were classified as being in danger of extinction out of the 204 bird species that were recorded in Hingol National Park between 2005 and 2007. Anthropogenic activities like development and population pressure are the main risks to these birds. In order to stop illicit trade and cruel hunting, WWF-Pakistan claims that it is imperative to raise awareness among all interested parties, including the community, government agencies, NGOs, academic institutions, and students. The loss of wetlands and the deterioration of bird habitats are two anthropogenic activities that might hinder bird migration [18].

8. Outbreaks or Other Diseases

There are many outbreaks caused by viruses and responsible for many deaths of human beings and wildlife including avian fauna. Outbreaks like EBOV, SARS, SARS-CoV-2, rabies etc. [15] rabies is zoonotic disease which is spread by animals mostly carnivores, and it can affect birds. Most often birds succumb due to shock or complication of animal bite injury and may not survive until the development of clinical signs of rabies infection [10].

Birds carry many of the same illnesses that people do, and they can also convey infectious agents to humans and other animals. Infectious illnesses are assumed to have wiped off avifauna, and many are now endangered, particularly indigenous island species. Although it is obvious that habitat degradation poses a direct danger to many bird species, it is unclear how these changes may influence disease transmission and susceptibility. Bird migration and dispersal can be affected by habitat deterioration, exposing populations to new infections [31].

The epidemic of COVID-19 has caused unprecedented changes across the world. The city-wide lockdown has an influence on "hedgehog" mortality. When comparing fatality

rates before and after the pandemic, it was discovered that "hedgehog" road mortality levels were more than 50% lower during the lockdown period. More research on the genetic and demographic effects of this once-in-a-lifetime encounter is required. According to observations, even short-term traffic reductions or road closures might be used as part of a plan for endangered animal population protection when highway is a concern [19].

9. Conclusion

It has been determined that deforestation causes bird populations to drop directly, owing to habitat degradation. The habitat of a bird is its home, and deforestation deprives them of it. Many birds are unable to procreate when they are deprived of their natural habitat, resulting in population decrease. Tropical deforestation is a major problem. The quality of data on deforestation rates has increased, but it is still weak, causing controversy and dispute. Deforestation is caused by a variety of variables, the most important of which are socioeconomic issues and trade. Deforestation is a major problem in today's society. Despite the fact that overall deforestation rates have decreased marginally in recent years, we continue to lose about 3 million ha of forest area each year.

10. Recommendations

- 1) Plant a more trees everywhere you can.
- 2) Use less paper at home and office.
- 3) Purchase recycled merchandises and then reutilize them again.
- 4) Acquisition qualified wood products.
- 5) Funding the yields of corporations that are loyal to decreasing deforestation.
- 6) Promote awareness in your group and in your community.

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