

Insistent need for Avian Fauna Conservation for Ecological and Societal well being: An Examination of perplexities of threats for avifauna and their Challenges for Society

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ABSTRACT

Each organism on this planet has a unique and key place in the food chain that avails to contribute the ecosystems in its own special way. Habitat loss is causing the greatest threat to various bird species. The forests, grasslands and other habitats perpetuate to vanish as they are unsustainably harvested for unending human consumption needs. As Wild life habitat, a well known nonprofit organization of Canada states "Without habitat, there is no wild life, it's that simple." And without wildlife there is no healthy functioning of ecosystem services upon which humans depend upon. The three main types of habitat loss are habitat destruction, habitat degradation, and habitat fragmentation. Examples for anthropogenic causes include deforestation, harvesting fossil fuels, dredging rivers, bottom trawling, urbanization, filling in wetlands and mowing fields. Birds are an intricate component of ecosystems which we require for our own survival. If no stringent steps are taken to preserve their habitats, it would not be too far, when birds will find a place only on the list of extinct species. And that would not be the end; the extinction of bird species will certainly have a fatal impact on existence of human race as well. So for us as humans, it becomes a great responsibility to preserve their habitat, and most significantly our own species.

Key words: Extinction, Ecosystem services, Habitat destruction, Endangerment, Exotic species.

Received 24.02.2019

Revised 08.03.2019

Accepted 30.04.2019

CITATION OF THIS ARTICLE

Shashi Sharma .Insistent need for Avian Fauna Conservation for Ecological and Societal well being: An Examination of perplexities of threats for avifauna and their Challenges for Society .Int. Arch. App. Sci. Technol; Vol 10 [2] June 2019: 129-133

INTRODUCTION

Species extinction has been a natural process since the beginning of life on the planet. Extinction in past has occurred due to catastrophic events, climate change, asteroid attack, diseases and competition in wild among the animals. This process of extinction and endangerment can take place naturally as an evolutionary process. Since the domination of Human species there has been a dramatic increase in rate of extinction and endangerment. Humans usually operate in endangerment of species in three diverse ways: habitat destruction, commercial exploitation of animals and forests, and the introduction of species from one part of the world to another.

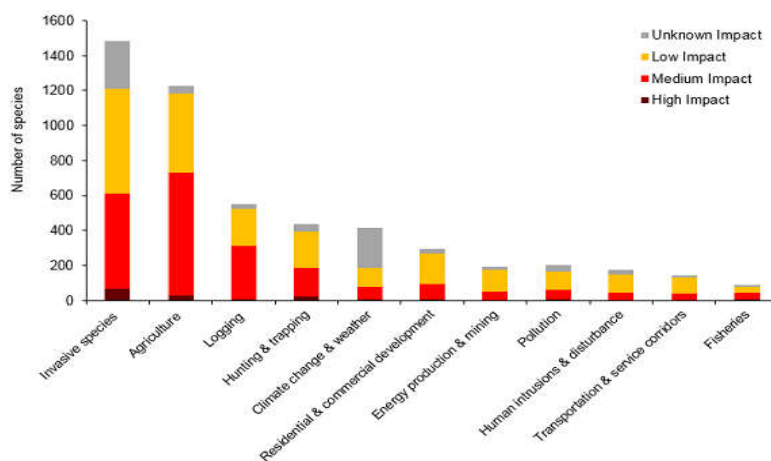
The impact of habitat destruction upon different vertebrate species had widely been studied, however its specific impact upon avian fauna and consequently upon the ecosystem functioning and services has still less been explored. The present paper examines the impact of decline of avian fauna upon ecosystem functioning, human survival

and society, with special relevance to Indian subcontinent. The present work also explores the pivotal roles of birds on efficient ecosystem functioning and maintenance of biodiversity.

CAUSES FOR ENDANGERMENT OF BIRDS

As per data provided by BirdLife’s World Bird Database (2016) the following chart shows the relative contribution of major causes of bird’s extinction. The graph depicts amplitude of relative risk on total number of threatened avian species. It shows spread of agriculture negatively impacts maximum number (77%) of threatened species, while invasive species affect 32% of total number threatened species of birds.

Fig 1. Causes of Bird Extinction (BirdLife’s World Bird Database, 2016)
Main threats to globally threatened birds worldwide



The following table summarizes main vulnerable and endangered bird species of Indian subcontinent, their habitat and main causes of their decline. It’s quite apparent that exotic species, hunting and habitat loss are the principal causes of endangerment of various birds’ species.

TABLE 1. EXAMPLES OF SOME RARE, VULNERABLE AND CRITICALLY ENDANGERED SPECIES OF BIRDS OF INDIAN SUBCONTINENT

S.N.	Bird species	Zoological Name	Habitat	Causes of decline
1	Red Headed Vulture or King vulture	<i>Sarcogyps calvus</i>	Indian subcontinent	Extensive use of diclofenac in veterinary use
2	Forest Owlet	<i>Athene blewitti</i>	MP and Chhattisgarh, Melghat Tiger Reserve, Taloda forest range	Habitat destruction
3	Spoon Billed Sandpiper	<i>Calidris pygmaea</i>	Delta of Sundarbans	Habitat destruction
4	Jerdon’s Courser	<i>Rhinoptilus bitorquatus</i>	Andhra Pradesh, Godavari river valley, Sri Lankamalleshwara sanctuary, Eastern Ghat forest range	Habitat destruction
5	Bengal florican	<i>Houbaropsis bengalensis</i>	Indian subcontinent	Poaching
6	White Bellied Heron	<i>Ardea insignis</i>	Great Himalayas and Eastern Himalayas	Habitat destruction and Poaching
7	Siberian crane	<i>Crus leucogeranus</i>	Migratory	Hunting along migration rout
8	Himalayan Quail	<i>Ophrysia superciliosa</i>	Western Himalayas of Uttarakhand and North West region	Habitat destruction
9	Sociable Lapwing	<i>Vanellus gregarius</i>	North West region of India	Habitat destruction
10	Great Indian bustard	<i>Ardeotis nigriceps</i>	Rajasthan, Gujarat and Maharashtra	Hunting, Habitat loss due to increased agriculture due to Indira Gandhi canal
11	Jungle babbler	<i>Turdoides striatus</i>	Indian subcontinent	Habitat destruction

1) Introduction of Exotic species

Species competition is major factor for determining the community organization of any habitat. Species that are very competitive and usually out-compete other native species are usually cause major shift of community organization. Exotic species are biological species which are not natural inhabitants of any habitat but they once introduced, they out-compete other natural inhabitants of that habitat. For example water hyacinth plant (*Eichhornia crassipes*) is a major problem in ecosystems of wetlands and lakes. The growth of lantana around is one factor responsible for the disappearance of the Himalayan quail (*Ophrysia superciliosa*) in Uttarakhand. Similarly, rock pigeon (*Columba livia*) introduced from Europe as gaming bird but it became invasive for various native birds. On similar grounds, house sparrow (*Passer domesticus*) out-compete for nesting site, which was introduced species from Europe.

2) Habitat destruction and fragmentation

Habitat is the place where any organism lives and perpetuates. Habitat provides necessary logistics for species survival. If habitat is lost then only a least possibility remains for any species survival. Hunting and habitat loss have been well studied causes of decline in avian populations [1]. Needless to say that the loss of forests, grasslands, plains and other natural systems are main anthropogenic causes of habitat loss [2]. Due to ever increasing human population, forest ecosystems are being rapidly turning into agriculture farms, leaving no breeding grounds for birds [3]. Recently, Ornithologists and environmentalist have raised serious concerns about conservation and reclamation Uran wetlands of Navi Mumbai, which is home ground of many endemic bird species.

3) Industrial Projects and Urbanization

Urbanization and Industrial projects are too directly vanishing and perturbing the natural habitats of birds [4]. Unfortunately, big industrial projects are less considerate about their impact on avian life. Urbanization and mining activities tragically vanish swamps and wetlands. Habitats are also being largely fragmented [5] or remain too small by the construction of roads or other such barriers that cause populations in these fragmented islands to become vulnerable to localized extinction.

Critically endangered birds like Great Indian Bustards (*Ardeotis nigriceps*) are regularly being killed by hitting windmills and high tension electric cables. In similar lines, Kharmore or lesser florican (*Sypheotides indicus*), which is endemic to Indian subcontinent, is under great threat due to degradation of grasslands because of rampant mining. As per concerns raised by national newspapers, in Ajmer (Rajasthan), lesser florican population in the Sonkhaliya grasslands of Ajmer is drastically declining.

4) Superstitious Practices and Cultural stigmas

Recently, superstitious practices like black magic are too posing a great threat to some of the bird species. Surprisingly, a recent article published in *Times of India*, clarifies that the a large number of Indian eagle owls (*Bubo bengalensis*) is now being smuggled for black magic practices even contesting in political rivalry. Notably, this owl species is endemic to the Indian subcontinent, therefore prone to vulnerability. Most species of owls are protected under schedule I of Red list of IUCN. The study is suggestive of killing of over 80,000 owls per year for black magic practices.

5) Environmental Pollution and Chemical contaminants

According to a study conducted by Salim Ali Centre for Ornithology and Natural History (SACON), Coimbatore, clarifies that fish in wetlands had high residues of heavy metals and pesticides, some at levels far above those prescribed by WHO. Another study of BNHS found that the habitat of Indian skimmer (*Rynchops albicollis*), which was once very common in the rivers systems of northern India, has become hazardous because of chemical contamination in rivers. It is categorized as vulnerable species in IUCN Red List.

PROTECTION OF BIRDS: ECOLOGICAL, CULTURAL AND ECONOMIC RATIONALIZATIONS

1) Ecological Rationalization

Birds and humans have been interconnected for inception of Humans. Birds provide essential services for human civilization. They serve disease management; pest control [6] to facilitate other ecosystem services as well, and therefore promote biodiversity. Pollination [7] and seed dispersal [8], for example, are imperative steps in plant reproductive cycles [9].

Birds furnish pivotal pollination or seed dispersal services [10], to many plant species. Such plants cannot reproduce without such vital role played by birds. Disturbing the avian community may ultimately leads to changes in plant community composition and biodiversity [11]. Loss in biodiversity directly affects human survival and well being.

Table 2 (source with courtesy PNAS December 28, 2004 vol. 101 no. 52, in the article Ecosystem consequences of bird declines authored by Paul R. Ehrlich and associates) well summarizes the ecological roles and services by different avian functional groups.

TABLE 2: ECOLOGICAL ROLES AND SERVICES BY DIFFERENT AVAIL FUNCTIONAL GROUPS

Functional Group	Ecological process	Ecosystem service and economic benefits	Negative consequences of loss of group
Frugivores	Seed dispersal	Removal of seeds from parent tree; escape from seed predators; improved germination; increased economical yield; increased gene flow; recolonization and restoration of disturbed ecosystems	Disruption of dispersal mutualisms; reduced seed removal; clumping of seeds under parent tree; increased seed predation; reduced recruitment; reduced gene flow and germination; reduction or extinction of dependent species
Nectarivores	Pollination	Outbreeding of dependent and or economically important species	Pollinator limitation; inbreeding and reduced fruit yield; evolutionary consequences; extinction
Scavengers	Consumption of carrion	Removal of carcasses; leading other scavengers to carcasses; nutrient recycling; sanitation	Slower decomposition; increases in carcasses; increases in undesirable species; disease outbreaks; changes in cultural practices
Insectivores	Predation on invertebrates	Control of insect populations; reduced plant damage; alternative to pesticides	Loss of natural pest control; pest outbreaks; crop losses; trophic cascades
Piscivores	Predation on fishes and invertebrates and production of guano	Controlling unwanted species; nutrient deposition around rookeries; soil formation in polar environments; indicators of fish stocks; environmental monitors	Loss of guano and associated nutrients; impoverishment of associated communities; loss of socioeconomic resources and environmental monitors; trophic cascades
Raptors	Predation on vertebrates	Regulation of rodent populations; secondary dispersal	Rodent pest outbreaks; trophic cascades; indirect effects
All species	Miscellaneous	Environmental monitoring; indirect effects; Bird watching tourism; reduction of agricultural residue; cultural and economic uses	Losses of socioeconomic resources and environmental monitors; unpredictable consequences

2) Cultural and Economic Rationalization

Birds have been intricate components of human art and culture. They cause spiritual enrichment and cognitive enhancement [12]. Some of them are of religiously designated to be significant and others are decorative and thus contribute to aesthetics.

Apart from this, Bird watching or birding is most recreational outdoor hobby for wild life lovers and tourists [13]. In the USA in 2001, 45 million bird watchers spent around billions of dollars generating \$85 billion in overall economic impact, and supporting over 860,000 jobs. Since India contains a varied range of climates, is now emerging as bird watching and ecotourism paradise. India hosts more than 1250 avian species. Birding has immense potential to contribute in wild life tourism and participatory conservation programs for spreading awareness among general public.

CONCLUSION

Birds are being only aerial vertebrates and having unique ecosystem services, is intricate part of ecology of the planet. Their functions cannot be substituted or replaced. Being

highly mobile, their activities affect interconnecting the different ecosystems. Because most birds fly, they can respond to irruptive or pulsed resources in ways generally not possible for other vertebrates. They not only offer behavioral services to the maintenance of ecosystems but also contribute to nutrient cycling through their scavenging and guano producing functions. They feed human interest and add beauty to the Nature. Their need for survival should be strategically handled and addressed.

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