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## Biodiversity and conservation of two important wetlands of River Satluj with special reference to avifauna

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### Abstract

The primary aim of this study was to find the avian diversity along river Satluj. This study period ranges from 2015-2017 about 180 kilometer long stretch of Satluj River. The study was conducted at two barrages of river namely Islam Barrage (District Bahawalpur) and Panjnad Barrage (District Muzaffargarh). Surveys were done during dawn (5:00 am to 7:00 am) and dusk (17:00 pm - 19:00 pm) hours and it can be said that River Satluj, supports a good number of bird species whether migratory or resident. Total avian species recorded from were 146 and 152 from SA 1 and SA 2 respectively. The five most dominant species were *Egretta garzeta*, *Passer domesticus*, *Bubulcus ibis*, *Corvus splendens*, *Aythya ferina*. In the future, proper management plans and strategies in the study area will not only increase the number of resident avian species but will also enhance the migratory and vagrant bird species. This report is first in its kind on the avifauna of this study area.

**Keywords:** Wetlands, Avifauna, Freshwater Ecosystem, Conservation

### 1. Introduction

Pakistan's arid climate encompasses nearly 780,000 ha wetlands area. These wetlands retain the 9.7 % of the overall land with 74% freshwater and 26% of coastal wetlands respectively [8]. In Pakistan, total 225 wetlands have endemic significance. Out of these only 9 wetlands are being considered for international importance [4, 8]. It is considered any land covered by water termed as wetland. They have key role in any ecosystem [6]. These wetlands in any country support large number of fauna though resident or migrant. Therefore these are considered as the transitional zones of two ecosystems (Aquatic and Terrestrial) and hence retaining the vital importance for the organism [8].

These wetlands resources are the richest among all the environments of the global ecosystems. They serve as the base of the any species diversity. It is due to abundant availability of water and other related products which are the necessity and have importance regarding survival for any species whether plant or animal [4]. They maintains the ecological balance besides having the store houses of plant genetic stuff. Wetlands play a vital role in layman by socio-economically.

Estimates show that there are 9042 species of the birds have been described internationally, while 2700 birds species from the Asian regions have been documented so far [7, 17]. According to Mirza [14] 668 avian species are present in the territorial jurisdiction of Pakistan. These avian species are facing the various threats posed by different anthropogenic activities. The activities which seriously altering the species natural habitat are illegal hunting, destruction of land and overgrazing [4, 18].

Another phenomenon which affects the species habitat destruction is eutrophication as it increased the sedimentation while depleting the oxygen directly or indirectly. *Sterna acuticauda* is an endemic wetland bird of Pakistan but its population is decreasing gradual due to destruction of its natural habitat [4]. Being ecologically fragile, these wetlands are facing serious threats of human activities [13]. The conservation of species diversity is thought one of the hottest issues of today [10]. The areas of Wildlife sanctuaries, biodiversity reserves and national parks are gaining the importance critically as they play role ecologically while supporting the biodiversity [9].

Pakistan is present at the western edge of South Asia. The flora and fauna of this country have the kind of both Palaearctic and Indo-Malayan characteristics.

As for its climate is concerned, Pakistan is mainly arid and semi-arid land [15]. As natural habitats have been degraded for thousands of years, but the process has been speeded up in the previous few years due to fast development actions and population growth [1].

## 2. Materials and methods

### 2.1 Methodology

The selected study area was surveyed from June 2015 to May 2017 extensively with 1 to 2 visits per month regularly. The diversity of the bird species were estimated through linear count survey method by using direct and indirect observation methods. Most of the field trips were during day time. Different field guides were used to correct identification of avian species [12, 14, 15-16].

Indirect method of data collection was also applied through informal discussions with the local community and other related persons. Relative abundance of five most dominant species was calculated by dividing the species number (n) to the sum of (N) species.

### 2.2 Study Area

#### Site 1

Islam Headworks is present over the river Satluj and was built in 1920-1930. The barrage was made by the Bahawalpur princely state with the help of British Government. It is present in near city of Hasilpur (Bahawalpur District). This wetland attracts the large wintering avian diversity.

#### Site 2

Panjand Headworks, a large water reservoir situated near the city of Alipur, District Muzaffargarh. It was also built in the Indus Valley Project of British Government and Nawab of Bahawalpur in 1920-1930. River Satluj merges in the River Chinab here slightly before the upstream.

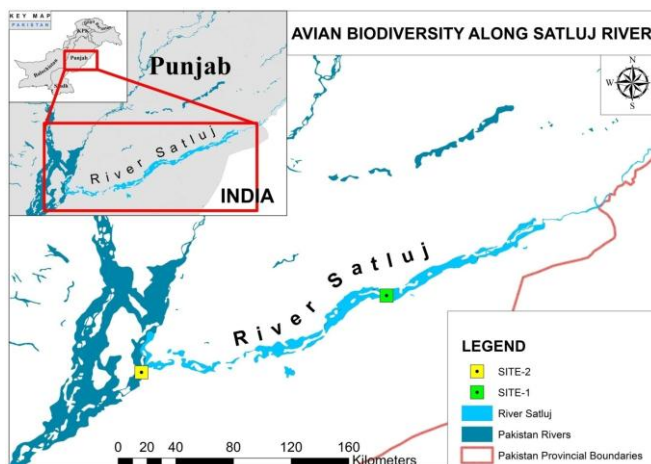


Fig 1: Avian Biodiversity along river Satluj

## 3. Results

In the present study, avian species' relative abundance was also noted (Table 1) which shows about dominant avian species in the two study areas. This RA of avian species could be considered to the availability of diet, habitat type and breeding activity of the species.

Total avian species recorded from were 146 and 152 from SA 1 and SA 2 respectively. The five most dominant species were *Egretta garzeta*, *Passer domesticus*, *Bubulcus ibis*, *Corvus splendens*, *Aythya ferina*. Their relative abundance were as 0.276, 0.212, 0.219, 0.156, 0.136 site area 1 while for second site 0.264, 0.235, 0.190, 0.165, 0.145.

Table 1: Relative Abundance of Five Dominant Species at both Study Areas

| Common Name    | Scientific Name          | RA SA 1 | RA SA 2 |
|----------------|--------------------------|---------|---------|
| Little Egret   | <i>Egretta garzeta</i>   | 0.276   | 0.264   |
| House Sparrow  | <i>Passer domesticus</i> | 0.212   | 0.235   |
| Cattle Egret   | <i>Bubulcus ibis</i>     | 0.219   | 0.190   |
| House Crow     | <i>Corvus splendens</i>  | 0.156   | 0.165   |
| Common Pochard | <i>Aythya ferina</i>     | 0.136   | 0.145   |

Family Ardidae remained the dominant family of both the study sites. Passeriformes was the dominant in terms of both the study in terms of numbers. According to the best of our available knowledge this study first report of its kind in *Aythya ferina* (Common Pochard) and no such report have been documented already in the study area.

## 4. Discussion

This is the premier study that would prove to be helpful for biodiversity of wetlands' fauna. The study revealed that only a single bird species (Common Pochard), of all the species, was vulnerable.

The study conducted by the researchers to get the knowledge of waterfowl population and distribution at Head Khanki revealed that 51 species of waterfowl were observed, that belonged to 33 genres and 16 families. Although the area is study deficient, yet the similar studies conducted in other parts of the country like Ali & Akhtar [1] reported 126 bird species from Chashma, 115 from Nammal lake, from Rangpur they reported 110 and 103 from Uchali lakes. Another researcher [5] from Muzaffar-abad, Azad Kashmir Pakistan, reported total of 59 avian species, 24 resident, 14 winter visitor and 11 were the summer visitor.

Similar field work reported by a group of researchers [8] who recorded 4328 winter avian population from head Qadirabad, Punjab, Pakistan; while during the present study 4280 population of birds recorded. In other study conducted [2], showed the bird population at Taunsa Barrage Wildlife Sanctuary (an International Ramsar Site) of 110 species recorded. In same study the number of avian species at Jiwani Coastal Wetlands was 109, while the common bird species at both sites were 49.

Following threats were observed during the study: a) As both sites of the study area are important wetlands of fresh water ecosystem of River Satluj, hence they are facing serious threats of anthropogenic activities. b) Habitat destruction is the major cause together with summer flooding, poaching, overgrazing and netting.

## 5. Recommendations

Cultivation of uncultivated area should be banned. 2) Illegal cutting of trees must be checked and appropriate measures should be adopted for their stopping. 3) It is dire need that various stake holders should co-operate each other for the wildlife conservation. 4) Awareness of the people through mass media for environment education and wildlife conservation. 5) Reduction in the over use of pesticides etc. 6) There should be strict ban on hunting of migratory avian species.

## 6. Conclusion

In the future, proper management plans and strategies in the study area will not only increase the number of resident avian species but will also enhance the migratory and vagrant bird species. This report is first in its kind on the avifauna of this study area.

## 7. Acknowledgments

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