

## **A Case Study on Winter Avifaunal Diversity Status In Arachandi Wetland, Banki, Odisha**

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### **Abstract**

Several species of birds inhabit wetlands. They form an important component of this biota that depend on vegetation structure. They are one of the most visible indicators of the total productivity of such biotic systems. Arachandi wetland being ecologically important with high nutritional value and productivity, support good diversity of birds. The present study is an attempt to put emphasis on documenting the avifaunal diversity in this wetland up to village level. During the study period 60 species of birds, belonging to 7 orders and 13 families were recorded. Order Anseriformes was the richest of species (17 species) followed by Charadriiformes (15 species), Pelecaniformes (13 species), Gauriformes (8 species), Suliformes (4 species), Ciconiiformes (2 species), and Podicipediformes (1 species). The maximum density of birds recorded in winter may be correlated with macrophytes that are exposed due to reducing water cover as well as exposed substrate providing countless invertebrates of varying sizes which occurred as food resources. As far as biodiversity status (IUCN-2018) is concerned, out of 60 species of birds, 52 species were categorized in to least concerned, 1 vulnerable, and 7 species nearly threatened. Among them 9 species were migratory birds.

**Keywords:** Wetland, Aifauna, Productivity, Diversity, Ecology, Vegetation, Macrophytes

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### **I. INTRODUCTION**

The Indian region is incredibly rich in birdlife. Over 1263 of the world's 8650 species of birds are found in this region [14]. This number rises to over 2000 with subspecies included which makes the Indian check list twice the size of those of Europe and North America. The species diversity and status of each bird species in different habitat were different as the habitat and vegetation cover is also different. Several species of birds inhabit wetlands either throughout their life or during certain part of their life [5], one of the most diverse and unique ecosystems in the world supporting huge biotic communities. Birds form an important component of this biota that depends on vegetation structure. Therefore, water-birds and water-associated birds are collectively termed as wetland birds [5]. Although wetlands occupy a small portion of the earth's land area, they are very important in the biosphere. Being ecologically significant with productivity and high nutritional value, they support good diversity of birds [2,12]. Dominant animal species in fresh water wetlands include many species of insects, birds, and amphibians; few mammals are also included in this biome.

Birds play a functional role as source of food chain, agents of flower pollination, seed dispersal, agents in breaking seed dormancy [10] from one place to another during their migration and local movements [11]. Many studies for varied purposes and in many ways on birds have been conducted. These studies indicate the importance of birds as simple, visible, easy to monitor indicators of health of an ecosystem. In recent times, the birds' population and diversity are dwindling or altering at a faster rate for use of fertilizers, pesticides, deforestation, development projects, diseases, loss of wetlands and other anthropogenic effects. These changes create serious concern for management authorities and scientists. Considering above facts, it is necessary for carrying a fresh check-list of avifaunal diversity of the wetlands. The aim of this study was to assess species diversity and richness of birds and to provide a species list in Arachandi wetland.

### **II. MATERIALS AND METHODS**

#### **II.1 Study Site**

The study was done in Arachandi wetland which is confined within the area of 1.214 km<sup>2</sup> and it is quite hostile for birds. Geographically, it is within 20.36353° latitude and 85.52671° longitude. The Arachandi is approximately 10 kms. away from Banki, 40 kms. from Cuttack and 1 km from Jatamundia Squire. The wetland covers water body and crop lands which provide wide range of habitats for the birds. Also, some of the areas within it are quite silent which indirectly promote the bird diversity.

The littoral zone of the lake is covered with various macrophytes. The south and south east sides are surrounded by forest land. The village is present on its western bank with its linear pattern settlement of people

across the road. The main drainage inflow of water enters the lake from southern side near the temple and minor drainages from Northwest. The annual rainfall is between 75 and 150 cm. It is evident that the area is never too hot and it is pleasantly comfortable all throughout the year.

## **II.2 Sampling of Birds**

In this present study, point count with about 50m distance was used after Blondel [1]. Random points were selected at three different trails and observed data of bird species were recorded. Birds' species were identified directly in the field or in difficult cases following photography for identification. Olympus 8x40 DPS I Binocular was used for observation. Canon 60D DSLR with canon 100-400 lens was used for photography. Birds of Indian Subcontinent [4] and a Photographic Guide book to the Birds of India [3] were used as field guide. Observations were recorded during February 2021. During each visit the census of birds was carried out during morning hours, half an hour after sunrise, which is known to be the best time for the observation of birds. Observations were made twice a day, i.e., 6.00 AM to 11 AM and 14.30 PM to 16.30 PM from each trail as these are the most active period of birds.

## **II.3 Instrument used**

The instrument used was Olympus 8 × 40 DPS Binoculars. Binocular are field glasses are two telescopes mounted side-by-side and aligned to point in same direction. All binoculars have a set of two figures, indicating their specification, sometime followed by letter code as B or GA. The first figures refer to magnification, which is generally between 7X and 10X. The second figures refer to diameter of larger lens, the objective lens, in mm. The size of binocular is governed by this second figure GA or RA shows that the binocular is rubber covered, offering some protection against knock and wear. For general bird watching lower magnification 7X or 8X are used. The lower the magnification the brighter the image, the wider the field view.

## **II.4 Area search**

The area search is a quantitative, habitats specific survey method that is widely applicable in most habitats, which is useful for diversity measurement such as species richness, bird community composition and; as well as providing simple avian-habitat relationship and natural history. The method is also well suited for public education and training observer. The method involves a time-constrained survey of a defined area, during which the observer records all birds seen or heard, differentiating those detected inside, outside, and flying over the search area. The birds were observed by sitting and standing from a hiding place.

## **II.5 Bird watching technique**

Identifying a bird can be a challenging process. Birds are active, energetic animals. Quick eye spotting is required in order to get possible detail in short span of time. The following techniques were used during bird watching. Birds were recognised by fixing eye on them. Continuous observations were made regarding their movement, songs, feeding habit and size. Simultaneously specific calls and songs were also identified. General size, shape, distinctive strips and patches of colour including crown strips, eye lines, nape colour, eye arcs or rings and birds bill size were noted. Wing bars, colour patches, and marking on bird body during stationary stage or flying stage were noted. Leg colour and length were also noted in each observation. Observations were confirmed with the help of Avibase bird count 2013.

## **III. RESULTS AND DISCUSSION**

During the present study a total of 60 species distributed in 7 orders and 13 families were recorded during the survey period. Anseriformes was the richest of species (17species) followed by Charadiiformes (15 species), Pelecaniformes(13species),Gauriformes (8 species), Suliformes (4 species), Ciconiiformes (2species), and Podicipediformes (1species).A detailed checklist of the observed bird species along with their scientific names is provided in Table 1. Of all the families, Anatidae dominated the list with 17 species followed by Ardeidae 11 species, Rallidae and Chradriidae 8 species each,Phalacrocoracidae 3 species, Threskiornithidae, Ciconidae, Recurvirostridae, Jacanidae and Glareolidae2 species each and rest three families were represented only by one species each. Among these 44 species were water dependent birds while 16 were terrestrial. Among them 9 migratory and 3 residents migratory rest are residential birds.

The variations in the bird density and the species richness are noted according to the seasonal changes. Maximum bird species were found to utilize the water body in the winter, while minimum in monsoon. Though the water body is utilized by the resident birds throughout the year the bird populations were maximum during winter due to the presence of migratory birds. In winter when the migratory bird population arrives, the pressure of migratory birds increases in plains some resident birds move to higher altitudes to reduce the competition for food resources. Walwert reported that the species that are winter migrants use wetlands for rest and other activities while waiting for the favourable condition of their home range. They involved in activities

that afford them opportunity to store enough fats for the journey back to Europe [15]. Also, higher number of birds in terrestrial habitat may be attributed to the terrestrial habitat having greater resources such as food and nesting sites and a resulting ability to support more birds [6,7].

During summer when the algae start drying and the dead algae float over the water, a suitable habitat is created for several microorganisms, hence making a good feeding habitat for resident Birds. Birds like little Cormorant, Herons and Egrets are favoured by this habitat. The exposure of vegetation due to decline in water level during summer creates suitable hiding places too. During this season the density of resident birds is maximum compared to migratory and resident Wading birds like Herons, Egrets, Lapwings and Plovers prefer shallow water with marshes, where food can be easily procured. During monsoon birds like Egrets and Herons were present at the margin of wet land where muddy bottom and macrophytes are present.

The drier side of Lake has forest on one side and traditional agricultural land on the other side which are also preferred by the said waders. During winter, the productivity of water body is stabilized and the food is easily accessible. This attracts the migratory species of wading birds that also increases species richness. The species that were winter migrants used the wetlands area for resting and other activities while waiting for favourable condition in their home range. During this time, they store enough fat for the journey back to their original habitat. Migrant species observed during the study were fairly good.

Birds serve as important bio-indicators as they have the ability to fly away and avoid any obnoxious condition. Hence, they are considered as important health indicators of the ecological conditions and productivity of an ecosystem [8,17]. So, management of all the wetlands is critical for conservation of nature and natural resources. While studying wetland avifauna in addition to species richness, the parameters such as diversity of bird population are frequently used as indicators of habitat quality. The maximum density of birds recorded in winter may be correlated with macrophytes that are exposed due to reducing water cover as well as exposed substrate providing countless invertebrates of varying sizes which occurred as food resources. Emerging vegetation such as Cattail species provides emergence sites for insects like damselflies, dragonflies and flying adults of other species that form food for various species of birds [16].

Bird lists are simply the list of bird species observed at a location. This list can be used for species richness regarding the general occurrence of bird species.

**Table 1 Birds diversity of Arachandi Wetland and their threat status**

| Sl.no | Birds  | Family            | Order            | *Status | *R/M |
|-------|--|-------------------|------------------|---------|------|
| 1.    | Little Grebe / <i>Tachybaptus ruficollis</i>           | Podicipedidae     | Podicipediformes | LC      | R    |
| 2.    | Great Cormorant / <i>Phalacrocorax carbo</i>           | Phalacrocoracidae | Suliforms        | LC      | R    |
| 3.    | Indian Shag / <i>P. fuscicollis</i>                    | Phalacrocoracidae | Suliforms        | LC      | R    |
| 4.    | Little Cormorant / <i>Mircrocarboniger</i>             | Phalacrocoracidae | Suliforms        | LC      | R    |
| 5.    | Oriental Darter/ <i>Anhinga melanogaster</i>           | Anchingidae       | Suliforms        | NT      | R    |
| 6.    | Grey Heron / <i>Ardea cinerea</i>                      | Ardeidae          | Pelecaniformes   | LC      | R    |
| 7.    | Purple Heron / <i>Ardea purpurea</i>                   | Ardeidae          | Pelecaniformes   | LC      | R    |
| 8.    | Median Egret / <i>Mesophoxyx intermedia</i>            | Ardeidae          | Pelecaniformes   | LC      | R    |
| 9.    | Little Egret / <i>Egretta garzetta</i>                 | Ardeidae          | Pelecaniformes   | LC      | R    |
| 10.   | Cattle Egret / <i>Bubulcus ibis</i>                    | Ardeidae          | Pelecaniformes   | LC      | R    |
| 11.   | Indian Pond Heron / <i>Ardeolagrayii</i>               | Ardeidae          | Pelecaniformes   | LC      | R    |
| 12.   | Malayan Night Heron / <i>Gorsachius melanolophus</i>   | Ardeidae          | Pelecaniformes   | LC      | R    |
| 13.   | Eurasian Bittern / <i>Botaurus stellaris</i>           | Ardeidae          | Pelecaniformes   | LC      | M    |
| 14.   | Yellow Bittern / <i>Ixobrychus sinensis</i>            | Ardeidae          | Pelecaniformes   | LC      | R    |
| 15.   | Black Bittern / <i>Dupetor flavicollis</i>             | Ardeidae          | Pelecaniformes   | LC      | R    |
| 16.   | Cinnamon Bittern / <i>Ixobrychus cinnamomeus</i>       | Ardeidae          | Pelecaniformes   | LC      | R    |
| 17.   | Black-headed Ibis / <i>Threskiornis melanocephalus</i> | Threskiornithidae | Pelecaniformes   | NT      | R    |
| 18.   | Glossy Ibis / <i>Plegadis falcinellus</i>              | Threskiornithidae | Pelecaniformes   | LC      | R    |
| 19.   | Painted Stork / <i>Mycteria leucocephala</i>           | Ciconiidae        | Ciconiiformes    | NT      | R    |
| 20.   | Asian Openbill / <i>Anastomus oscitans</i>             | Ciconiidae        | Ciconiiformes    | LC      | R    |
| 21.   | Large Whistling Duck / <i>Dendrocygna bicolor</i>      | Anatidae          | Anseriformes     | LC      | R    |
| 22.   | Lesser Whistling Duck / <i>D. javanica</i>             | Anatidae          | Anseriformes     | LC      | R    |
| 23.   | Bar-headed Goose / <i>Anser indicus</i>                | Anatidae          | Anseriformes     | LC      | M    |
| 24.   | Greylag Goose / <i>A. anser</i>                        | Anatidae          | Anseriformes     | LC      | R    |
| 25.   | Brahminy (Ruddy) Shelduck / <i>Tadorna ferruginea</i>  | Anatidae          | Anseriformes     | LC      | R    |
| 26.   | Common Shelduck / <i>T. tadorna</i>                    | Anatidae          | Anseriformes     | LC      | M    |
| 27.   | Cotton Teal / <i>Nettion scotlandianus</i>             | Anatidae          | Anseriformes     | LC      | R    |
| 28.   | Northern Pintail / <i>Anas acuta</i>                   | Anatidae          | Anseriformes     | LC      | M    |
| 29.   | Common Teal / <i>Anas crecca</i>                       | Anatidae          | Anseriformes     | LC      | R    |
| 30.   | Spot-billed Duck / <i>Anas poecilorhyncha</i>          | Anatidae          | Anseriformes     | LC      | R    |
| 31.   | Garganey / <i>Anas querquedula</i>                     | Anatidae          | Anseriformes     | LC      | R    |
| 32.   | Tufted Pochard / <i>Aythya fuligula</i>                | Anatidae          | Anseriformes     | V       | M    |
| 33.   | Eurasian Wigeon / <i>Mareca penelope</i>               | Anatidae          | Anseriformes     | LC      |      |

|     |   |                  |                 |    |   |
|-----|---|------------------|-----------------|----|---|
| 34. | Gadwall / <i>M. strepera</i>                                | Anatidae         | Anseriformes    | LC | M |
| 35. | Falcated Teal / <i>M. falcata</i>                           | Anatidae         | Anseriformes    | NT |   |
| 36. | Northern Shoveler / <i>Spatula clypeata</i>                 | Anatidae         | Anseriformes    | LC | M |
| 37. | Red-crested Pochard / <i>Netta rufina</i>                   | Anatidae         | Anseriformes    | LC | M |
| 38. | Ruddy-breasted Crake / <i>Porzana fusca</i>                 | Rallidae         | Gruiformes      | LC | R |
| 39. | Slaty-breasted Rail / <i>Gallinallus striatus</i>           | Rallidae         | Gruiformes      | LC | R |
| 40. | Baillon's Crake / <i>Porzana pusilla</i>                    | Rallidae         | Gruiformes      | LC | R |
| 41. | Water cock / <i>Gallicrex cinerea</i>                       | Rallidae         | Gruiformes      | LC | R |
| 42. | Purple Swamphen / <i>Porphyrioporphyrus</i>                 | Rallidae         | Gruiformes      | LC | R |
| 43. | White-breasted Waterhen /<br><i>Amaurornis phoenicurus</i>  | Rallidae         | Gruiformes      | LC | R |
| 44. | Common Moorhen / <i>Gallinula chloropus</i>                 | Rallidae         | Gruiformes      | LC | R |
| 45. | Common Coot / <i>Fulica atra</i>                            | Rallidae         | Gruiformes      | LC | R |
| 46. | Bronze-winged Jacana / <i>Metopidius indicus</i>            | Jacaniidae       | Charadriiformes | LC | R |
| 47. | Pheasant-tailed Jacana /<br><i>Hydrophasianus chirurgus</i> | Jacaniidae       | Charadriiformes | LC | R |
| 48. | Avocet / <i>Recurvirostra avosetta</i>                      | Recurvirostridae | Charadriiformes | LC | R |
| 49. | Black-winged Stilt / <i>Himantopus himantopus</i>           | Recurvirostridae | Charadriiformes | LC | R |
| 50. | Eurasian Oystercatcher / <i>Haematopus ostralegus</i>       | Haematopodidae   | Charadriiformes | LC | M |
| 51. | Oriental Pratincole / <i>Glareola maldivarum</i>            | Glareolidae      | Charadriiformes | LC | R |
| 52. | Small Pratincole / <i>G. lactea</i>                         | Glareolidae      | Charadriiformes | LC | R |
| 53. | Northern Lapwing / <i>Vanellus vanellus</i>                 | Charadriidae     | Charadriiformes | NT | R |
| 54. | Red-wattled Lapwing / <i>Vanellus indicus</i>               | Charadriidae     | Charadriiformes | LC | R |
| 55. | River Lapwing / <i>Vanellus duvaucelii</i>                  | Charadriidae     | Charadriiformes | NT | R |
| 56. | Black-tailed Godwit / <i>Limosalimos</i>                    | Charadriidae     | Charadriiformes | NT | R |
| 57. | Pacific Golden Plover / <i>Pluvialis fulva</i>              | Charadriidae     | Charadriiformes | LC | R |
| 58. | Grey Plover / <i>Pluvialis squatarola</i>                   | Charadriidae     | Charadriiformes | LC | R |
| 59. | Little Ringed Plover / <i>Charadrius dubius</i>             | Charadriidae     | Charadriiformes | LC | R |
| 60. | Kentish Plover / <i>Charadrius alexandrinus</i>             | Charadriidae     | Charadriiformes | LC | R |

\*LC-Least Concern, NT-Near Threatened, V-Vulnerable, R-Regional, M-Migratory

#### IV. CONCLUSION

As a result of current study, it was observed that Arachandi wetland is rich in avifaunal diversity. Biodiversity is essential for protection of overall environmental quality, stabilization of ecosystem, and for understanding the intrinsic worth of all species on Arachandi. The findings of present study may serve as baseline information for conservation and management of bird resources of this wetland.

#### REFERENCES

- [1]. Blondel J., C. Ferry and B. Frochot (1981). Point counts with unlimited distance. In: Ralph C. J., Scott. M. (eds.). Estimating numbers of terrestrial birds. Studies in Avian Biology. 6: 414-420.
- [2]. Gibbs, J. P. (1993). Wetlands, 13: 25-31.
- [3]. Grewal, B., B. Harvey and O. Pfister (2002). A photographic guide to the birds of India. Princeton University Press.
- [4]. Grimmett, R., C. Inskipp and T. Inskipp (2012). Birds of the Indian Subcontinent. Oxford University Press, Delhi.
- [5]. Kumar, A., J.P. Sati, P.C. Tak and J.R.B. Alfred (2005). Handbook on Indian wetland birds and their observation. Zoological Survey of India.
- [6]. Lahkar, D., Rout, S.D., Sahu, H.K., Sinha, A., Dutta, S.K. (2011) "Checklist of birds of the North Orissa University campus, Baripada, Orissa", Zoo's Print. 26(5):25-28.
- [7]. Lameed, G.A. (2011) "Species diversity and abundance of wild birds in Dagona-Waterfowl Sanctuary Borno State, Nigeria". Afr. J. Environ. Sci. Technol. 5(10):855-866.
- [8]. Lee, P.Y., Rotenberry, J.T. (2005) "Relationships between bird species and tree species assemblages in forested habitats of eastern North America". J. Biogeogr. 32:1139-1150.
- [9]. Nason I. (1992) Discovering birds. Pisces Publication, pp. 67-69.
- [10]. Niemi G.J. (1985) Patterns of morphological evolution in bird genera of New World and Old-World Peatlands. Ecology, 66: 1215-1228.
- [11]. Paracuellos, M. (2006) Biodiversity and Conservation, 15: 4569-4582.
- [12]. Praveen, J., Jayapal R., & Pittie, A. (2016) A checklist of the birds of India, Ind, Birds 11(5&6): 113-172
- [13]. Walwert, M., Mardiasuti, A. (2004) Muhlenberg, M., "Effects of land use on bird species richness in Sulawesi, Indonesia". Conservation. Biol. 18:1339-1346,
- [14]. Weller, M. W. (1999) Wetland Birds. Cambridge University Press, Cambridge.
- [15]. Welsh, D.A. (1987) "Birds as indicators of forest stand condition in boreal forest of eastern Canada. In: Diamond AW and Filion FL. The value of Birds". International council for Bird preservation. Cambridge, England. pp. 259-266.