

Causes of Migratory Birds' Populations Decline in Purulia District, West Bengal, India

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Abstract: District Purulia has several large and small water bodies having diverse aquatic flora and fauna. The wetlands of Purulia are adobe of various migratory as well as residential birds. But the misfortune in respect to ecosystem is that a decreasing trend is observed among the three year study (2006-07, 2012-13 & 2018-19). In last 6 years, population of migratory bird in this district have been reduced by nearly 37%. The present study deals with the causes of avian migratory species' populations decline at wetlands of Purulia district. There are 39 migratory bird species in number in these wetland regions of this district belonging to 8 orders and 12 families. Red-crested Pochard, Tufted Duck, Lesser Whistling Duck, Northern Pintail, Gadwall, Eurasian Wigeon, Common Coot etc. are found in large number in winter season in these wetlands. However decreasing trend in migratory birds' diversity has been observed due to the destruction of natural habitats and anthropogenic interference.

Keywords: Avian migratory, threat, wetland.

I. INTRODUCTION

Avifaunal species are one of the main indicators which determine the health of wetlands [1]. Migratory bird species play a significant role in the aquatic ecosystem and increase faunal diversity. Avian species of wetlands are facing tremendous pressure due to the unethical behaviour of human beings [2].

In the Indian subcontinent the majority of migratory birds are winter migrant. It is estimated that over hundred species of migratory birds fly to India, either in search of feeding grounds or to protect themselves from severe winter bite of their native habitat (According to ENVIS Centre of Avian Ecology).

Wetlands of district Purulia are crucial incubators of various migratory as well as residential birds. A trend has been observed that migration of avian species is decreasing year after year (Anandabazar Patrika; 9th January, 2017). Considering this scenario, an effort has been made to study the threats of avifaunal migratory species of the wetlands of this district. Among the major wetlands of Purulia basically five of them (Baranti Reservoir, Muradi; Adra Saheb Bandh lake; Purulia Saheb Bandh; Kalidaha Jore, Indrabil and Kumari Dam) attract a large number of migratory birds in winter. There are only a few reports available till date about

migratory avian species of the entire lower Chotanagpur Plateau region.

Section I contains the introduction of relationship between migratory avian species and wetlands, Section II tells objectives of the study, Section III focuses observation period, Section IV describes study area, Section V contains data source and observation method, Section VI explains threats of the migratory birds in this area and Section VII concludes.

II. OBJECTIVES OF THE STUDY

An effort has been taken to focus on the following objectives through the present study to analyse the threats of migratory birds.

III. OBSERVATION PERIOD

The present study has been conducted for three consecutive years (November 2017 to March 2019).

IV. STUDY AREA

Purulia District belongs to Chotanagpur Plateau of western part of West Bengal. Purulia has a sub tropical climate nature and bears low hill, highlands, arid landscape and high vegetation. Due to undulated topography nearly 50% of the

rainfall flows away as runoff. The district is covered by mostly residual soil formed by weathering of bed rocks.

The present study has been conducted in five important wetlands spread over Purulia district of West Bengal (Fig. 1 and Fig.2). The observed region is divided into three areas (urban, semi urban and rural). Purulia Saheb Bandh is situated in urban area; Adra Saheb Bandh is located in semi-urban area and rest three are located in rural belt.



Fig.1- Location of study area

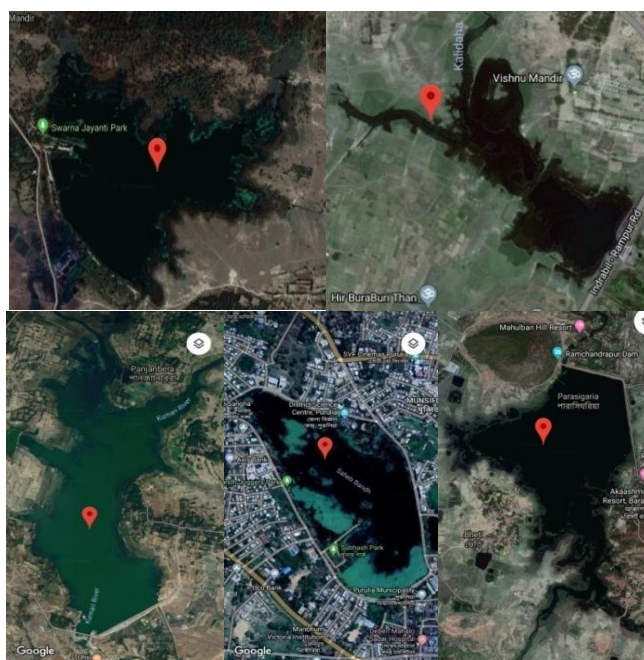


Fig.2-Satellite view of wetlands from Google Map, Saheb Bandh Lake, Adra, Kalidaha Jore, Kumari Dam, Puruliya Saheb Bandh & Baranti Reservoir.

Adra Saheb Bandh: It was constructed by British administration of Bengal Nagpur Railway in the period 1901-1902. Now the owner of the lake is South Eastern Railway. It is located at $86^{\circ}70'E$ longitude and $23^{\circ}48'N$ latitude and it is 3km northeast of Adra Railway Station.

Total area of the lake is 6.31sq.km. Lake water is used mainly for supplying potable water to Adra Township.

Baranti Reservoir: It is situated between Muradhi Hill and Baranti Hill near Ramchandrapur, 3KM from Muradhi Rail Station in Saturi Block of Purulia. Its location is $23.5778^{\circ}N$ $86.8450^{\circ}E$. It had been constructed for irrigation project in 1975. It is commonly known as Muradhi Lake. Total area of the lake is 6sq.km, surrounded by forest area. It has rich biodiversity with large number of flora and fauna.

Kalidaha Jore: Kalidaha Jore is located at $23^{\circ}37'N$ $86^{\circ}07'E$ in Kalidaha near Indrabil in Kashipur Block. To interconnect nearby villages through waterway Govt. constructed this wetland in 1964-65. It occupies about 9 acres of land. Water of the perennial wetland is used for domestic, irrigation, fishing etc.

Kumari Dam: The dam is situated on Kumari River at Dubrajpur, 26km from Puruliya with coordinates: $23^{\circ}9'54''N$ $86^{\circ}17'10''E$. It was operated in the year 1984 and maintained by I&W Dept., Govt of West Bengal. The dam is mainly used for the purpose of irrigation. Total area of the reservoir is 21 acres.

Purulia Saheb Bandh: It is the lung of Purulia town. Size of the wetland is around 70 acres with $23.3395^{\circ}N$, $86.3586^{\circ}E$. It was constructed by the then British administration during 1838-1843 for supplying drinking water. It is also named as Nibaronsayar in accordance with the name of Nibaran Chandra Dasgupta, a freedom fighter and great patriot of Purulia.

V. DATA SOURCE & OBSERVATION METHOD

This study is mainly based on primary and secondary data sources. For primary data, avian species have been observed and recorded directly in the field and regular field survey has been made to analyse the threats of migratory birds. Different research papers, Wikipedia, different books, internet access have been used as secondary data sources.

Nicon Aculon Binocular A211 10-22x50 has been used for close observation of birds and Nicon D7200 camera, with Nikkor Lens 70-300 mm for photography. The check list of species has been prepared following Ali(1996), Grimmett and Inskipp(2011). To get better response in observations relating to peak behavioral activities of birds, suitable time (1 or 2 hours after sunrise or before sunset) has been considered.

Observed Migratory Birds				
Winter Migrants				
Order	Common Name	Scientific Name	Families	Location
Charadriiformes	Green Sandpiper	<i>Tringa ochropus</i>	Scolopacidae	ASB, BR
	Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	All
	Marsh Sandpiper	<i>Tringa stagnatilis</i>	Scolopacidae	ASB, BR
	Little Ringed Plover	<i>Charadrius dubius</i>	Charadriidae	BR, KD, PSB
	Golden Plover	<i>Pluvialis fulva</i>	Charadriidae	KD
Anseriformes	Red-Crested Pochard	<i>Netta Rufina</i>	Anatidae	All
	Gadwall	<i>Mareca strepera</i>	Anatidae	All
	Garganey	<i>Spatula querquedula</i>	Anatidae	BR, KJ, ASB, PSB
	Tufted Duck	<i>Aythya fuligula</i>	Anatidae	BR, ASB
	Common Pochard	<i>Aythya farina</i>	Anatidae	All
	Eurasian Wigeon	<i>Mareca Penelope</i>	Anatidae	All
	Northern Pintail	<i>Anas acuta</i>	Anatidae	All
	Northern Shoveler	<i>Spatula clypeata</i>	Anatidae	PSB
	Common Teal	<i>Anas crecca</i>	Anatidae	BR, KD, ASB, KJ
	Greylag Goose	<i>Anser anser</i>	Anatidae	BR, KJ
	Ruddy Shelduck	<i>Tadorna ferruginea</i>	Anatidae	BR
	Ferruginous Duck	<i>Aythya nyroca</i>	Anatidae	ASB
	Podicipediformes	Great Crested Grebe	<i>Podiceps cristatus</i>	Podicipedidae
Gruiformes	Common Coot	<i>Fulica atra</i>	Rallidae	All
	Baillon's Crake	<i>Zapornia pusilla</i>	Rallidae	PSB, BR, KD
Passeriformes	Common Chiffchaff	<i>Phylloscopus collybita</i>	Phylloscopidae	KD, BR
	Greenish Warbler	<i>Phylloscopus trochiloides</i>	Phylloscopidae	BR
	Siberian rubythroat	<i>Calliope calliope</i>	Muscicapidae	BR
	Citrine Wagtail	<i>Motacilla citreola</i>	Motacillidae	All
	Yellow Wagtail	<i>Motacilla flava</i>	Motacillidae	BR
	Grey Wagtail	<i>Motacilla cinerea</i>	Motacillidae	BR
	Tree Pipit	<i>Anthus trivialis</i>	Motacillidae	BR
Suliformes	Great Cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae	All
Accipitriformes	Osprey	<i>Pandion haliaetus</i>	Pandionidae	BR, ASB, KD
	Marsh Harrier	<i>Cirus aeruginosus</i>	Accipitridae	BR
Falconiformes	Peregrine Falcon	<i>Falco peregrinus</i>	Falconidae	BR
Local Migrants				
Order	Common Name	Scientific Name	Families	Location
Charadriiformes	Yellow-wattled Lapwing	<i>Vanellus malabarius</i>	Charadriidae	ASB, BR, KD
	Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	ASB, BR, KD
Anseriformes	Lesser Whistling Duck	<i>Dendrocygna javanica</i>	Anatidae	All
	Indian spot-billed duck	<i>Anas poecilorhyncha</i>	Anatidae	BR
	Cotton Pygmy Goose	<i>Nettapus coromandelianus</i>	Anatidae	PSB, KD, BR, KJ
Gruiformes	Common Moorhen	<i>Gallinula chloropus</i>	Rallidae	ASB, BR, PSB, KD
Podicipediformes	Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipedidae	All

ASB- Adra Saheb Bandh, BR- Baranti Reservoir, KD- Kumari Dam, KJ- Kalidaha Jore, PSB- Purulia Saheb Bandh

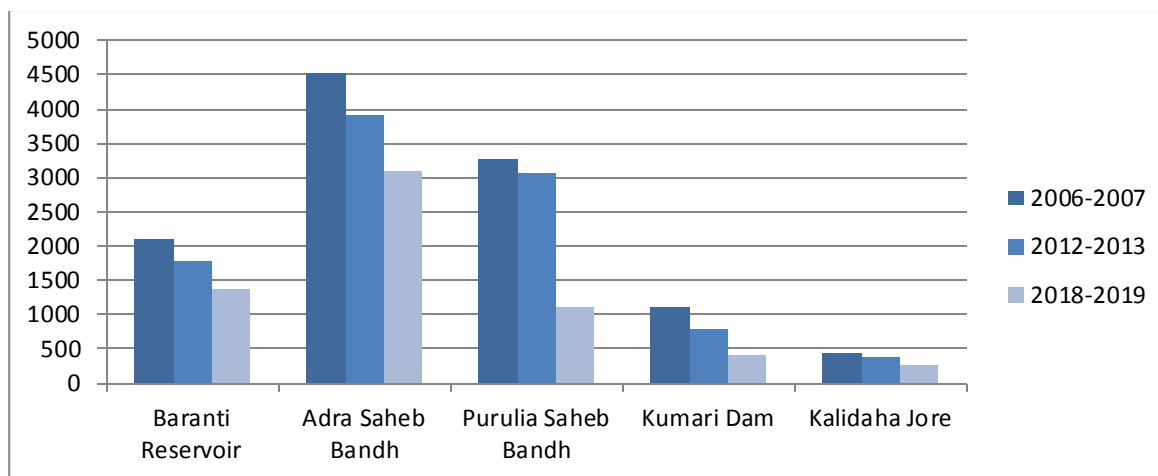


Fig. 3. Approximate value of migratory birds recorded in five wetlands in 2006-2007, 2012-2013 and 2018-2019 (Census report of total migratory birds population in 2006-2007 is recorded according to Nandi, N.C. Et al, 2004 and Nandi, N.C. Et al 2007; census of 2012-2013 is recorded from the conversation to the local people, who are basically kin interested on migratory avian species and news paper report and in 2018-2019 the census report is made by periodical visit to the wetlands by author).

VI. THREATS OF MIGRATORY BIRDS IN THE AREA OF STUDY

Due to unfavourable situation generated by man or environment or any other means the survival of avian species is being hampered. As a result many populations of bird species are on decline. At present times birds are threatened by different angles which need to address in order to turn the trend of demise. A summary of a number of those probable threats in the wetlands of Purulia are given below.

Pollution

Pollution such as lead poisoning or oil spills is not only harmful to locally affected birds, but to migratory birds as well. Polluted habitats provide less and improper food even it may be toxic, that create a longer adverse effect on migratory bird even after leaving the area. Furthermore, heavy pollution will reduce suitable habitat. Black dusts, releasing from sponge iron factory bears harmful carbon and silica particles. Those particles infect respiratory, reproductive and vision system, spreading through water bodies and air [7]. For example Baranti Reservoir is located 5km from Vision Sponge Iron Pvt. Ltd. Factory in Madhukunda, Purulia; 6km from Vikash Metal Pvt. Ltd. Factory in Poradiha, Purulia and 12km from Mark Steel Ltd. in Neturia, Purulia. These three sponge iron factories have been big threat to the environment of Baranti Reservoir.



Fig. 4. Sponge iron plant

Hunting

Illegal hunting and poaching can be thought of as a threat at this time for migratory birds [10]. Most of lakes in this district are surrounded by many tribal communities. In Purulia district out of the total population, 18.27% is tribal and 32% Mahatos (as per census 2011). Local tribal peoples hunt birds as a source of food and some people hunt for mental recreation (below poverty line status - 35%). They are not aware of ecosystem and socio-economic impact of avian species (literacy rate of Purulia - 64.48 %).

Deforestation

Wetland surrounding forests are being abolished vigorously. Tribal community depends on forest not only for firewood but also as a means of source of income for their livelihood. Many forest base migratory birds lose shelter due to deforestation. Rapid loss of forest based wetland habitat brings a terrible question mark in their

migration (WMBD 2011). For examples, according to the railway budget 2009-2010, big portion Kang Forest on north bank of Adra Saheb Bndh was cut down for improper management of proposed 1000MW thermal plant. In Baranti Reservoir massive deforestation during the 1970s spelt havoc on flora and fauna of the area. In 1995 ten young aspirants created interest in social forestation and plantation among local people and it was a grand success.



Fig. 5. Deforestation

Climate Change

Global warming also influences the routes of many migratory birds and their annual migration rhythm. Due to global warming temperature, wind flow and rainfall changes rapidly. A lot of migratory birds change their routes, shorten or completely cancel their journey as a result of changing temperatures, humidity, wind flow etc. The warm spring temperatures in some regions have led to an earlier departure of many birds. Some of the bird species are able to adapt to these changes, while others could not and have become extinct as a result. This is a natural process [8].

Urbanisation

Colourful lights used in city’s beauty; multi-storeyed building, increased pollution rate, reduced span of water bodies, pressure of noise creating giant vehicles are the big threats to migratory birds which are fruits of modern civilization or urbanization [6].

Polythene

In winter season a huge numbers of visitors come to the Water bodies for picnic or enjoy weekend holidays. They leave a large amount plastic bag, tharmocol plate. Those create a fatal issue to nature as well as migratory birds. When ingested, it can lead to poisoning and even starvation (CMS 2019).



Fig. 6. Polythene bags loitering on lake side

Eutrophication

Algal bloom or algae bloom makes discoloration in the water from their pigments. Fast growing algae population decreases oxygen level in water. Even water can become temporarily hypoxic due to death of algae. Again growth of phytoplankton resists the light penetration into the lower depth of the water column. As a result living component favourable to local or migratory birds are being lesser [9].



Fig. 7. Purulia Saheb Bandh is covered by eutrophication and water hyacinth

In Purulia Saheb Bandh, the open water surface is reducing day by day by eutrophication and algal bloom. Even a large portion of the water body is engulfed by water hyacinth (*Eichhornia crassipes*). Administration is combating to get rid of water hyacinth from long time.

Beside those, there are so many other factors which have more impact on attendance of migratory bird species like uses of mobile phone, visual land mark etc. Generally migratory birds use the earth's magnetic field and some visual landmarks to navigate their migrating route. It is true that radiation from electronics gadgets has remarkable impact on magnetic field. So havoc use of mobile phone may be a cause for disturbing the magnetic field [13, 14].

VII. CONCLUSION

In last 6 years, population of migratory bird in this district have been reduced by nearly 37%. Notably, the number of migratory birds in Purulia Saheb Bandh is reducing severely. It is observed that the wetlands are undergoing unwanted change in biodiversity due to huge pollution, climate change, deforestation, illegal hunting, urbanisation, overcrowding, eutrophication of wetland etc.

To come back the earlier well favourable or more favourable environment to the migratory bird species, first of all it is needed to develop awareness among civilized being like human. To aware in depth awareness programme to be run periodically containing the facts like why people should safeguard wetlands, socio-economic value of wetlands in continuous way. Expertise knowledge may be developed through capacity building and training programme. Identifying the specific goal of specific wetland, decision against some infrastructure development may be taken for healthy and flourish environment in the wetlands such as building up watch tower. Activities of the tourists are also causing disturbances to the lake ecosystem. There should be strict management rules for visitors for the conservation of biodiversity in the wetlands and the area should be announced as a polythene free zone. Govt. should take further steps to control pollution to protect wetlands' diversity. To prevent deforestation proper education among villagers may be a better solution. A sustainable and holistic management planning is necessary for conservation of wetlands.

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