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STUDIES ON DEMOGRAPHIC PRESSURES ON AVIFAUNAL DIVERSITY OF ICTHAPURAM WETLAND AND ITS SOURROUNDINGS. ICTHAPURAM MANDAL, SRIKAKULAM DISTRICT, ANDRAPRADESH, INDIA.

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ABSTRACT
The wetlands of Srikakulam district are facing tremendous anthropogenic pressure, which can greatly influence the structure of the bird community. Due to human pressures wetland destruction and degradation have been major causes for the progressive loss of the rich biological diversity associated with these habitats. During my study 36 species of birds were recorded from April 2014 to December 2014.The relationship between habitat characteristics and community structure varied throughout the year, suggesting that the birds respond differently to one or other habitat characteristic depending on the season. Wetlands played major role in development and sustainable in all the sectors of human activities. On this background there is an urgent need to conserve and manage on sustainable basis.

KEYWORDS: Icthapuram, Srikakulam, wetland, Human pressures, avifauna diversity, conservation.

INTRODUCTION
The integrity of most of the wetlands is under threat due to various pressures, some of which are universal and some particular to the district. Due to the well developed transportation links such as the Chennai-Calcutta National Highway and the broad-gauge railway line passing through the coastal areas, and easy access to the sea for building Jetties, transportation of construction materials and raw materials for industries is cost effective. Proposals for setting up two Super Thermal Power Plants (STPPs), one at Sompeta and another one at Bhavanapadu, a part of the Naupada swamps, are in advanced stage. Despite intense opposition from the local communities, NGOs, Environmentalists and Scientists, permission was granted for both the proposals. The loss of water bird habitats through direct and indirect human interferences has led to a decline in several water bird populations. Therefore, it is vital to understand the underlying causes for the decline in populations and to control these trends in order to prevent the loss of key components of the biodiversity of wetland habitats.

Wetland destruction and degradation have been major causes for the progressive loss of the rich biological diversity associated with these habitats. A number of animal and plant species dependent on the wetlands are currently threatened. To develop and maintain an international network of wetlands, which is important for the conservation of global biological diversity and for sustaining human life through the maintenance of their ecosystem components, processes and their services, is very much necessary.

STUDY AREA
Ichapuram wetland(Image-A,B) is Located in Ichapuram village of Ichapuram mandal in Srikakulam district. It is situated on 18^{0}.87738813 N latitude and 84^{0}.453578 E longitudes. This is natural and important perennial wetland complex is situated partly in Srikakulam district and partly in the Ganjam district of Odisha. Hundreds of acres of Salt pans and aquaculture farms spread across this wetland. Nevertheless it has got rich biodiversity. It is 21 m from sea level.

MATERIALS AND METHODS
Birds play an important role in the maintenance of natural ecosystem. Avifaunal surveys were carried out at regular intervals during Pre-monsoon, monsoon and Post-monsoon periods of the year, in order to cover migratory and resident species. The study includes identification of different bird's viz., Aquatic, Terrestrial and Water dependent avian species. Observations were made over a period of 9 months from April 2014 to December 2014 with an aid of field binoculars (7x35m and 10x50 m). Identification was based on standard scientific procedures, field identification by direct sightings; photographs were taken whenever feasible and possible by using Nikon 35 mm digital camera with

appropriate zoom lens. Indirect observations, signs and vocalizations were also recorded. Birds seen were recorded with habitat type, season and frequency of occurrence. Monitored the crepuscular period in the study area such as bird number, activity and factors of presence were recorded. Bird survey was conducted, when the birds are most active during day from 06:00 to 9.30 hrs and from 16:00 to 19:00 hrs. Identification manuals and field guides by Ali & Ripley (1989), Kazmierczak (2000) and Grimmett et al., (2001) were used during survey.

RESULTS

During the study period 36 bird species (Table-1) were recorded. Out of the 36 species 17 species were wetland, 10 species were terrestrial and 9 species were wetland dependant. As status wise 14 species were resident (These are dominant), followed by 11 species were resident/ local migratory, 6 were winter visitor and 5 species were exclusively local migratory (its least count). as guild (Feeding habitat) wise 9 species were insectivores (These are dominant) followed by omnivores with 7 species, aquatic feeders with 7 species, piscivores with 5 species, carnivores, grainivores with 3 species and frugivores with 2 species.

Local people used both the wetlands for various purposes for their livelihood, fishing being most common activity. Fishing activity was high during monsoon and winter. However, during the drier parts of the year intense agricultural work was observed. During winter, however, the birds were indifferent to such disturbances. For cultivation purpose, the land was cleared and leveled, ridges and embankments were built up, cultivated land was flooded with the remaining wetland water, and insecticides were sprayed indiscriminately. As a result, the areas with intense agricultural activities seemed as having no vegetative or topographical heterogeneity. Direct human interference, grazing, and phosphorus content in the covered area and the percentage of submerged aquatic vegetation were significantly correlated with bird species numbers in all the seasons. Average depth of wetland and habitat heterogeneity were significant in the pre monsoon and winter seasons but not during the monsoon period. Floating vegetation percentage was significantly correlated with water bird species numbers only during the monsoon period. In post monsoon, the number of migratory birds was best predicted by habitat heterogeneity. Habitat heterogeneity was also the major characteristic that best predicted the wintering migratory duck assemblage. However, wintering migratory bird density was best predicted by the percentage of submerged aquatic vegetation. The number of resident or local migratory birds was best predicted by the total water covered area and also it was positively related to the presence of submerged vegetation. However, average depth of the water body and the presence of floating vegetation had a negative impact on the number of resident or local migrants through all the seasons.

A) Field photography

B) Google satellite map

Fig-1: study area (A, B)

Table-1: Checklist of birds recorded from study area.

S. No	Common Name	Scientific Name	Habitat	Status	Guild
1	**Little Grebe**	*Tachybaptus ruficollis*	W F	R	**Pis**
2	**Little Cormorant**	*Phalacrocorax niger*	W F	R /LM B	**Pis**
3	**Darter**	*Anhinga melanogaster*	W	R/LM B	**Pis**
4	**Cattle Egret**	*Bubulcus ibis*	T F	R	**Aqa Car**
5	**Indian Pond-Heron**	*Ardeola grayii*	W F	R	**Aqa Omn**
6	**Painted Stork**	*Mycteria leucocephala*	W F	LM B	**Pis Omn**
7	**Asian Openbill-Stork**	*Anastomus oscitans*	W	LM/WM	**Aqa Snails**
8	**Spot-bill Duck**	*Anas poecilorhyncha*	W F	LM	**Aqa Omn**
9	**Common Teal**	*Anas crecca*	W F	LM	**Aqa Omn**
10	**Bar Headed Geese**	*Anser indicus*	W	WV	**Aqa Veg**
11	**Brahminy Kite**	*Haliastur indus*	WD	R/LM	**Car**
12	**Purple Moorhen**	*Pulphyrio porphyria*	W	R/LM	**Omn**
13	**Common Moorhen**	*Gallinula chloropus*	W	R/LM	**Omn**
14	**Common Coot**	*Fulica atra*	W F	LM/WM	**Omn**
15	**Bronze-Winged Jacana**	*Metopidius indicus*	W	R	**Omn Ins**
16	**Black-Winged Stilt**	*Himantopus himantopus*	W F	R/LM	**Ins Omn**
17	**Red-Wattled Lapwing**	*Vanellus indicus*	WD	R	**Ins Omn**
18	**Painted snipe**	*Rostratual benghlensis*	W F	R/L	**Omn**
19	**Little Stint**	*Galidris minuta*	W F	WV	**Car Omn**
20	**Common Snipe**	*Gallinago gallinago*	W F	WM	**Aqa Omn**
21	**Blue Rock Pigeon**	*Columba livia*	T F	R	**Gra Fru**
22	**Spotted Dove**	*Streptopelia chinensis*	T F	R	**Gra Fru**
23	**Rose-ringed Parakeet**	*Psittacula krameri*	T F	R/LM	**Fru Gra**
24	**Brain fever Bird**	*Hierococcyx varius*	T	R	**Car**
25	**Asian Koel**	*Eudynamys scolopacea*	T	R/LM	**Fru**
26	**Brown Fish-Owl**	*Ketupa zeylonensis*	WD SP	R/LM	**Pis Car PR**
27	**House Swift**	*Apus affinis*	WD F	R/LM	**Ins**
28	**Small Bee-eater**	*Merops orientalis*	WD	R	**Ins**
29	**Ashy wood Swallow**	*Atramus fuscus*	WD	R	**Ins**
30	**Common Myna**	*Acridotherus tristia*	T F	R	**Omn**
31	**House Crow**	*Corvus splendens*	T F	R	**Omn**
32	**Large bush Warbler**	*Cattia major*	T/WD	R	**Ins**
33	**Indian great reed warbler**	*Acrocephalus stentoreus*	T/WD	WM	**Ins**
34	**Yellow Wagtail**	*Motacilla flava*	WD/T	WV	**Ins**
35	**Grey Wagtail**	*Motacilla cinerea*	WD/T	WV	**Ins**
36	**Baya Weaver**	***Ploceus philippinus***	**WD**	**R**	**Gra Ins**

A) Status

Aqa - Aquatic animals, Car - Carnivorous, Fru - Frugivorous
Ins - Insectivorous, Omn - Omnivorous, Pis - Piscivorous
Pr - Predatory, Sca - Scavenger, See - Seed eaters
Sn - Snakes, Veg - Vegetarian, Nec - Nectarivorous
Crust - Crustaceans,Gra - Grainivorous

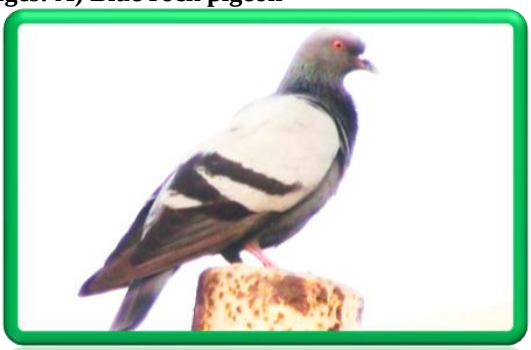
B) Habitats

T - Terrestrial, WL - Wetland, WD - Wetland Dependent

C) Food Habits: Basic Diet

R - Resident, LM - Local Migrant, WV - Winter Visitor
M - Migrant; Br- Breeding Visitor, S - Summer Visitor
P - Passage Migrant, Vg - Vagrant, C - Common
UC - Uncommon, SC - Scarce; R-Rare
FC - Seen in flocks/ Gregarious; SP-Small Parties

Images: A) Blue rock pigeon



C) Common mynah

DISCUSSION AND CONCLUSITION

India has totally 27,403 wetlands, of which 23,444 are inland wetlands and 3,959 are coastal wetlands. According to the Directory of Asian Wetlands (1989), wetlands occupy 18.4% of the country's geographical area, of which 70 % are under paddy cultivation. As far as type and magnitude of human interferences are concerned, the wetland faces almost similar problems during the monsoon and pre-monsoon periods. In post monsoon, the cultivation, this is practiced intensively at some areas.

As the results suggest, direct human interferences do not impose real threat to the birdlife of these wetland. There exists a strong positive correlation between habitat size and species diversity that consistently corresponds with results of other studies in a variety of environments (Sillen & Solbreck 1977; Brown & Dinsmore 1986; Opdam 1991; Andren 1994; Turner 1996; Babbitt 2000; Paracuellos & Telleria 2004; Gonzalez-Gajardo et al. 2009). The only other wetland characteristic, which is significantly correlated with water bird species diversity during all the seasons, is submerged aquatic vegetation. During the monsoon period, mostly nonliving wading and dabbling birds are found in this region and these birds prefer foraging for submerged vegetation in shallow water, even when food is in abundance in deeper. Wintering birds, however, preferred to forage in water with less submerged vegetation.

Intense agricultural practices during drier parts of the season make it impossible to maintain structural heterogeneity, both in terms of vegetative heterogeneity and topographical heterogeneity. Thick submerged aquatic vegetation also appeared as a deterrent factor for winter migrants. The run-off from agricultural land enters the wetland causing an increase in the nutrient concentrations of soil and water. The most evident results of the nutrient input are the replacement of the primary native species with hypertrophy tolerant species.

As expected, a number of variables were associated with the densities of water birds during the monsoon period. Water covered area is the most important criterion that dictates bird number positively but the average depth of the water body has a negative impact on bird numbers. Only resident or local migratory bird's nested. in the wetland during the monsoon and the predominance of floating vegetation in the preferred nesting zone supports the views of many other studies that advocate the importance of floating vegetation in the breeding success of many water birds.

Species richness and bird abundance was fundamentally affected by attributes of the size of the water covered area, particularly in case of local migrants and resident birds. Loss of habitat heterogeneity and predominance of submerged aquatic vegetation in turn appears to be an artifact of agricultural practices. However, local migrants and resident birds are still thriving and breeding successfully in this wetland.

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