

BENEFITS AND CHALLENGES OF DESILTING AND DEVELOPMENT ON THE AVIFAUNA OF ANEKERE POND, KARKALA, UDUPI DISTRICT, KARNATAKA.

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SYNOPSIS: Wetlands are highly fertile and productive aquatic ecosystems. They are the important habitats for fishes, insects, amphibians, reptiles and other wildlife (Hosetti, 2001). The present study is focused towards the evaluation of the benefits and challenges of desiltation and development on the Biodiversity of Anekere Pond with special reference to avifauna. The study area is the Anekere Pond, spread in an area of about 31.65 acres at present having a Jain Shrine (Basadi) in the centre and it is located in Karkala Taluk of Udupi District, Karnataka State at the foothills of Western Ghats. This pond is an ecological and religious heritage of this region. Developmental activities project a severe threat to the Biodiversity of the pond at present. In this study regular visit to the pond was to document the seasonal change in avifauna for 2 years from November 2014 to September 2016. The diversity and density of birds and other biodiversity in the pond has been declining drastically along the study period. It is due to the non availability of food, habitat destruction and disturbance due to human activities. Nevertheless the condition may improve over a period of time after the completion of the project.

INTRODUCTION:

Wetlands are most complex aquatic ecosystems constituting a treasure of Biodiversity. They are the highly fertile and productive ecosystems in the world. They are the prime habitats for waders, aquatic birds and other wildlife such as reptiles, amphibians, fishes, insects and many invertebrates. The social demand and dependence on the wetlands provides an unaccountable economic value to such habitats. Due to inadequate attention and ignorance of common man, wetlands are referred as wastelands in the past leading to its disappearance in the process of urbanization and development. Inventory and conservation of avifauna of wetlands gained its momentum after Ramsar convention in 1972, enacted in December, 1973 demands an urgent need to develop the conservation strategies and management plan by inventorying, monitoring and documenting the diversity and density of Biodiversity with special reference to water fowl. Man made wetlands of lentic group include temple

ponds, lakes, tanks, reservoirs, paddy fields etc. Anekere pond, the study area is a temple pond located at Karkala, in Udupi District, Karnataka, was built by Pandyadeva of Bhiravarasu Dynasty in 1262 A.D. The pond is an abode of biodiversity and also acted as a main source of ground water to recharge the neighboring wells and bore wells. It is an ecological and religious heritage of the town. Anekere Pond is spread in an area of about 31.65 acres at present after clearance of peripheral encroachments, having a Jain Shrine (Basadi) in the centre. Anekere pond has been attracting human attention by its glorious avifauna.

Human activities in catchments area and *Salvinia molesta*, an alien weed infestation in the pond has curtailed the water holding capacity and pulverized the flora of the pond. It has affected the water fowls to a maximum extent. Attempts are made to conserve the biodiversity of the pond over two decades by the Rotary club and other nature lovers of Karkala since 1999. Under the banner of 'Save Anekere', 700 NSS volunteers of neighboring colleges, 225 school children, 240 Rotarians, 55 Rotaract members and many public have toiled hard for partial eradication of the weed. The effort was visual only for few months and by then the weed spread in highest vigor. Again from 2010 under the grant of UIDSSMT, a Government scheme of Rs. 65 lacks, the desiltation and weed eradication was done in a large scale. In the last couple of years, renovation work has been undertaken with a project grant of Rs. 85 lacks, including Desiltation, weed eradication, bund construction, fencing and setting up of walking track around the pond. A scenic park is also set up at the north side of the pond by the town Municipality with a grant of Rs.15 lacks. These developmental activities caused a major loss of biodiversity and remarkable disturbance to the avifauna. The study for a period of two years from November 2014 to September 2016 has shown a remarkable change in the diversity and density of avifauna and also a marked decline in the biodiversity. Several bird species have displaced to the neighboring water bodies or to distant places. Those birds breeding in the pond earlier were shifted their breeding ground. Thus the habitat transformation due to human activities has lead to drastic change in the diversity and density of wetland birds at the study area.

Key words: Avifauna, Wetland, Biodiversity, Habitat, Density, Diversity, Anekere, weed, Tree duck.

STUDY AREA:

The study area is the Anekere pond, a man made wetland, located in Karkala Taluk of Udupi District, Karnataka state at the foot hills of Western Ghats. It is located at 13° North latitude and 75° east longitude. The altitude is about 300 meters. The average rainfall is about 4500 mm per annum and the temperature ranges from 19° to 38° C. Anekere pond is located in a picturesque environment. The pond is spread in an area of 35.65 acres surrounded by economic crop gardens and lush vegetation having paddy and sugarcane fields, coconut and arecanut orchards and has a Jain Temple (Basadi) in the centre. The pond receives rain water from catchment area in rainy season and the excess water flows out through a downstream. The pond was breeding ground for some eels in rainy season in the past. In course of time they have lost this breeding ground. The pond is inhabited by about 60 species of aquatic plants, 20 species of fishes, 14 species of reptiles, 30 species of birds. In

recent years the flora of the pond is completely dominated by the alien weed *Salvinia molesta* suppose to be of South American origin.



Fig 1: Aerial view of Anekere Pond (inner fig: Schematic figure of Anekere Pond) Karkala, Udupi, Karnataka, India.

MATERIALS AND METHODS:

Inventorying water fowls diversity and density is taken up for which regular visit to the pond was made and an average count of 4 months were accounted for a season for convenience in the present study for a period of two years from November 2014 to September 2016. Water fowl population was enumerated by point count, look and see methods (Colin et.al. 1992). Binoculars were used to see the birds. Some species of birds were photographed. Water fowls were identified by referring the key provided. (Salim Ali, 1996 and Bharath Bhushan et.al.1993). The relative abundance of birds was recorded and their fluctuation in the different seasons in last two years was considered for discussion and to draw a conclusion. The birds are classified on the basis of "The Book of Indian Birds" Ali, 1996)

RESULTS AND DISCUSSION:

Reduction in the water retention in the pond and alien weed infestation has altered the ecological characteristics of the pond. The water fowl species density and diversity was found to be decreasing from the earlier records. However the statistics show a remarkable fluctuation in the water fowl population in the present study. Human activities due to the development work are a major cause of destruction of biodiversity in the pond. At the onset of the project uncontrolled fish capture by the general public in the pond resulted in the depletion of fish diversity and also caused scarcity of food to the birds. Some of the birds inhabiting the pond earlier like Coot and Ringed plover, open bill stork were not recorded. Even the purple moorhens were not found in the last season.

The green mat of vegetation and the lush environs in and around the study area include aquatic plants (Hydrophytes), grasses, emergent plants, semi emergent plants and terrestrial plants. Some of these plants provide nesting site and also form a protection cover to birds. Some plant parts may be used as food by aquatic animals and birds. The weed *Salvinia* form a thick green mat that provide a favorable habitat for birds like moorhens, Jacanas etc. and also form the sites for floating nests to these birds. Since the Anekere pond is getting dried up partially in summer and being polluted by dumping the solid wastes, the bird life in the pond is threatened. Spreading of the *Salvinia* weed also made many of the floral species to disappear from the pond. Even the partial weed eradication and desiltation leading to habitat transformation poses a threat to the bird life. Thus now the pond becomes a threatened habitat to wetland birds.

The study conducted in the last two years has shown that the diversity and density of avifauna was proportionally decreased over the years. It was evident that the water fowl population was found to be maximum before the beginning of developmental work. The moderate volume of water storage, favorable temperature, availability of abundant food and the visit of migratory birds were the cause for maximum population before. As there are cultivated fields and other ponds around Karkala, most of the local birds are displaced afterwards and the migratory birds might have shifted their feeding ground.

Little grebes (*Tachybaptus ruficollis*) occupied the pond invariably in winter. They are locally displaced due to disturbance. Little cormorants (*Phalacrocorax niger*) were found in the study area in all seasons but the number is dwindling during the study period. However they were found moving to large trees in neighboring woodlands for breeding activity with other birds like herons. Similar observation of mixed nesting of cormorants with herons was reported by Thompson (1981). Cormorants, Herons and Egrets were found in remarkable number in the pond as there was abundant food source and safe habitat earlier is now drastically declined and their number is also fluctuating in different seasons.

The highest population of the lesser whistling teal or tree duck (*Dendrocygna javanica*) was found in the study area before. Since these birds are the least disturbed ones, their population is still dominating with a marked count down

Common teal (*Anas crecca*) and Cotton teal (*Nettapus coromandelianus*) were local migratory birds found foraging in the pond earlier from December to April are now reduced in number drastically.

White breasted waterhen (*Amaurornis phoenicurus*), Small blue kingfisher (*Alcedo atthis*), white breasted kingfisher (*Halcyon smyrnensis*), Pied kingfisher (*Ceryle rudis*) and brown headed stork billed kingfisher (*Pelargopsis capensis*). Small green bee eaters (*Merops orientalis*), large pied wagtail (*Motacilla madaraspatensis*) and common swallow (*Hirundo rustica*) were the resident species, recorded during different seasons in the study period with different density.

Purple moorhen (*Porphyrio porphyrio*) was a very common resident bird in the pond from 1994. They are reduced in number due to disturbance and surprisingly they were altogether absent in the last season.

Fish population, amphibians, reptiles and some invertebrates were also decreasing in both density and diversity. During the present study out of around 60 species of plants only about 46 species of plants, out of 20 fish species, 12 species of fishes, 9 species of amphibians and 4 species of reptiles are documented. The trend during the study reveals that there is no guaranty of restoration of the original characteristic of the pond even after the completion of the work to rebuild its glory of rich biodiversity.

Seasonal variation in the diversity and density of wetland birds during the study period is presented in the table and the graph. It was observed that the avifaunal diversity and density was more in 2014-15, before the developmental activities and then decreased drastically. It is a serious fact to note that they have not returned to the pond even after the completion of the work. This may be due to their habituation to neighboring ponds or due to human intervention of their habitat.

Months / seasons	Diversity	Density
Nov,Dec,Jan, Feb 14-15 (winter)	34	240
Mar,Apr,May,Jun 2015 (summer)	23	174
Jul,Aug,Sep,Oct 2015 (rainy)	16	125
Nov,Dec,Jan, Feb 15-16 (winter)	22	168
Mar,Apr,May,Jun 2016 (summer)	14	96
Jul,Aug,Sep 2016 (rainy)	15	115

Table 1: Seasonal diversity and density of Avifauna in Anekere Pond in 2014-15 and 15-16.

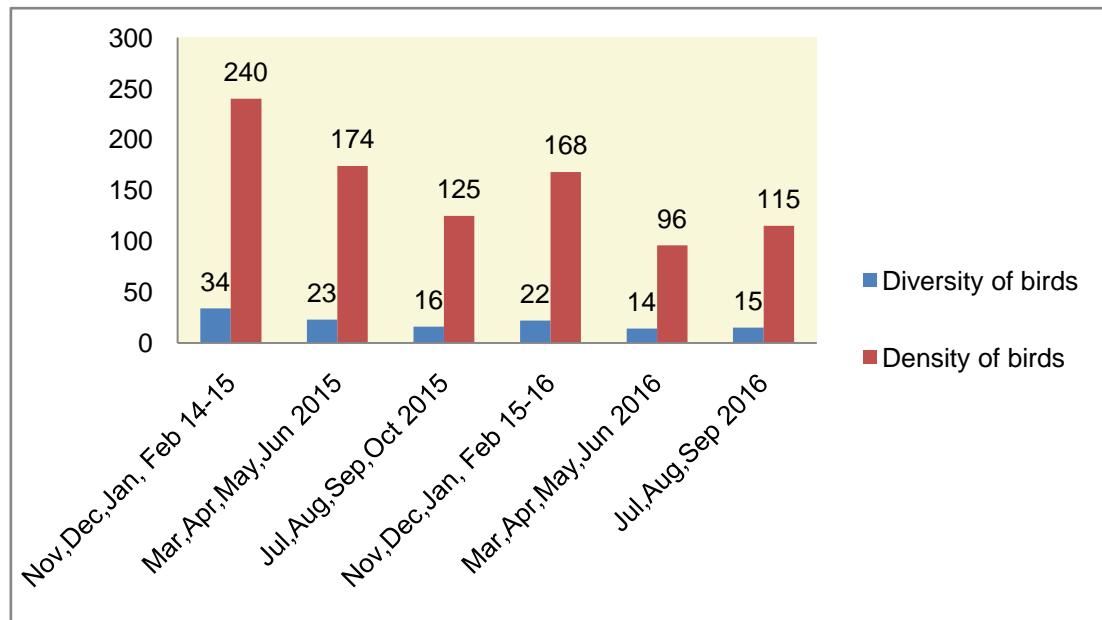


Fig 2: Seasonal diversity and density of Avifauna in Anekere Pond in 2014-15 and 15-16.

Checklist of birds cited in the study area.

<u>S.No.</u>	<u>Common Name.</u>	<u>Scientific name.</u>
Order: Podicipediformes Family: Podicipitidae		
1	Little grebe	<i>Tachybaptus ruficollis</i>
Order: Pelecaniformes Family: Phalacrocoracidae		
2	Little cormorant	<i>Phalacrocorax niger</i>
Order: Ciconiiformes Family: Ardeidae		
3	Purple heron	<i>Ardea purpurea</i>
4	Grey heron	<i>Ardea cinerea</i>
5	Little green heron	<i>Ardeola striatus</i>
6	Pond heron	<i>Ardeola grayii</i>
7	Cattle egret	<i>Bubulcus ibis</i>
8	Median egret	<i>Egretta intermedia</i>
9	Little egret	<i>Egretta garzetta</i>
Order: Anseriformes Family: Anatidae		
10	Tree duck (lesser whistling teal)	<i>Dendrocygna javanica</i>
11	Common teal	<i>Anas crecca</i>
12	Cotton teal	<i>Nettapus coromandelianus</i>
Order: Gruiformes Family: Rallidae		
13	White breasted waterhen	<i>Amaurornis phoenicurus</i>
14	Purple moorhen	<i>Porphyrio porphyrio</i>
Order: Charadriiformes Family: Jacanidae		
15	Bronze winged jacana	<i>Metopidius indicus</i>

Family: Charadriidae		
16	Red wattled lapwing	<i>Vanellus indicus</i>
17	Common sandpiper	<i>Tringa hypoleucos</i>
Order: Coraciiformes Family: Alcedinidae		
18	Small blue kingfisher	<i>Alcedo atthis</i>
19	Whitebreasted kingfisher	<i>Halcyon smyrnensis</i>
20	Pied kingfisher	<i>Ceryle rudis</i>
21	Brown headed stork billed king fisher	<i>Pelargopsis capensis</i>
Order: Passeriformes Family: Motacillidae		
22	Large pied wagtail	<i>Motacilla madaraspatensis</i>
Family: Sturnidae		
23	Indian Myna	<i>Acridotheres tristis</i>

Summary and conclusion:

The present investigation proved that the altered ecological characteristics of the pond caused the biodiversity depletion. This has affected the population of birds in the study area remarkably. Hence an immediate action plan should be initiated to make this scenic pond a biodiversity rich wetland and an abode of waterfowls. It could be achieved by minimizing the human activities in and around the pond immediately. Fishes may be released into the pond so as to enrich the faunal diversity and to provide abundant food to avifauna. The dream project of boat club idea of the year 2010, which is withdrawn temporarily should be permanently stopped forever.

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