

A Bird Habitat Study Approach on Physico-Chemical Properties of Some Wetlands of North Gujarat

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Abstract: Air, Soil and Water are the main components of environment. The Soil providing platform to all living and nonliving things, whereas water is the main source to maintain and transport elements in each spheres of Earth. Study of habitat is always an essential part to know the ecology and to know how an organism uses the resources. Habitat is a limiting factor for survival of any organism due to its complex physical, chemical and biological properties. Many studies have been carried out on wetland study to investigate bird habitats. The present study was conducted in three different wetland namely Amrapura Village, Sidhada village and Sidhada dam of Radhanpur Taluka of Patan District. Water and soil samples were collected to know their physico-chemical properties and to know how they affect the bird population during migratory season. The samples were analyzed in laboratory facilities through very specific standard methods. The results shows that the physico-chemical properties of a habitat may be one of the factors to resume bird abundance especially migratory bird are concern.

Key Words: Wetland, Water, Soil, Physico-Chemical Properties, Migratory Bird, Abundance.

INTRODUCTION

Specifically wetlands are characterized as having a water table that stands at or near the land surface for a long enough season each year to support hydrophytes. Put simply, wetlands are lands made up of hydric soil. Wetlands such as swamps, marshes, and bogs are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for aquatic organisms in saturated soil conditions (USEPA 1991).

Wetlands play a vital role in ecosystems and environmental sustainability. They provide many important functions such as storm and flood control, shoreline stabilization, sediment retention and nutrient removal, water purification,

groundwater replenishment, wildlife and fisheries habitat, and are reservoirs of biodiversity. However, agricultural activities, land development, and hydrologic modifications have caused sharp reductions in the areas of the country's natural wetlands.

According to the U.S. Fish and Wildlife Service, wetlands are transitional between terrestrial lands and aquatic systems that frequently support the growth of hydrophytes on predominantly undrained hydric soil. Hydric soil formation is one of the key features of the wetland development. Under alternating anoxic/anaerobic conditions, microbe assisted chemical transformation plays an important role in maintaining the health ecological functions of wetlands (Mitsch and Gosselink 2000). The presence of reducing conditions in hydric soils leads to the complex transformation of many important elements including nitrogen, carbon, sulfur, iron, and manganese. Since their water chemistry is coupled with chemical transformation in hydric soils, wetlands water quality is likely dependent on the functions of hydric soils. Healthy wetlands can provide water quality improvement, flood attenuation, erosion control, recreational opportunities and varied species habitat. Wetlands that are stressed cannot perform these functions well. Wetlands having physical stressors such as a lack of water, cultivation, and excessive grazing will lose their capacity to grow healthy plants and eventually lose their hydric soils and nutrient cycling capacities. Only through wetlands monitoring and assessment of the hydrological, chemical, and biological character of wetlands, it can be determined whether the wetlands that are being retained and protected are performing their functions well or not.

METHODOLOGY

The present study was conducted in three different wetland of Patan district namely Amrapura Village, Sidhada village and Sidhada dam of Radhanpur Taluka. The study was conducted on 1st February

2013. The wetlands were visited and samples were collected. The area and depth of each wetland was approximately 2 to 3 Sq. Km. and 3 to 6 feet respectively. On visiting the wetlands, it was revealed that the wetland was low on vegetation but had high bird population. Also it revealed that the wetland had high human and domestic animal influence.

Soil samples were collected using a core push. Samples were taken from a depth of 25 inches from the wetland sites. One composite soil sample was collected for each wetland site. Top (0-10 cm) and lower layer (10-25 cm) soil samples were collected using sterile spatula, stored in heavy-duty sterile

Zip lock bags, and placed in ice box during transportation. The water samples were also collected and placed in ice box during transportation. All water and soil samples were transferred immediately to the lab and stored at 4 ° C in refrigerator before analysis. Basic water quality parameters such as pH, temperature were measured onsite. Water samples were collected and processed according to approved methods as in APHA. Dissolved oxygen, conductivity, pH and temperature were measured using a portable meter.

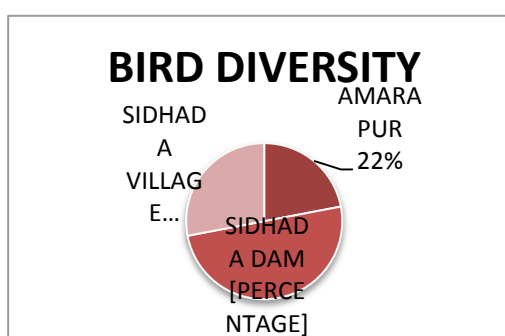
The birds species were counted using binocular having resolution of 10 x 50. The birds were confirmed using Book of Birds of the Indian Sub-Continent (Grimmet 1999).

RESULTS

The below table 1 shows the value of various physico-chemical parameters analyzed during the study of the three wetlands namely Amrapur, Sidhada Dam and Sidhada Village.

Parameter	Amrapur Wetland		Sidhada dam		Sidhada Village	
	Soil	Water	Soil	Water	Soil	Water
pH	7.4	7.3	7	7.4	7.1	7.4
TDS(PPM)	300	350	250	277	200	210
Acidity(PPM)	116	0	0	80	25	10
Alkalinity(PPM)	0	125	350	50	175	55
TotalHardness(PPM)	350	1060	1770	2400	2500	450
Sulphate(PPM)	6.15	4.92	2.46	4.11	4.52	10.29
Chloride(PPM)	240	1029	239.9	849.7	1950	1900
BOD(PPM)	167	40	24.1	50.15	22	5.25
COD(PPM)	1280	2800	2850	2500	1760	480
Phosphate(PPM)	67	79	95	87	50	90

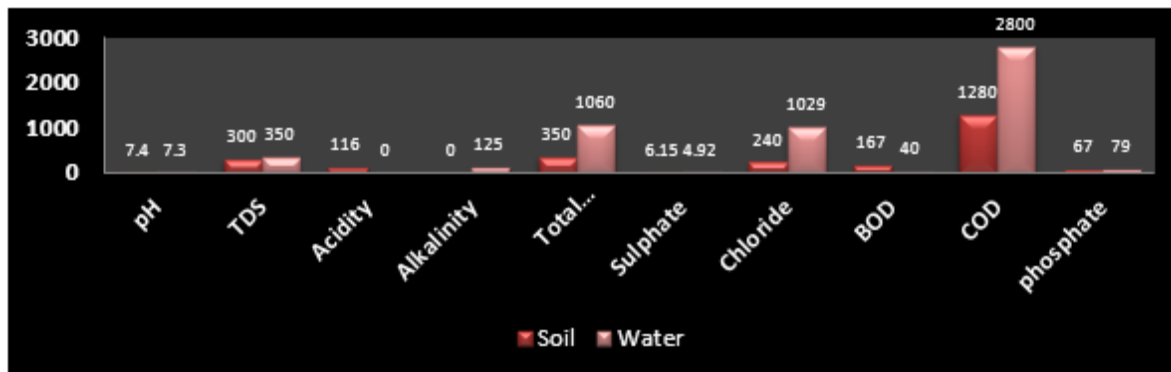
No. of Bird Individual	No. of Bird Species
310	11
405	14
448	25



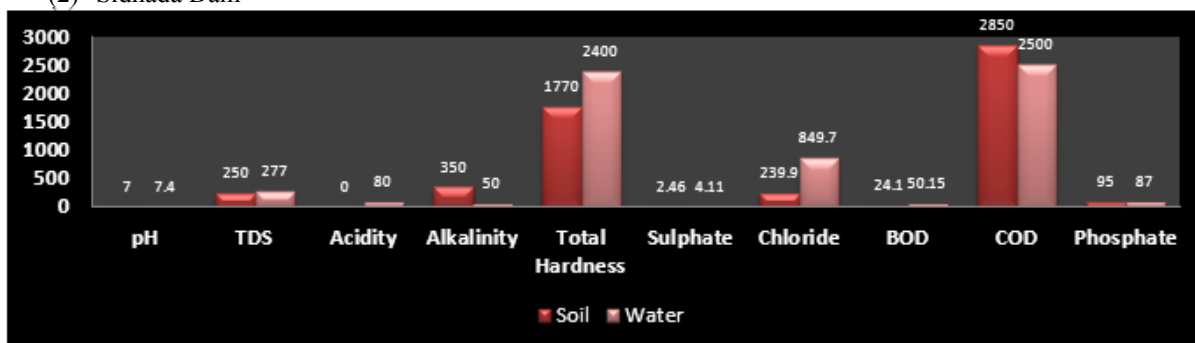
The above pie chart shows the bird diversity in percentage and the above table 2 shows the population of individual bird's in each species which were observed at the three wetlands namely Amrapur, Sidhada Dam and Sidhada Village.

The following Bar graph are the graphical representation of the physico-chemical parameters of the three wetlands namely Amrapur, Sidhada Dam and Sidhada Village.

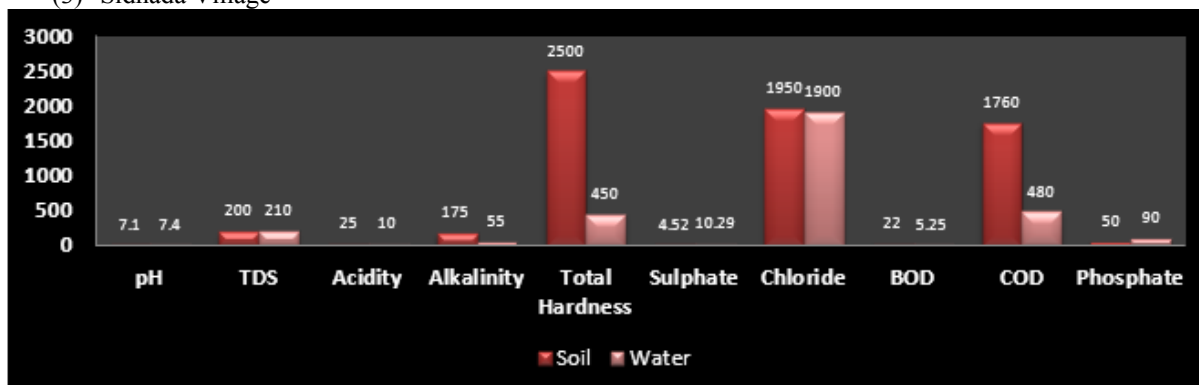
(1) Amrapur Wetland



(2) Sidhada Dam



(3) Sidhada Village



DISCUSSION

From the analyzed results it can be said that pH was found neutral in all the wetlands. TDS was found below the standard limit of drinking water i.e 500 ppm in all the wetlands. Amrapur wetland soil was more acidic as compared to the other two wetlands and the water of sidhada dam was found more acidic as compared to the other two wetlands. Alkalinity was found below the standard limit of 200 ppm in all three wetlands but the soil of sidhada dam showed more alkalinity followed by sidhada village soil. Total Hardness was found above the standard limit of 300 ppm in all three wetlands but the soil of sidhada dam showed more Total Hardness followed by sidhada village soil.

Sulphate was found below the standard limit of 200 ppm in all wetlands. Chloride was found high in all

the three wetlands than the standard limit of 250 ppm. Also B.O.D, C.O.D and phosphorus were found high in almost all the wetlands.

The high value of total hardness and chloride makes the water unfit for domestic use and effects the palatability of water respectively. Also total hardness and chloride were found high in the soils of the wetlands, hence it can be said that there might be leaching of ions from the soil to water due to runoff. The high value of B.O.D and C.O.D shows the wetland were under the pressure of high organic pollution load. The high value of phosphorus may be due to washing activity at the wetland.

CONCLUSION

The present study gives scope for further research. It provides plans for conservation and restoration of

wetland as an important bird habitat. It also provide scope to increase the number of migratory birds during post winter migratory season. Also it helps to control human activities on wetland which can prove adverse on bird's population.

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