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CONSERVING SHEIKHA LAKE :A REVIEW

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ABSTRACT

Wetlands are known to have a unique ecosystem of aquatic plants which have constant interactions with birds and animals. Present study was conducted in Sheikha Lake situated 17 km away from Aligarh city in Uttar Pradesh, India. The lake represents a mosaic of habitats such as wetland, grassland and forest. This wetland behaves like an ideal habitat for wintering and breeding waterfowl. The area supports a varied variety of faunal and floral species. Agriculture is the main source of income for the people around Sheikhalake. Paddy and wheat are the major crops grown in this area. Ten random plots of 10 meter radius were laid to understand percent anthropogenic pressures. Serious lack of awareness for wetland functions and their benefits to society in adjoining villages was observed. Influx of exotic species like *Eichhornia* sp. and *Ipoemia* sp. has caused serious damage to the wetland. Weed encroachment (31%), lopping (27%),grazing (20%) and wood cutting (12%) were found to be some of the major threats in the study site.Only a concentrated effort on the part of official agencies, professionals, NGOs, and the local communities themselves, to comprehend the complexities of this delicately balanced, biologically rich wetland ecosystem, and take appropriate action, can save Sheikha Lake from demise.

KEYWORDS : Aligarh, Conservation, Encroachment, Lake, Sheikha, Wetland

Wetlands have been defined as a large body of water surrounded by land for temporary or permanent period of time that develops into being a distinct ecosystem (Department of Environmental Protection). However according to Ramsar convention, a wetland can be defined as " areas of marsh, fen, peatland or water whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brakish or salt including areas of marine water the depth of which do not exceed 6 metres." (Ramsar; 2015).

Previously, wetlands were not perceived as a resource to be conserved, rather they were believed to be a wasteland (Bond et al.; 1992). The most significant factor which separates wetlands from the other ecosystem types is its unique vegetation of aquatic plants (Butler; 2010). The more wetlands were studies, the more their role and economic importance was realized by naturalists and conservationists (Bond et al.; 1992).

The present review was conducted for Sheikha lake in Aligarh district which is an important bird area. The study aimed to understand the research works carried out so far in the study site along with the areas lacking. It was also aimed to create awareness among the readers and budding researchers about an absolutely neglected wetland of international importance.

Study Area

Sheikha lake is a wetland situated at about 17 km away from Aligarh (27^0 49' N, 78^0 10' E) on Aligarh Jalali road near village Sheikha. It covers about 30 hectare of the area. The Upper Ganga canal flows next to the lake (Fig 1).

In 1852, with the formation of the Upper Ganga Canal, this perennial fresh water lake was formed. It is surrounded by agricultural fields on two sides. The precipitation received by the area is recorded to be < 1,000 mm. Temperature in the area may vary from 4^oC to 40^oC(Rahmani and Sharma; 1997).

The lake represents a mosaic of habitats such as wetland, grassland and forest. This wetland behaves like an ideal habitat for wintering and breeding waterfowl. It possess a variety of floral species including *Terminalia arjuna* and *Syzigium cumunii*. *Acacia* sp., *Dalbergia sissoo*, *Azadirachta indica* and many more. The most detrimental weeds in the lake include *Ipomoea aquatica*, *Eichhornia crassipes*, *Lantana camara*, and *Cassia tora*. *Murraya koenigii* is another shrub seen in this area (Fig 2).

The area supports a varied variety of faunal species as well such as blue bull *Boselaphustrago camelus*, black buck *Antilope cervicapra*, three striped squirrel *Funambulus palmarum*, Indian mongoose *Herpestese dwardsii*, black-naped hare *Lepusnigri collis*, rhesus macaque *Macaca mulatta* and jackal *Canisa ureus* (Khan; 2002).

Till the mid-1970s, Sheikha jheel was one of the major shooting ground for local hunters. It was later controlled by educational campaigns by Nature Conservation Society of Aligarh (Rahmani et al.;2009). A

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total of 166 water bird species have been reported in and around Sheikha (Wetlands International; 2006). Some of these include, the great crested grebe *Podicepscristatus*, painted stork *Mycterialeucocephala*, barheaded goose *Anserindicus*, purple heron *Ardeapurpurea*, purple swamphen *Porphyrio porphyria*, wooly necked stork *Ciconia episcopusand* so on. About 100-200 Sarus Cranes *Grusantigone* congregate in this small wetland, mostly in the dry months (Khan; 2002).

It is a great place for bird watchers and it is visited by many tourists during the migratory season of birds (www.sheikhajheel.com).

Bhavavankhera and Sheikha are the two main villages that surrounds the lake. Some other villages are Edalpur, Changeri, Jalali, Gangary and Panaithi etc. The total population of Sheikha village was more than a 1000 comprising mainly of Rajputs and Jatavas in 2002 which could be many folds by now (Khan; 2002).

Agriculture is the main source of income for the people around Sheikha lake which encompasses combination of rich farmers with their own tractors and other agricultural equipment and poor peasants irrigating either others' fields or their own small pieces of land. Paddy and wheat are the major crops grown in this area. Some farmers are also recorded to grow sugarcane, maize and mustard (Khan; 2002). The lake is being used by the people for irrigation of their land and conducting small scale fishing activities. Domestic cattle are being grazed on the land continuously during summers. This is done mostly by the local people to avoid conversion of the wetland into a terrestrial ecosystem (Khan; 2002).

Choudhury et al. (1999) have reported 30 adults and 10 juveniles of Sarus crane Grusantigone during their survey and have concluded Sheikha lake to be important for Sarus crane conservation. A pilot bird ringing project was initiated in the lake during 1988 where several birds with Russian rings were recaptured (Yahya pers. comm.; 2001).Mishra in 2008 and 2013 conducted studies on the fisheries species of Sheikhalake and was able to identify a new species of protozoa from a fresh water fish Channastriatus.Waterfowl awareness campaigns were also carried out at Sheikhalake by Abbasi and Khan in 2003.

The lake is included in Important Bird Areas due to its significance as an important wetland of huge aggregations of migratory birds (Islam and Rahmani; 2008). Also, the wetland division of the Ministry of Environment and Forests (MOEF), Government of India, has notified Sheikhalake under the Wetland Conservation Programme (www.sheikhajheel.com).

MATERIALS AND METHODS

Primary observations were carried out by visiting the site and recording significant findings i.e. number of birds and mammals were recorded along with degradation in the area. During the study, a total of 10 random plots of 10 meter radius were laid in the area to determine percent wood cutting, lopping and grazing along with weed encroachment. Occular observations were conducted for understanding the percentage encroachment in the site. MS Excel (2010) was used to analyze the data.

Studies from different sources were compiled together to estimate the amount of work done towards this wetland. Studies from different researchers were collected through the libraries and internet to see their respective research areas in the study site. Old and most recent articles related to the study area were studied to understand the areas which needs to be focused for the effective conservation of the lake.

RESULTS

It was observed that despite severe threats hovering over the study site, the area is visited by numerous birds and mammals (Table 1).

Weed encroachment (31%), lopping (27%), grazing (20%) and wood cutting (12%) were found to be some of the major threats in the study site (Fig 3.). Since the wetland doesn't have a proper boundary demarcated, it is easy for the area to be encroached upon. The other threats recorded were siltation, eutrophication, encroachment, pollution (mostly plastic), Though there are studies conducted on the lake but recent studies are required to understand the changes which are occurring on a rapid rate in the wetland. As per the documents retrieved, some of the areas of study are never touched in the study site which

Table 1 : List of Faunal Species Recorded from Sheikha Lake

S. No.	Common Name	Scientific Name
AVIFAUNA		
1.	Sarus crane	*Grus antigone*
2.	Cattle egret	*Bubulcus ibis*
3.	Large cormorant	*Phalacrocorax carbo*
4.	little cormorant	*Phalacrocorax niger*
5.	Oriental Darter	*Anhinga anhinga*
6.	Grey heron	*Ardea cinerea*
7.	Marsh harrier	*Cirus aeruginosus*
8.	Purple swamphen	*Porphyrio porphyrio*
9.	Indian moorhen	*Gallinula chloropus*
10.	Spotted owlet	*Athene brama*
11.	Egyptian Vulture	*Neophron percnopterus*
12.	Little grebe	*Tachybaptus ruficollis*
13.	Bronze . winged Jacana	*Metopidus indicus*
14.	Spot billed duck	*Anas poecilorhyncha*
MAMMAL		
1.	Golden Jackal	*Canis aureus*
2.	Jungle Cat	*Felis chaus*
3.	Blue Bull	*Boselaphus tragocamelus*

could be important for its conservation. In a crux, it was tried to list the touched (Fig 4) and untouched (Table 2) areas of study in Shekha Lake. The analysis was solely based on the literature found.

DISCUSSION

There is a serious deficiency in data for recent years in the study area. This causes a window of uncertainty in any research work conducted from now on. During the visit to this lake two serious obstacles to wetland conservation decision making was observed. First, there still persists a serious lack of awareness for wetland functions and their benefits to society in adjoining villages. A second major problem to wetland evaluation is that the majority of wetland benefits points to the public in general, and not exclusively to a particular landowner. As decisions regarding wetlands in private ownership are usually based on individual benefit, the costs to society are seldom built into the evaluation.

Sheikha lake has no definite shoreline; the expanse of water and its depth vary with seasons. To conserve the lake, it is important to conserve its boundary as well.

A distinct feature or Sheikha lake is the profusion of aquatic vegetation it supports, in particular, the unique floating mats of vegetation *Ipoemia aquatica*. Although water hyacinth infestation and an excessive growth of *Ipoemia* have become serious problems in recent times, the lake has, even in the past been very rich in vegetation. Some *Typha* species are also seen in the peripheral areas.

The enormous quantities of vegetable matter decaying in the swamps make them high capacity fertilizer factories releasing large quantities of fish food. The

Figure 1 : Google Earth Image (Georeferenced) of Sheikha Lake

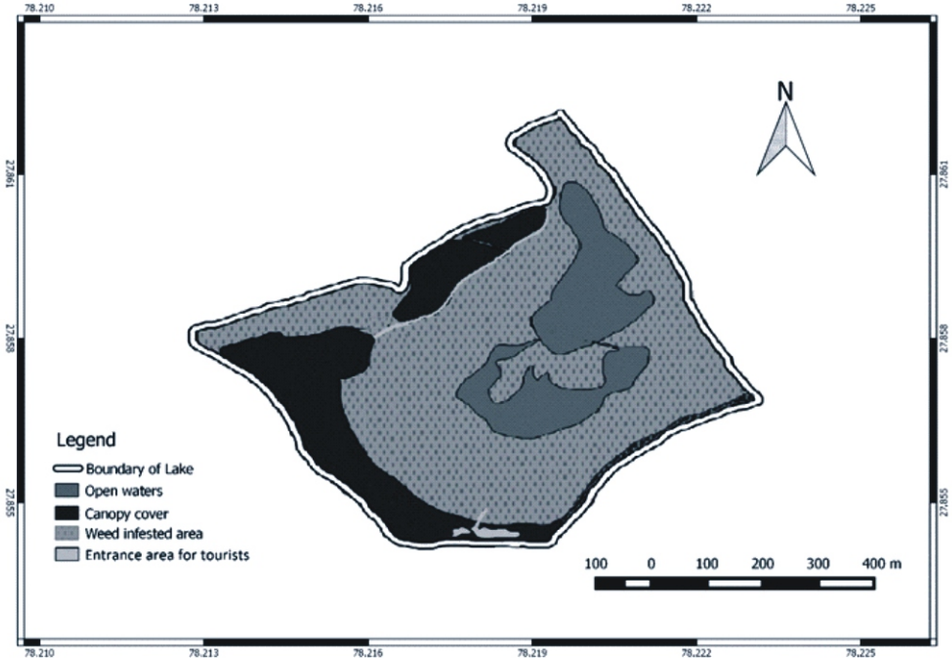

Figure 2 : Map of Sheikha Lake Prepared Through QGIS and Google Earth

Table 2 : Studies Which Were Never Carried Out in Sheikha lake and Which Needs to be Conducted to Understand the Biodiversity of the Study Site

S. No.	Suggested topic	Studies which could be conducted in the future
1.	Mammals	Individual study on mammals such as Nilgai, Jackal and other mammalian species and their interactions.
2.	Amount of anthropogenic pressure	The study could be conducted in detail including all aspects.
3.	Weed infestation	Study on the weed infesting the lake and the factors favoring its growth.
4.	Heronries	Formation of mixed hunting parties of various bird species.
5.	A complete ecosystem study	An official complete study on Sheikha Lake is still required.

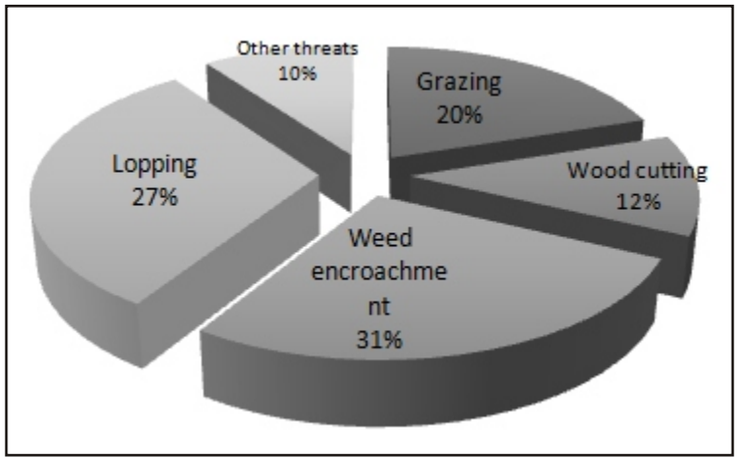

Figure 3 : Percentage of Various Threats Observed on Sheikha Lake

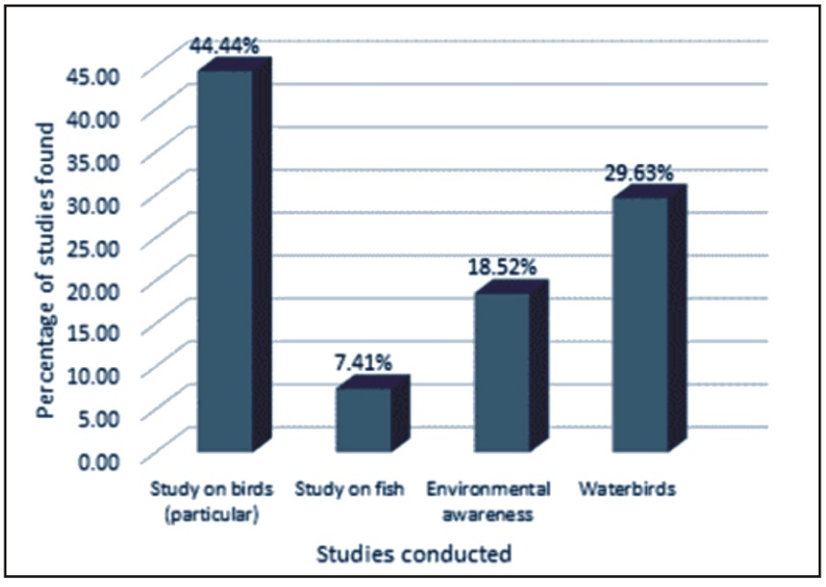

Figure 4 : Literature in Major Topics Found on the Studies Conducted in Sheikha Lake

agricultural fields in the surroundings of the lake owe all their fertility to the cycling of nutrients in the swamps.

Sheikha lake is in a bad condition than it was in the past. In order to ultimately reverse current pressures on the Sheikha lake ecosystem, a conservation strategy need to be developed and implemented. These resources need to be rejuvenated, while alternative channels of subsistence and employment must be sought.

There should be proper research and monitoring systems regarding the ecological problems of the lake. This includes soil conservation measures in the catchment, weaning shifting cultivators away from the damaging practice, and involving a combination of pasture development, cattle breed improvement and livestock reduction schemes to reduce siltation.

Manual and mechanical removal of water hyacinth *Eichhornia* sp. would generate employment. Facilities to utilize the weed for biogas production, paper, pulp and fiber, chemical products, and mulch and compost needs, to be introduced. The spread of weevils in the lake for the eradication of hyacinth urgently needs to be investigated.

Illegal encroachers should be dispossessed of their holdings, which could then be distributed among the genuinely landless unemployed. Unless these human issues are resolved, all conservation efforts will be futile.

Aquaculture should be encouraged in the catchment to reduce pressure on the fishery resources of the lake. Waterfowl in the area are vulnerable to illegal hunting. It is therefore, extremely important to make sure no such activities are prevailing in the area.

There should be a limit of usage for fertilizers on crop fields to control the pollution caused by run-off water in the wetland. Weed infestation is directly related to the large fertilizer inflow into the wetlands. Weeds like *Ipoemia* are to be eradicated for the betterment of the wetland and its fauna. Sewage and chemicals brought into the lake from the adjoining areas in the catchment, and the washing in of hazardous pesticides and insecticides sprayed on crops is damaging the water quality.

Only a concentrated effort on the part of official agencies, professionals, NGOs, and the local communities themselves, to comprehend the complexities of this delicately balanced, biologically rich wetland ecosystem, and take appropriate action, can save Sheikha Lake from demise.

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