Biodiversity of Ansupa Lake in Odisha & Need for Conservation

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***Abstract*—Sustainable management of natural resources has become a key issue for survival of life on earth. Conservation of biodiversity has been put to the highest priority through Convention on Biological Diversity (CBD). This paper identifies the uniqueness of the largest fresh water habitat in Odisha. The lake comprises 194 species of birds, 61 fish species, 244 macrophytes, 88 butterflies, 10 species of reptiles and 26 mammals. Freshwater Lakes, especially those that have significant importance from socio-economic point of view and sustenance of bio-diversity need to be protected from various manmade degradations. To bring in to focus the importance of organised restoration of degraded freshwater Lakes an effort is made through this write up to expose various facets of the problems encountered in Ansupa Lake and implementation of organised restoration strategies to overcome various setbacks and the future course of action, by synthesising available information. Natural hazards owing to their adverse impacts, also contribute to the loss of biodiversity. Thus, an urgent need has been felt to conserve the gene pool involving a mix of in situ as well as ex situ strategies.**

***Keywords*—Biodiversity, Ansupa Lake, Macrophytes, conservation, CBD.**

I. INTRODUCTION

Both Old World and New World cultures have been centered on freshwater habitats. Freshwater biodiversity is seriously threatened today - a telling indicator of the status of the world's freshwater ecosystems. Freshwater lakes are classical examples of habitat islands (in this case, bodies of water surrounded by expanses of land). Like islands in general, the larger, more ancient lakes tend to have high levels of endemism, and in the rift lakes of Africa or Lake Baikal of Central Asia, Chilka and Kolleru lakes of India species diversity can be spectacular. Biodiversity in freshwater systems is distributed in a fundamentally different pattern from that in marine or terrestrial systems. Organisms on land or in the sea live in media that are more or less continuous over extensive regions, and species adjust their ranges to some degree as climate or ecological conditions change. But freshwater habitats are relatively discontinuous, and many freshwater species do not disperse easily across the land barriers that separate river drainages into discrete units. This has three important consequences: a) freshwater species must survive climatic and ecological changes in place; b) freshwater biodiversity is usually highly localized, and even small lake or stream systems often harbour unique, locally evolved forms of life; and c) freshwater species diversity is high even inregions where the number of species at any given site is low, since species differ between one site and the next. Unfortunately, lakes are like islands in another way too: they suffer high rates of extinction when habitat modification begins or when exotic species are introduced. The introduction of non-native species - regrettably still often sanctioned or promoted by governments - is associated with the depletion of biodiversity and the collapse of major fisheries in such lakes as Lake Chapala of Mexico, Lake Gatun of Panama, and the Great Lakes of North America. Other factors contributing to the decline of freshwater ecosystems and their native biota are chemical and thermal pollution, over-harvesting and habitat modifications (such as dam construction). These factors have affected biodiversity to different degrees in both industrialized and developing regions. In Europe and North America, pollution, acidification, and the physical modification of streams have had the greatest impact. In much of South America and Africa, Over-harvesting and introduction of nonnative species are relatively more important as agents of biodiversity loss. Programs to protect freshwater biodiversity in industrialized countries have lagged far behind the programs for saving terrestrial biota. Unfortunately, freshwater sustainability issues do not appear to be a primary consideration in the planning and implementation of

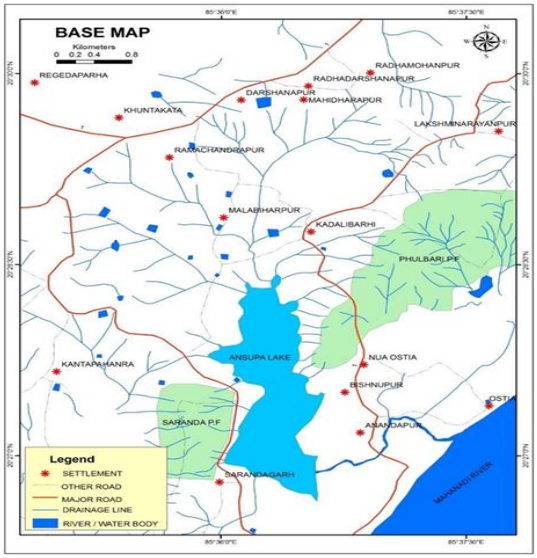
water use projects, nor in the allocation of use permits. In India, in spite of promulgating various laws to protect our water bodies and coastal wetlands, bio-degradation of these fragile ecosystems reached alarming stage necessitating focused rehabilitation of some of the famous fresh water bodies that are in one way or the other are connected with the coastal corridor and through which the adjacent offshore segments. Study after study shows, all over the world, that the health of many of the freshwater lakes (including the 5 Great Lakes of US) is in jeopardy. While we have been working heroically to hold the line over the years to prevent their further decline, we have been entrusted with powerful new resources to rehabilitate the lakes: leadership at the highest levels demanding action, policy tools, and the promise of significant financial resources. With these, there are no more reasons for delay. After all, many of the lakes including Kolleru Lake of India have endured some 50 to 150 years of abuse. Though it will take time for the ecosystem to respond to our actions today, there is not another minute to lose in restoring these magnificent waterways for tomorrow. To the extent that actions undertaken now increase the resiliency of the ecosystem, they will also help the Lakes adapt to climate change. The well articulated Action Plans adapted by different countries, following well tested quality norms– including the funding andother policy tools that will be used to leverage its outcomes – are intended to realize our goals: that the fish are safe to eat; the water is safe to drink; the beaches and waters are safe for swimming, surfing, boating and recreating; native species and habitats are protected and thriving; no community suffers disproportionately from the impacts of pollution; and the Lakes are a healthy place for people and wildlife to live. An effort is made here to bring into focus the alarming destruction of important water bodies of India, especially Kolleru Lake and steps initiated to cure the setbacks and prevent further degradation.Since the degradation and subsequent rehabilitation are fraught with various socio-economic ill effects, the presentation is confined to specifics of scientific importance. We, however, reproduced the excellent presentation made by Nagabhatla and Sellamuttu (2008) to educate the present generation scientific community to view at environmental issues with an open mind and take up scientific studies to focus on over all wellbeing of our environment, specially water bodies and wetlands located in the ecologically fragile coastal corridor.

II. STUDY AREA

Ansupa is the largest freshwater lake and important inland wetland of Odisha situated in Banki Sub-division of Cuttack district and has its fame from time immemorial for its scenic beauty, biodiversity and natural resources. It is an Oxbow lake found due to meandering of River among the many beautiful spots in the state of Odisha, its natural scenery and situation attracts large number of Tourists. It is said that in earlier times Ansupa was known as “Anasapata” as it is a water source formed out of a part of river Mahanadi. Others would say that it was known as ‘Hansapata’ as its water source had attracted hoards of wild swans in the past. Be that as it may, the lake is now known as Ansupa. But with passage of time, the eco-degradation of this nature’s bounty was started with thick growth of aquatic weeds of various types. The lake water gradually lost its productivity due to non penetration of sunlight through thick weed cover. The lush green forest cover started depleting on the hillocks around the lake. Some parts of the hillocks are recently planted with Anacardiumoccidentale and Acacia auriculaeformis. Its natural scrub jungles are no more seen. The lake, which was once rich with valuable carps, cat fishes and murrels and lotus on crystal clear water, as poets describe, is now full of varieties of aquatic weeds. The channel which was connecting the lake with the river Mahanadi through which the flood water from the river Mahanadi was entering into the lake was almost dead, most probably due to the rising sand bed of river and changing river course. Previously during the high flood, the flood water of the river Mahanadi used to pass through the lake from its south eastern side and was driving away the weeds through its south western side and was a process of natural de-weeding. Now the backwaters of south eastern side do not have sufficient force to take away the weeds. So the water body of the lake was now seen completely covered by different types of weeds, leading to excessive growth of aquatic weeds belonging to rooted, submerged and floating categories. The decay of weeds and its accumulation on the bed of the lake gradually increased organic sedimentation. Though the catchment area is recently planted with Anacardiumoccidentale (Cashew) the steep hillocks have very poor ground flora and therefore the surface run off is constantly adding the silt into the lake. Besides, the huge amounts of weeds which are 5 completing their life cycles in the lake added to the problems. Therefore, the lake bed was

rising every year. The high amounts of organic deposits are have resulted due to eutrophication of the lake; as a result, the water quality is drastically going down causing a great loss to the fish productivity of the lake. The size and amount of the fish production was decreasing every Year. The lake which was producing over 50 tonnes of fishes annually in the long past was gradually declining and reached its lowest landing of 3.75 tonnes in 1986-87. The lake water is also being used for agricultural irrigation in the peripheral areas. There are four lift irrigation points which help considerably for agriculture. On the other hand by closing the openings of two inlets 'Godighai' Hanaghai' and kabulajora' the local village grow different corps in rabiseason and even in kharif season in the Years of drought. However, the local people do not take much interest to develop this wetland and its resources. The water is polluted through various sources, particularly due to eutrophication, through decay of weeds and now the sewage from the nearby public Health Centre being drained into the lake. The problems of encroachment by the local people for agricultural activities is well marked during the onset of summer when they go for summer paddy (cultivation on the fringes of the lake by putting earth barriers to separate the peripheral low water lying areas from the main water bodies. In Ostia even the whole water is drained into river Mahanadi by opening the earth barrier and converting the whole water body into cultivated field in summer.

Fig:1: Ansupa Lake (BASE MAP)



III. RESEARCH METHODOLOGY

A visit was undertaken to the site during the year 2023 and biodiversity of Ansupa Lake was noted. Various information and data were collected during interaction with local inhabitants.

IV. RESULT & DISCUSSION

Birds are playing an important role in the Eco-system as a part of food web, Wetlands are important bird habitats and Birds use them for feeding and nesting. Ansupa Lake is the habitat of ample number of domestic as well as migratory birds during winter seasons. No systematic documentations of birds species are available till now.

The following fauna and flora were detected during the study period.

Fig-2: Fishes of Ansupa Lake

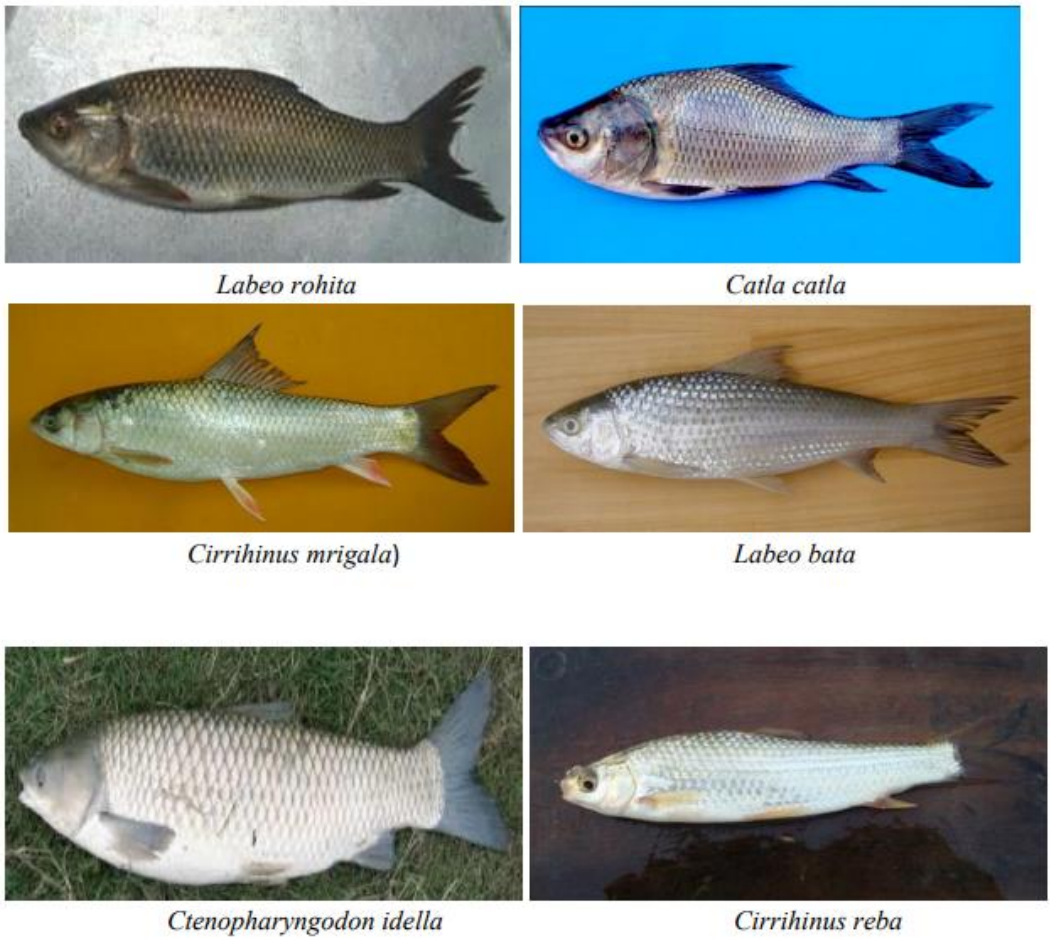


Fig-3: Birds of Ansupa Lake

Table:1 Checklist of birds of Ansupa lake

Family	Common name	Scientific name
Anatidae	Cotton pygmy goose	*Nettapus coromandelianus*
	Lesser whistling duck	*Dendrocygna javanica*
	Northern shoveller	*Anas clypeata*
	Red crested pochard	*Rhodonessa rufina*
	Brahminy shelduck	*Todorna ferruginea*
Ardeidae	Black-crowned night heron	*Nycticorax nycticorax*
	Black bittern	*Dupetor flavicollis*
	Cattle egret	*Bubulcus ibis*
	Crestnut bittern	*Ixobrychus cinnamomeus*
	Grey heron	*Ardea cinerea*
	Median egret	*Mesophoyx intermedia*
	Little egret	*Egretta garzetta*
	Indian pond heron	*Ardeola grayii*
	Purple heron	*Ardea purpurea*
Ciconidae	Asian open-bill stork	*Anastomus oscitans*
	Painted stork	*Mycteria leucocephala*
Charadriidae	Red wattled Lapwing	*Vanellus indicus*
	Little ringed plover	*Charadrius dubius*
Alcedinidae	Small blue kingfisher	*Alcedo atthis*
	Lesser pied kingfisher	*Ceryle rudis*
	Stork-billed kingfisher	*Halcyon capensis*
	White-breasted kingfisher	*Halcyon smyrnensis*
	Chestnut headed bee-eater	*Merops leschenaulti*
Pycnonotidae	Red whiskered bulbul	*Pycnonotus jocosus*
	Red vented bulbul	*Pycnonotus cafer*
Strigidae	Spotteed owlet	*Athene brama*
Ramphastidae	Brown-headed barbet	*Megalaima zeylanica*
Columbidae	Spotted dove	*Streptopelia chinensis*
	Little brown dove	*Streptopelia senegalensis*
Corvidae	Jungle crow	*Corvus macrorhynchos*
Motacillidae	Paddy field pipit	*Anthus rufulus*
Jacanidae	Pheasant-tailed jacana	*Hydrophasianus Chirurgus*
	Bronze-winged jacana	*Metopidius indicus*
Rallidae	Purple moorhen	*Porphyrio porphyrio*
	Common moorhen	*Gallinula chloropus*
	White-breasted waterhen	*Amaurornis phoenicurus*
	Common coot	*Fulica atra*
Phalacrocoracidae	Little cormorant	*Phalacrocorax niger*
	Indian shag	*Phalacrocorax fuscicollis*
	Great cormorant	*Phalacrocorax carbo*
Recurvirostridae	Black-winged stilt	*Himantopus himantopus*
Scolopacidae	Common sand piper	*Actitis hypoleucos*
Estrildidae	Red munia	*Amandava amandava*
	White rumped munia	*Lonchura striata*
Laridae	River tern	*Sterna aurantia*
Accipitridae	Black kite	*Milvus migrans*
	Western marsh harrier	*Circus aeruginosus*
	Black shouldered kite	*Elanus caeruleus*
Falconidae	Red-headed falcon	*Falco chicquera*
Phasianidae	Common quail	*Coturnix coturnix*
Dicruridae	Black drongo	*Dicrurus macrocercus*
Nectariniidae	Purple sunbird	*Nectarinia asiatica*
	Purple rumped sunbird	*Nectarinia zeylonica*

Table-2: Macrophytes of Ansupa Lake

Emergent macrophytes	Floating Leaved macrophytes
Aeschynomene aspera Linn.	*Aponogetonnatans* (Linn.) Engl. & Krause
Coldeniaprocumbens Linn.	*Euryaleferox*Salisb.
*Cyperuscephalotes*Vahi	*Ipomoesaquatica*Forsk.
Cyperusplatystylis R.Br.	*Nelumbo nuciferaGaertner*
Echinochloastagnina (Retz.) Beauv.	*Nymphaesnouchali*Burm.f.
Ecliptaprostrata Linn.	*Nymphoideshydrophylla* (Lour.) Kuntze
Eleocharis dulcis (Burm.f.) Hanschel	*N.indica* (Linn.) Kuntze
*Enydraflactuans*Liour.	*Trapa natansvar. bispinosa* (Roxb.) Makino
Fuirenaciliaris (Linn.) Roxb.	**Submerged macrophytes**
Limnophytonobtusifolium (Linn.) Mig.	*Ceratophyllumdemersum* Linn.
Ludwigiaadscendens (Linn.) Hara	*Hydrillaverticillata* (Linn.f.) Royle
L.octovalvis (Jacq.) Raven	*Limnophilaheterophylla* (Roxb.) Benth.
Monochoria hastate (Linn.) Solms.	*Myriophyllumtetrandrum*Roxb.
Oryza rufipogon Griff.	*Najas foveolata* A.Br. ex Magam.
Panicum repens Linn.	*Ottellaalismoides* (Linn.) Pers.
Phyla nodiflora (Linn.) Greene	*Potamogetoncrispus* Linn.
Polygonum barbatum Linn.	*Potamogetonpectinatus* Linn.
*P. glabrum*Willd.	*Vallisnerianatans* (Lour.) Hara
Saccharum spontaneum Linn.	
Sacciolepisinterrupta (Wild.) Stapf	**Free floating**
Sagittariatrifolia Linn.	*Echhorniacrassipes* (Mart.) Solms.
Scirpusgrossus Linn. f.	*Pistiastratiotes* Linn.
Scleriaterrestris (Linn.) Fass	*Salviniacucullata*Roxb.
Setariapumila (Poir.) Roem. & Sch.	*Utriculariainflexa var. stellaris* (Linn.f.) P. Taylor
Sphaeranthus indicus Linn.	
*Typha angustata*Bory&Chaub.	

Table-3: List of fin fishes of Ansupa lake

Sl. No.	Name of fish species	Sl. No.	Name of fish species
1.	*Catlacatla*	21.	*Channastriatus*
2.	*Labeorohita*	22.	*Channamarulius*
3.	*Cirrhinusmrigala*	23.	*Channapunctata*
4.	*Labeocalbasu*	24.	*Clariasmagur*
5.	*Labeobata*	25.	*Heteropneustesfossilis*
6.	*Cirrhinusreba*	26.	*Anabas testudineus*
7.	*Cyprinus carpio*	27.	*Wallago attu*
8.	*Ctenopharyngodonidella*	28.	*Mystuscavasius*
9.	*Salmophasiabacaila*	29.	*Sperataseenghala*
10.	*Systomussarana*	30.	*Glossogobiusgiuris*
11.	*Puntius sophore*	31.	*Nandusnandus*
12.	*Puntius terio*	32.	*Badisbadis*
13.	*Pethiaphutunio*	33.	*Ompokbimaculatus*
14.	*Rasbora daniconius*	34.	*Mastacembelusarmatus*
15.	*Amblypharyngodonmola*	35.	*Monopteruscuchia*
16.	*Lepidocephalichthysguntea*	36.	*Notopterusnotopterus*
17.	*Parambassislala*	37.	*Ailiacoila*
18.	*Parambassisranga*	38.	*Macrobrachiummalcolmsonii*
19.	*Trichogasterlalius*	39.	*Macrobrachiumlamerrii*
20.	*Trichogasterfasciata*	40.	Smaller*Macrobrachium sp.*

Conservation status:

Wetlands are vital ecosystems that provide livelihood for the millions of people who live in and around them. The value of wetland system to the earth and to human kind is of paramount importance for sustainable development. The area of Ansupa lake in the early nineties was 320 hector. Today it is restricted to only 231 hector. Although India is a party to the Ramsar convention, it does not have strong national laws to prevent the misuse of wet lands. A study published by the Salim Ali Centre for Ornithology and Natural History, Coimbatore says that between 1991-2001, India lost 40% of its wetland. The National Wetland Conservation Programme was started in 1987. India's wetlands are extraordinarily diverse – ranging from lakes and ponds to marshes, mangroves, backwaters and lagoons, and play a vital role in maintaining water balance, flood prevention, biodiversity and support food security and livelihoods. This water body is also ideal site for wintering birds. In the past huge number of birds used to this place. But the number is very less now due to the vanishing fish production in the lake and scrub jungles round the lake resulting in the destruction of ideal habitat for birds. So busy shrubs should be planted to the periphery of the lakes to help nesting and breeding of the birds. There should be complete prohibition of bird poaching in lake area.

Since recently lot of interest has been generated both at government (Odisha State) and private levels for the development of Ansupa Lake a detailed eco-floristic study of this lake has been carried out which help in the management and monitoring the ecodevelopment programme. As a case study it will be a guideline for the eco-floristic analysis of other water bodies enumerated earlier.

Hardly any step has so far been taken for improvement of the lake habitat and it is now necessary to prepare a database of the biodiversity of the lake. A good no. of resident birds is seen in the lake and the no. goes as high as 8000 to 10,000 during winter. With the improvement of the lake eco-system, the lake will definite be the destination of migratory and resident birds. Improvement of forest cover in the

catchment area can be the abode of many wild animals. Thus, the thrust of this activity will be to improve the wildlife management in Ansupa through community-based protection, and constitution of anti- poaching squads for protection of birds. The second priority is aimed at creating awareness and capacity building among the local villagers through workshops, seminars, awareness campaigns in schools and other crowded places in and around the Lake.

Besides, wide varieties of aquatic plants & shoreline plants are available in Ansupa lake. An inventory of aquatic plants was documented by CDA earlier. But there has been considerable changes in the macrophytes types/species has taken place in the meanwhile which need to be documented through scientific inventory. Apart from macrophytes, phytoplankton, zooplankton and macrobenthick organisms are also required to be documented through inventory in order to help repairing biodiversity 65 conservation and management planning. The overall biodiversity groups would be as under.

1. Birds (Avifauna)
2. Aquatic macrophytes
3. Terrestrial macrophytes/higher plants
4. Pisces (separate budget provision has been given under fishery component)
5. Phytoplankton & Zooplankton
6. Macrobenthic invertebrate organisms
7. Wild animals

V. CONCLUSION

It is clearly evident from the information gathered from presently available literature that freshwater lake management needs committed and focused integrated management strategies. Unless constant monitoring of various facets of restoration and post restoration measures is carried out on a regular basis, covering various components none can ensure sustenance of lake`s health. Details included in the present write up need to be supplemented by ongoing studies by various organisations to have a comprehensive understanding of freshwater lake ecosystem and its impact on bio diversity. To summarize the major problems of the lake are:

(I) Poor vegetation on the catchment (degraded catchment) of the lake resulting in soil erosion
(II) The channel connecting the lake with the river is no more functional. The natural de-weeding process is being arrested.
(III) Gradual decreasing of water depth of the area and high rate of weed infestation.
(IV) Environment of the fringes (low water laying areas) of the lake for agricultural use
(V) Depletion of the fishery resources of the lake.

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