

# INTEGRATED SUSTAINABLE ENVIRONMENTAL CONSERVATION OF ANSUPA LAKE : A FAMOUS WATER RESOURCE OF ORISSA, INDIA

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## SYNOPSIS

*The most important water resources are wet lands like lakes and reservoirs. Apart from being sources of water, Lakes are highly productive eco systems. A large number of people depend upon the lake resources for irrigation, drinking, fishery, energy production etc. for their sustenance. It has unique bio diversity character. It harbors a large number of aquatic fauna and flora. Sometimes the productivity is more than agriculture resources. Coastal lakes like Chilika lake and inland lake like Ansupa lake Orissa are very important water resources and very famous Natural Heritage sites.*

*Ansupa lake is the largest very old fresh water lake of Orissa. It is situated between 85° – 86° E Long., & 20° 31' N Latitude near the bank of biggest river Mahanadi. It was formed as a part (Ansa in Oriya language) of the biggest river Mahanadi a water source (Pata in Oriya language), called "Ansa Pata" now called as Ansupa lake. It is bounded by Saranda hills on the western side and Bishnupur hills on its northern side, part of eastern Ghat region. It is of national importance due to its unique bio diversity character.*

*It is linked directly with river by a channel, Kabula Nalla, which acts as both inlet and outlet, through which flood water enters the lake and excess water also goes out after the flood. Another channel Hulluhula Nala, which was acting as inlet is now defunct.*

*The water spread area was 419.15 Acres now reduced to 375 to 380 Acres. The maximum depth was about 15 to 20 meters, now reduced to 8 to 10 meters. The average depth being 4 meters. The total catchment area is about 2810 ha., reduced to 1544 ha. for treatment. It harbors 24 types of aquatic flora having submerged, floating and emergent types of weeds, 27 types of fishes, 29 types of migratory & resident birds, 12 types of reptiles. The rain fall is 48 inch to 15 inch per year and the relative humidity is 47%.*

*It is surrounded by 4 Panchayats having about 25,000 people who depend upon the lake resources for their day to day living, mostly fishery.*

*Due to various environmental degradations like siltation, decrease in flow circulation of water, closer of inlet and outlet mechanism of flow of water, highly eutrophic condition, weed infestation, the lake is degrading very fast threatening the eco system. As a result, the fishery and tourism potentials were adversely affected.*

*Realizing the importance of conserving the lake the State Govt. has initiated an Integrated Sustainable Environmental Management Programme like Catchment Area Treatment, including Soil Conservation Measures with heavy plantations to arrest siltation and eutrophication, engineering intervention to augment floor circulation of water by opening inlet channel from river Mahanadi and developing outlet channel, desilting and dewatering activities, Weed Management Activities, Common Property Resource Management including development of Fishery and Eco-tourism and Constant Environmental Monitoring to assess the progress of the work. Apart from that various socio-economic activities like Community Participation through Water Shed Committees, SHG formation and training etc. for alternate income generation activities are being carried out for the peripheral villages of the lake.*

*The key management strategy is that all activities are being carried out very successfully with active participation of local committee to make it sustainable.*

**Key Words :** Integrated, Sustainable, Environmental, Management, Lake and Community, Participation.

## 1. INTRODUCTION

Ansupa Lake is the largest freshwater lake in the State of Orissa and geographically it is situated between 85-86° Longitude East and 20°31' Latitude North. It is on the left side of the river Mahanadi, the biggest river of Orissa and is about 87 kms from the state capital Bhubaneswar.

The lake is bounded by Saranda hills on its western side, Bishnupur hill on its north-eastern side and by villages, which are pre-dominated by fishermen families. The lake is connected in its south-west side with the river Mahanadi by a channel called Kabula Nullah through which flood waters of river Mahanadi enters into the lake. There is another channel called Hulluhula Nala, which has also an opening to Mahanadi acted as outlet to flush out excess water from the lake. The lake also used to get water through other sources like Sankana Nalla, Khandaka Nallah and Kantapahara Patta, which are now defunct. Over the years due to environmental degradations like closure of the inlet and outlet mechanism of flow of water, siltation, weed infestation and water quality changes and due to high eutrophic condition, the wetland is in the process of decay, which need to be conserved well for posterity with wise use concept.

The lake is of national importance due to its unique biodiversity character and is a famous natural heritage of the State of Orissa. It harbours, a large number of fishes, aquatic plants (submerged, floating and emergent types). Different types of domestic and migratory birds visit the lake in winter-time, attracting a large number of tourists. A very old fort called Saranda Fort built during Keshari dynasty is situated near the lake.

This wetland is a highly productive ecosystem. About more than twenty thousand people living in the peripheral villages in four panchayats depend very much on the lake resources mainly fishery of the lake for the livelihood.

## 2. ORIGIN

The literature survey revealed<sup>1</sup> that Ansupa was known as Ainspa Pat (Ansa-pata) as it is a water source (Pata) formed out of a part (Ansa) of river Mohanadi. It was also known as Hansa-Pata as it is a water source (Pata) and had attracted hoards of wild swans (Hansa) in the past. In course of time, be that as it may be, lake is now known as Ansupa Lake.

## 3. PHYSICAL & CHEMICAL FEATURES

### 3.1 Area

Old records<sup>1</sup> reveal that originally the area of the lake was 419.15 acres. But due to the process of siltation, a major

part of the water spread area has been converted into paddy field and it has been reduced to 375 to 385 acres. The maximum depth was about 15 to 20 meters, which has considerably reduced due to heavy siltation to 8 to 10 meters now. The average depth being about 4 meters. The total catchment area is about 2810 hectare and is situated in the mid central table land zone (Agro-climatic zone).

### 3.2 Rainfall and Climate

The settlement report of 1920 reveals that the lake area was receiving an average annual rainfall between 53" to 57". But with denudation of forest cover the average rainfall has now got reduced to 48-50" a year. There are about 73 rainy days and the temperature varies from 55°F to 104°F and the relative humidity varies from 72% to 80% during south-west and post-monsoon periods.

## 4. POPULATION

The local population in the surrounding area of the lake is around 20,000 out of which about 25% are fishermen, who depend fully on the lake resources, i.e. fishery for their sustenance.

## 5. LAND USE LAND COVER

The land use and land cover pattern around Ansupa lake area was studied with the help of the sequential satellite imageries taken during last 10 years and also the use pattern particularly by the people residing in 14 revenue peripheral villages were determined.

### 5.1 Bio-diversity Character

Ansupa Lake is having unique bio-diversity character. It harbours 21 types aquatic flora, 24 types of fishes, 27 types of common resident birds, 14 types of migratory birds visit the lake in Winter time, 12 types of reptiles. 22 types of wild animals are present near the lake. Apart from that 27 + 6 types of valuable tree species, 9 types plant species, 3 types of shrubs, 5 types of common climber and 8 types of important herbs are available near Ansupa Lake.

The entire eco-system is threatened due to various environmental degradations occurring in the lake. Steps to be taken to conserve the lake and restore the eco-system.

## 6. SCIENTIFIC STUDIES

### 6.1 Water Quality Analysis

Water samples from six representative stations were collected during January 2006 to December 2006. Relevant parameters like water depth, water and air temperature, transparency of water, pH, alkalinity, acidity,

free CO<sub>2</sub>, dissolved O<sub>2</sub>, solubility of oxygen, chloride content, total hardness, NO<sub>2</sub>, PO<sub>4</sub>, SiO<sub>3</sub> and chlorophyll concentration were analysed. Analysis results indicate variable characteristic features in different parts of the lake. Based on the analysis results the water quality condition and eutrophic status of the lake have been evaluated.

## 7. PROBLEMS OF THE LAKE

The important issues responsible for deterioration of the wetland which were identified would be stated as follows –

### (a) Siltation

There is heavy siltation. The quality of the silt is mainly clay and sand and about one lakh metric ton of silt enter the lake during rainy season every year.

### (b) Weed infestation

There is rapid proliferation of freshwater weeds in the lake like submerged, emergent and floating types of 21 varieties, which is due to heavy nutrient loading like N and P from the peripheral paddy fields and also due to the use of detergents by the people resulting in high eutrophic condition of the lake water. About 1/3<sup>rd</sup> of the water spread area is weed infested.

### (c) Decrease in water circulation

The closure of the inlet and outlet mechanism of flow of water from river Mahanadi resulting in water circulation and increase in sedimentation process.

### (d) Water quality degradation

Due to heavy nutrient flow and due to human intervention, the water quality of the lake has considerably degraded and polluted and it is highly eutrophic condition.

### (e) Decrease in fishery potential

There were a number of freshwater fishes, about 24 types in the lake. There is considerable decrease in fishery potential. Pisciculture was introduced during 1985-86. The fish production (Catch) went up during 1985-88. But due to environmental degradation, at present the fish catch has declined from 50 kg per day (during the above period) to about 10-5 kg a day at present.

### (f) Decrease in avi fauna

There is considerable reduction in the number of migratory and resident birds due to improper condition of the lake habitat.

## (g) Tourism Potential

Ansupa Lake has its fame since time immemorial among the beautiful tourist spots in the State of Orissa. The natural scenery and the environmental situation have attracted the poets and writers in the past. Due to the presence of a very old historical fort it is considered as a natural heritage site of Orissa. Several migratory and resident birds visit the lake in winter time. There is tremendous tourism potential.

## 8. MANAGEMENT STRATEGIES

Various scientific and detailed socio-economic studies were undertaken. Various issues related to environmental deterioration of the lake were identified. Accordingly management strategies were determined for integrated sustainable environmental conservation of Ansupa Lake with various developmental objectives.

## 9. IMPACTS OF ADVERSE FACTORS

- (a). Rapid change of the eco-system, due to various environmental factors like eutrophication and weed infestation and water quality changes, etc. has adversely affected the productivity of the lake, thus, adversely affecting the socio-economic condition of the local community.
- (b). Closer of the inlet of the lake coupled with rapid silting threatened the lake of its existence and its bio-diversity character.

## 10. AMELIORATING MEASURES

In order to protect and develop the wetland for wise use concept an integrated sustainable ecological development project proposal is being formulated for long term measures.

## 11. OBJECTIVE

### 11.1 Approach

There are two fundamental reasons for preparing an Integrated sustainable environmental management Plan for Ansupa Lake, which should be sustainable.

The first reason is the physical and chemical changes which are occurring in the lake as a result of sedimentation, weed infestation and eutrophication reduction in the water quality and reduction in productivity of the aquatic environment.

The second factor is equally important, is the set of human changes which have occurred in the last four decade, most notable is the involvement of conflicting interest in the local

community, the increased population, the disregard for conservation, and especially the uncontrolled expansion of unauthorized use pattern in the periphery of the lake, resulting in the considerable decrease in the water spread area and water quality.

Therefore, various physical, ecological, scientific and socio-economic and institutional issues were identified and accordingly the detail action plans have been prepared and some of those are being implemented by the State Government.

Therefore, a long term integrated sustainable environmental conservation of Ansupa lake and its ecosystem plans are being implemented with community participation at every stage of implementation.

#### **Work already done in the field :**

The important action plan which is being implemented by the State Government for the conservation and restoration of Ansupa Lake in an integrated manner.

#### **Activity – 1 : Improvement of Water Circulation**

Improvement of water inflow and outflow mechanism from Mahanadi to Ansupa Lake by digging one inlet channel directly from Mahanadi and improving the outlet channel with a sluice gate through engineering intervention.

#### **Activity – 2 : Desiltation and Periphery Management**

Since the lake bed has become nutrient rich over the years, therefore desilting the area is absolutely necessary to get rid of the bottom sediment and increase the carrying capacity of the lake. About one lakh cum of silt has been removed by dredging with the available funds from 10<sup>th</sup> Finance Commission. This desilted material is disposed off at nearby place, preferably near paddy fields and making a periphery bund.

#### **Activity – 3 : Catchment Area Treatment**

- Some Soil conservation measures like gully control traps, water harvesting structures have been constructed at the catchment area.
- About one km. of periphery bunds has been made to arrest eroded soil to come into the lake and arrangement for flushing water.
- Some periphery plantation at the periphery has been made to arrest soil erosion. But a lot more plantation is to be done.

#### **Activity – 4 : Weed Management**

It consists of :

- Selective De-weeding including up-rooting manually

with community participation about half of the water spread area has been carried out.

- Disposal of de-weeding material for green manure
- Steps are being taken to use of de-weeded material as green manure / bio-gas generation.

#### **Activity – 5 : Common Property Resource Management**

Efforts are being made to develop common property which are treated as waste land for agriculture and cash crop plantation purposes with the help of community mobilization and participation.

#### **Activity – 6 : Fishery Development**

After desilting and dewatering the lake efforts are being made to improve the fishery potential by way of making hatcheries to breed fish seeds and then put it in the lake to grow for catching the fish and marketing by the people which would improve their income generation activities.

#### **Activity – 7 : Tourism Development**

After renovating the lake efforts are being made to improve the tourism potential by making tourist huts, by making arrangements for boating and angling etc.

All these above mentioned activities are being implemented in phased manner and in an integrated manner by the State Govt. of Orissa with community mobilization and participation to make it sustainable.

## **12. IMPLEMENTATION PROCESS**

- Community mobilization camps in different villages (13 Nos)
- Formation of water-shed development team (WDT) in which one soil scientist, one social scientist, Agriculture and Horticulture experts are included.
- Formation of water-shed committees in Panchayat levels (Four)
- Formation of village level groups like user groups, labour groups, fishermen groups and SHGs.
- **Catchment area treatment :**
- Community participated in catchment area treatment like construction of GCs and LBS and water harvesting structures.
- **De-silting and de-weeding activities :**
- Similarly, fisherman and labour groups participated in manual de-weeding.
- **Plantation programme :**
- SHGs and labour groups participated in plantation programmes



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#### 12.1 Creation and Activities of SHGs

- 100 women SHGs have been formed and mobilized.
- Participated in Awareness Generation Programmes and Training Camps
- Alternate income generation activities.
- Various training programmes in handicraft, handloom and in agriculture sector are being given to SHGs through various Govt. agencies like Women and Child Dept., by NABARD and Industry Dept., Govt. of Orissa.

#### 13. COMMON PROPERTY RESOURCE MANAGEMENT

Ansupa lake is surrounded by 5 panchayats like Subarnapur, Kadalibadi, Ostia, Kantapanhara, Malabiharpur. Some of the land which is lying as waste land and are not being used. Such common property is to be developed in such a way that it would be used by the villagers for earning their livelihood.

#### 14. CONCLUSION

It has been found that the Environmental Conservation of Ansupa Lake in above mentioned manner has yielded date very satisfactory results when it is done in an Integrated Manner with active community participation at every stage of implementation of programme to make it Sustainable. This is a very good example of conversing wetlands in future.

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