Integrated Management Plan for ANSUPA LAKE

2019-20 to 2023-24

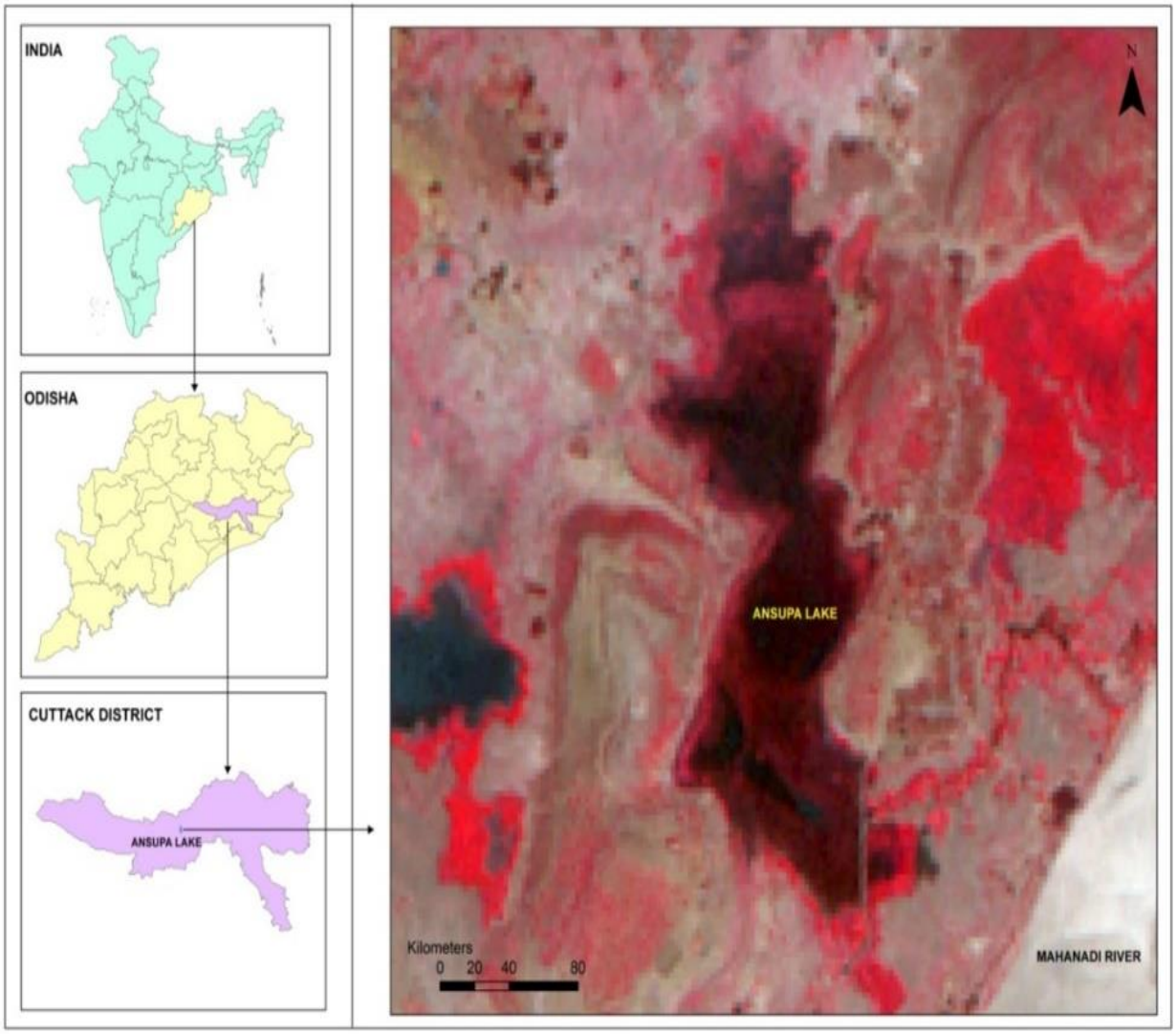
ANSUPA LAKE Brief

Sl. No.	Item	Description
1	Wetland Name	Ansupa LAKE
2	Wetland Area (in ha)	206.65
3	Locations: (District, State)	Cuttack, Odisha
4	Area of the Direct Catchment (in ha)	5231 ha
5	Name of the nodal agency for management plan implementation	Chilika Development Authority (CDA), Forest & Environment Department, Government of Odisha
6	Management Plan Period	2019-20 to 2023-24
7	Date on which approval of State/UT Wetland Authority was obtained	No. ENV-II-47/2019 17590/F&E, Date. 17.09.2019
8	Total Budget	INR 2123 Lakhs
9	Total Fund available from Convergence sources	INR 600 Lakhs
10	Funds requested from the MoEF & CC, GOI, New Delhi	INR 747.96 Lakhs for a period of three years from FY 2021-22 to FY 2023-24

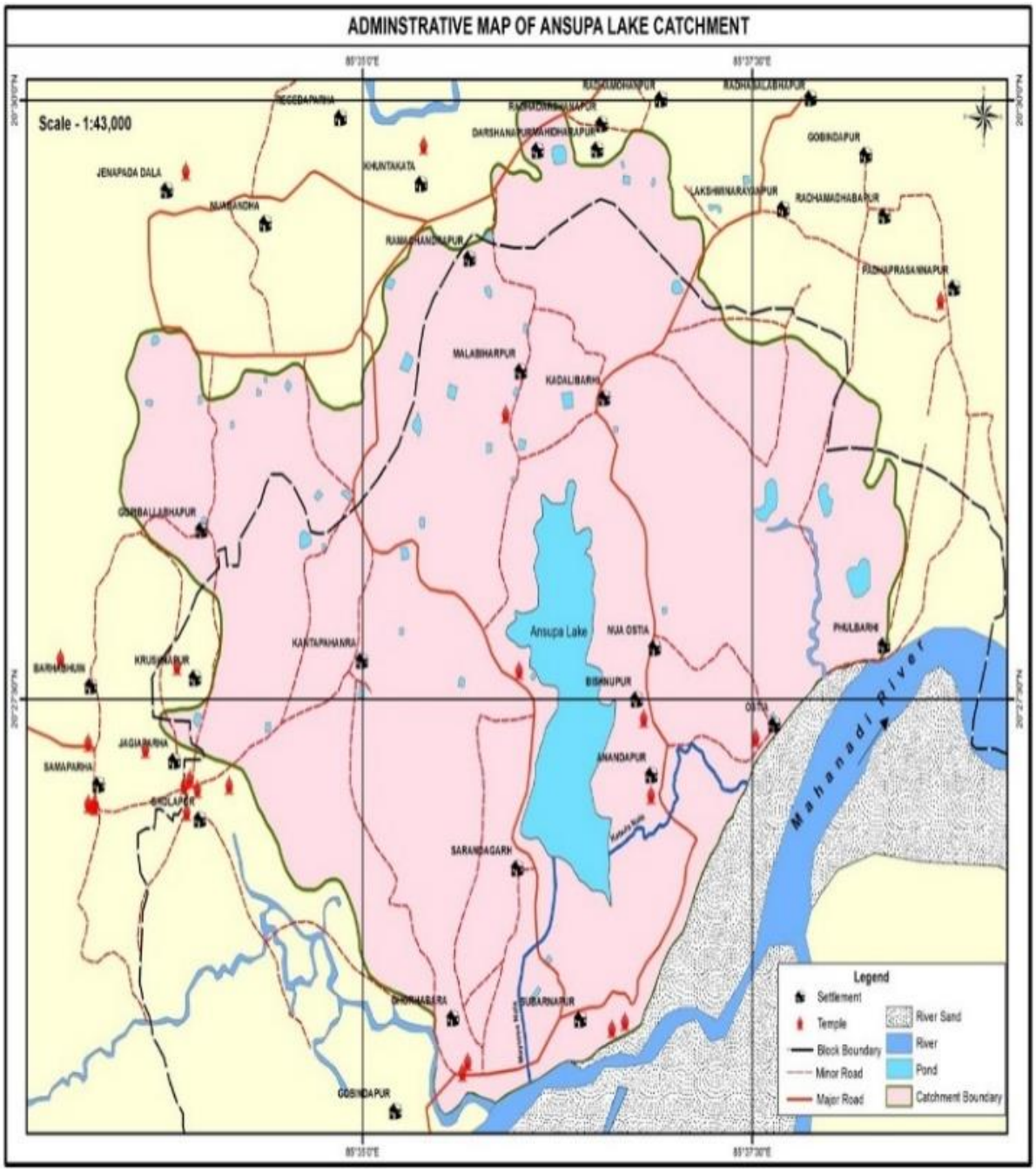
1. Introduction:

1.1. Rationale for management Planning

Wetlands are highly productive eco-system referred to as Supermarket of nature and are being understood recently for their values and functions. The wise use of wetland resources and the community participation is another dimension of wetland management.



Some of the detrimental factors responsible for the degradation of wetland ecosystem are deforestation, industrial growth, urbanization and over exploitation of wetland resources



like alternation of land use practices etc. The fertilizers and pesticide runoff from agriculture field, domestic sewage, industrial waste and unsustainable use of the wetland resources adversely. Excessive nutrient loading is also detrimental to the wetland ecosystem resulting in eutrophication. This also led to proliferation of macrophytes including the invasive species pose a serious management problem. Much of our limnological understanding originates from natural lake ecosystems.

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

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 *rabi*season 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.

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.

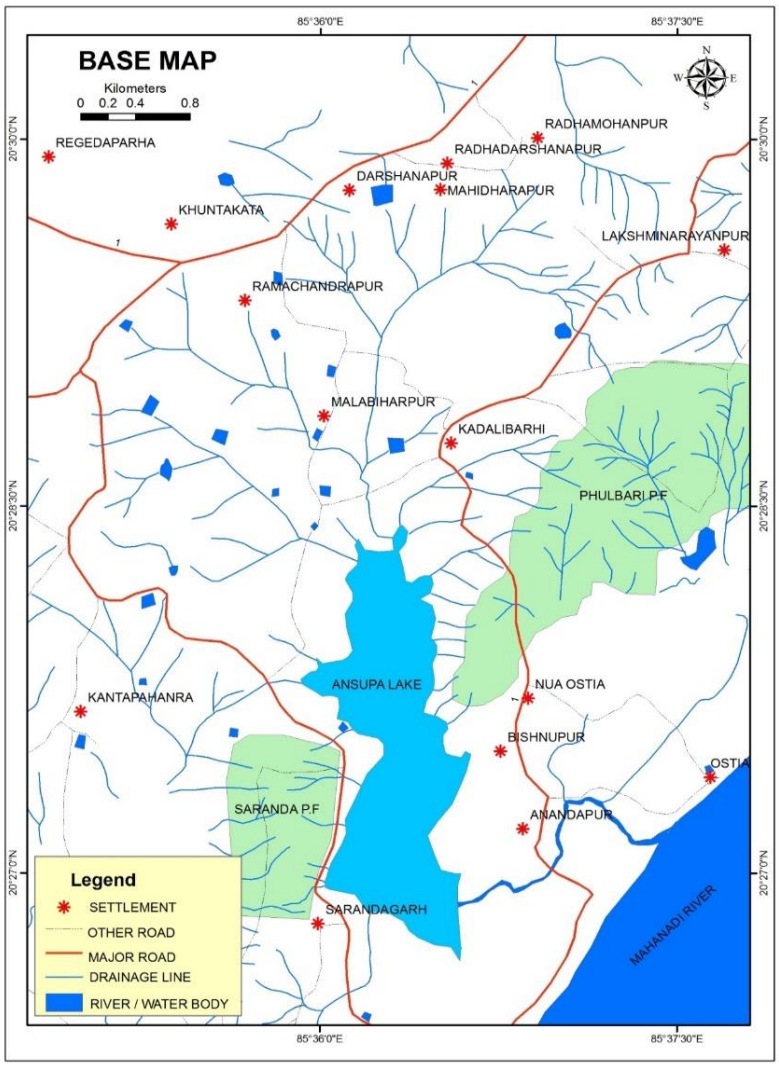
(III) Gradual decreasing of water depth of the area and high rate of weed infestation.

(IV) Environment of the fringes (low water laying areas) of the lake for agricultural use

(V) Depletion of the fishery resources of the lake.

1.2. Terms of reference

Ansupa is one of the largest natural freshwater wetlands of the State, with riverine characters. It occupies the 2nd position in the present list of conservation wetland in the State. It plays a vital role by way of meeting the fresh water demands of the locality. The lake is in a state of severe degradation. The water quality of the lake is poor due to eutrophication. The lake is heavily infested with the aquatic weeds. One of the major predicaments in the Lake management has been the encroachment for paddy cultivation along the shoreline of the lake. The wetland serves as the lifeline for the fishers from two villages. The wetland shelters fairly good fresh water biodiversity. The wetland is also wintering ground for hundred species of migratory birds. It has an immense recreational value as during winter large numbers of visitors come to the wetland being attracted by its scenic beauty as well as the avifauna. The rich biodiversity of the wetland needs to be inventoried. The locational advantage of the lake also provides ample opportunity for promoting wetland education. It is also a repository of the riverine fish diversity. Due to the above values and functions and its immense socio-economic importance it was included in the list of wetland of national importance. Thus it warrants priority for restoration and wise use of resources in sustainable manner with active community participation.



1.3. Approach and Method

Provide an overview of approach (ways in which the recommended steps have been used)

Describe the data sources and research carried out for management planning if any.

The major approach for sustainable/responsible management of Ansupa lake concerns mainly restoration of the wetland, sustainable weed management, development of fishery resources, research and monitoring intervention, biodiversity conservation and revitalization of primary fishermen cooperative society through access to soft credit.

2. Description of Wetlands features

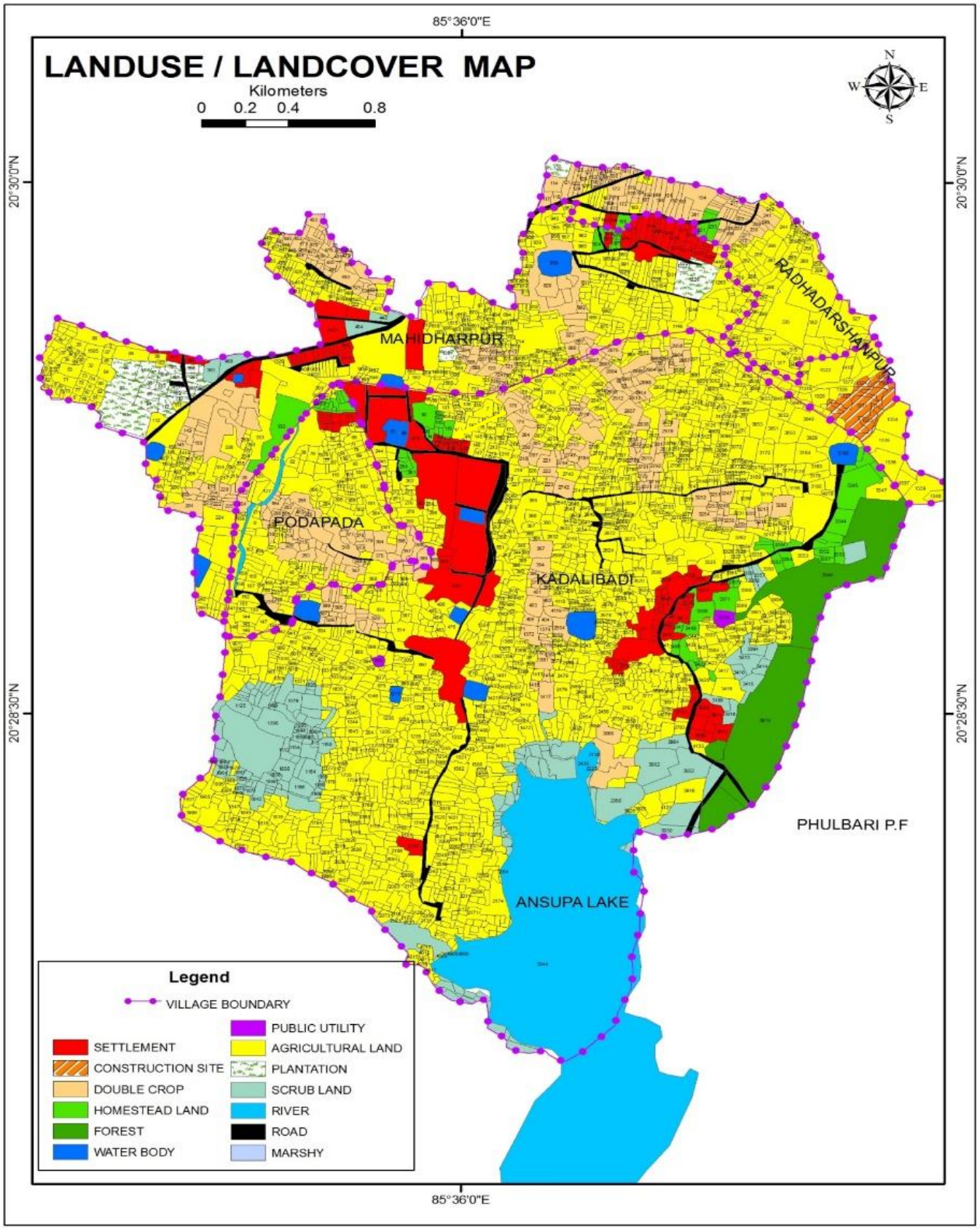
2.1 Location and Extent:

The lake is situated near village Subarnpur in Banki block of Cuttack district in Longitude. on the left bank of river Mahanadi which is close to the boundary of Athgarh Subdivision. It is well connected by pucca road to Athagarh and Banki Sub-Divisional Headquarters in both sides of river Mahanadi. The high level bridge over Mahanadi near Jatamundia is the connecting path for both Sub-divisions. The length of Ansupa Lake is about 3km. and breadth varies from 250 m to 500 m. The area of the lake is about 382 acres comprising of 152 acres of Kadalibadi mouza, 138 acres of Bishnupur mouza and 92 acres of Subrnapur mouza.

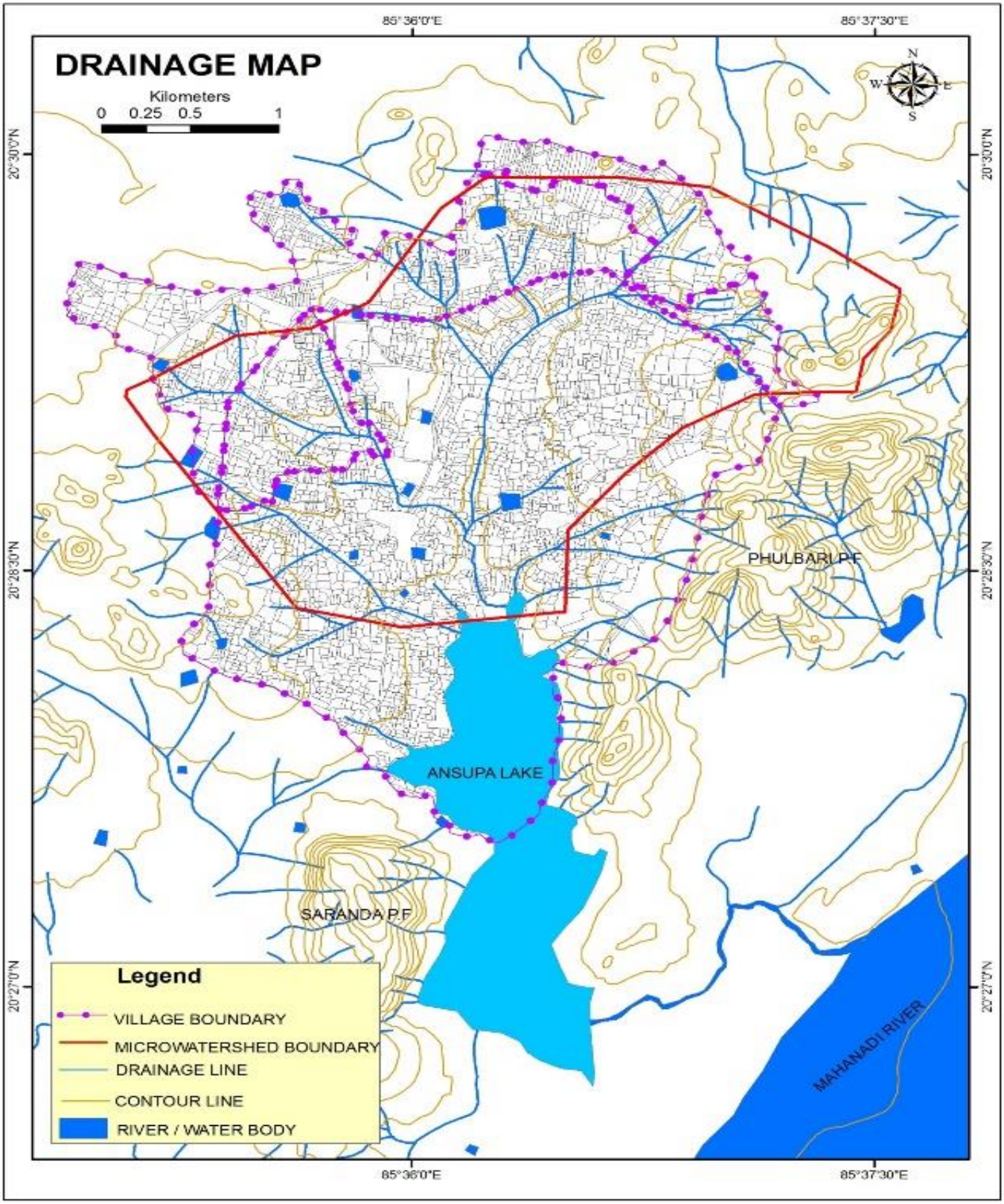
The lake is bounded by the Saranda hills on its Western side, Bishnupur hill on its North-Eastern side and by villages like Subarnapur, Malbiharpur, Kadalibadi, and Bishnupur. From the settlement report of 1928 it is seen that the area was receiving an annual average rainfall between 53” to 57” but with the denudation of the forest growths the average rain fall has now come down to about 50” annually.

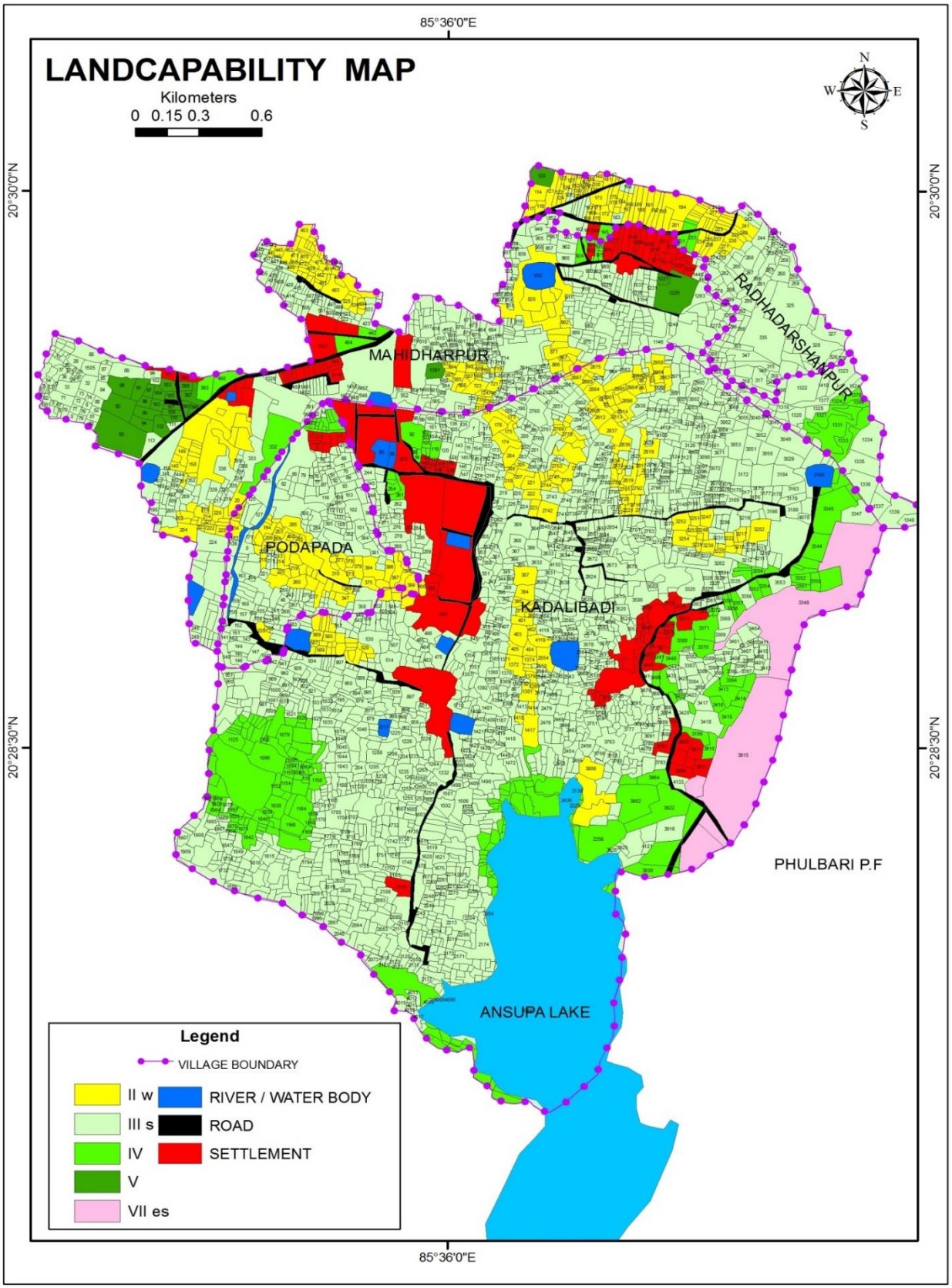
The flood water from river Mahanadi enters through a link channel known as Mayuri Nallah into the lake on its South-East side. The surplus water from Ansupa Lake escapades in to river Mahanadi through Kabula Nallah. This channel passes through villages like Ostia, Bishnupur and Anandpur. The other channel named Sankhamunha Nallah a tributary of Huluhula Nallah which was reported to be connecting the lake on its South-West side with the river Mahanadi through villages Ghadabar and Govindpur has got choaked due to soil erosion from the encircling hillock and siltation of mouth of Huluhula Nallah and encroachment for paddy cultivation. As a result, the water spread area of the lake after Kantapanhara Patch gets reduced day by day. The currently estimated water spread area stands at 206.65 ha.

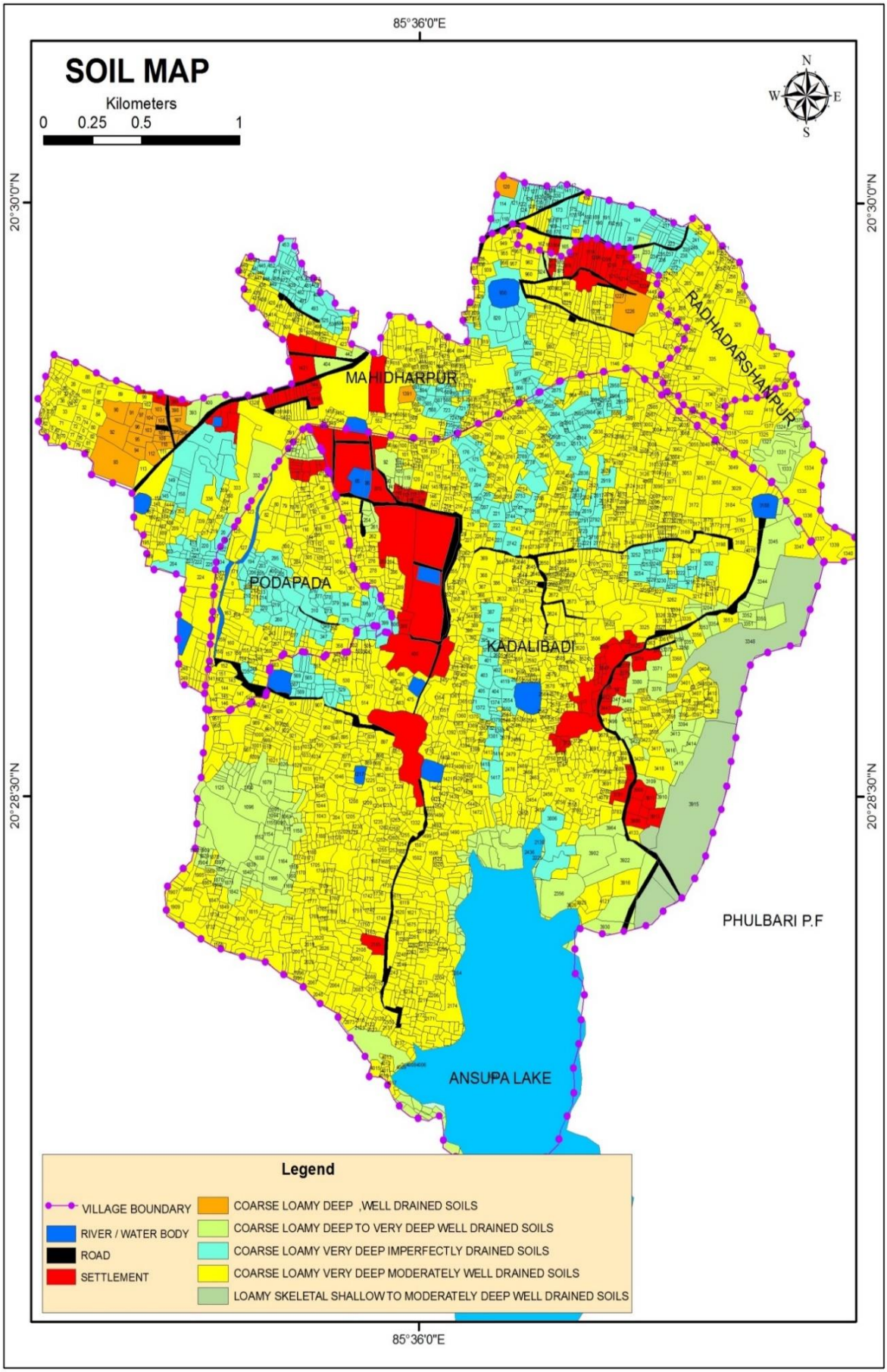
Odisha within 20 26’ 28.43” to 20 28’ 34.44” Latitude and 85 35’ 56.74” to 85 36’

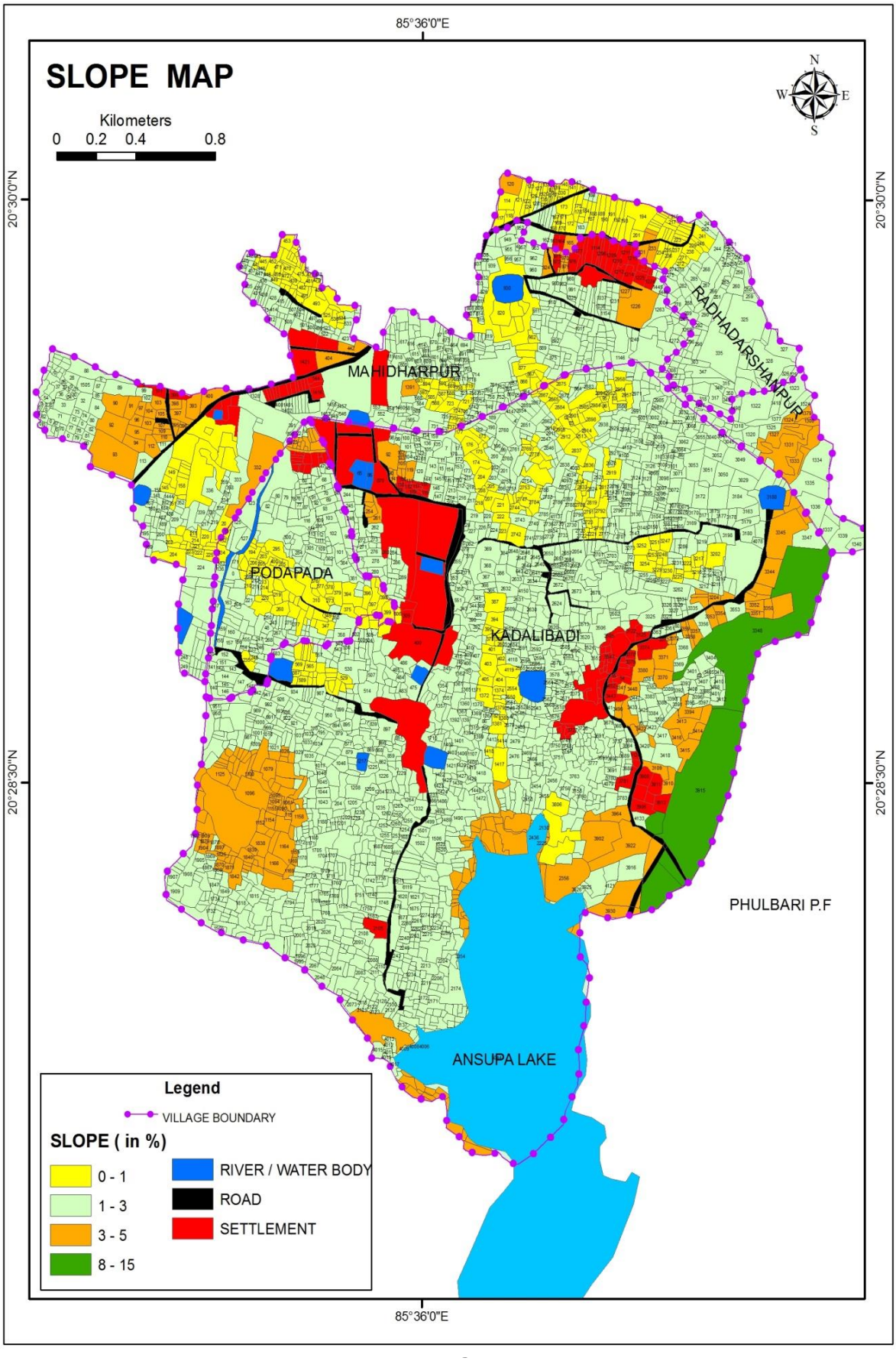


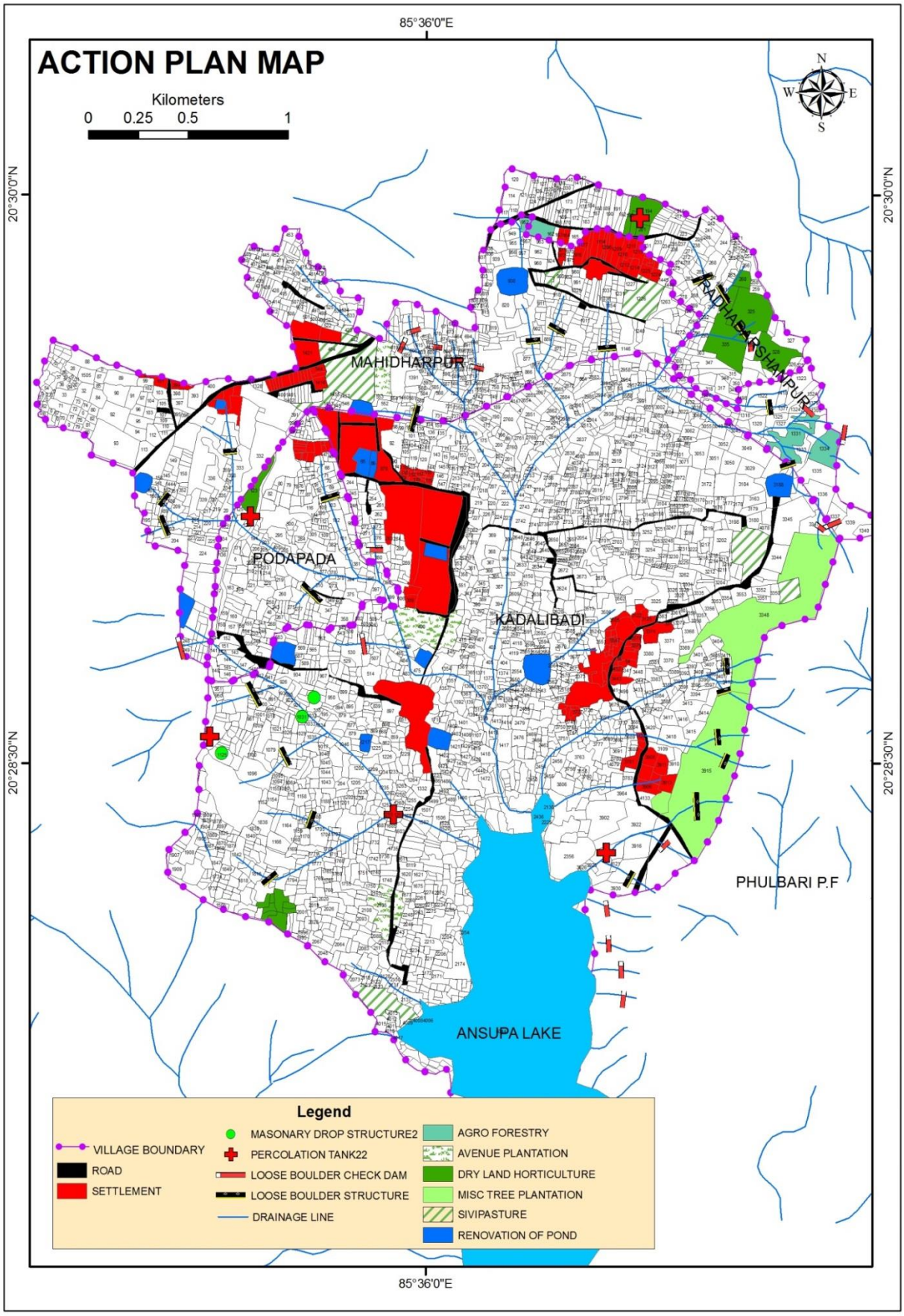
30.01”


DRAINAGE MAP
Kilometers
0 0.25 0.5 1
N
W
E
S
85°36'0"E
85°37'30"E
20°30'0"N
20°28'30"N
20°27'0"N
PHULBARI P.F
ANSUPA LAKE
SARANDA P.F
MAHANADI RIVER
Legend
VILLAGE BOUNDARY
MICROWATERSHED BOUNDARY
DRAINAGE LINE
CONTOUR LINE
RIVER / WATER BODY

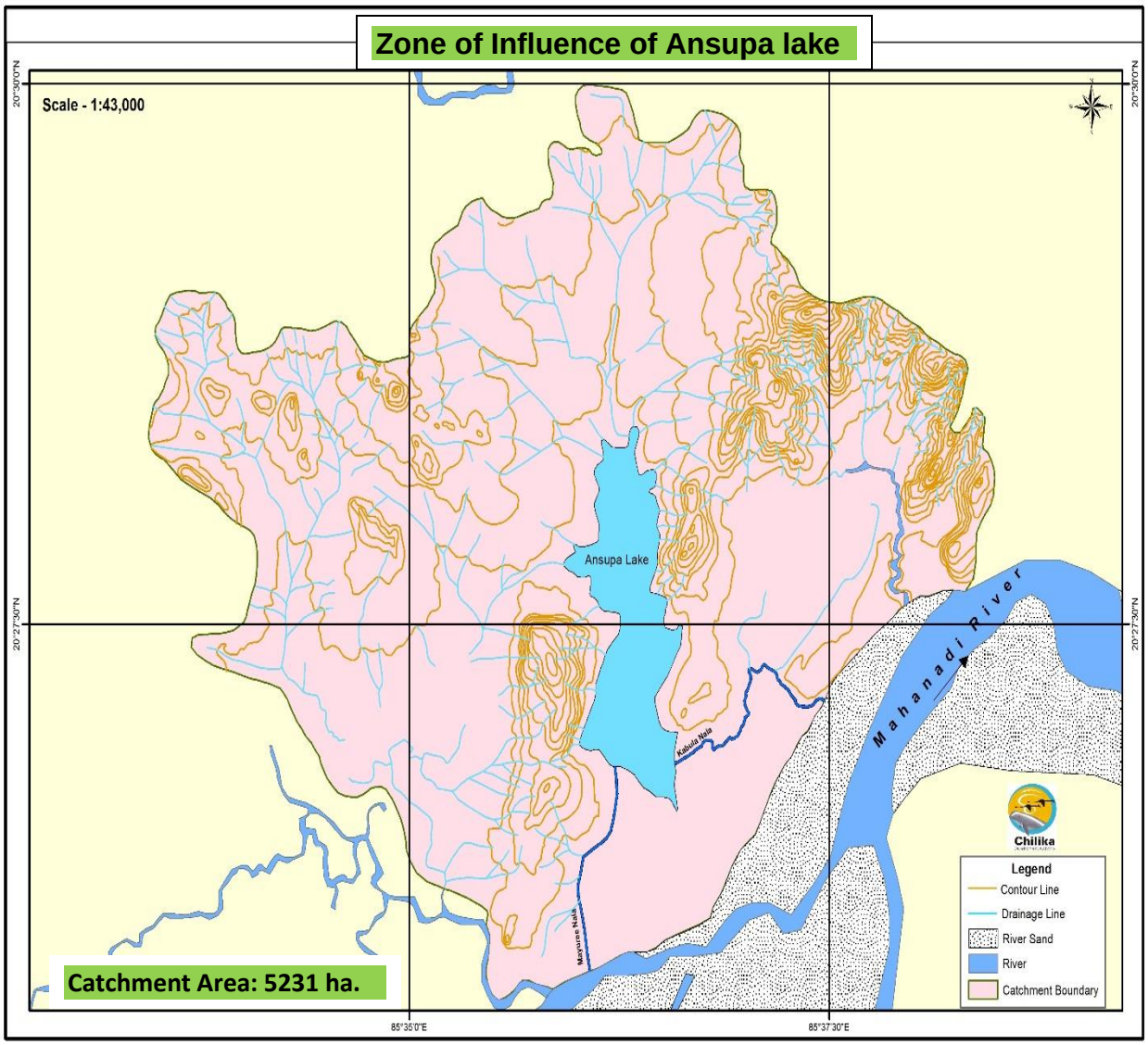

LANDCAPABILITY MAP
Kilometers
0 0.15 0.3 0.6
N
W
E
S
85°36'0"E
20°30'0"N
20°28'30"N
MAHIDHARPUR
RADHADARSHANPUR
PODAPADA
KADALIBADI
PHULBARI P.F
ANSUPA LAKE
Legend
VILLAGE BOUNDARY
II w
III s
IV
V
VII es
RIVER / WATER BODY
ROAD
SETTLEMENT


SOIL MAP
Kilometers
0 0.25 0.5 1
N
W E
S
85°36'0"E
20°30'0"N
20°28'30"N
MAHIDHARPUR
RADHADARSHANPUR
PODAPADA
KADALIBADI
PHULBARI P.F
ANSUPA LAKE
Legend
VILLAGE BOUNDARY
RIVER / WATER BODY
ROAD
SETTLEMENT
COARSE LOAMY DEEP ,WELL DRAINED SOILS
COARSE LOAMY DEEP TO VERY DEEP WELL DRAINED SOILS
COARSE LOAMY VERY DEEP IMPERFECTLY DRAINED SOILS
COARSE LOAMY VERY DEEP MODERATELY WELL DRAINED SOILS
LOAMY SKELETAL SHALLOW TO MODERATELY DEEP WELL DRAINED SOILS

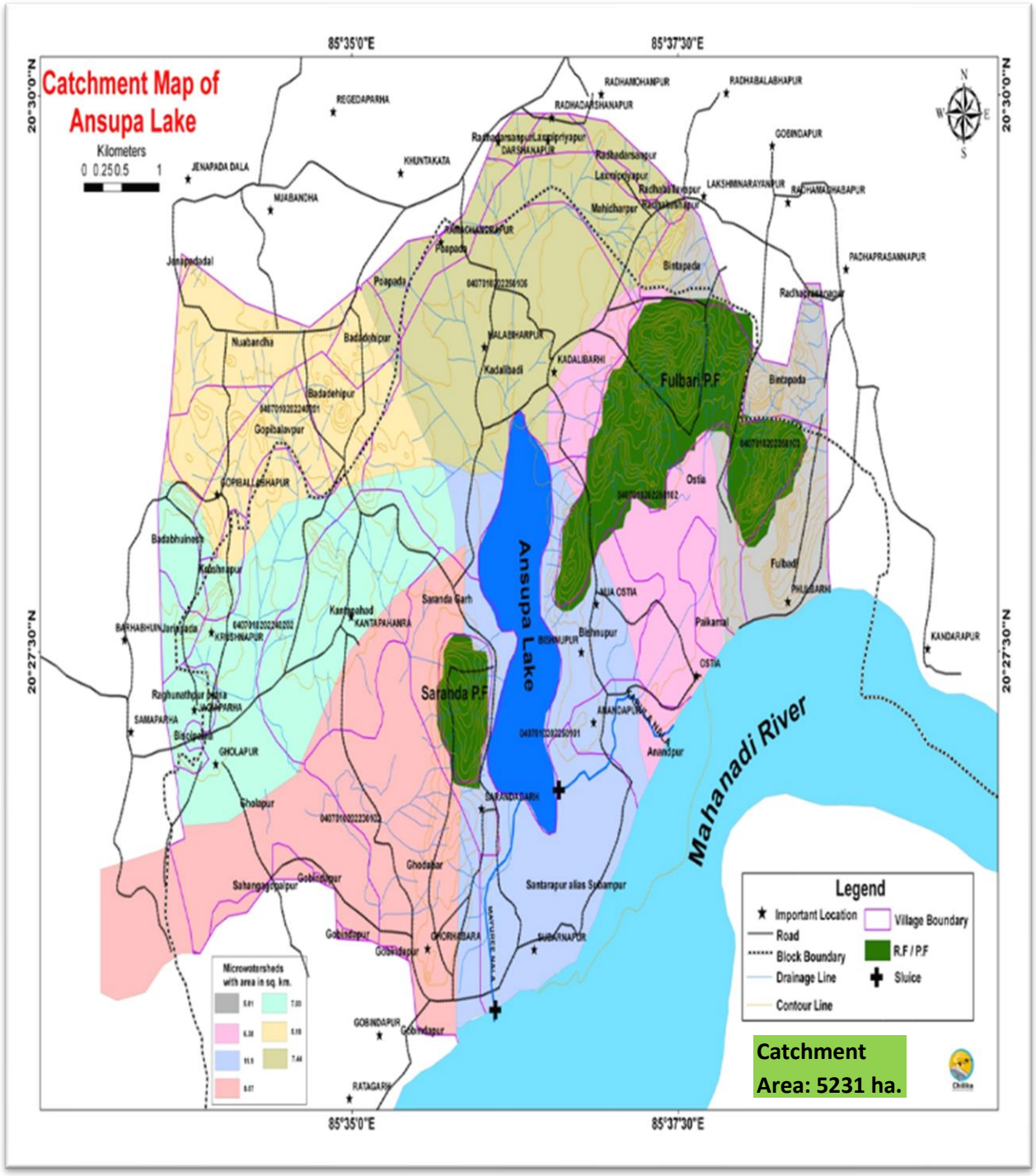

SLOPE MAP
Kilometers
0 0.2 0.4 0.8
N
W E
S
85°36'0"E
20°30'0"N
20°28'30"N
MAHIDHARPUR
RADHADARSHANPUR
PODAPADA
KADALIBADI
PHULBARI P.F
ANSUPA LAKE
Legend
VILLAGE BOUNDARY
SLOPE (in %)
0 - 1
1 - 3
3 - 5
8 - 15
RIVER / WATER BODY
ROAD
SETTLEMENT


ACTION PLAN MAP
Kilometers
0 0.25 0.5 1
N
W E
S
85°36'0"E
20°30'0"N
20°28'30"N
MAHIDHARPUR
RADHAKRISHANPUR
PODAPADA
KADALIBADI
PHULBARI P.F
ANSUPA LAKE
Legend
VILLAGE BOUNDARY
ROAD
SETTLEMENT
MASONARY DROP STRUCTURE2
PERCOLATION TANK22
LOOSE BOULDER CHECK DAM
LOOSE BOULDER STRUCTURE
DRAINAGE LINE
AGRO FORESTRY
AVENUE PLANTATION
DRY LAND HORTICULTURE
MISC TREE PLANTATION
SIVIPASTURE
RENOVATION OF POND

2.2. Wetland Catchments:



Ansupa Lake is a topographic depression surrounded by small hillocks such as Saranda (124 m) on the west, Bishnupur (65 m) on the east Dhangarh (160m) on the north and Betlapahara (105 m) on the northwest. The surrounding region is broadly undulating and in some patches plain with isolated hill ranges and dissected valleys. Water from high land areas usually draining into Mahanadi River but due to the local depressions poor slopes gets collected in the low lying areas giving rise to the water bodies. The lake is connected with Mahanadi in its southern side with a channel known as “Mayuri Canal” through which flood water of Mahanadi enters into the lake. To the southwest of Ansupa there is another channel known as “Huluhula Nala” which has come



originates from Tigiria Tahsil and outfalls into Mahanadi traversing through the borders of some of the villages of Kantapanhara and Subarnapur village panchayats. The low-lying area of Ansupa Lake. Therefore is formed by two gondwana uplands on the two sides and high bank of Mahanadi on the other. As per the microwatershed map of Ansupa lake the total catchment area of the lake is 5231.00 ha

2.3 Hydrological Regimes:

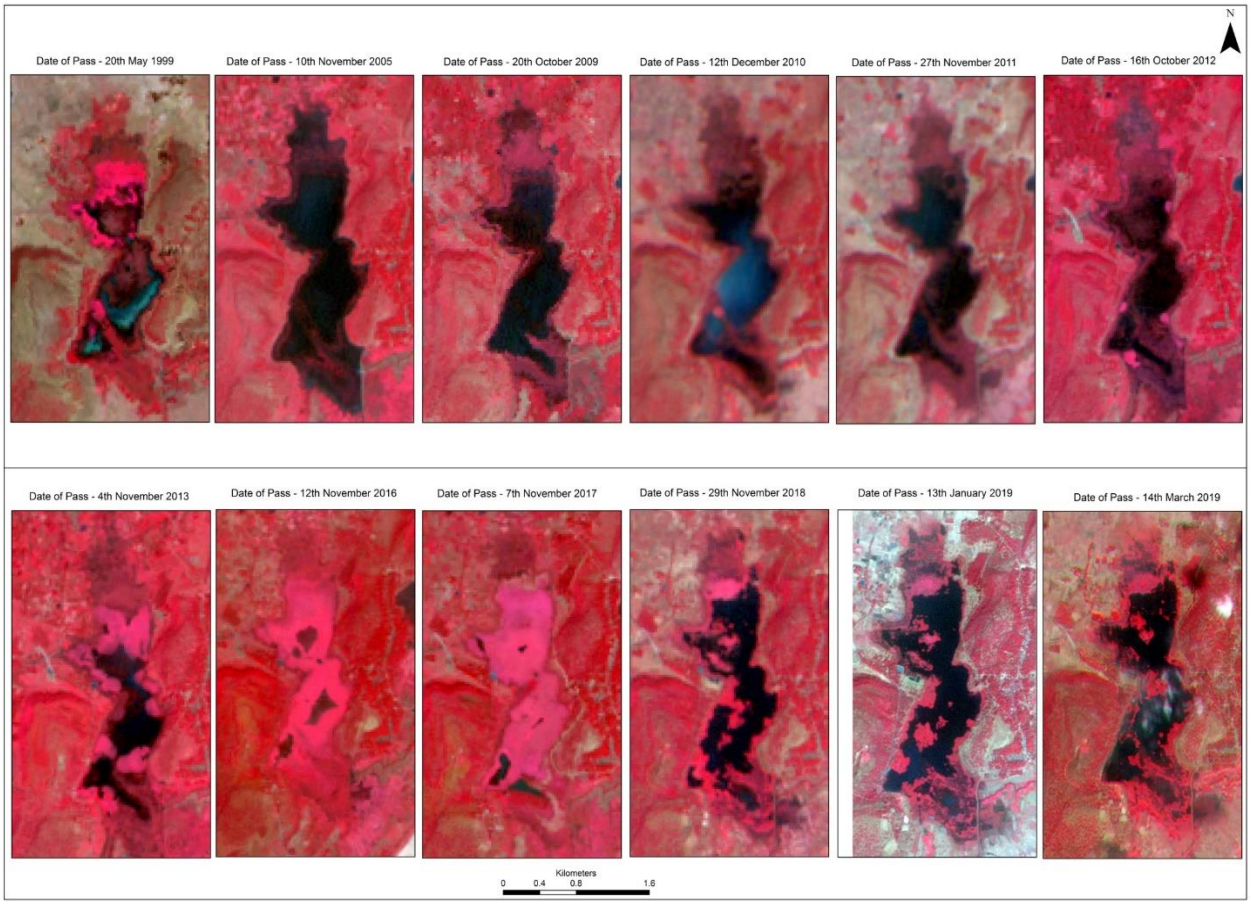
The hydrological interventions were carried out by the Water Resources Department for improvement of the Lake Water hydrology. For water circulation in to Ansupa Lake from Mahanadi river. The strategy of inflow and outflow mechanism has been approved by the 98th special Technical Advisory Committee (T.A.C) of State Flood Control Board held on 24.12.2004 of Engineer-in-Chief Water Resources, Odisha and the main objectives are as follows:

(i) To maintain the pond level at RL 31.50 M after raising and strengthening of Dahalia embankment, so that lake area can be increased to 665.46 Ac.
(ii) To maintain water circulation inside the lake and flushing the floating weed, sand and other formation and decreasing sedimentation process and weed infestation.
(iii) To sustain water inflows into the Ansupa Lake during medium flood other than high flow period of Mahanadi.
(iv) To increase the irrigation potential at the periphery of the lake.
(v) To restrict growth of hydrophytes like algae and eutrophication of water by flushing fresh water.

The Dahalia embankment was constructed to increase the water holding capacity to the lake. Lake side protection work by boulder packing was carried out to protect the soil erosion due to wave action of pounding water. Drainage sluice at the inlet point of Mayuree channel on Mahanadi left embankment was constructed to facilitate entry of flood water from river Mahanadi to Ansupa Lake. Mayuree channel was excavated from the inlet point up to the lake to increase discharge capacity up to 18 Cusec. Two numbers of bridges have been constructed over Mayuree channel at crossing points of Subarnapur – Ghodabara and Subarnapur – Athagarh roads. Drainage sluice at the off taking point of Kabula channel on Dahalia embankment was constructed to release the flood discharge through Kabula channel i.e the outlet channel to river Mahanadi. Accordingly, Sl.1 to Sl.5 works has been executed through P.D, DRDA, Cuttack with technical supervision by D.O.W.R.

2.4 Water spread:

From the decadal analysis of the IRS LISS III data shows that the minimum water spread area was 161.79 (Ha.) in the year 1999, Maximum was 228.77 (Ha.) during the year 2013 and the average water spread as calculated was 205.09 (Ha.). Chilika Development Authority have been initiated the process of removing the aquatic weeds from the bed by engaging the weed Harvestor procured with the financial support under the ICZM project.


N
Date of Pass - 20th May 1999
Date of Pass - 10th November 2005
Date of Pass - 20th October 2009
Date of Pass - 12th December 2010
Date of Pass - 27th November 2011
Date of Pass - 16th October 2012
Date of Pass - 4th November 2013
Date of Pass - 12th November 2016
Date of Pass - 7th November 2017
Date of Pass - 29th November 2018
Date of Pass - 13th January 2019
Date of Pass - 14th March 2019
Kilometers
0 0.4 0.8 1.6

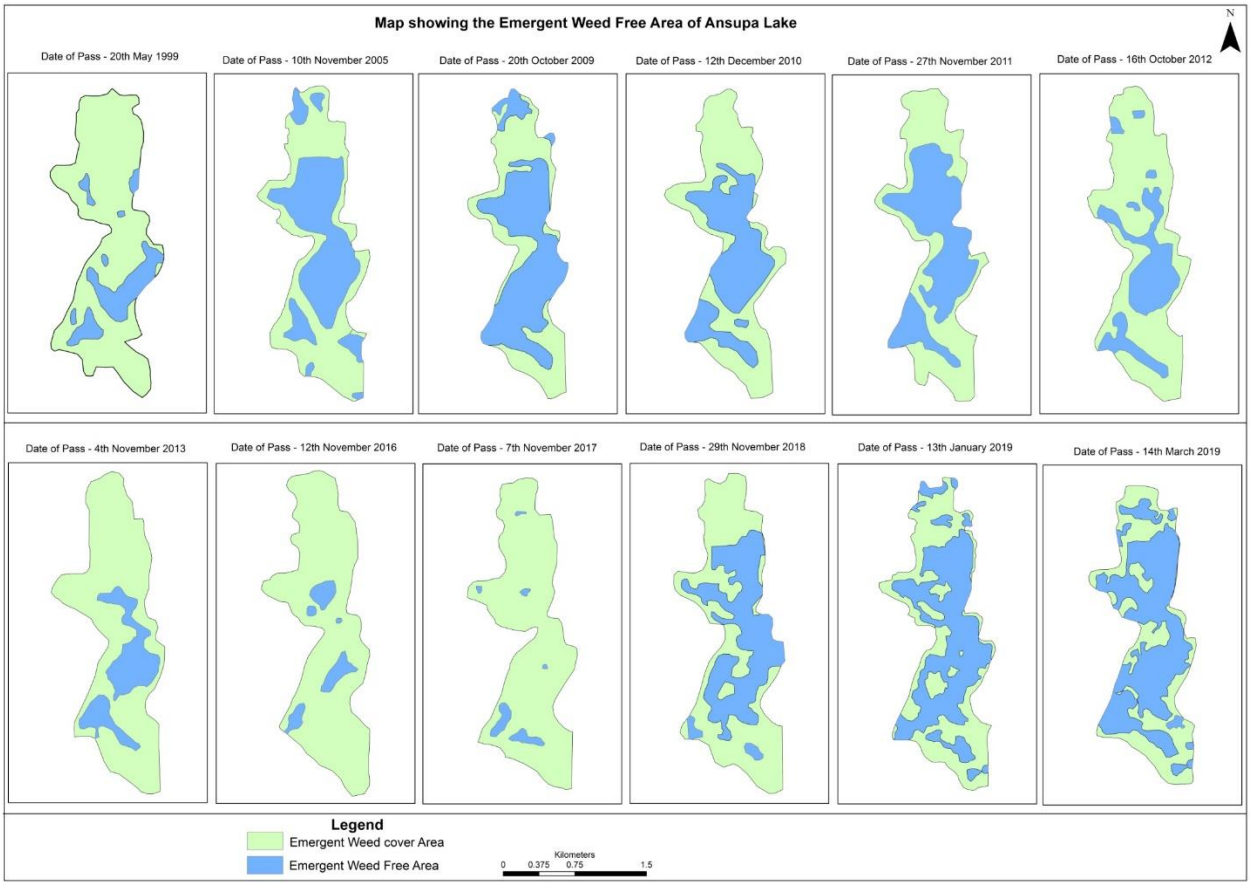
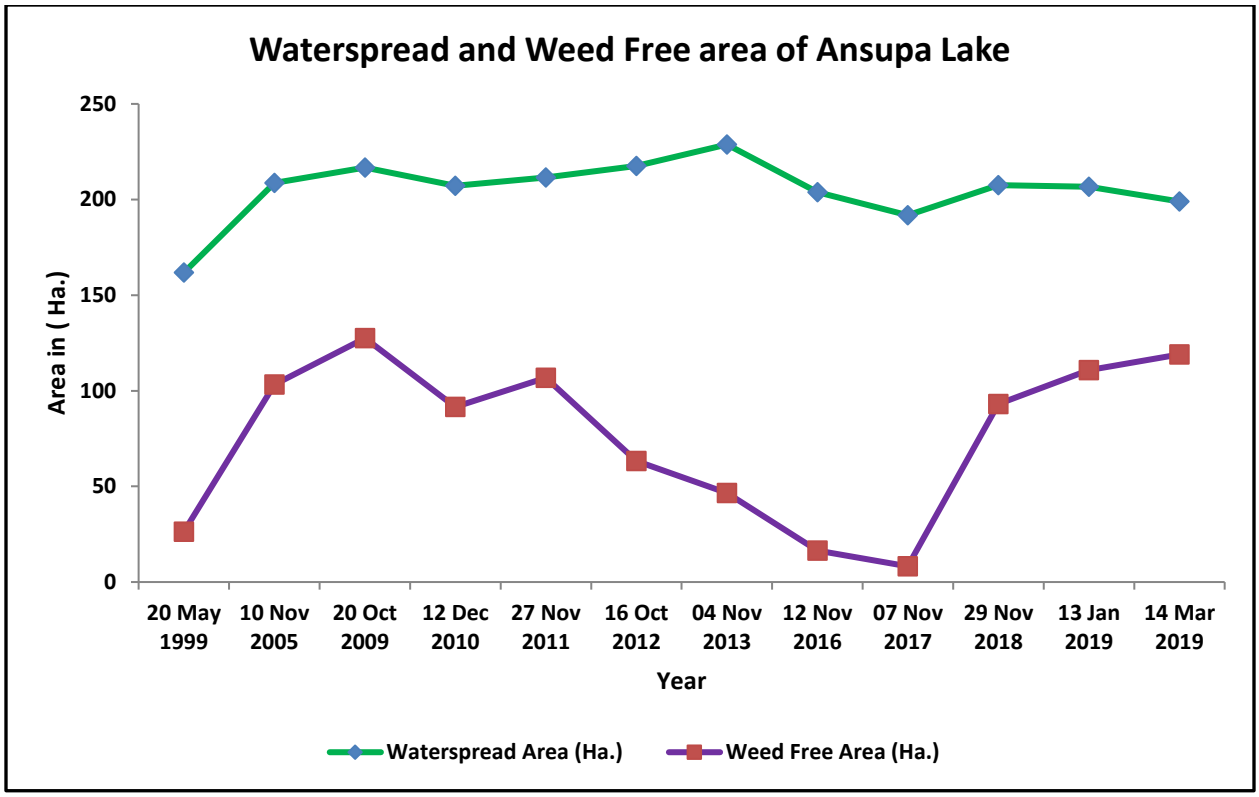

Map showing the Emergent Weed Free Area of Ansupa Lake
N
Date of Pass - 20th May 1999
Date of Pass - 10th November 2005
Date of Pass - 20th October 2009
Date of Pass - 12th December 2010
Date of Pass - 27th November 2011
Date of Pass - 16th October 2012
Date of Pass - 4th November 2013
Date of Pass - 12th November 2016
Date of Pass - 7th November 2017
Date of Pass - 29th November 2018
Date of Pass - 13th January 2019
Date of Pass - 14th March 2019
Legend
Emergent Weed cover Area
Emergent Weed Free Area
Kilometers
0 0.375 0.75 1.5

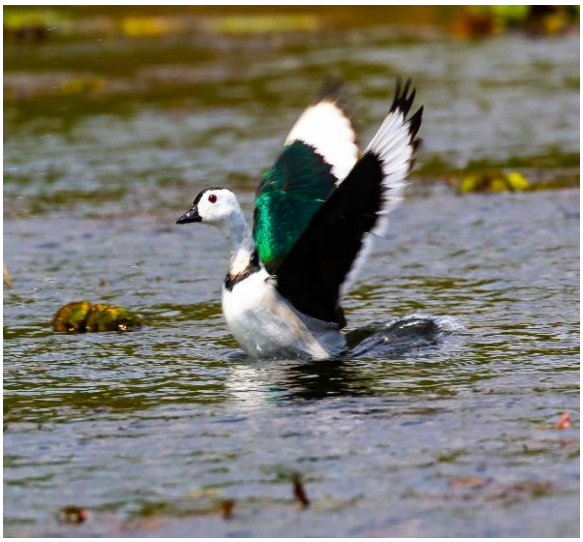
Table 1: Decadal changes of Water Spread area of Ansupa lake

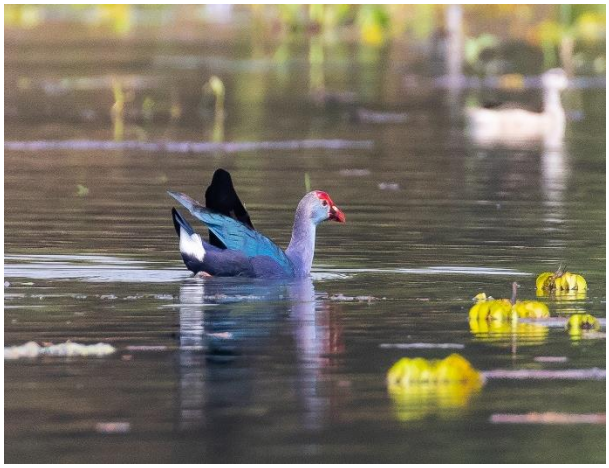
Year	Water spread Area (Ha.)	Weed Free Area (Ha.)	Weed Area (Ha.)
20 May 1999	161.79	26.36	135.43
10 Nov 2005	208.69	103.33	105.36
20 Oct 2009	216.8	127.5	89.3
12 Dec 2010	207.26	91.52	115.74
27 Nov 2011	211.52	106.75	104.77
16 Oct 2012	217.5	63.25	154.25
04 Nov 2013	228.77	46.58	182.19
12 Nov 2016	203.81	16.42	187.39
07 Nov 2017	191.8	8.22	183.58
29 Nov 2018	207.55	93.09	114.46
13 Jan 2019	206.65	110.83	95.82
14 Mar 2019	198.95	119.01	79.94
Minimum	161.79	8.22	79.94
Maximum	228.77	127.5	187.39
Average	205.0908333	76.07166667	129.019167



2.5 Bio-diversity;

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. Steps are





being taken to document the available bird species. Based on some information available in published research papers about 60 species birds belong to 27 families are as per Annexure -I.

Mollugo sp.	**Micranthemum sp.**
	
Stachytarpheta jamaicensis	Evolvulus nummularius
	

Nelumbo nucifera	Nymphaea nouchali
	
Nymphaea rubra	Nymphaea pubescen
	

2.6 Eco- system Services

Ansupa Lake provides a range of eco-system services to the life and livelihoods of the local communities living in and around. The eco-system services, which comprise of provisioning services, regulating services and cultural services in respect of Ansupa Lake have not been assessed as yet, which need to be done in future. The key provisioning services include fishery resources, aquatic vegetation for economic use and contribution of its cultural aspects and bio-diversities. However, the Lake fishery stands out as the most important provisioning service which contributes more than 80% to the economic values of provisioning services and livelihoods.

2.7 Socio economics and livelihood;

Ansupa is the main livelihood source for fisherman families of nearby villages, over 65 families are depending on fishing activities. Tourism is slowly gearing up to provide

alternative livelihood to people. It's also irrigation source for agriculture activities in catchment areas.

Prior to 1959-60 fishing right in the lake was being enjoyed by the fishermen of Subarnapur, Kadalibadi and Bishnupur villages on payment of fisherman Jamma. The state government made an attempt to settle the fishing right through public auction. In response to this the local fishermen filed a civil suit which was dismissed. Thereafter the lake fishery was put to public auction during the year 1974-75. Subsequently according to Government order in the Revenue Department G.O. No.36774/R., dated the 27th June 1974, the fishery right is annually being settled with Ansupa Primary Fishermen Co-operative Society which includes two fishing villages namely, Subarnapur and Malabiharipur. Due to degradation of the Lake ecosystem and the fall in productivity the economic condition of the Ansupa Fishermen Co-operative Society is not sound. There is a second Fisheries Co-operative society in the village Subarnapur which has fishing rights in river Mahanadi. The economic condition of the members of Subarnapur society is still worse. It is reported that the catch in river Mahanadi has gone down considerably after construction of the Barrage upstream at Munduli.

3. Evaluation of Wetlands Features

3.1 Priority wetland features that need to be maintained and thresholds thereof;

The priority major wetlands feature that to be maintained is as follows;

i. Catchment treatment/Watershed Management
ii. Weed control by way of Manual and also mechanical
iii. Fishery resources development
iv. Development of Eco-tourism
v. Fish stock enhancement
vi. Hydrological regimes (Water Balance, sedimentation, bathymetry)
vii. Water and sediment quality (DO, BOD, nutrients, transparency, pH, temperature)
viii. Biological diversity (flora and fauna such as phytoplankton, zooplankton, benthic and pelagic microbial communities, macrophytes, algae, fishes, birds,).

Conservation of Bio-diversity and Improvement of livelihoods of people are the priority aims of this plan.

Ansupa Water Quality parameters;

Sl. No.	Parameters	Values	Permissible Threshold limit by CPCB/ MoEF & CC, New Delhi, GOI
1	pH	8.74	6.5 to 8.5
2	Turbidity	19.4 NTU	5 to 10 NTU
3	DO	5.572 ppm	>4mg/l, for propagation of wild life and fisheries.
4	$P0_4$-P	0.73 µmol/l	0.8-3 µmol/l
5	BOD	3.74 mg/l	<3mg/l for propagation of wild life and fisheries.

6	$N0_3$-N	11.90 µmol/l	0-71 µmol/l
7	Total Alkalinity	71.12 ppm	200 ppm

3.2 Threats:

The major problems of the lake are:

(I) Poor vegetation on the catchment of the lake resulting in soil erosion & sedimentation

(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 by way of schematic encroachment and

(V) Depletion of the fishery resources of the lake, (vi) loss of bio-diversity.

Threats to Ecological Character;

Key threats	Likely influence on Ecological character	Likelihood of changes in ecological character in near term
High rate of siltation- Ansupa lake receives silt load from the catchment, which aggravated the siltation processes and also the change in the land use pattern in the Ansupa catchments. The poor vegetation in the catchment triggers the rapid sedimentation of the lake bed, which effects its bathymetry	Loss of water holding capacity and thereby ability to regulate hydrological regimes. Due to siltation, the lake became shallow. Environment of the	High

	fringes (low water laying areas) of the lake for agricultural use by way of schematic encroachment	
Changes in Water connectivity- Ansupa receives the flood water from Mahanadi river during the South West Monsoon. As the feeder channel that connects to Mahanadi river got silted up, which effects the input of fresh water into the lake, in the process it also effect the auto recruitment of fish juveniles from Mahanadi river into the lake	Changes in the Hydrological regimes, Impact on the fishery resources and its ability to sustain the fishery and regulate the Hydrological regimes	High
Regional Climate Change- From observation of the precipitation data during the SW Monsoon shows that there is decrease in fresh water in Mahanadi River due to the impact of the Climate Change, which impacting the temporal variability of the precipitation regimes. These changes will have adverse impact on the hydrological regimes, which is a key determinant for the lake biota and also the ecosystem services	Changes in hydrological regimes with associated changes in several components and also processes	High
Invasion of Water Hyacinths and Nymphaea rubra -Rapid increase in the area of the Water Hyacinths and Nymphaea rubra, due to the high input of nutrients from the catchments,	Stress on the fishing breeding ground and	High

and also open defection which creates stress on the fish breeding ground and also health hazards to the local communities	also communities livelihood	
Increasing pressure on Lake Fisheries- Analysis of the data indicates that there is sudden increase in the active fishers and also fishing boat deployment in the lake. There is decrease in the fishery output. There is a high risk of overexploitation of the fishery resources, which will impact the livelihoods of the fishermen communities depend on the lake for their day to day livelihood	Stress on the Biota and ecosystem services	High
Increase Tourist pressure: The uncontrolled tourism will impact the biota and also it will impact the livelihood of the local communities (Eco-system services). As there is no regulation, the tourist will litter the lake with unabated use of single use plastics	Stress on the Biota and ecosystem services of the lake	Medium

Presently, the lake ecosystem has been facing serious anthropogenic pressures due to open use of the lake resources by the local communities. To make the resource users responsible a massive outreach programme needs to be implemented to make the local communities aware about the values and functions of the wetlands.

4. Institutional arrangements

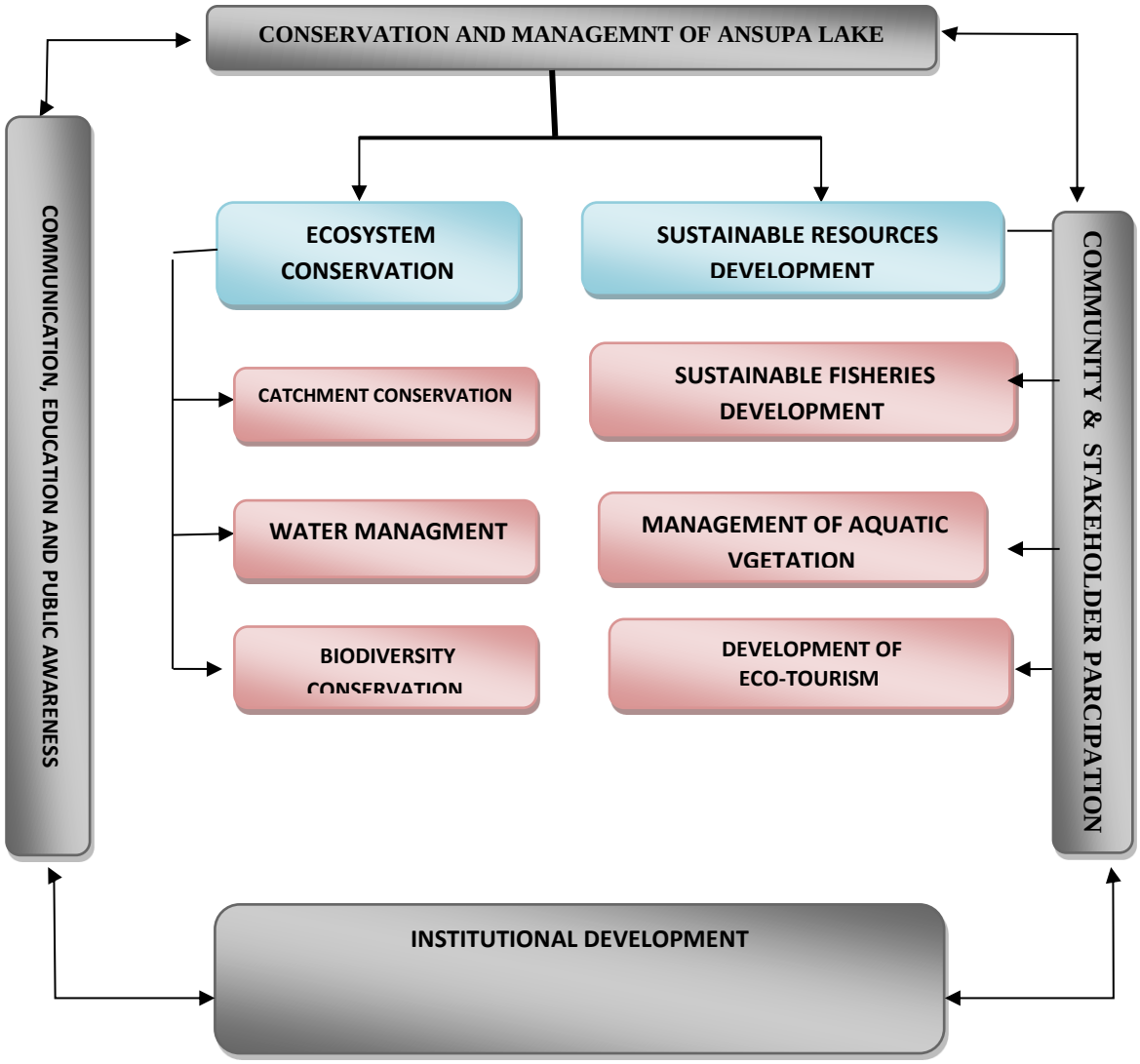
4.1. Review of existing arrangements

Chilika Development Authority is monitoring conservation and restoration activities at Ansupa Lake. Major activities of CDA includes removal of floating weeds,

Desiltation in some parts of the lake, improving aesthetic beauty of the surroundings and protecting interest of fisherman communities who are depending on the lake fishery.

Wetland Research and Training Centre (WRTC) a scientific wing of Chilika Development Authority established for Chilika Lake (coastal wetland) at Barkul, Balugaon is constantly monitoring the health of the lake. Different parameters will be scientifically analyzed in well-equipped laboratory and the results will be given in the form of health report card at frequent intervals. The health card is prepared in easily understandable form, so that all the stakeholders can use the information.

As per the decision taken in the High Level Committee meeting held on 11.11.2009 management of Ansupa Lake has been transferred to Chilika Development Authority from DRDA, Cuttack. Chilika Development Authority took stock of the situation. Studied the root cause of degradation of the Lake and analyzed the past system of management. Based on the analysis the following frame work for comprehensive management of Ansupa Lake is adopted by Chilika Development Authority. In another meeting of high level committee at govt. level decision was taken that fishery resource development activities will be carried out by CDA in association with the District Fishery Officer, Cuttack. The technical plan and program will be provided by CDA and the field level implementation of the program will be accomplished by the District Fishery Officer, Cuttack.



4.2 Rules & Regulations

Ministry of Environment, Forest & Climate Change (MoEF & CC), Government of India formulated the Wetlands (Conservation & Management) Rules, 2017 for conservation of the International Importance Ramsar sites and also the National Importance wetlands as per the direction of the Hon'ble Supreme Court of India.

The new rules, notified by the environment ministry, decentralize wetlands management by giving states powers to not only identify and notify wetlands within their jurisdictions but also keep a watch on prohibited activities. It also indirectly

widens the ambit of permitted activities by inserting the 'wise use' principle, giving powers to state-level wetland authorities to decide what can be allowed in larger interest. The notification says, "The wetlands shall be conserved and managed in accordance with the principle of 'wise use' as determined by the Wetlands Authority." The Centre's role under the Wetlands (Conservation and Management) Rules, 2017, will be restricted to monitoring its implementation by states/UTs, recommending trans-boundary wetlands for notification and reviewing integrated management of selected wetlands under the Ramsar Convention — an international arrangement to preserve identified wetlands.

Notable provisions as follows;

- **Definition** - Wetlands are defined as an area of marsh, fen, peatland or water.
- It could be natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt.
- It includes areas of marine water the depth of which at low tide does not exceed six metres.
- The rules apply to:

i. Wetlands categorised as “wetlands of international importance” under the Ramsar Convention.
ii. Wetlands as notified by the central and state governments and UT administration.

- **Management** - The new Rules farm out wetland management to states and union territories.
- The State or UT Wetlands Authority will have to prepare a list of all wetlands and a list of wetlands to be notified, within specified time.
- However, it is up to the states to decide which wetlands are to be notified.
- A comprehensive digital inventory of all wetlands is to be prepared within a year.
- **CWRA** - The new rules have done away with the earlier Central Wetlands Regulatory Authority (CWRA) entirely.
- CWRA has been replaced by the National Wetland Committee, which has a merely advisory role. These include -

i. advising the central government on proposals received from states/UTs for “omission of the prohibited activities”.
ii. prescribing norms and guidelines for integrated management of wetlands based on wise-use principle.
iii. recommending trans-boundary wetlands for notification.
iv. reviewing the progress of integrated management of Ramsar Convention sites.

- **Restrictions** - As per the new rules, encroachments on wetlands have been banned.
- It also prohibits solid waste dumping, discharge of untreated waste and effluents from industries and human settlements.
- It says that conservation and management would be based on the principle of 'wise use', which is to be determined by the Wetlands Authority.

The shortfalls:

- **Definition** - The 2010 Rules included in the definition of wetlands all inland waters such as lakes, reservoir, tanks, backwaters, lagoon, creeks, estuaries, etc.
- It also included man-made wetland and the zone of direct influence on wetlands.
- However, the 2017 Rules are not as comprehensive as this.
- It does not include river channels, paddy fields, human-made water bodies/tanks specifically for drinking water purposes, aquaculture, salt production, recreation and irrigation purposes.
- It also do not include wetlands under forest and coastal regulation zones..
- **Management** - There were lethargic response from states and UTs, in the past, on wetlands protection.
- So devolving management to states and UTs could be ineffective
- **Restrictions** - The term 'wise use' is subjective and could dilute the earlier restrictions.
- There is also no timeline specified for phasing out solid waste and untreated waste from being dumped into wetlands.
- The restrictions on "any other activity likely to have an adverse impact on the ecosystem of the wetland", are not specified clearly in the Rules.
- **Appeal** – The older provision of appealing to the National Green Tribunal does not exist in the 2017 Rules.

Indian Fisheries Act 1887

Community based organizations are playing important role in the conservation activities of this lake. Fisherman communities are voluntary participating in different government Schemes and activities. A successful fish stocking activity was carried out with the help of local fisherman communities. A Self Help Group (SHG) is being formed to look after the Eco-garden developed by Chilika Development Authority in the vicinity of Ansupa Lake.

4.3 Gaps

More involvement of expert groups like Educational Institutions, Scientific Communities, and Non-Governmental Organizations is highly necessary to effectively

manage the conservation activities. Training and Education to the managers including civil society and community-based organizations and primary resource users will substantially improve the quality of works undertaken for conservation and restoration of Ansupa Lake.

4.4 Proposed arrangements for Wetland Management;

Chilika Development Authority will be nodal agency for all the works to be carried out at Ansupa Lake. Wetland Research and Training Centre (WRTC) will regularly monitor and provide valuable scientific inputs which will help in decision making for management planning.

Various departments will be included in the institutional arrangements for an integrated development approach. Agriculture department will look after the interest of agricultural communities by providing advanced agriculture practices. Also initiatives will be taken to popularize organic agriculture in the catchment area of Ansupa Lake which will help in mitigating inflow of fertilizers and insecticides to the lake. Fishery department will play a major role in increasing fishery output. Fish stocking will be carried out to increase the fish availability in the lake. Marketing and storage facilities will be provided so that fisherman communities will get proper price for their products. Other than above mentioned departments all the concerned departments will be included wherever their role is necessary.

Participatory approach to include civil societies and community based organizations will be followed as they play very important role in success of the project. SHGs will be further strengthened necessary training and other facilities will be provided and alternative livelihood will be generated.

Training and Capacity Development of Local fishers shall be taken care of by CDA in association with the Departmental fisheries, Odisha.

5. Setting Management Objectives

5.1. Goal and purpose

Major goal and purpose of the integrated management plan is conservation and restoration of Ansupa Lake in a participatory approach. The successes of this plan will greatly benefit environment and also the interest of people who are depending on the lake for their livelihood.

5.2. Benefits (ecological as well as societal)

Important expected output of the project is to restore the eco-system of the lake. There are number of bird species, macrofauna, macroflora, various types of fish species are depending on the lake. More importantly Ansupa is a sweet water lake, conservation of fresh water is one of the priority objectives in present day world. As conservation approach also includes catchment area of the lake, both eco-system as well as people in the catchment area will enjoy direct and indirect benefits. It is also observed that wherever soil moisture conservation activities are undertaken the agriculture lands nearby are getting substantial benefits.

The objective of this plan is not only to conserve eco-system but also to protect interest of local people. Restoration of lake will result in increasing fish availability, irrigation water for agriculture, more benefits of tourism, generation of employment, etc. It is also a learning opportunity for managers as well as local people. With continuous development measures for fishery resources the expected yield potential of the lake with 206 ha water spread area would be nearly 25 tones of fish at the rate of 120 kg per ha^{-year} which could be valued at Rs.37.5 lakhs which would significantly enhance the livelihoods of local communities. (Rs.57, 692 per year income/households).

5.3. Management objectives

The major management objectives of the project are listed below:

1. Removal of aquatic weeds.
2. Prevention of Soil erosion, to save Lake from siltation and to recharge the ground water table by rain water harvesting/catchment treatment.

3. Increase the productivity of land by rain water harvesting and better management of cultivable land.
4. Upliftment of stakeholders to their Socio economic standards. Create employment opportunity to the youth of surrounding villages.
5. Sustainable development of fishery resources and strengthening of fishery cooperative institution.
6. Conservation of Biodiversity.
7. To create more avenue for ecotourism.

5.4 Strategies

Removal of water weeds will be carried out with the help of weed harvester Machine in combination with locally available resources. Enough importance will be given to create employment by involving local people wherever manual labour is necessary. The removed weeds will be used for compost preparation which will be used by local people for agriculture purpose.

Soil and Moisture Conservation (SMC) activities will be widely carried out in catchment area to prevent Soil erosion and to Save Ansupa Lake from siltation. The SMC structures like staggered trenches, loose boulder structures, check dams, percolation tanks, water harvesting ponds will be constructed in proper places which will result in recharging the ground water table by rain water and mitigates siltation. Facility will be provided to use conserve rain water for agriculture purposes to Increase the productivity of land.

Self Help Groups (SHG) and Civil Societies Groups will be strengthened by providing trainings, exposure visits, employment generation, livelihood creation which will improve their Socio-economic standards. Improvement of tourism infrastructure also provides additional employment opportunity to the youth of surrounding villagers.

Removal of water weeds, fish stocking, providing irrigation water will help in Maximum utilization of unproductive area.

Horticulture, Agriculture, Pisciculture, Animal Husbandry sector will be significantly enhanced in the nearby areas by involving all concerned departments in the institutional arrangements.

Conservation of Biodiversity of the locality will be achieved by restoring lake eco-system as well as by creating awareness among the public in nearby areas. Scientific approaches will be efficiently utilized to document and monitor status of bio-diversity in the lake. Fishery biodiversity management will follow the management steps such as inventory of species diversity and assessment of their conservation status as assessed nationally and internationally by IUCN red list data, conservation of endemic species and documentation of occurrence of new riverine fish species and conservation measures through training awareness to the primary resource users (fishers).

6. Monitoring and Evaluation plan

6.1. Monitoring Strategy

Monitoring and Evaluation play vital role for the success of the plan. The major aims of the monitoring is as follows:

- Provide timely, accurate, reliable and relevant information on the progress and performance of watershed developmental activities.
- Reflect the true picture; emphasize corrective measures/ improvements rather than mere reports.
- Design, develop and deploy Management Information System.
- Collect Analyze and Communicate data, avoiding gaps and delays.
- Disseminate M & E observations and ensure effective feedback mechanism.
- Easy data retrieval from data bank through MIS for decision making/
- Corrective measures.
- Documentation of scenario and status changes at any point of time which would help implement corrective measures to overcome deficiencies and short fall
- Identify and share the best practices and lessons learnt.
- Provide timely progress

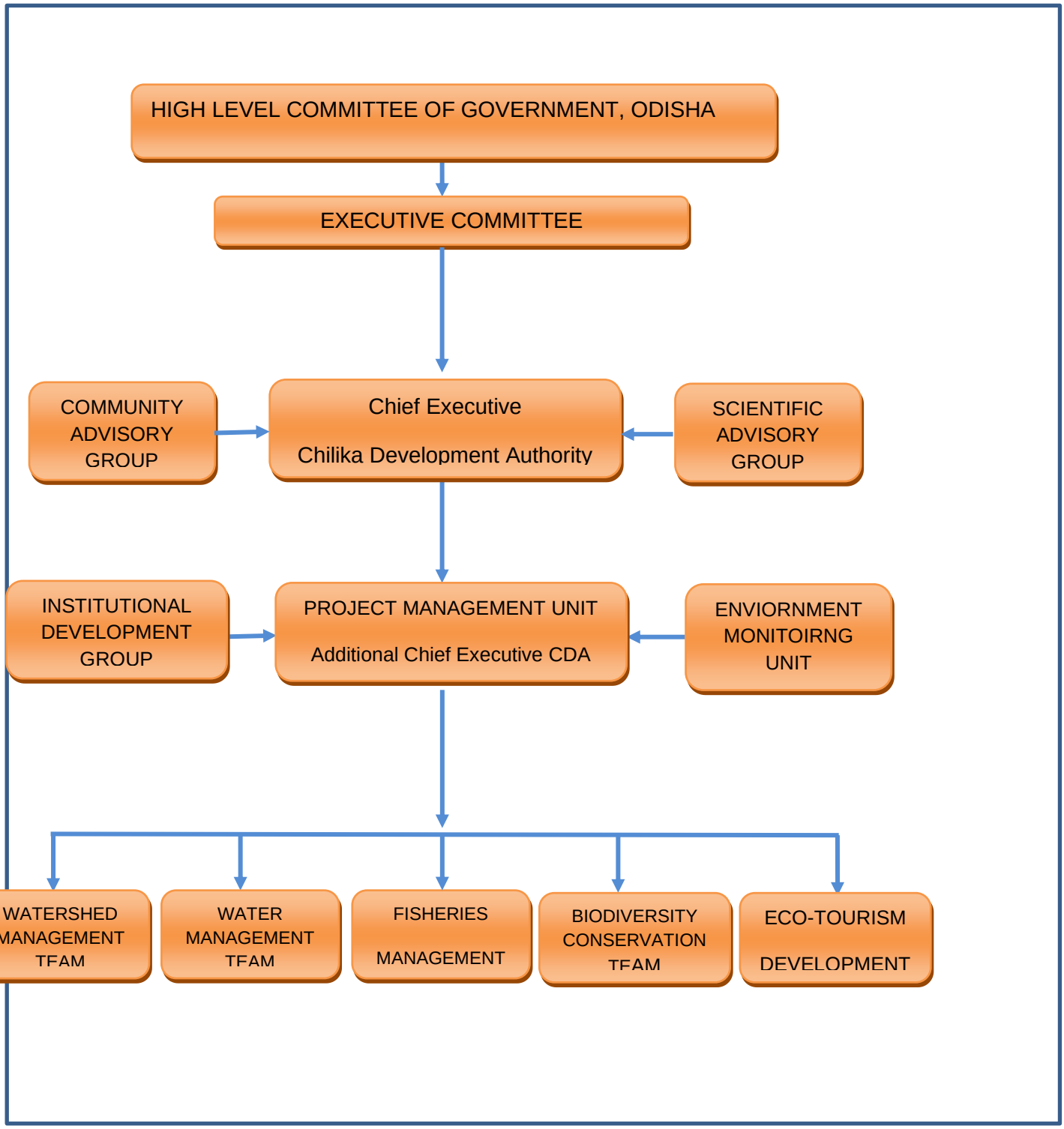
6.2. Monitoring parameters, frequency and responsibility.

Activity	Monitoring Parameters	Frequency of Monitoring	Monitoring Agency
Soil Moisture Conservation	Type of the Structure , Dimensions of the structure , suitability of the structure to the location	Once in 15 days during the work	Officer above the rank of ACF

Weed Removal	Amount of areas cleaned, cost benefit ratio, disposal of the removed weeds.	Once in 15 days during the work	Officer above the rank of ACF
Water Quality Assessment	Water temperature, Depth PH, TSS, Turbidity, Dissolved oxygen, Total alkalinity, hardness, BOD, COD, Nutrients (Nitrogen & Phosphate) & among biological parameters, phyto & zoo plankton diversity & density, primary productivity	Monthly Quarterly	Scientist, WRTC
Fishery Resource Development Fish Stocking a) Rearing of carp seeds in pens to grow large size fingerlings for stocking in the Lake	a)Procurement of standard fingerlings of Indian major carps & Chinese grass carp & Stocking in pens in batches	3 batches per year – once in a month during August, September and October	Fishery Consultants of CDA and ACF-II Fishery Consultants of CDA
b) Fish growth monitoring	b) Species wise growth assessment through sampling	Quarterly	
c) Collection of harvesting data	c) Harvesting data to be collected from PFCS records	Half yearly	
Tourism Activities	Construction work, management of tourists, Maintenance of Eco-garden.	Based on needs	Officer above the rank of ACF

6.3. Institutional design

For smooth implementation and monitoring of the restoration plan following institutional frame work is suggested.



6.4. Infrastructure and human resources design

Infrastructures like vehicles for transportation, machines and other equipment will be used from resources available with Chilika Development Authority. If required they will be engaged on hiring basis. Local people will be engaged for manual work, payment will be made based on skill and as per the guidelines of state government.

Chilika Development Authority is already associated with four numbers of SHGs they are taking part in various activities of monitoring and evaluation. It is proposed to include educational institutions and Non-Governmental Organizations based on the requirement. Whenever need arises research institutions other than wetland research and training center will be included in monitoring team.

6.5. Reporting

Chilika Development Authority, Bhubaneswar and WRTC, Barkul will prepare a bi-monthly report reflecting the progress of the projects and short comings if any with reasons.

6.6. Review and adaptation

The monitoring committee will scrutinize the report in detail and discuss with the field level executing agency. Steps will be taken to provide necessary inputs where ever required for executing quality work in a reasonable time frame.

7. Developing an Action Plan\

7.1. Component wise activities linked with management objectives

Restoration strategy:

For restoration of the Lake a comprehensive management plan is formulated by the Chilika Development Authority for restoration and sustainable management of the Lake with the active community participation. The following components are proposed to be carried out under the aegis of the CDA.

7.2 Treatment of the catchment:

The total catchment area of the lake is 5231.00 ha. Systematic soil and land use survey of the catchment area of the lake has been surveyed by Remote Sensing Techniques by the Odisha Space Applications Center (ORSAC), Bhubaneswar. The soils are light textured with acidic characteristics in uplands where as in the low-lying areas the soil is sandy clay loam to clay loam. Soil in the area is well drained and susceptible to erosion due to its texture and topography. The erosion is moderate to severe. The soil pH is 5 to

5.5 on the uplands and is medium in the low laying areas. The water holding capacity of these soils varies from 25-30%. The catchment area of Ansupa Lake is predominated by agriculture land of which accounts for more than 45% of the total area. The erosion prone soil structure of the catchment result in heavy silt load in to the lake. This is due to undulating Topography, Light textured acid soils and heavy rainfall. The uplands of the area are generally weakly bounded and the waste lands are subjected to heavy sheet and gully erosion. The forest is prone to illicit felling by the local inhabitants for fuel and timber. These are triggering heavy silt flow in to the lake which is already silted up. Treatment of the catchment area is thus an urgent need to decrease the silt inflow in to the lake.

7.2.1 Strategy for treatment of the catchment

- The treatment of the catchment would be carried out in a participatory mode.
- The treatment would be carried out on micro-watershed basis.
- Integrated management of land-soil-water and vegetation.
- Conservation of natural resources by holistic approach from ridge to valley philosophy.
- Capacity building of the communities for planning, implementation monitoring and post management of the project activities.
- Adoption of local technical inputs by giving emphasis on vegetative measures which are eco-friendly, cost effective easily replicable.
- Creating environment for symbiotic existence of the natural resources and the people who directly or indirectly depend on this for their sustenance.
- Sustained production base in the field of Agriculture, Horticulture, Silvipastural, Forest and off-farm activities.
- Development of village level institutions for post implementation management.

- Special emphasis to weaker section of the society i.e. women and landless people.

The main objective of this component would be to stabilize the degraded area in the catchment of the Lake Ansupa comprising of 5231 ha. through a menu of land treatments, emphasizing soil and moisture conservation measures and by introduction of more sustainable land management practices, including seeking long term, community based, management solution for public non arable land. All the land irrespective of their ownership would be considered for treatment i.e. private land, public land and forest land, including the drainage lines both on private and community lands. This would not only reduce the silt load in to the lake but check the land degradation and improve the moisture regime of the soil which would act as insurance against the crop failure.

The basic approach proposed to be adopted would be to create an enabling environment, by capacity building at community level for integrated and holistic management of natural resources. The participatory approach shall facilitate the communities to formulate site-specific micro-plans with a major input in the form of indigenous knowledge & skills supplemented through learning from various trainings.

The main goal of the project is to inculcate participatory self-sustainable watershed management practices so as to enable the community to reverse the degradation of land & water resources and to produce biomass in a sustainable manner. The project proposes to introduce appropriate land management practices through development of the cost-effective & sustainable technologies, which are simple, convenient to implement and maintain by the stakeholders themselves.

7.2.2. Desilting works near Dahalia embankment;

The Dahalia embankment was constructed to increase the water holding capacity to the lake. Lake side protection work by boulder packing was carried out to protect the soil erosion due to wave action of pounding water. Drainage sluice at the inlet point of Mayuree channel on Mahanadi left embankment was constructed to facilitate entry of flood water from river Mahanadi to Ansupa Lake. Mayuree channel was excavated from the inlet point up to the lake to increase discharge

capacity up to 18 Cusec. Two numbers of bridges have been constructed over Mayuree channel at crossing points of Subarnapur – Ghodabara and Subarnapur – Athagarh roads. Drainage sluice at the off taking point of Kabula channel on Dahalia embankment was constructed to release the flood discharge through Kabula channel i.e the outlet channel to river Mahanadi. Accordingly, Sl.1 to Sl.5 works has been executed through P.D, DRDA, and Cuttack with technical supervision by D.O.W.R.

In item No: VI above for construction of an escape section may be provided in a portion of the Dahalia Embankment for safety of the scheme is left out. It requires Rs.60.00 lakhs for completion of the scheme. Similarly items No: VII above for construction of sluice at Sankha Nallah near Khandak bridge site to maintain pond level at Kantapanhara Patta requires another Rs. 70.00 lakhs. De-silting and de-weeding work (Phase-1) from the tail of Mayuree channel to the off taking point of Kabula channel has been completed with an expenditure of 130.00 lakhs. in between 20d.27’21.92” N to 20d.27’48.01” N Latitude and 85d.36’5.96” E to 85d.36’ 17.10” E Longitude.

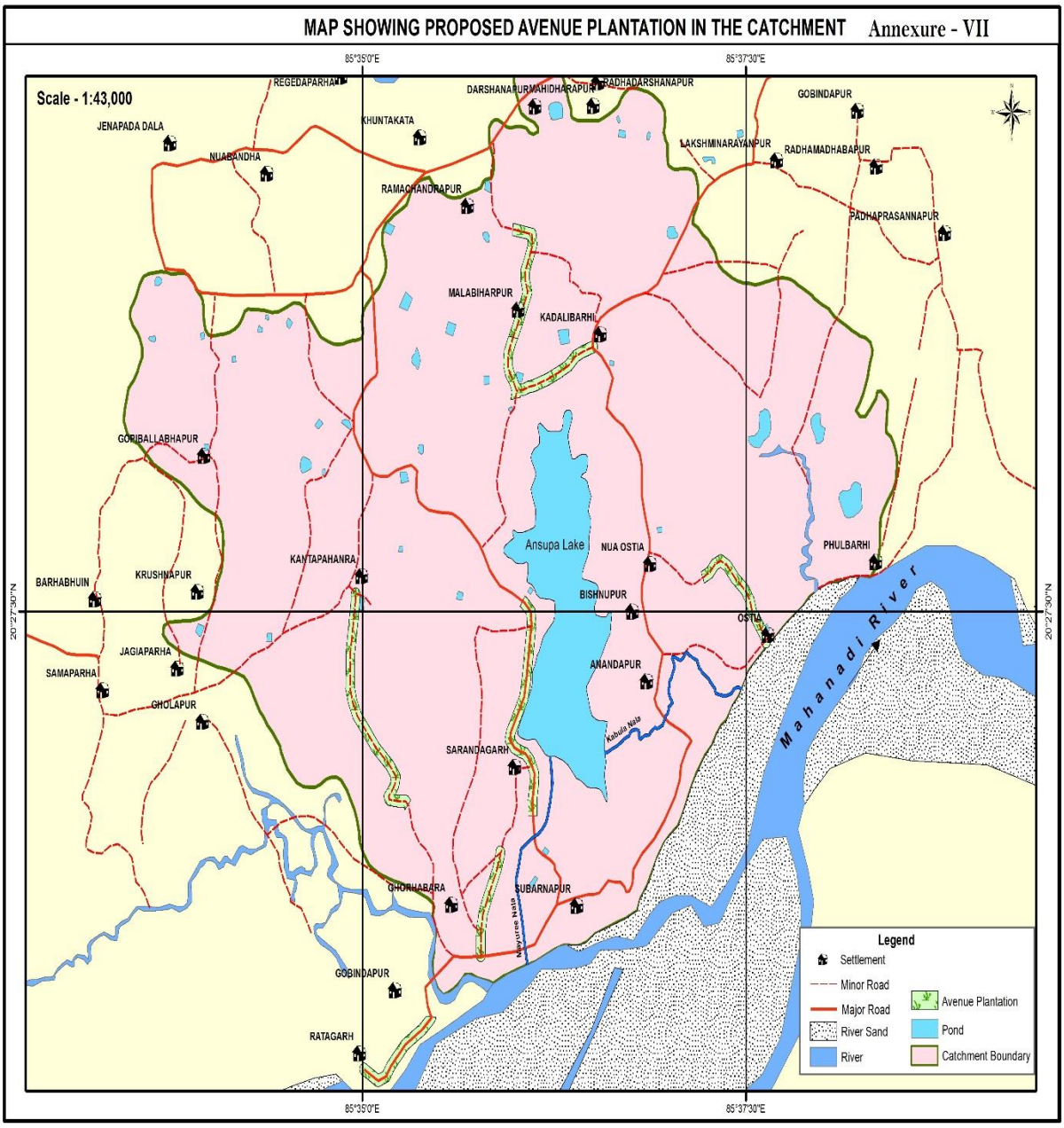
The year wise budget provision will be as under:

(Rs. in Lakhs)

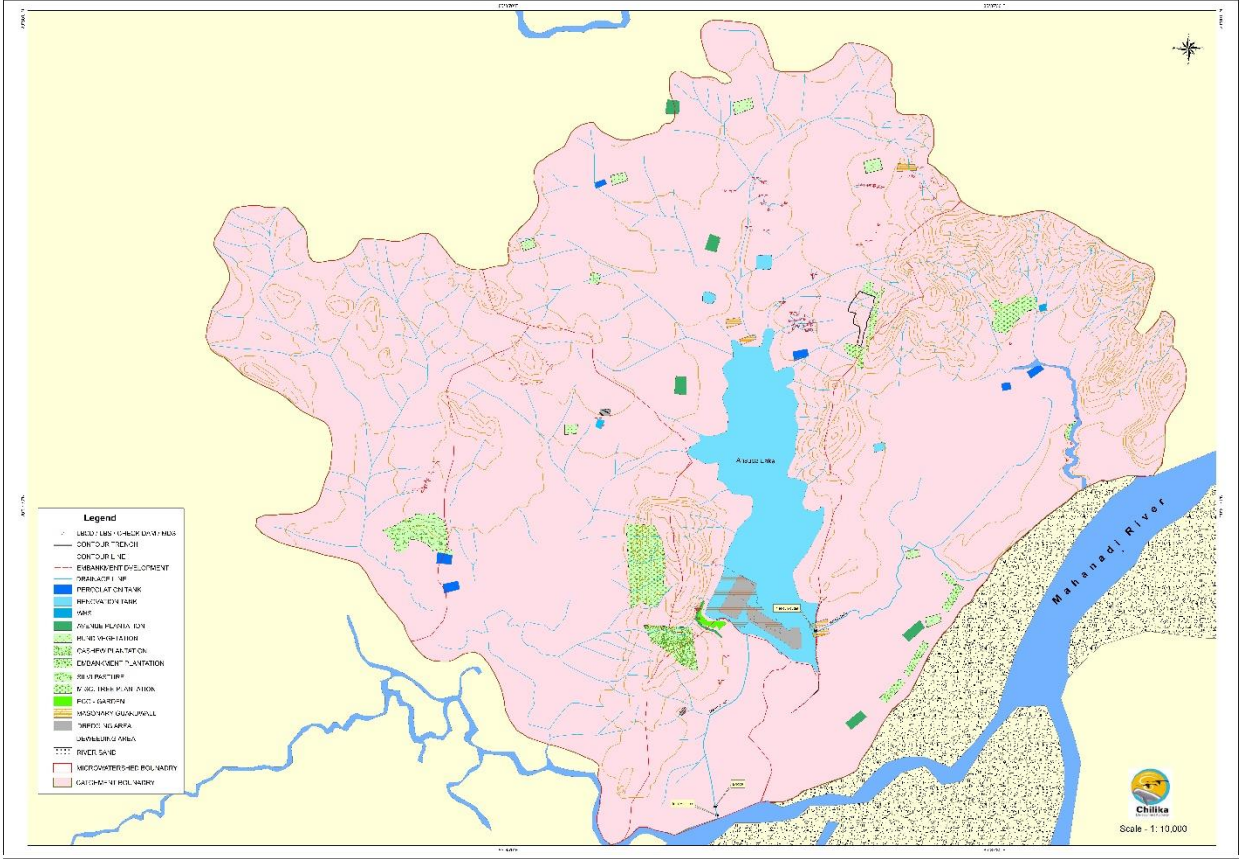
Year	Physical Target (Cu.M.)	Budget
2019-20	21,600	40.00
2020-21	21,600	40.00
2021-22	21,600	30.00
2022-23	21,600	20.00
2023-24	21,600	20.00
Total =	1,08,000	150.00

7.2.3. Soil Moisture Conservation

The lake is bounded by the Saranda hills on its Western side, Bishnupur hill on its North-Eastern side and by villages like Subarnapur, Malbiharpur, Kadalibadi, and Bishnupur. From the settlement report of 1928 it is seen that the area was receiving an annual average rainfall between 53” to 57” but with the denudation of the forest growths the average rain fall has now come down to about 50” annually. So it is highly essential to recharge the ground water by making interventions for water storage system as well as to arrest the silt during flow of rain water from ridge to valley. Soil Moisture Conservation measures through CCT; Field bunding etc will definitely be the proper intervention for the purpose. The five years estimated budget stands at Rs.300.00 lakhs and the yearly break up is shown below.

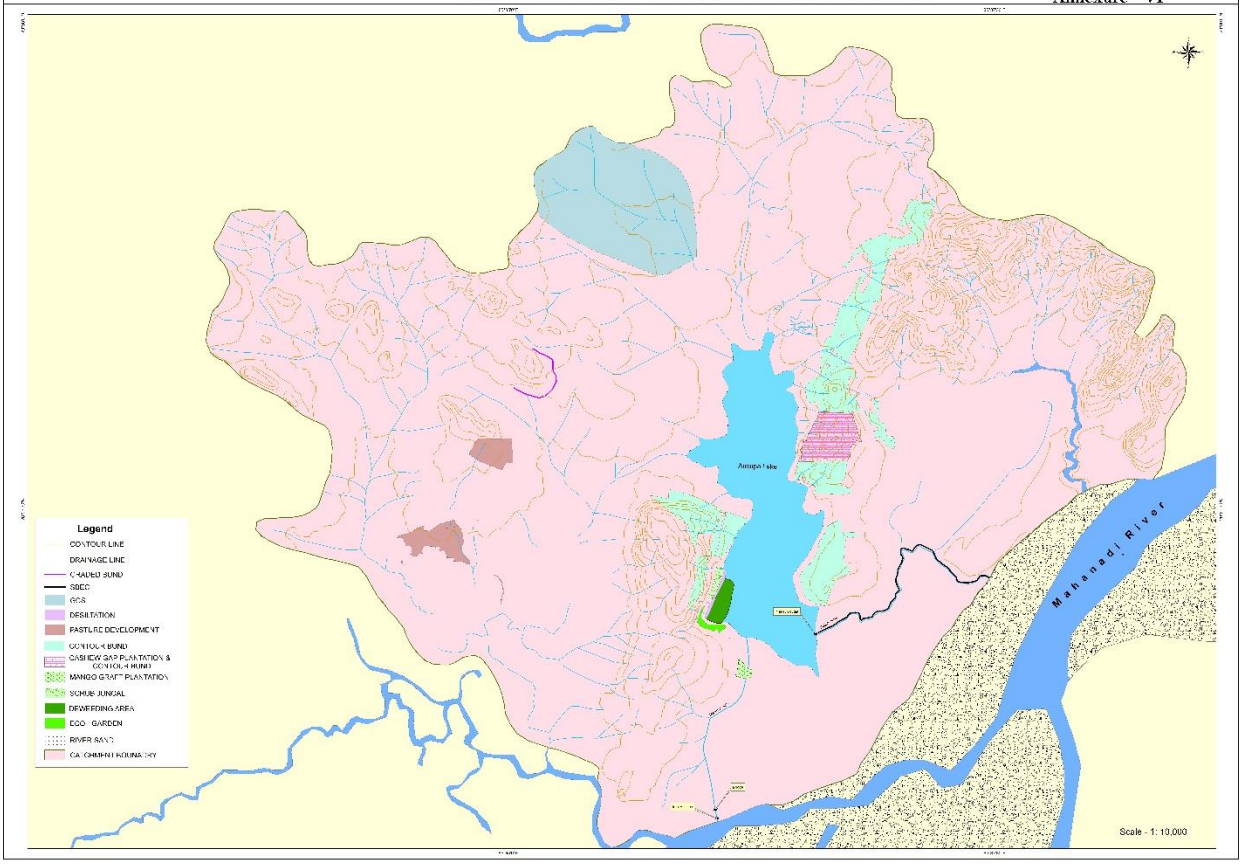

MAP SHOWING PROPOSED AVENUE PLANTATION IN THE CATCHMENT
Annexure - VII
Scale - 1:43,000
85°35'0"E
85°37'30"E
20°27'30"N
REGEDAPARHA
DARSHANARURMAHIDHARAPUR
RADHADARSHANAPUR
GOBINDAPUR
JENAPADA DALA
KHUNTAKATA
NUABANDHA
LAKSHMINARAYANPUR
RADHAMADHABAPUR
RAMACHANDRAPUR
RADHAPRASANNAPUR
MALABIHARPUR
KADALIBARHI
GORIBALLABHAPUR
Ansupa Lake
NUA OSTIA
PHULBARHI
KANTAPAHANRA
BARHABHUIN
KRUSHNAPUR
BISHNUPUR
OSTIA
JAGIAPARHA
SAMAPARHA
ANANDAPUR
GHOLAPUR
Kabula Nala
SARANDAGARH
Mahanadi River
GHORHABARA
SUBARNAPUR
Mayurna Nala
GOBINDAPUR
RATAGARH
Legend
Settlement
Minor Road
Major Road
River Sand
River
Avenue Plantation
Pond
Catchment Boundary

ANSUPA LAKE MANAGEMENT - INTERVENTIONS EXECUTED IN THE PAST



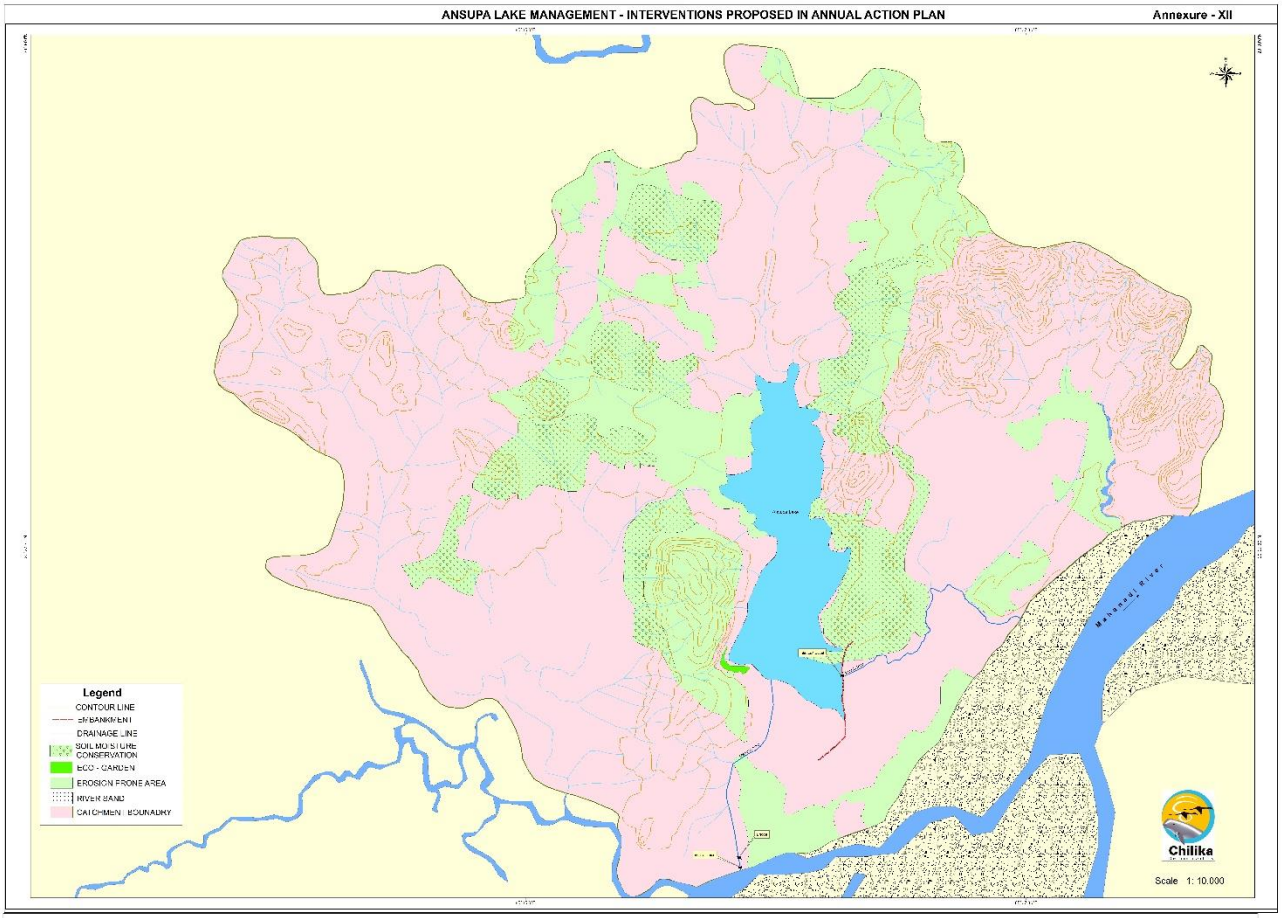
ANSUPA LAKE MANAGEMENT - INTERVENTIONS PROPOSED IN THE ACTION PLAN

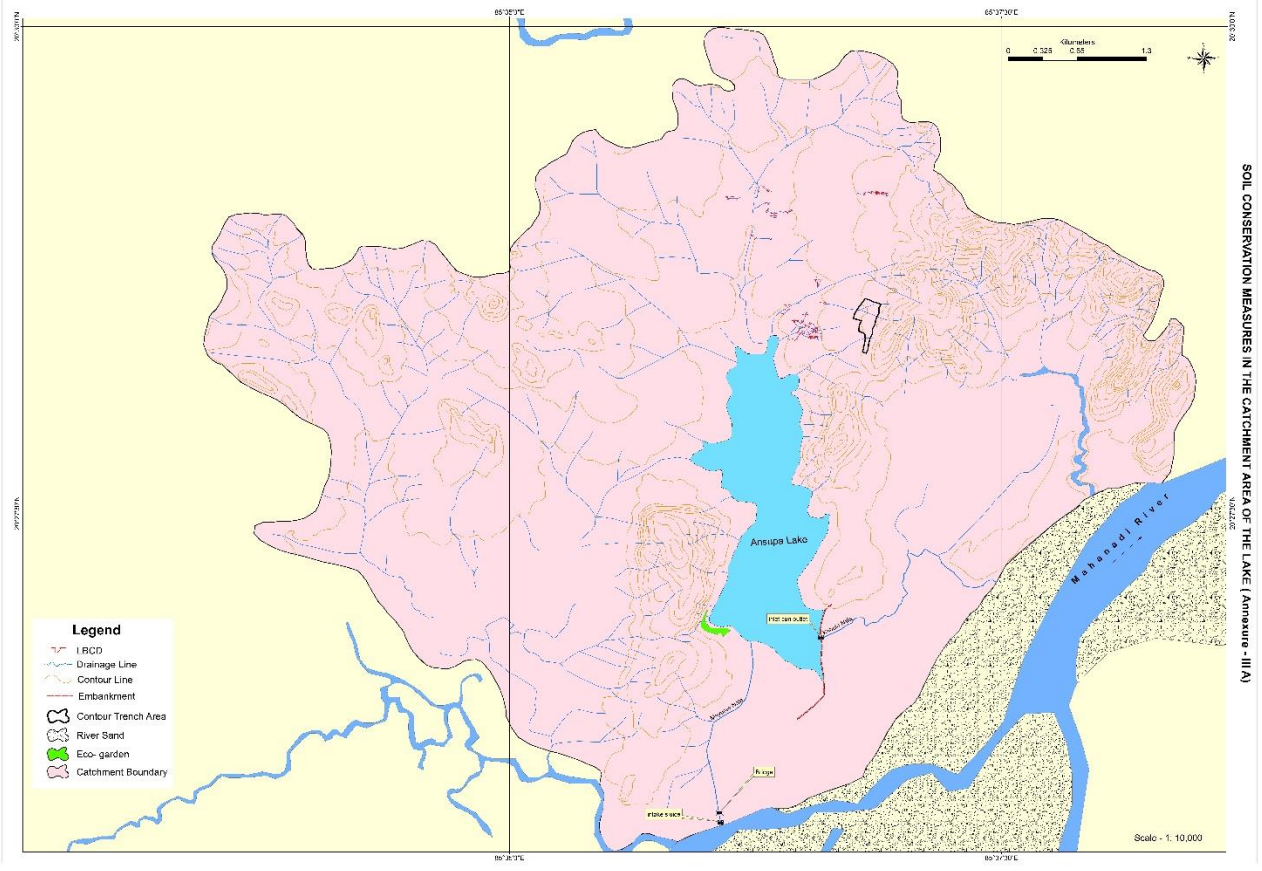
Annexure - VI



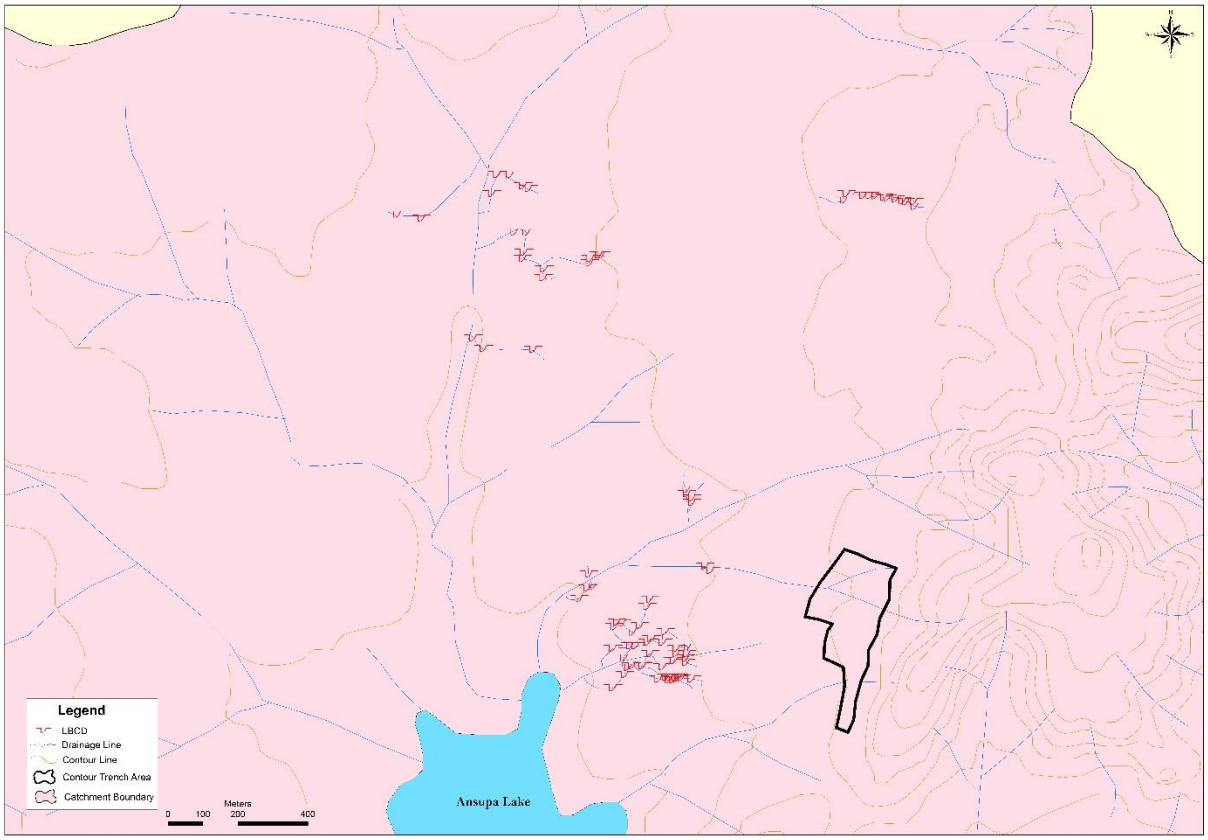
ANSUPA LAKE MANAGEMENT - INTERVENTIONS PROPOSED IN ANNUAL ACTION PLAN

Annexure - XII

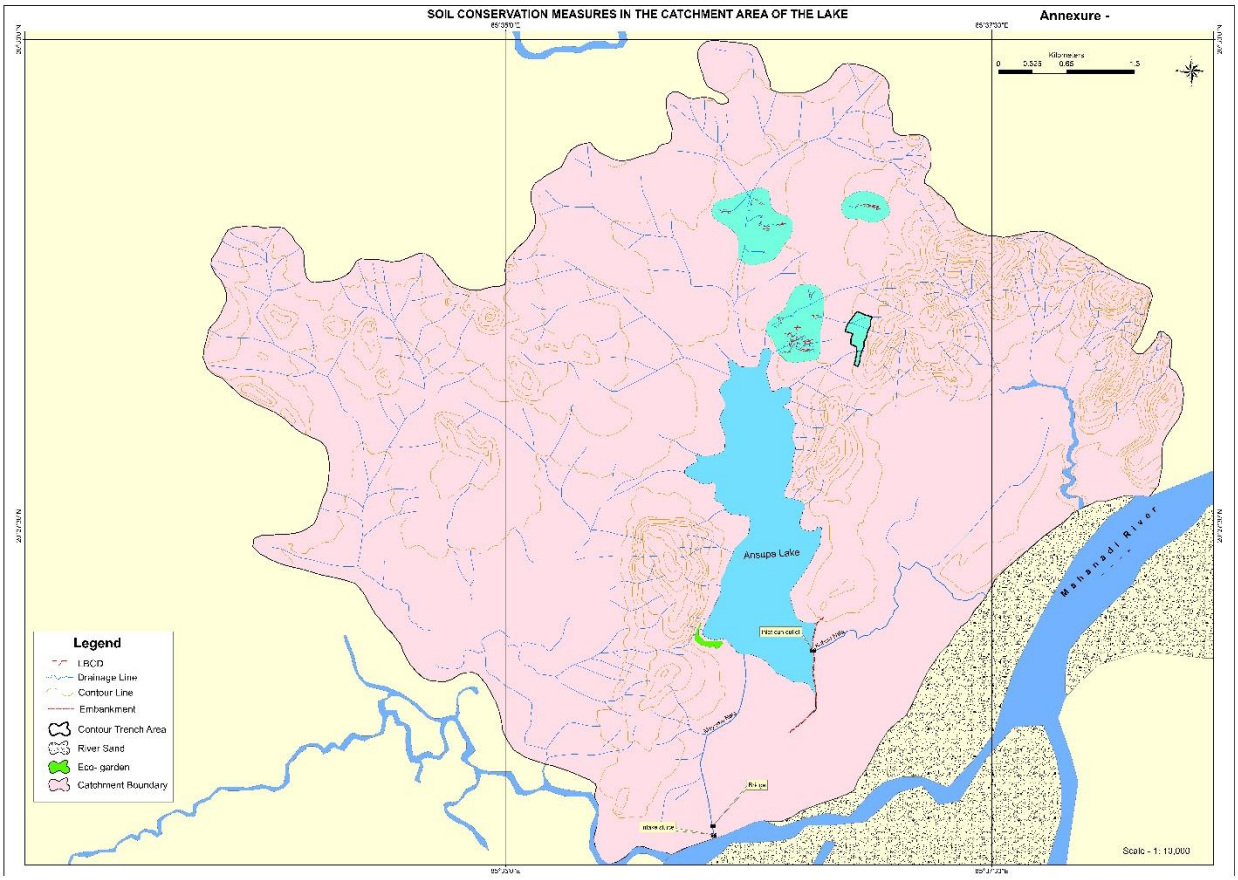


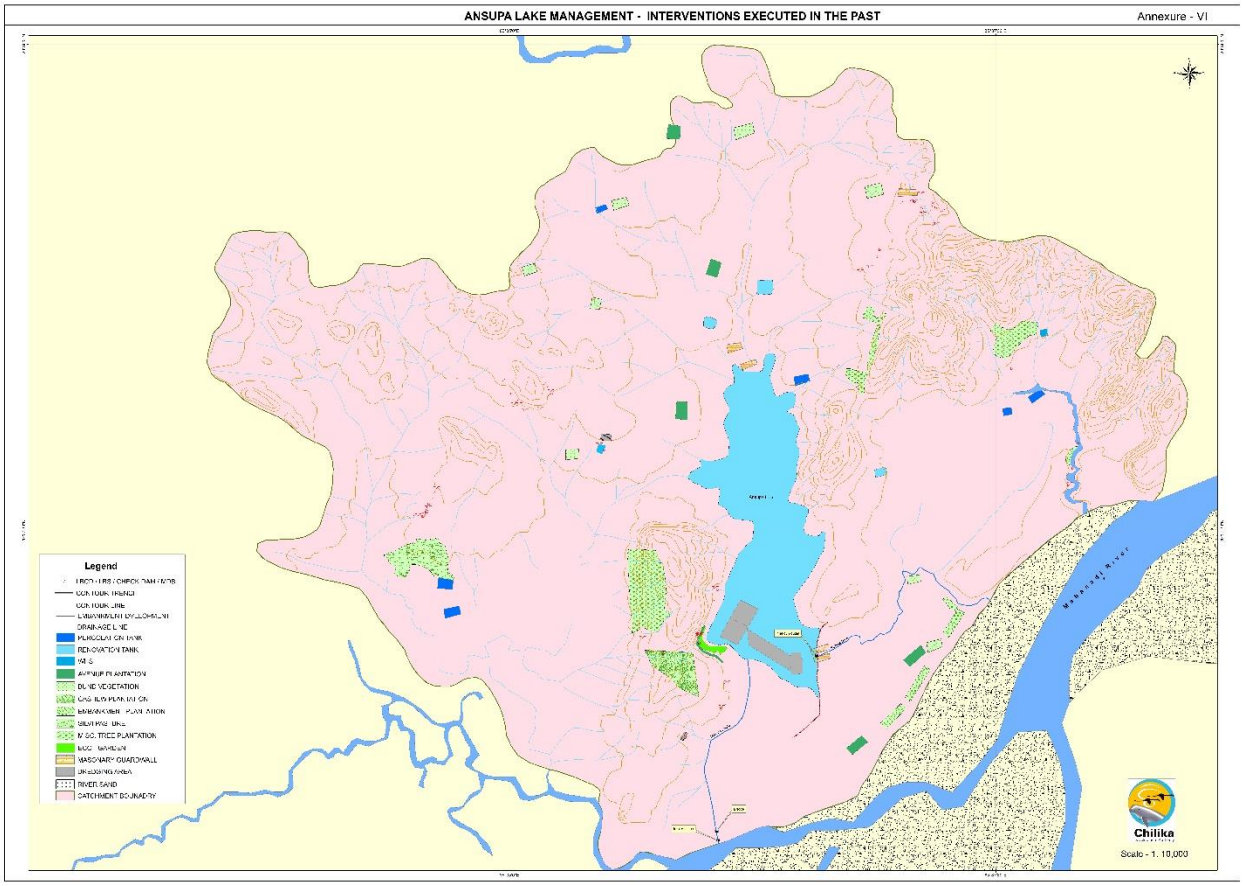


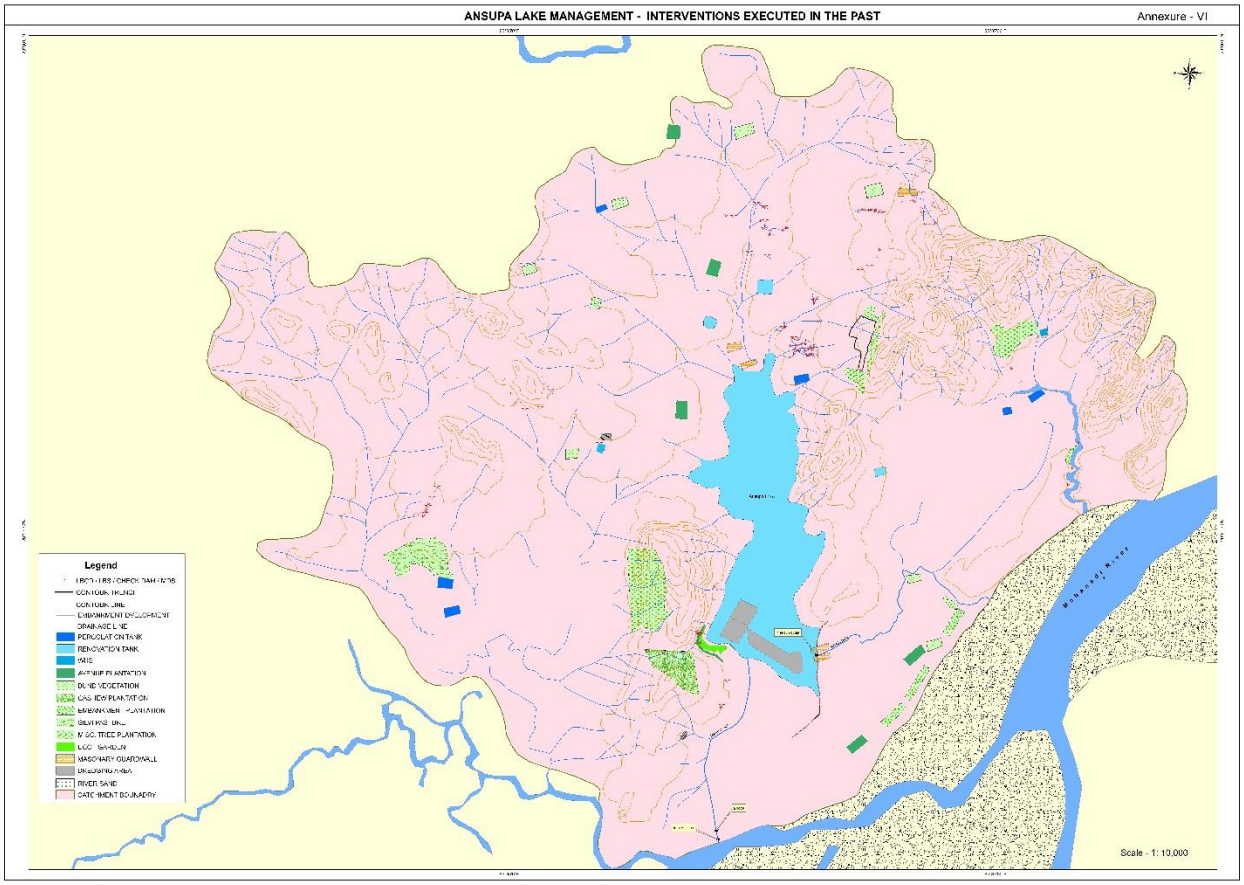
SOIL CONSERVATION MEASURES IN THE CATCHMENT AREA OF THE LAKE (Annexure - III A)



ENLARGE MAP SHOWING THE SOIL CONSERVATION MEASURES IN THE CATCHMENT AREA OF THE LAKE(Annexure - III B)




ANSUPA LAKE MANAGEMENT - INTERVENTIONS EXECUTED IN THE PAST
Annexure - VI
Legend
Mahanadi River
Chilika
Scale - 1: 10,000


ANSUPA LAKE MANAGEMENT - INTERVENTIONS EXECUTED IN THE PAST
Annexure - VI
Legend
Mahanadi River
Scale - 1: 10,000

The year wise budget provision will be as under:

(Rs. in lakhs)

Year	Activities Watershed Wise	Budget
2019-20	Water Harvesting Structure (WHS) @ Rs. 3,50,000* 8= Rs. 28,00,000 Loose Boulder Check dam @ Rs. 6000*15 = Rs. 90,000 Percolation Tank of dimension 40m by 30 m, Depth 3 m. @ Rs. 2,50,000* 6 = Rs. 15,00,000 Gully Control Structure @ Rs. 5000*12= Rs. 60,000 Loose Boulder Check Dam @ Rs. 25,000* 8 = 2,00,000 Staggered Trench @ Rs. 3000*10= 30,000 Administrative, Monitoring, Evaluation & Watershed Committee Contingency = Rs.13,20,000 Excavation of Well @ Rs. 1,25,000* 4 = 5,00,000	60.00
2020-21	Water Harvesting Structure (WHS) @ Rs. 3,50,000* 8= Rs. 28,00,000 Loose Boulder Check dam @ Rs. 6000*15 = Rs. 90,000 Percolation Tank of dimension 40m by 30 m, Depth 3 m. @ Rs. 2,50,000* 6 = Rs. 15,00,000 Gully Control Structure @ Rs. 5000*12= Rs. 60,000 Loose Boulder Check Dam @ Rs. 25,000* 8 = 2,00,000 Staggered Trench @ Rs. 3000*10= 30,000 Administrative, Monitoring, Evaluation & Watershed Committee Contingency = Rs.13,20,000 Excavation of Well @ Rs. 1,25,000* 4 = 5,00,000	60.00

2021-22	Water Harvesting Structure (WHS) @ Rs. 3,50,000* 8= Rs. 28,00,000 Loose Boulder Check dam @ Rs. 6000*15 = Rs. 90,000 Percolation Tank of dimension 40m by 30 m, Depth 3 m. @ Rs. 2,50,000* 6 = Rs. 15,00,000 Gully Control Structure @ Rs. 5000*12= Rs. 60,000 Loose Boulder Check Dam @ Rs. 25,000* 8 = 2,00,000 Staggered Trench @ Rs. 3000*10= 30,000 Administrative, Monitoring, Evaluation & Watershed Committee Contingency = Rs.13,20,000 Excavation of Well @ Rs. 1,25,000* 4 = 5,00,000	60.00
2022-23	Water Harvesting Structure (WHS) @ Rs. 3,50,000* 8= Rs. 28,00,000 Loose Boulder Check dam @ Rs. 6000*15 = Rs. 90,000 Percolation Tank of dimension 40m by 30 m, Depth 3 m. @ Rs. 2,50,000* 6 = Rs. 15,00,000 Gully Control Structure @ Rs. 5000*12= Rs. 60,000 Loose Boulder Check Dam @ Rs. 25,000* 8 = 2,00,000 Staggered Trench @ Rs. 3000*10= 30,000 Administrative, Monitoring, Evaluation & Watershed Committee Contingency = Rs.13,20,000 Excavation of Well @ Rs. 1,25,000* 4 = 5,00,000	60.00

2023-24	Water Harvesting Structure (WHS) @ Rs. 3,50,000* 8= Rs. 28,00,000 Loose Boulder Check dam @ Rs. 6000*15 = Rs. 90,000 Percolation Tank of dimension 40m by 30 m, Depth 3 m. @ Rs. 2,50,000* 6 = Rs. 15,00,000 Gully Control Structure @ Rs. 5000*12= Rs. 60,000 Loose Boulder Check Dam @ Rs. 25,000* 8 = 2,00,000 Staggered Trench @ Rs. 3000*10= 30,000 Administrative, Monitoring, Evaluation & Watershed Committee Contingency = Rs.13,20,000 Excavation of Well @ Rs. 1,25,000* 4 = 5,00,000	60.00
	Total	**300.00**

7.3 Weed management

Abundant growth of aquatic weeds in the lake plays an obstacle to the growth of fishery resources as well as adversely affects the tourism activities in the lake. The weeds which are in great abundance in the lake are *Pistia stratiotes, Eichhorniacrassipes, Monochoria hastate and Salvinia cucullata.* The submerged species are represented by *Potamogetonpectinatus, Najasfoveolata, Hydrilla verticillata, Ceratophyllumdemersum, Utricullariainflexa, Otteliaalismoides.*

The channel joining the river and lake is almost dead but low water lying areas are still marked such places are rich in species content and dominated by amphibious life forms. In general the tall elements like *Typha angustata, Saccharum spontaneum, Scleriaterrestris, Scirpusgrossus*are found in abundance. During rainy season *Limnophilaheterophylla, Setariapumlla, Enydraflactuans are* commonly met with. Hence to make the lake more tourists friendly and more productive from fishery point of view, it is essential to get rid of the profuse growth of aquatic weeds through removal i.e. by way of mechanical removal or manual.

7.3.1. Manual de-weeding

Removal of aquatic weeds from the lake manually has been tried and in the past and the process is successful only in the shore line i.e up to a water depth of 1.00 mt. The activity can be continued through engagement of local labour in the shore line especially during September / October. However participatory approach in implementation of the activity would be followed i.e. to be executed through block / DRDA under NREGS. The existing approved cost norm (by the PCCF Wildlife and Chief Wildlife Warden, Odisha) would be followed for removal of weeds from the lake. Growth of aquatic weeds has almost spread all over the lake and it is proposed to go for manual de-weeding of the weeds along the shore line with a width of 20 meters. Into the lake. It is proposed to de-weed the aquatic weeds over 30 ha. each year manually.

7.3.2. Mechanical de-weeding.

Profuse growth of aquatic weeds is seen almost all over the water spread area of the lake. This weed growth affects adversely the growth of fishery resources in the lake and also badly affects the water sports activity, which has very good potential for promotion of tourism activities. Hence it is essential to remove the aquatic weeds from the lake i.e. specially from the area marked for water sports and boating through mechanical weed harvester. The activity needs to be continued at regular intervals to keep the area free from weeds. Removal of aquatic weeds through the use of weed harvester would be undertaken in the deeper portions of the lake i.e. beyond 20 meters from the shore line and with water depth more than 1 meter. The proposal for purchase of weed harvester is included in the plan and the cost estimate for the purpose would be placed after due consultation with technical experts and on receipt of proposals thereof.

The year wise budget provision will be as under:

(*Rs.in Lakhs)*

Year	Physical Target in Ha.	Budget
2019-20	**140**	**30.00**
2020-21	**140**	**20.00**
2021-22	**140**	**20.00**
2022-23	**140**	**20.00**
2023-24	**140**	**20.00**
Total =	**700**	**110.00**

7.4 Close Monitoring of physio-chemical parameters

Hydrology is the most important factor which affects the bio resources and biological productivity of the wetland / water body. Ansupa Lake receives fresh water from its catchment from an area of about 52.31 sq km through different streams. Most importantly Ansupa receives water from river Mahanadi during flood through the channels like Mayuri nallah and Kabula nallah. The fresh water inflow into the lake is directly relates to the rainfall in its catchment. The lake ecosystem is greatly influenced by the flow from the catchment.

Limnology is the study of lakes which includes both abiotic and biotic factors of the lake ecosystem. The abiotic factor includes water and sediment of the lake whereas the biotic factor includes flora and fauna present in the lake. The physical and chemical parameters have tremendous effect on the biological parameters in the lake ecosystem. The growth and development of flora and fauna is mainly governed by the physico-chemical parameters of water and sediment. The physical factor includes water colour, temperature, depth, transparency, current, tidal wave and total suspended solids etc. Besides these, there are some important factors, such as weather, rainfall and atmospheric temperature which have also direct effect on Lake Ecosystem. The chemical parameters include pH, conductivity,

alkalinity, acidity and salinity etc.. The major element includes calcium, iron, chloride, sulphate, ammonia, nitrite, nitrate, organic nitrogen, orthophosphate, total phosphate.

The hydro physico-chemical factors have on aquatic flora and fauna immense effect. Like other plants, aquatic macrophytes, algae and phytoplanktons require nutrients and light to grow are also affected by temperature, pH etc. or inhibited by toxic elements and excessive amount of certain environmental factors. These factors modify the composition of plant community, species composition of fish and other aquatic fauna of the lake.

It is proposed to constantly monitor the physio-chemical and biological parameters of the lake water to create data base for future management. The monitoring stations (10 nos.) shall be fixed spread all over the lake from which to water and sediment samples would be collected for analysis at three season. The inflow of fresh water into the lake and outflow from the lake through the nallahs needs to be monitored regularly through deployment of gauge stations and current meter etc. The close monitoring of water quality parameters at Ansupa and hydrobiological monitoring shall be carried out by the scientific team of Wetland Research and Training Centre (WRTC) of CDA, Barakul (Balugaon).

Table 3: Proposed Budget for Hydrobiological Monitoring Activities

(Rs.in Lakhs)

Sl. no.	Activity	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1.	Close monitoring of water quality including BOD estimation(10-12 sampling stations)	3.00	3.00	3.00	3.00	3.00	15.00
2.	Detailed survey of Macrophytes	2.00	2.00	2.00	2.00	2.00	10.00
3.	Monitoring of phytoplancton & primary productivity	2.00	2.00	2.00	2.00	2.00	10.00
4.	Monitoring of macrozoobanthos	1.00	1.00	1.00	1.00	1.00	5.00
5.	Monitoring by application of remote sensing and GIS	2.00	2.00	2.00	2.00	2.00	10.00
	Total:	**10.00**	**10.00**	**10.00**	**10.00**	**10.00**	**50.00**

7.5 Fishery resources development

Ansupa Lake was famous for the fresh water fish which used to cater to the needs of Cuttack city. With the severe degradation of the lake ecosystem the fish production of the Lake also declined significantly. The major contributing factor for the decline in fish catch and degradation of the Fisheries of Ansupa lake are as follows;

- Closure of inlets connecting the river Mahanadi and the lake to the Southern sector of the Lake. This is adversely affecting the auto stocking from River.
- Permanent closure of “Godighai” near Anandapur village and installation of a narrow sluice gate at “Hanaghai” on “Dahalia” embankment.
- Rapid siltation due to degradation of catchment and weed infestation leading to eutrophic condition, reduction in fishing area, poor conversion of energy to fish biomass.
- No attempt for artificial stocking of the lake systematically. Though carp seed stocking in a limited scale was initiated by the Department of Fisheries during mid-eighties, it was discontinued after 1987-1988.
- Consequent upon decrease of inflow and out flow of river water during flood season the water spread areas is decreasing over the years. This is also triggering encroachment by local villagers for paddy cultivation.

  Institutional weakness, the Ansupa Primary Fishermen Cooperative Society is virtually defunct.

7.5.1. Proposed fisheries development plan:

For long term planning detail information on the Lake ecosystem is essential. The lake environment is different and needs detail study for a clear understanding of its trophic set up. Such scientific investigation in respect of Ansupa Lake, the largest freshwater lake in Odisha, is of paramount importance. In absence of such study no long-term management strategies can be developed for restoration of ecosystem and development of fisheries in Ansupa Lake. However as an immediate step both short and long-term strategies may be contemplated to restore the Lake ecosystem and to develop the fisheries of Ansupa Lake.

Fishes of Ansupa Lake

Labeo rohita

Catla catla

Cirrihinus mrigala)

Labeo bata

Ctenopharyngodon idella

Cirrihinus reba

7.5.2 Biological control of weed through grass carp

The lake is choked with submerged weeds mixed with floating macrophytes, covering more than 90% of lake area. This is a major predicament to the Lake fishery. Fishery development in the lake would not be possible unless the floating weeds are removed, which may be done either manually or mechanically. Assessment of the density of the submerged weed needs to be carried out to arrive at the stocking density of grass carp for biological control of the weed. The density of weed in the lake may be estimated in terms of wet weight biomass (kg/m^3). After assessment of the existing weed density of

the lake, immediate steps need to be taken for partial clearance of weed to facilitate stocking of grass carp fingerlings for effective biological control of weed.

From the rapid assessment made, the mean area under weed coverage is 153 ha, the depth of the weed coverage is 1.25 m and the wet weight biomass of 1 m^3 is 8 kg. Thus, the total density of submerged weed was assessed to be 15,300 mt.

7.5.2.1 Stocking of Grass carp fingerlings for biological control of weed in the lake:

Grass carp (*Ctenopharyngodonidella*), is a voracious weed eater and is very effective for biological control of submerged species like *Hydrilla,Najas, Ceratophyllum* etc. and free floating weeds like, *Wolffia*, *Lemna, Azolla*, *Spirodella* etc. The grass carp species consume aquatic weeds continuously several times of its body weight and adult fish can consume upto 2-3 times of their body weight. The fish grows very fast converting the weeds into valuable fish flesh. However, 65% of the weed material is digested and 35% is released into water in undigested form. This would enhance the nutrient content of the Lake water which needs to be taken in to consideration. From management perspective normally, 70-75 number of grass carp per hectare of the size 125-200 mm would be released for effective control weeds in the Lake. The estimated number of grass carp fingerlings required for stocking of the Lake at the above density would be around 12,000. The stocking can be carried out in phased manner *i.e.* at the rate of 3,000 per year for four years.

7.5.2.2 Pen culture to grow large size fingerlings to stock the Lake

Pen culture is one of the advanced methods to raise fingerlings from fry and advanced fingerlings from standard fingerlings. This is a useful and economic technique for in-situ production of large size fingerlings at the reservoir/fresh water Lake sites. 2 to

3 ha. Pens constructed with HDPE 0.5mm multiply netting materials with 15 to 16 feet height and bottom sealed with sand bags will be required in Ansupa Lake for adequate stocking of large size fingerlings grown in the pens. Indian major carp fingerling would comprise of mainly two species *catla catla* and *labeo rohita.* In addition the Chinese grass carp which can grow very fast in Ansupa Lake by consuming available submerged weeds such as *hydrilla, lemna* etc*.* shall be stocked in the Lake. Such pen culture will be carried out at Ansupa in batches so that stocking and harvesting in Ansupa could be a continuous process.

7.5.2.3. Fish stock enhancement in the Lake through stocking of fingerlings of Indian Major Carps (IMC) and Chinese Grass carps continuously for four years.

It is proposed to release large size fingerlings of Indian Major Carps (*catla* and *rohu* and Chinese grass carps) to enhance the fishery stock of the lake. The maximum stocking density for Ansupa lake with 206 ha. water spread area would be 1.03 lakh standard fingerlings (80 to 120 mm). But for higher survival and growth at harvest it is advisable to stock the lake with large size fingerlings of at least 50gm. Individual size. Therefore this size large fingerlings would be 1/4th conversion of standard fingerlings. Therefore the maximum stocking density in Ansupa can be estimated at 25,750 no. of 50 gm. Size large fingerlings per batch and the estimated annual harvest will be more than 25 tonnes .

7.5.2.4 Raising of major carp fingerlings in the captive nursery

One captive rearing pond of 0.8 ha area has been developed at Ansupa for in-situ production of carp fry/fingerlings which can be use for cage/pen culture at Ansupa. The carp seeds can be produced by following standard practice of nursery and rearing pond management. The rearing pond @ 3 lakhs standard fry/ha can be stocked to produce standard fingerlings with 80% survival. Therefore about 2.4 lakhs standard fingerlings will be produced from the rearing pond unit at Ansupa.

7.5.4 Training and awareness program for the local fishers on fishery resource management and wise use of resources which also include publication of a monograph book on fishes and shell fishes of Ansupa

It is proposed to conduct 4 no. training and capacity building camps in Ansupa lake for the fishers of Ansupa Primary Fisherman Cooperative Society. The society having more than 250 memberships shall be sensitized through the awareness training camp in four batches per year. There will be about 63 members in each training camp and the training program will conduct at Ansupa lake. 4 training camp will be organized during the year in the month of April, July, November and March. The expenditure per training camp shall be as follows.

1. Refreshment for fisher trainees (63) @Rs.50/- per trainee = Rs.3,150.00
2. Training materials @Rs.30/- per trainee = Rs.1,890.00
3. Miscellaneous expenditure (LS) = Rs. 100.00

Total = Rs.5,140.00

Annual Budget = 4 x Rs.5,140.00 = **Rs.20,560.00 say, Rs.21,000.00 (0.21 lakh)**

Thus 5 years breakup of the cost with 10% annual excavation will be as follows:

(Rs. in Lakhs)

Component	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Training and awareness program for the local fishers on fishery resource management and wise use of resources which also includes publication of a monograph book on fishes and shell fishes of Ansupa	0.21	0.23	0.25	0.27	0.30	1.26
Under the said program a monograph book on the fish and shell fish diversity of Chilika lake (40-50 species) is proposed to be published in the form of pictorial color images of the fish and shell fish species. The book will not only be useful to the fisher trainees and also to the visitors who are coming to visit the eco garden of Ansupa. This will be a useful document of the lake. The book of about 60 pages with color photographs and printings will cost about Rs.1.00 lakh						1.00
Total	**0.21**	**0.23**	**0.25**	**0.27**	**0.30**	**2.26**

7.5.5 Construction and management of a small fish museum exclusively for fish and shell fish species of Ansupa lake

Although more than 40 fin fish and 10 shell fish species of fresh water environment are reported from Ansupa lake, there is no fish museum for the preserved specimen of those fishes and shell fishes at Ansupa. There is a nice eco garden at Ansupa which is regularly visited by quite a large no. of visitors. It is therefore proposed under the action plan that a small museum of preserved specimens of Ansupa fishes, prawns and crabs will attract more visitors to the eco garden. A small masonry room of 11 x 12 feet size shall accommodate wooden or steel racks for placement of glass or acrylic specimen containers containing fish and shell fish specimens preserved in formaldehyde. The total approximate cost of the component will be as under:

1. 11' x 12' size masonry room = **Rs.1.25 lakhs** (first year)
2. Cost of specimen containers = Rs.0.05 lakh
3. Preservative chemicals = Rs.0.02 lakh
4. Wooden rack(6-7 nos.) = Rs.1.20 lakh

Total = **Rs.1.27 lakhs**

Grand Total = Rs.2.52 lakhs

Thus 5 years breakup of the cost with 10% annual excavation will be as follows:

(Rs. in lakhs)

Component	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Small fish museum for Ansupa fishes	1.25	0.64	0.63	-	-	2.52
Total	**1.25**	**0.64**	**0.63**	**-**	**-**	**2.52**

7.5.6 Revitalization of Ansupa Primary Fisherman Cooperative Society (PFCS)

There is one PFCS called Ansupa PFCS involving two fisherman villages namely Subarnapur & Malabiharipur. The total active membership of the PFCS is 250. The administrative authority for the PFCS is the district fishery officer, Cuttack under the department of fisheries who acts as assistant registrar for the PFCS. The PFCS is in a moribund condition without having adequate capital base to effectively to run and manage the society activities. The fisherman member of the society are the primary users of fishery resources of Ansupa lake. Over a decade the PFCS has not received any financial assistant from any source to strengthen their organisation and activities. Per capita income of fishermen is very low for which their livelihood has been affected.

Since 2003-04 Chilika Development Authority, after taking over the restoration & management of Ansupa lake, has been trying to support Ansupa PFCS to enhance their management capacity & to involve them actively in the management of fishery resources in Ansupa. The fisherman members of PFCS lost their boats & nets during the last cyclones and which are yet to be replaced for effective fishing in the lake. The society does not have its office accommodation for holding periodical meetings of the PFCS. The society thus needs financial assistant in the form of either soft loan or as a revolving fund to revitalize the PFCS to effectively manage their society, procurement of boats and nets to replace the lost and damaged fishing equipment so that the fishermen can effectively carry out fishing in the lake.

It is therefore proposed to provide financial support in the form of soft loan with low rate of simple interest or as a revolving fund through the banker of the society. Keeping in view the need of fisher members, Rs.10 lakhs (Rupees Ten Lakhs) only shall be provided as revolving fund to the PFCS which will be maintained by the banker of the society. The *modus-operandi* for operation of revolving fund will be to provide Rs.15,000.00 to each of seventy fishers having fishing boats and the fisher shall have to repay the amount through the society to the participating bank in a period of 5 years. Each loanee fisherman shall deposit Rs.250.00 as monthly installment with the secretary of the society and thus the society will collect Rs.17,500.00 from 70 loanee fisherman every

month and deposit in the revolving account maintained in the bank, and in this way Rs.10 lakhs shall be repaid within the period of 5 years.

Table no. 4 Proposed Budget and Activities for the Component Fisheries Resources Development

(2019-20 to 2023-24)

(Rs. in Lakhs)

Sl. no.	Activity Description	Unit cost in INR	2019 -20	2020-21	2021 -22	2022 -23	2023-24	Total
1	Pen culture for large size fingerling production	Rs.8.452 lakhs per year for three batch fingerlings production from pens and stocking in Ansupa	7.00	7.7	8.47	9.32	9.77	**42.26**
2	Captive nursery management for production of fingerlings from spawn/fry stage for stocking in lake	Rs.8.452 lakhs per year for one time operation in a year	0.24	0.26	0.28	0.30	0.33	**1.41**

3	Training and awareness program including publication of a monograph book on fish and shell fish species of Ansupa	(a) Rs.0.0514 lakhs per training camp (Annual budget 0.21 to 0.30 lakhs per year)	0.21	0.23	0.25	0.27	0.30	**1.26**
		(b) Publication of monograph book on fish and shell fish diversity of Ansupa	-	-	-	1.00	-	**1.00**
4.	Small fish museum for Ansupa Fishes	----------	1.25	0.64	0.63	-	-	**2.52**
5.	Revitalization of Ansupa Primary Fisherman Cooperative Society (PFCS)	----------	10.00		--	--	--	**10.00**
	Total							**58.45**

(Rupees Fifty Eight lakhs and Forty Five Thousand) only

7.5.6.1 Implementation of conservation measures:

The fishery resources of Ansupa Lake are used as a common property resource by the local fishers. The fishery resources are in a degraded form due to degradation of lake eco-system. Some of the regulation needs to be put into practice in form of appropriate mesh size regulation for different type of fishing nets operated by the fishermen and observation of “closed season” during monsoon (mid June-mid August) to prevent fishing mortality of under sized carps and to give chance to the brood stock of major carps to breed in the lake for population enhancement are essential. Such measures are very important for sustainable management of capture fishery in lakes. For this the PFCS needs to be empowered with capacity development and financial support. The PFCS would function as a grass root level institution once the PFCS is strengthened it would be possible to implement the conservation measures. The programme would be linked to awareness and other outreach programme. Regulation of harvestable size of fish would be strictly followed. Under this regulation, major carps below the size of 500gm would not be harvested by the fishers. Fingerlings after stocking every year would not be caught from the lake.

7.5.7 Financial outlay:

The component of fishery resources development of Ansupa involving the **aforementioned activities would** require a total budget of Rs.58.45 lakhs. The year wise breakup of the financial outlay for all sub-components under fishery resource development are presented in table no. 5

Table no. 5 Proposed Budget and Activities for the Component Fisheries Resources Development

(2019-20 to 2023-24)

(Rs. in Lakhs)

Sl. no.	Activity Description	Unit cost in INR	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1	Pen culture for large size fingerling production	Rs.8.452 lakhs per year for three batch fingerlings production from pens and stocking in Ansupa	7.00	7.7	8.47	9.32	9.77	**42.26**
2	Captive nursery management for production of fingerlings from spawn/fry stage for stocking in lake	Rs.8.452 lakhs per year for one time operation in a year	0.24	0.26	0.28	0.30	0.33	**1.41**
3	Training and awareness program including publication of a monograph book on fish and shell fish species of Ansupa	(a) Rs.0.0514 lakhs per training camp (Annual budget 0.21 to 0.30 lakhs per year)	0.21	0.23	0.25	0.27	0.30	**1.26**
		(b) Publication of monograph book on fish and shell fish diversity of Ansupa	-	-	-	1.00	-	**1.00**
4.	Small fish museum for Ansupa Fishes	----------	1.25	0.64	0.63	-	-	**2.52**
5.	Revitalization of Ansupa Primary Fisherman Cooperative Society (PFCS)	----------	10.00		--	--	--	**10.00**
	Total							**58.45**

(Rupees Fifty Eight Lakhs and Forty Five Thousand) only

7.6 Biodiversity Inventory & conservation

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 around 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 eco-development 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

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

The proposed activities and budget provisions for 5 years will be as under:

(Rs. in lakhs)

Sl. no.	Activity	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1	Protection & conservation of biodiversity	12.00	12.00	12.00	12.00	12.00	60.00
2	Awareness campaign through meetings, seminars and workshops	5.00	5.00	5.00	5.00	5.00	25.00
	Total =	**17.00**	**17.00**	**17.00**	**17.00**	**17.00**	**85.00**

7.7 Communication Education and Public Awareness (CEPA)

Ansupa Lake is a common property resource. For sustainable management of the lake the active participation of the local communities is essential. For community participation in the sustainable management of the Lake and to ensure wise use of the Lake resources outreach programme warrants high priority. To achieve this, **Communication, Education and Public Awareness (CEPA)** tool needs to be put in to practice to generate

adequate awareness among the local community about the values & functions of wetland ecosystem and wise use of its resources to maintain the ecological integrity of the wetland.

It is proposed to generate awareness about the values and function of the wetland through carefully planned awareness programme. The target group would be resource users, students and other stake holders. Different CEPA tools would be used to achieve these objectives. For the purpose, customized signage, brochure, other education materials would be developed at the same time curriculum for environmental education for the school children would be developed.

It is proposed to organize the awareness and environmental education programmes. Necessary kits & materials i.e. posters, pamphlets, brochures, video strips, documentary on various traditional method of fishing, traditional fishing gears, wise use practices and other resource use will be developed. Emphasis would be laid on the capacity building of stakeholders, school children, NGOs & CBO. The five years financial outlay for implementation of CEPA activities has been estimated at Rs.75.00 lakhs as furnished below.

(Rs. in Lakh)

Year	Budget
2019-20	15.00
2020-21	15.00
2021-22	15.00
2022-23	15.00
2023-24	15.00
Total =	**75.00**

7.8 Maintenance of Eco-park :

An eco-part is developed at the shore of Ansupa lake at a strategic location with an objective to promote the CEPA activities. The eco garden on the shore of the Ansupa Lake over an area on 5 acres on which the nature trails, customized signage's , gazebos are installed along with the sprinkler irrigation system, boating facilities, and land scaping is done . This would serve as a hub for the environmental education and other CEPA activities for the school children particular and the general visitor in general. For its maintenance and developments regular funds flow is required. The five years budget for development and maintenance of eco park and its ancillary activities has been estimated at **Rs.1295.00 lakhs** and the year wise breakup is furnished below.

Year wise budget proposal for development & management of **eco-park** at Ansupa Lake during 2019-20 to 2023-24

(Rs. in Lakh)

Component	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Development of Eco-Garden (Creation & Development)	100.00	100.00	100.00	100.00	100.00	500.00
Construction of watch tower 3 Nos. and its maintenance	90.00	10.00	10.00	10.00	10.00	130.00
Construction of 1st Floor of the camp office of CDA and its maintenance.	50.00	10.00	10.00	10.00	10.00	90.00
Construction of public utility and its maintenance.	30.00	10.00	10.00	10.00	10.00	70.00
Provision of Sit out around Nature Trail.	5.00	5.00	5.00	5.00	5.00	25.00
Extension of Nature Trail and its maintenance.	30.00	15.00	15.00	15.00	15.00	90.00
Irrigation facilities, sprinkler system and provision drinking water facilities.	20.00	15.00	15.00	15.00	15.00	80.00
Maintenance and extension of rockery garden.	30.00	10.00	10.00	10.00	10.00	70.00
Electrical Maintenance inside the Eco-Garden.	10.00	15.00	20.00	25.00	30.00	100.00
Construction of Masonry boundary wall and Gate.	80.00	15.00	15.00	15.00	15.00	140.00
Total	**445**	**205**	**210**	**215**	**220**	**1295**

8.0 Budget & Activity Phasing

8.1 Activity Linked Budget

The integrated management planning frame work of Ansupa Lake comprises of six major planning components/activities such as;

(1) Wetland features
(2) Evaluation of wetland features
(3) Institutional arrangements
(4) Setting management of objectives
(5) Monitoring and evaluation plan and
(6) Developing an action plan.

The budget summary is presented for all six planning activities as under:

ANSUPA LAKE:

Proposed Budget and Activities for the Component **For Integrated Management Plan For Ansupa Lake**

(2019-20 to 2023-24)

(Rs. in Lakhs)

Sl. no.	Activity Description	2019-20	2020-21	2021-22	2022-23	2023-24	Total
1.	**Catchment Management**						
	1.1 Soil Moisture Conservation Water Harvesting Structure (WHS) @ Rs. 3,50,000* 8= Rs. 28,00,000 Loose Boulder Check dam @ Rs. 6000*15 = Rs. 90,000 Percolation Tank of dimension 40m by 30 m, Depth 3 m. @ Rs. 2,50,000* 6 = Rs. 15,00,000 Gully Control Structure @ Rs. 5000*12= Rs. 60,000 Loose Boulder Check Dam @ Rs. 25,000* 8 = 2,00,000 Staggered Trench @ Rs. 3000*10= 30,000 Administrative, Monitoring, Evaluation & Watershed Committee Contingency = Rs.13,20,000 Excavation of Well @ Rs. 1,25,000* 4 = 5,00,000	60.00	60.00	60.00	60.00	60.00	300.00
	1.2 Desilting near Dahalia embankment (Length 240m.*Depth 1.8m.*Width 50m)= 21,600 Cu.M.*Rate Rs. 140 for Excavation	40.00	40.00	30.00	20.00	20.00	150.00
2.	Weed Management (Weed removal using both Mechanical and also Weed Harvester @ 140 Ha./year @ Rs. 16,000	22.00	22.00	22.00	22.00	22.00	110.00
3.	Bio diversity inventory & Conservation Manpower (One JRF, One Field Attendant, One Data operator)= Rs. 6,24,000 Publication of Books on Birds, Flora of Ansupa lake = Rs. 5,00,000 Bird Census =Rs. 1,00,000 Travel = Rs. 1,00,000 Capacity Building (Four Training /Two Seminar) = Rs. 2,00,000 Contingency = Rs. 1,76,000	17.00	17.00	17.00	17.00	17.00	85.00

4.	**CEPA** Environmental Education programme in 50 schools (@ Rs. 10,000/School financial assistant) = 5,00,000 Campaign against use of Plastics (5 meetings in a year @ Rs. 30000= Rs. 1,50,00 Development posters, pamphlets, brochures, video strips, documentary on various traditional method of fishing, traditional fishing gears, wise use practices and other resource use = Rs. 8,50,000	15.00	15.00	15.00	15.00	15.00	75.00
5.	**Development & Management of Eco-park at Ansupa Lake** Development of Eco-Garden over 4.05 ha (Creation & Development) Construction of watch tower 3 Nos. and its maintenance Construction of 1st Floor of the camp office of CDA and its maintenance. Construction of 10 Nos. of public utility and its maintenance. Provision of 10 Nos. of Sit out around Nature Trail. Extension of Nature Trail (3 Rkm) and its maintenance. Irrigation facilities, sprinkler system and provision drinking water facilities. Maintenance and extension of rockery garden. Electrical Maintenance inside the Eco-Garden. Construction of Masonry boundary wall and Gate. (Length of Wall-1000 Rmt & Gate- 10' x8')	445.00	205.00	210.00	215.00	220.00	1295.00
	Sub Total:	**597.00**	**352.00**	**352.00**	**352.00**	**362.00**	**2,015.00**
6.	**Monitoring of hydro-biological parameters**						
	Consumables/Chemicals	5	5	5	5	5	25
	Travel	2	2	2	2	2	10
	Contingency	3	3	3	3	3	15
	Sub Total	**10**	**10**	**10**	**10**	**10**	**50**

7.	**Fishery Resources Development**	7.00	7.7	8.47	9.32	9.77	**42.26**
	7.1 Captive nursery management for production of fingerlings from spawn/fry stage for stocking in lake Rs.10.00 Lakhs per year	0.24	0.26	0.28	0.30	0.33	**1.41**
	7.2 Training and awareness program including publication of a monograph book on fish and shell fish species of Ansupa	0.21	0.23	0.25	0.27	0.30	**0.21**
	Rs.10.00 Lakhs per year Rs.8.452 lakhs per year for three batch fingerlings production from pens and stocking in Ansupa Rs.8.452 lakhs per year for one time operation in a year (a) Rs.0.0514 lakhs per training camp (Annual budget 0.21 to 0.30 lakhs per year) (b) Publication of monograph book on fish and shell fish diversity of Ansupa	-	-	-	1.00	-	**1.00**
	7.3 Small fish museum for Ansupa Fishes	1.25	0.64	0.63	-	-	**2.52**
	7.4 Revitalization of Primary Fisherman Cooperative society through soft loan assistance (1 No.)	10.00	-	-	-	-	**10.00**
	Sub Total	18.70	8.83	9.63	10.89	10.4	**58.45**
	Grand Total:	**627.70**	**377.83**	**373.63**	**369.89**	**374.40**	**2,123.45**

(Say, Rs.21.23 Crores)

Analysis of convergence funding in Lakhs

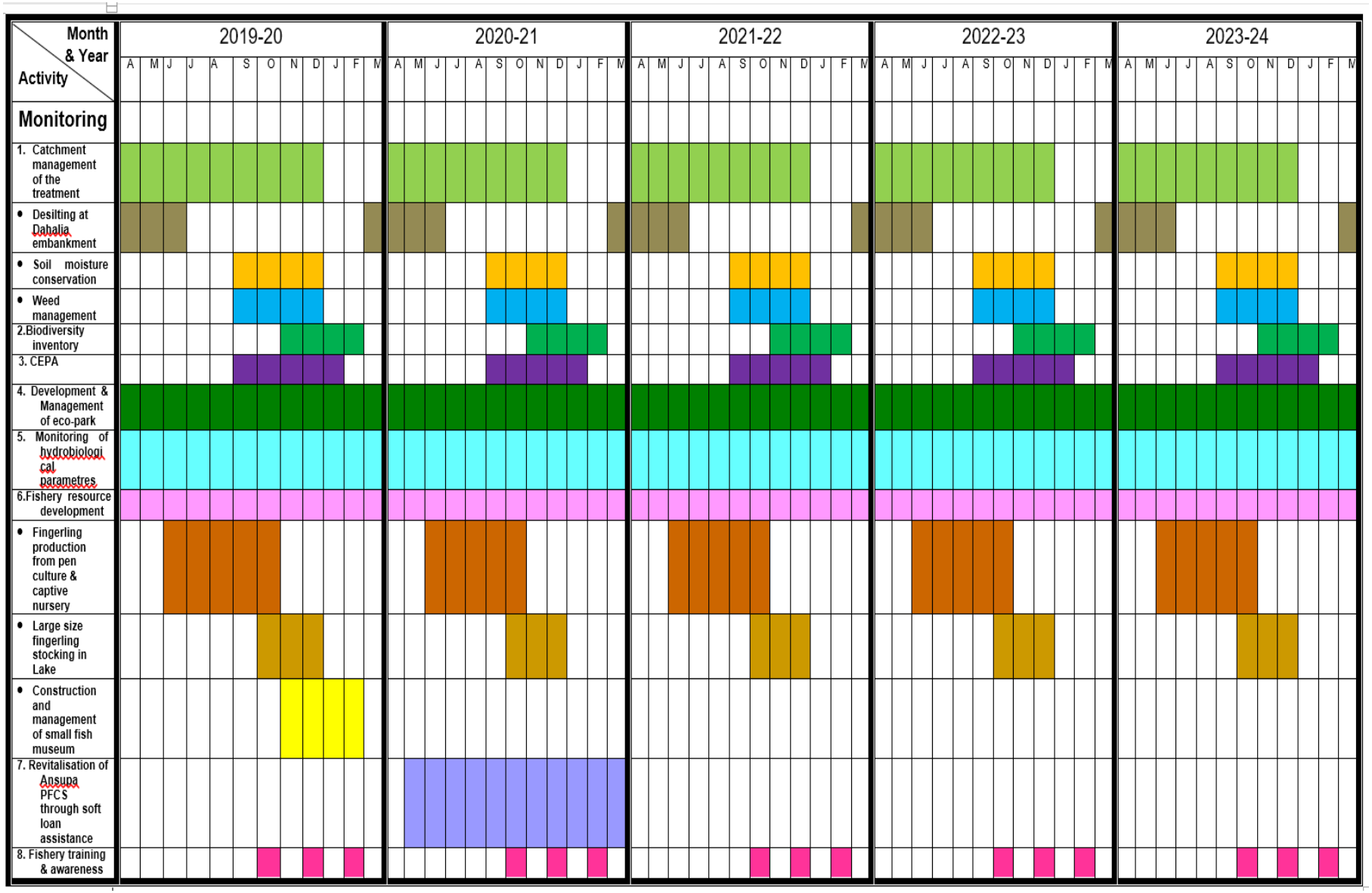
Activity	Total Budget	Funds from Central Government Scheme (Scheme Name)	Funds from State Government (Scheme Name)	Funds from other donors (Project and donor name)	Funds from private sector (Name of the agency)	Funds available from convergence sources	Funds required to be raised
	(a)	(b)	(c)	(d)	(e)	(f)=(b)+(c)+(d)+(e)	(g)=(a)-(f)
	2123.00		500.00 (Plan) 300.00 (MGNREGS)				1370.12

- **The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) of Panchayati Raj Department, Government of Odisha**

Year wise break up of requirement of funds required from NPCA in Lakhs

Sl.No	Activity	Funds Required in Yr I	Funds Required in Yr II	Funds Required in Yr III	Funds Required in Yr IV	Funds Required in Yr V	Total
		275.17	266.86	205.93			747.96

8.2 Time planning



ANNEXURE-I

Checklist of birds of Ansupa lake, Cuttack district, Odisha, India

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*

List of Macrophytes **ANNEXURE-II**

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.	*Utricułariainflexa var. stellaris* (Linn.f.) P. Taylor
Sphaeranthus indicus Linn.	
*Typha angustata*Bory&Chaub.	

List of fin fishes of Ansupa lake **ANNEXURE -III**

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.*