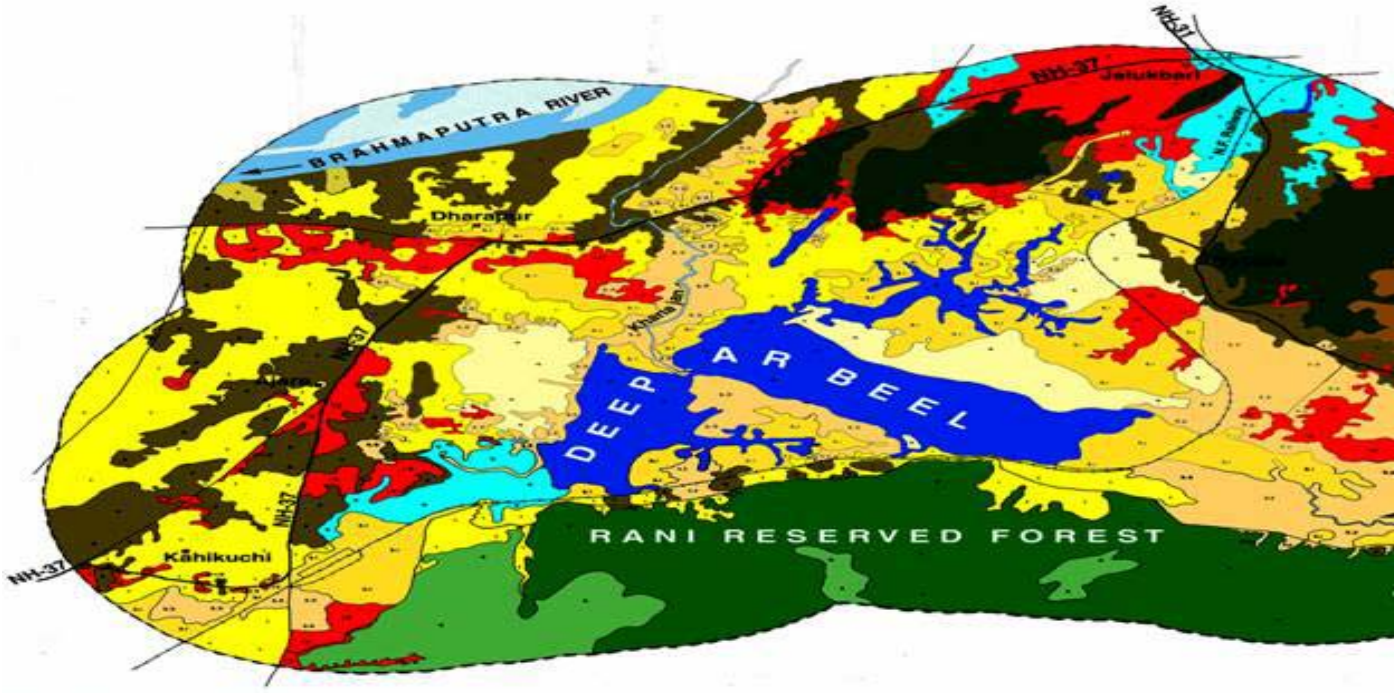
Report on Visit to Deepor Beel in Assam – a w included under National Wetland Conservatio Management Programme of the Ministry Environment & Forests.

13-14 August 2008



Planning Commission
Government of India

Report on Visit to Deepor Beel in Assam – a wetland included under National Wetland Conservation and Management Programme of the Ministry of Environment & Forests. 13-14 August 2008

1. Context

The Expert Team constituted by the Planning Commission, Government of India, to Review the status of implementation of the National Wetland Conservation and Management Programme (NWCMP) of the Ministry of Environment & Forests, by visiting selected wetlands in the country, made an on-the-spot review and assessment of the Deepor Beel near Guwahati in Assam. This was the third wetland visited after Chilika and Vembanad-Kol.

2. Visit itinerary

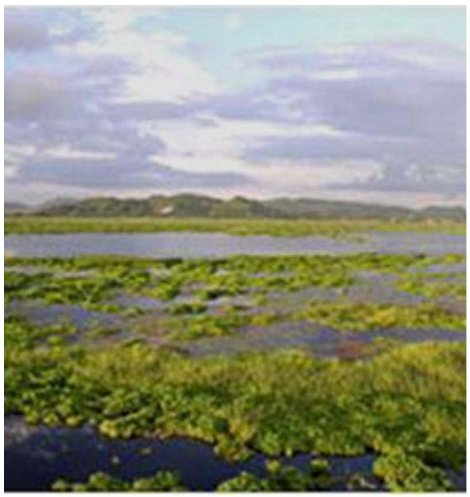
The Team comprising Dr.(Mrs.) Indrani Chandrasekharan, Advisor(E&F), Planning Commission, Dr. T. Balasubramanian, Director, CAS in Marine Biology, Annamalai University and Dr. V. Sampath, Ex-Advisor, MoES and UNDP Sr. National Consultant, visited Deepor Beel on 13th & 14th(FN) August 2008 and held discussions with Dr.Jaideep Baruah, Scientific Officer & Head i/c, Environmental Division, Assam Science Technology & Environment Council (ASTEC); Dr. A.K. Baruwa, Retd. Director, ASTEC; Mr. M.C. Malakar, Principal Chief Conservator of Forests (Wild Life) & Chief Wildlife Warden, Assam; B. S. Bonal, Chief Conservator of Forests (Wild Life); and Dr. U.C. Goswami, Prof. Dept. of Zoology, Guwahati University – a Member of the National Wetland Management Board.

Details of presentations and discussions held are at Annexure-1. This was followed by a field visit to the Beel area in the outskirts of Guwahati.

3. Deepor Beel, Guwahati, Assam

Deepor Beel (Beel means wetland or large aquatic body in Assamese) located about 10 km southwest of Guwahati city is considered as one of the large and important riverine wetlands in the Brahmaputra valley of lower Assam, India.

Deepor Beel is an open lake basin connected with a set of inflow and out flow channels. Originally, the beel had its natural linkages with the river Brahmaputra through the Sola Beel and the swampy areas of Pandu to the northeast. Due to construction of residential buildings, NH-37 and Railway line the main link has already been disrupted and it remains as a small secondary channel. A perennial stream originating from Basistha runs through the heart of the beel and joins the river Brahmaputra through Khanamukh towards north of the Beel. The stream is also fed by Bharalu river.



A view of Deepor Beel

Documents indicate ,including those submitt the UNESCO, that ,Deepor beel is spread ov area of 40.14 sq km during the monsoon (incl encroached/reclaimed/developed area of 30.8 km). **The Beel is currently estimated to c 9.27 sq km. However the actual waterbo only 4.1 Sq Km.** Depth of the Beel ranges about 6 m to 1.5 m depending on the se monsoon or dry season. The site is reporte support a number of IUCN red-listed species.

.

Deepor Beel has both biological and environmental importance besides being the only major storm water storage basin for Guwahati city.

It is considered as one of the staging sites for migratory birds in India; and some of the large congregations of aquatic birds in Assam during winter. Because of the richness of avian fauna it enjoyed, Deepor Beel has been selected as one of the Important Bird Area (IBA) sites by Birdlife International. Deepor beel has also been designated as a Ramsar Site in November 2002.

Sewage from Guwahati – a major source of pollution - entering Deepor Beel

Deepor beel provides a means of livelihood for a number of local families. Nymphaea nuts, flowers, etc., are harvested for sale in the local markets and these constitute valuable natural crops. The seeds of giant water lily, annually leased by the government revenue department, is also another major source of revenue after fish.

Nymphaea seed & flower

The Beel is reported to support threatened species of birds like spotbilled pelican, lesser adjutant stork, greater adjutant stork, black necked stork, and large whistling teal. It supports 50 fish species belonging to 19 families.

It is reported that the local people traditionally utilise the beel for harvesting fish and molluscs and for collecting fodder for domestic cattle, natural food, such as, vegetables, flowers, aquatic seeds, etc.

The 4.1 sq Km waterbody is proposed to be notified as Deepor Beel Bird Sanctuary, Guwahati with the lush green Rani forest of Tripura on oneside.. The site for the Deepor Beel Bird Sanctuary is strategically located at a stone's throw distance from the bustling Guwahati city. The Department of Forests, Assam has listed over 120 species of birds habiting the sanctuary. They include kingfishers, fishing eagles, adjutant storks and a number of ducks species.

4. Field Visits and observations

The Team accompanied by the CCF (Wildlife) and Head, Env.Division,ASTEC, visited the Beel in the afternoon of 13th August 2008 after the presentation and discussions at ASTEC. The team was taken to the watch tower located at the edge of the Beel and shown the measures undertaken for protecting the wetlands by constructing embankments. The Team observed that the watch tower supported by bamboo coated with cement mortar, was almost in a dilapidated condition (a portion of the cement concrete slab in the ceiling missing and the cement coated bamboo pillars seemingly giving way) and the construction of embankments was also half done. The Team was told that the structure has been handed over to the Engg.College authorities for maintenance and continuous watch.

Construction of embankment – yet to be completed

Watch tower–in dilapidated condition

As in the case of Vembanad lake in Kerala, the Deepor Beel is heavily infested with water hyacinth, besides emergent weeds such as Hydrilla, Nymphaea, etc., indicating that the entire beel was highly eutrophicated due to the inflow of enormous quantity (50%) of the untreated Guwahati city sewage and other inorganic/industrial effluents, and agriculture wastes.

Heavy infestation of the Beel by Water hyacinth, hydrilla & other weeds

Patta lands inside the Beel

Encroachment of the Beel was so very evident / rampant that there were a number of dwelling units and cement structures l inside the Beel. The railway track divides the beel into a number of small pockets. The laying of railway track and reclamation of the area outside the railway track has contributed to shrinkage of the beel area from 40 sq km. The Team was informed by CCF(WL) and ASTEC that some of these reclaimed areas have been granted Patta by the state Government and hence they are no longer treated as encroachments.

A view of garbage dumped near the margin of Beel

On the other side of the beel towards the NH 34, the Team could see a number of brick kilns and the city's garbage dumping ground. ASTEC said that since the garbage dumping yard is abutting the margin of the beel, there is every possibility of the solid and liquid wastes, leaching into the beel during rainy season, further deteriorating the water quality.

Enroute to the Wetland Interpretation Centre (WIC), the Team was shown the entry point of the Guwahati city sewage and storm water drain into the river Basistha and the Beel. The Team was informed that the Guwahati city does not have a sewage treatment plant and the raw sewage is directly discharged into Bhramaputra and the beel, via Basistha Bahini inlet canal.

The Wetland Interpretation Centre, is being constructed near the proposed sanctuary site. It was noted that the solar panel of the live fence has been stolen. The building for housing the exhibits for awareness creation is half way through and incomplete with cracks developing on the flooring of the building. If was felt that if the construction is not completed within the next few months, there is every possibility that slowly some of the window frames and other structures would vanish. and the entire facility may have to be re-constructed, involving additional investment.

Wetland Interpretation Centre (WIC) – incomplete in all respects

Team at the WIC discussing with ASTEC officials reasons for non-completion of construction of WIC

From the watch tower constructed at the Bird sanctuary site for bird watching the Team could hardly sight a few local birds, unlike the Chilika or Vembanad bird sanctuaries where some migratory birds could be seen, even though it was not the season for their migration to India.

In the opinion of the ASTEC and Forest officials, on declaration as Wildlife Sanctuary it would be the most suitable site for tourism development. The Team advised the officials to approach tourism development with caution, as it may be detrimental to the already depleted biodiversity of the beel, which is further threatened by pollution and other anthropogenic activity. The Team noted that the Government of Assam has recognised this area as a sanctuary, but no thought has so far been given on addressing some of the threats to the entire beel ecosystem including the sanctuary area, pollution, eutrophication, dense growth of weeds, encroachments, garbage dumping, etc.

Team members on cruise in side Deepor Beel

The Team accompanied by the ASTEC official & CCF(WL) cruised in a country boat, in a part of the beel being designated as sanctuary.The water in the entire area appeared to be turbid, grossly polluted and organically enriched, with high levels of putrification and profuse growth of hydrilla and water hyacinth.

The Team advised CCF to take all possible measures to reduce/regulate the inflow of untreated city sewage into the beel near the sanctuary area in consultation with the Guwahati Metropolitian Development Authority and local authorities. ASTEC was asked to submit proposals for setting up of 2 STPs one at the point of sewage flow into Basistha and its draining point into the Beel. It is reported that the past two decades have witnessed a lot of transformation in the ecological and social character of Deepor Beel. Some of the natural and anthropogenic activities that are threatening the Deepor Beel include:

- Construction of railway line along the southern boundary of the Deepor beel;
- Industrial development within the periphery of the beel;
- Large scale encroachment within the Deepor beel area;
- Allotment of government vacant land to private parties by Government settlement department;
- Brick kiln and soil cutting within the beel ecosystem;
- Hunting, trapping and killing of wild birds and mammals within and in the adjoining areas of Deepor beel;
- Unplanned and destructive fishing practices without any control/regulation on mesh size, etc.

Large-scale encroachment, heavy siltation from the denuded hills surrounding the beel, accumulation of all sorts of filth and wastes from the Bharalu and Bahini rivers, unregulated fishing practices, invasion of aquatic weeds, industrial development within its periphery, construction of railway line along the southern boundary, quarrying within the beel ecosystem, etc., have pushed this once-pristine ecosystem to the brink of disappearance.

Water quality

An analysis of the water quality data collected during 6 months between February & July 2004 by the Guwahati University, Guwahati revealed that between February and May, the pH of the water collected from 10 sampling points across the Beel was between 4.7 and 6.9 except for 2 recordings of 7.1. The highly acidic condition of the water of Deepor Beel could be due to high level of putrification of the aquatic vegetation, lack of water flow and continuous inflow of city sewage and industrial wastes into the beel. During June and July with the onset of monsoon and freshwater flow, the water turned alkaline with the pH ranging between 7.3 and 8.9.

The Dissolved Oxygen of the water ranged between 1.6 mg/l to 5.2 mg/l during Feb-April & July and between 2.2 mg/l and 7.2 mg/l during May-June 2004, indicating that during Feb-April the water in most of the sampling points is almost anoxic, which recovers after the monsoon with flushing of the beel with freshwater.

The BOD of the beel water during the entire period of sampling in 2004 was reported to be ranging between 60 and 260 mg/l (except on 6 occasions between May and July 2004 when the value was 40 mg/l). Similarly the COD values were also very high ranging between 52 mg/l and 273 mg/l except on two occasions when the value was 32 mg/l in one station during July 2004 and 44 mg/l in another station during April, 2004. These high BOD and COD values indicate the very high level of domestic pollution of the beel water, even though there appeared to be some recovery of the water quality during June-July with the onset of the south-west monsoon.

The values of heavy metals in the Beel water were also found to be very high with mercury recording values in the range of 12.4 µg/l – 139.9 µg/l and Arsenic values ranging between 16.57 µg/l and 169.2 µg/l, on most occasions except for two occasions when the value was recorded to be below detectable levels –once in April at Goenka Woolen Mill (which presently is reported to be shut down) and another at Khanajan (northwest side of the beel) in July.

The data on coliform count of the water samples also indicate that the water quality of the beel is very bad.

Guwahati Water-bodies (Preservation and Conservation) Act, 2008

After decades of neglect, coupled with large-scale encroachments - both legal and illegal -that have almost pushed them to extinction, four water-bodies located in the heart of Guwahati are beginning to see a ray of hope for

survival. The Assam Government has brought in a legislation to protect and conserve them and proposes imprisonment of up to three years for those who encroach the water bodies.

Christened as the Guwahati Water-bodies (Preservation and Conservation) Act, 2008, this legislation, passed by the Assembly in July 2008, not only intends to save the water-bodies from disappearing, but also proposes to ease the acute water-logging and artificial floods that Guwahati faces every monsoon. There is also a plan to convert them into eco-tourism spots in the future.

5. Recommendations

5.1 Setting up of a Deepor Beel Development Authority

The Team noted with concern the virtual lack of coordination and cooperation between the GMDA ,Fisheries, Town & Country Planning, Revenue, Environment & Forests, Tourism, Pollution Control Board and the Assam Science Technology and Environment Council (ASTEC), as evidenced by a number of overlapping and duplicating activities being taken up by ASTEC. Such activities include provision of drinking water to the villages in the vicinity of the Beel, providing funding support for digging fish ponds for aquaculture, training on pisciculture, development of eco-tourism activities, etc., which normally are to be taken up as the activities of the fisheries department through Fish Farmers' Development Agencies set up in each district of Assam and the Tourism Department. *It is therefore recommended that the State Government set up a High powered Deepor Beel Development Authority with adequate powers, drawing Members from all line Departments for better coordination and cooperation in implementing the conservation and management initiatives for restoration of Deepor Beel. The state may also consider strengthening the line department or identifying GDMA as the agency responsible for restoration of the Beel.*

5.2 Conservation & Restoration of the Beel

The Government of Assam declared 4.14 Sq Km of the beel area as a sanctuary (Deepor Beel Sanctuary). *Shooting and bird-trapping are prohibited by law, but enforcement is poor.* The area is patrolled by the fishery department. A comprehensive Management Action Plan for Deepor Beel was prepared by ASTEC during 2002. *Even though a few initiatives have been taken by ASTEC with funding from GOI and the State Government*

during the current year , a lot remains to be done for at least partial restoration of this wetland.

Deepor is the best indicator of the environmental quality of the city, and the day when birds cease to flock the beel, it will confirm the complete transformation of the once-green city into a quagmire of pollution.

There is an urgent need therefore for the State Government to stop the steady encroachment by settlements and industries into the wetland by enforcing the provisions of the newly enacted Guwahati Water-bodies (Preservation and Conservation) Act, 2008 and prevent the contamination from agricultural and industrial wastes, as well as creat a proper management system to regulate human activities in the wetland.

Recently, the ASTEC undertook a restoration drive of Deepor, aimed mainly at digging up the beel bed and enhancing its water-retaining capacity. A most laudable move no doubt, but *for any long-term drive to preserve Deepor it is imperative that human interference is brought down to an appreciable level.*

Equally urgent is extending protection to the green cover on the city's hills, because widespread deforestation on the hills has been a significant factor behind accumulation of huge deposits of earth and silt on the beel bed.

While this wetland is to be protected strictly from the environmental perspective, it can also be developed and promoted as fisheries and tourist attraction, providing gainful employment avenues to thousands after the water quality of the Beel is restored . It is time that the state government gives a serious thought to securing the health and well-being of the Beel.

5.3 Pollution & water quality

Pollution control board has given the Assam government an ultimatum and issued a warning of outbreak of epidemic, due to the contamination of Deepor Beel. Yet the GMDA continues to dump and burn garbage on the fringes of the wetland. The core area of Deepor Beel is a picnic spot for local residents.and flow of untreated sewage and draining of effluents are likely to destroy any remaining aquatic animals.

The heavy metal concentration (particularly Mercury, Arsenic, and Iron) and concentration of Fluoride, which are well above the permissible limit in the Beel's water (as per data available for 2004) is of concern and there is an urgent need to reduce their concentration.

It is therefore, *recommended that the following major anthropogenic threats are given immediate attention and mitigation by the State government, for*

minimising the adverse impacts of the liquid and solid wastes on the Beel and its fishery wealth:

- *The State Government should set up two sewage treatment plants on priority for treating the Guwahati city sewage, at the outlet point on the Basistha and at the point were Basistha channal drains into the Deepor Beel. Proposal if any submitted under JNNURM to the MoUD be also pursued.*
- *Municipal garbage dumping in the wetland by GMDA is to be stopped and moved to another place immediately and the wastes treated as per the regulation in place. A new technology developed by BARC for decontamination and disposal by irradiation be adopted.*
- *All out efforts to be made by the authorities concerned to carry out extensive water quality and pollution monitoring studies on a regular basis across the Beel to make an assessment of the status of pollution, identify the point and non-point sources of pollutants and take remedial measures for mitigating the adverse impacts of these pollutants on the Beel's ecosystem and its resources.*

5.4 Declaration of a Wild Life Sanctuary

As the southern part of the beel is covered by Chakradoli Hill, Garbhanga Reserve Forest and Rani Reserve Forest many of the Wildlife inhabitants of these areas such as elephant , tiger, deer, fox, bird and reptile are frequently visit to the beel for feeding and drinking purposes.

Even though a preliminary action has been taken for declaring 4.1 sq.km area of the Beel as a Wild Life Sanctuary, the State Government is yet to issue the final notification. *It is recommended that the State Government should declare the Wildlife Sanctuary immediately and take steps for keeping the Beel waters in the area falling under the sanctuary clean, of sewage, industrial and agricultural pollution.*

5.5 Implementation of the Management Action Plan

A Management Action Plan was prepared by ASTEC during 2002 and even after 6 years, hardly a few activities have been taken up for implementation and even the activities which have been taken up for implementation are yet to be completed and in some cases (e.g., Wetland Interpretation Centre), the construction has been suspended. Between 2003-04 and 2007-08, the ASTEC has received Rs. 288.46 lakh from the GOI for Deepor Beel Management Programme, against the sanctioned amount of Rs. 338.80 lakh. It was noted that the ASTEC could not use the funds judiciously and hence at

the end of every financial year at least 30-50% of the funds released were remaining unutilised. This is in spite of the fact that ASTEC has funded a number of activities which are the direct concern of the other line departments such as fisheries, tourism, Town & country Planning, etc. *Hence, it is recommended that the ASTEC should evolve an appropriate plan for judicious utilisation of the funds sanctioned and released by the Government of India for conservation and management of the Deepor Beel and its resources rather than diverting the funds for activities which normally could be supported by other line departments.*

5.6 Restoration of Mined areas

The team suggested that Prof C.R. Babu , head of the centre of Excellence Centre for be invited to restore the mined out rock surfaces with no vegetation by a technology developed by the Centre.

5.7 Weed Infestation

The Team during its field visit saw heavy infestation of water hyacinth and hydrilla almost in the entire stretch of the Beel, except in the area proposed as a Sanctuary where, the water hyacinth was found washed ashore by wind action. The ASTEC and Forest Department should take appropriate measures such as mechanical removal of the weeds and keep the Beel pollution free, to contain the spread of these weeds.

5.8 Legal framework and mechanism

Noting that there is no legal framework and mechanism in place for protecting and conserving the Deepor Beel and its resources, regulation of tourism, controlling/preventing domestic, agricultural and industrial pollution and over-exploitation of the resources, the Team recommends that the State Government frame rules and enforce them strictly, by setting up an institutional mechanism for this purpose. The draft notification available on the Website of the MoEF on wetland conservation be analysed and suggestion made.

5.9 Reassessment of the land use/land cover pattern along Deepor Beel

Considering that there has been a rapid shrinkage of the Deepor Beel area from around 40 sq.km to around 4.1 sq.km over the past few decades, and that there are different views on the effective water area inside the Beel, it is recommended that ASTEC in collaboration with the ASRSAC should undertake a realistic reassessment of the Beel area, the change in land use and land cover pattern with the help of remote sensing and geographic information

system. The state government should make all out effort to restore the original land mass to the Beel.

5.10 Biodiversity

The Team noting that there is no reliable data on the biodiversity of the Deepor Beel, recommends that the ASTEC should take up a concerted programme for studying the biodiversity of the Beel and compare it with the past data and bring out a biodiversity atlas of the Deepor Beel.

5.11 Awareness campaign

Team noted that effective steps are needed for creating awareness among the community on protecting and conserving the Deepor Beel and its resources. It is recommended that State Govt/ ASTEC jointly with Wild Life & Forests Departments should bring out education/awareness material in the form of pamphlets/handouts, video films, booklets and disseminate among the local community including the school children.

Annexure-1

Summary of Presentation made on 13-8-2008 on Deepor Beel

1. Presentation by Dr. Jaideep Baruah, ASTEC, Assam

The presentation highlighted the Management Action Plan for Deepor Beel implemented by ASTEC, with funding support from the Ministry of Environment & Forests, Government of India between 2003-04 and 2007-08. In his presentation he covered the following aspects:

- Shoreline migration of Deepor Beel from 1911 to 1990.
- Sources of water inflow– runoff from adjacent hills and Guwahati city, Mara-Bharalu and Basistha Bahini (carrying sewage and storm water from Guwahati city) and outflow via Khandajan.
- Land use pattern in the catchment area – agriculture, industrial, commercial, residential, etc., with agriculture being the most predominant activity.
- Floral diversity of the beel with 111 species belonging to free floating, submerged and emergent weeds/plants besides swamp/marsh and wetland hydrophytes).
- Fauna – 201 species of birds and 21 species of mammals in the Beel and adjacent forests.
- Problems and threats to the ecosystem.
- Management objectives which include:
    - Protection of Boundary of the Lake & Prevent Encroachment
    - Control of Mining Activity
    - Control of Nutrient Flow
    - Control of Commercial Exploitation of Aquatic Products
    - Control of Commercial Fishing
    - Removal of Obnoxious Aquatic Weeds
    - Increase of Water Retaining Capacity of Deepor Beel
    - Conservation of Catchment Area
    - Restoration of Water Quality
    - Implementation Strategies for a Sustainable Wetland Ecosystem
- Management Action Plan which includes:
    - Demarcation of boundary – only partially done.
    - Construction of embankments to protect wetland from further encroachment.
    - Regeneration of the silted area by dredging.

- Carrying out all relevant scientific studies, which include preparation of contour map, bathymetry & water retaining capacity, catchment area upgradation plan, water quality, floral and faunal studies including microbes, developing an information system, hydrology of inlet and outlets, dispersal of sewage and storm water, land settlement pattern, silt deposition, conservation of threatened species, etc.
- Preparation of a Comprehensive Master Plan to rejuvenate Deepor Beel.
- Socio-economic studies (in 2000),
- Catchment area treatment measures – silt detention, Gully control, Earthern bunding, Stream bank erosion control, silt pit formation, Plantation in forest blanks, Trenching along the fence, etc.
- Weed control,

- Protective Measures such as:
  - De-silting,
  - Regeneration of area outside the core area of the beel,
  - Vegetative contour hedge on the embankment,

- Pollution abatement – detailed water quality analysis and clearing of water drain and water treatment.
- Community participation and educational awareness
- Funds received and expenditure thereon from 2003-04 to 2007-08.
- Activities and accomplishments during Phase-1, 2 &3 of the project.

2. Presentation by Mr. B.S. Bonal, CCF(WL), Assam

The CCF(WL) made a presentation on the proposed Deepor Beel Wildlife Sanctuary (DWLS). A summary is given below:

- Total Number of wetlands in the State of Assam is 3513 and the total area covered is 101231.60 ha. which constitutes 1.29 per cent of the total geographical area of the State.
- Deepor Beel, the riverine origin and storm water storage basin of Guwahati city is situated at 10 km southwest of Guwahati.
- Its area extends 26˚03'26" to 26°09'26" N and 90˚36'39" to 90˚41'25" E in the south of the mighty Brahmaputra.
- Beel has an actual perennial water holding area of 10.1 sq.km and total area extends up o 40.1 sq.km during flood. 4.1 sq.km is recommended by Collector as Wildlife sanctuary for final Notification.
- Deepor Beel is open type of lake basin connected with sets of inflow and out flow channels.

- Due to construction of residential buildings, NH-37 and Railway line the main link disrupted and remains as small secondary channel.
- Morphometry and demography of the Beel,
- Significance of the DWLS,
- Problems of the WLS.
- Action taken which includes:
    - De-siltation
    - Plantation
    - Watch Tower
    - De-weeding - removal of water hyacinth
    - Socio-economy survey
    - Pursue final notification
    - Elephant depradation
    - Coordination with stakeholders