CHAPTER 7

CONCLUSION
The rapid development of open cast coal mining in the Tikak colliery in Margherita sub-division in Tinsukia District of Assam is destroying the resources of food and water for the original inhabitant of these areas, mainly indigenous people, of more than 750 villagers. The region has extremely fertile land which is now being converted into a mining site, taking away vital farming land and forests, and polluting the Patkai wetland which is the potential water source of the area. This means a gross violation of the inhabitant’s right to food - and hunger and malnutrition for them in the future.

In the recent times, increased ecological awareness among researchers, have resulted in search for innovative approaches for revegetation of coal mine area in India and abroad (Dugaya et al., 1996; Gupta et al., 1994; Kumar and Jena 1996; Pandya et al., 1997; Prasad and Mahammad 1990; Sonkar et al., 1998; Zak and Parkinson 1983). The use of native and indigenous plant species have been emphasized in revegetation programs with a view to maintain essential processes and life support system, preservation of genetic diversity and to ensure sustainable utilization of species and ecosystem (Banerjee et al., 1996; Jha and Singh 1993; Soni et al., 1989). Plant species also emerge naturally on the barren mined land after certain intervals of time from the initiation of dump, but succession of plant species under such situation proceeds at a much slower rate (Bradshaw & Chadwick 1986; Singh and Jha 1992; Roberts et al., 1981). Therefore, it is essential to understand the structure and function of an
ecosystem with its primary and secondary succession patterns for a successful revegetation programs (Gibson et al., 1985; Thomson et al., 1984).

MEASURES OF RECLAMATION

Surface mined land can be used to create wetlands where none existed before (OTA, 1984). Since natural wetlands are being lost to agriculture (about 80% of the loss) and for building construction and other purposes (20%) at a frightening rate, the replacement of many of their functions elsewhere has positive features. In the case of hazardous waste sites, several major options are available: (followed after www.wisconsinwetlands.org., 2008.)

(1) Detoxification the site and restoration to original condition or some alternative ecologically stable condition;

(2) At sites where option 1 may be technologically impossible, or cost prohibitive, the primary objectives would be to exclude the general public, migratory water fowl, and so on to reduce or eliminate the chances of inadvertent exposure to hazardous materials and to immobilize the waste so that adjacent areas are not contaminated;

(3) Removal and treatment of those portions of the hazardous waste still in a relatively concentrated form should be done and to leave the partially dispersed and transformed wastes that are difficult to collect and treat on the site until natural transformations continue;
(4) To reduce the hazard or risk to a level considered acceptable to society and then to restore the site to either original condition or to some alternative ecosystem (such as a wetland) that would be acceptable to society.

(5) **Phytoremediation**: *Eichhornia crassipes*, *Lemna minor*, and *Azolla pinnata* were frontier metal accumulators hence can be selected for field phytoremediation experiments. During field phytoremediation experiments using aquatic macrophytes, marked percentage reduction in metals concentrations were recorded.

**PRESENT STATUS OF PATKAI LAKE**

The details of wetland ecosystem in Tinsukia district, Assam has not been studied earlier and perfect accounts of physico-chemical and biological aspects are not available and no such type of studies on fish diversity in relation to water quality have been carried out here. Therefore, the present studies have been conducted, focusing monitoring of water quality and potential value for fish culture.

The present findings indicate that water quality of the experimental Patkai lake is suffering from metal pollution. On the other hand, the control water body, Mota beel have good potential for fishery practice. The small rural ponds like Patkai lake can be a very good source of income from fishery or recreational water body if it can be augmented with scientific management as small wetlands are more manageable and
high yielding than larger ones. Hence it is necessary to protect and conserve these water bodies. This demands immediate action from fishery biologists, planners and policy makers.

**MITIGATION OF AMD (Acid Mine Discharge):** Some of the mitigative measures that can be used in the dealing with the Acid Mine Drainage of Patkai lake are outlined here:

1. **Bacterial Inhibition**
2. **Active Treatment Methods:** Limestone, Hydrated Lime, Soda Ash, Caustic Soda, Ammonia
4. Mining and associated activities should be designed for the minimum possible land requirement.
5. The subsidence movements due to underground mining and their impacts on the land and its uses should be predicted.
6. The mining activities should be designed in such a manner that the changes in the surface drainage pattern are minimum.
7. In case of opencast mines, the mine should be planned with decommissioning, closure, reclamation and rehabilitation so that the land after mining can be brought in economic uses.

8. Provisions should be made in open cast mining for separate removal and handling of top and sub-soils so that these can be re-laid at the time of reclamation for developing the land uses of the reclaimed surface.

The results for the present study on Patkai lake near Tikak OCM indicates the need for comprehensive monitoring of the lake for proper management decisions to be taken for the restoration the lake, which had been threatened ecologically due to AMD and various anthropogenic activities. Control measures should be taken to restore the natural bio-diversity of the wetland by restricted fishing, bathing, washing of clothes in the water. The mining wastes should be treated with standard means before disposal to the water body.

Concerned authorities of the NECF Ltd have to take appropriate action by controlling the AMD and industrial effluent let into the Patkai Lake. Letting in treated water would maintain the water quality that will improve the aquatic biota. The Patkai Lake needs immediate remedial actions against water quality degradation. Hence the Margherita Development Block (MDB) should stop NECF Ltd for dumping of coal and AMD, which has affected the water quality and aquatic biota in the lake as revealed in this study.
FIG 8 :: TIKAK OCM

FIG 9 :: BATHING IN PATKAI LAKE

FIG 10 :: Washing of clothes and plankton collection in Patkai lake

FIG 11A :: PART OF PATKAI LAKE (Winter season)

FIG 12 :: PATKAI LAKE (during Summer season)
18. Washing of cloth by local people at the bank of Patkai lake
Fig 19  :- Plankton collection from Patkai lake

Fig 20  :- A Part of Mota Beel (During Winter Season)