Project Update: May 2011

As part of rhino habitat suitability potential study in buffer areas of Manas we surveyed both eastern and western buffer cover of Manas biosphere reserve. The eastern buffer of Manas biosphere reserve (BR) is comprised of reserve forests (R.F.) namely Dadhora R.F., Batabari R.F. and Subankhata R.F. while Sukanjali R.F. and Dihira forest serves as links for contiguity of habitat but is not included under Manas BR. In western buffer Manas R.F. is the main forests.

All the reserve forests in eastern buffer are badly damaged due to severe anthropogenic pressure. While about more than 50% area under Subankhata R.F. found to be encroached, another small patch about 1 sq. km semievergreen forest remain good in Indo-Bhutan border area. Due to the initiative of local NGO, about 2 sq. km of degraded and encroached area has been gradually restored to forest with 1-4 years old tree species with weed *Chromalaena odorata* and Saccharum grass dominated the vegetation. Similarly, in Batabari R.F. about 50% deciduous forest is converted to degraded or scrub forest area. Local people have a tendency to encroach the area while local NGOs have tough time to resist the anthropogenic pressure. More than 2 sq. km. encroached area under Daodhora R.F. attached to core zone has been also gradually recovered by another local NGO. These restored areas formed scrub forest from bare ground. Though rhino prefer grassland, these forests will serve as cover during hot season and corridor between long distanced riparian grassland.

Though there is diversity of food plants in buffer areas, the volume of each food plants is not enough in eastern buffer. The riparian sides of the area mainly cover the early successional grassland dominated by *Saccharum narenga* in monsoon season, while winter is very dry and lack of undergrowth vegetation. On the other hand, the western buffer with good cover of grassland has much potential for future rhino areas if proper infrastructure can be developed. The burning percentage in this grassland is very high with 80-100 percent in dry winter season resulting scarcity of food and less cover for wildlife.

The study identified grassland assemblages or associations in western and eastern buffer habitat namely *Saccharum narenga, Phragmites karka – Themeda villosa - Saccharum ravennae, Arundo donox, Saccharum ravennae, Phragmites karka, Imperata cylindrica, Imperata cylindrica-Saccharum narenga, Saccharum spontaneum* and one non grass assemblage *Alpinia allughas.* The small pond type aquatic bodies serve as wallowing sites for rhinos in buffer zones. These are generally formed due to changing of river channels in due course of time. Some of the plants identified in the aquatic bodies are namely *Limnophylla sessiliflora,* Ceratophyllum *demersum, Vallisnaria spiralis, Ottelia dismoides, Nymphoides cristatum, Nelumbo nucifera, Trapa nutans, Pistia stratiodes, Vallisnaria spiralis* and problematic weed *Eichornia crassipes.* Besides several sedges and short grass like *Cyperus brevifolius, C. digitatus, C. killingia, C. iria, Panicum paludosum, Paspalum conjugatum, Scripus grossus, Scirpus juncoides, Carax spiculata etc.* are recorded from the habitat.

The mapping of invasive species in core zone of Manas continues. *Chromaelaena odorata* found to covering new areas and would be a greater threat than other invasive species *Bombax ceiba* and *Leea asiatica. Chromaelaena* covers about more than 90 percent in some boundary grassland pockets where domestic cattle regularly graze since early nineties.

The threat in eastern buffer area is complicated in nature. Though two local NGOs with their conservation volunteers tries to protect the forests and wildlife, the disturbance continues in terms of logging pressure and fuel wood collection. The conflict between local NGO and unaware villagers resulted withdraw of conservation activities from some pockets. This resulted severe logging pressure in

the area with support of outside traders. Some conservation initiatives by different conservation NGOs, local tribal council and community leaders were taken.

We met 97 families in fringe areas of Dadhora reserve forest to find out their interest in conservation campaign. The meeting of small groups like 3-4 families at a time helped us to aware them importance of Manas and its rhinos and benefit they may get through different socioeconomic upgradation programme by different agencies. While some of them are already engaged in conservation activities under one local NGO, others informed us about local problem like water scarcity, crop and household damage by wild elephant. They are very much interested to take alternative livelihood like piggery, weaving and dairy and horticultural crops. We are planning to cover these areas for introducing alternative livelihood options with support of local NGO and other local agencies. This strategy will support us in minimizing disturbance, increase practical awareness particularly to create a friendly environment between villagers and local conservation groups.

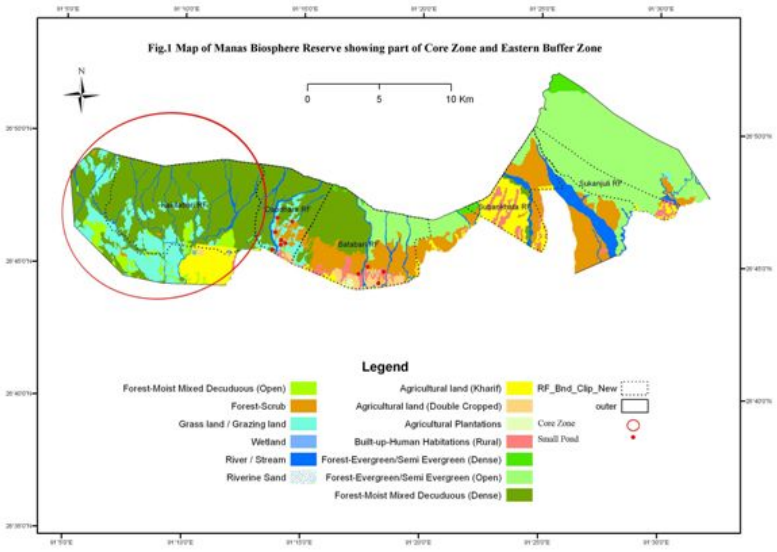

Fig. 1. Map of Manas Biosphere Reserve showing part of core zone and eastern buffer habitat.

Fig.2. Small patch of good rhino habitat in dry western buffer zone.

The eastern buffer areas aree comprised of low height (3-12 meters) trees namely *Lagerstroemia parviflora, Laenae grandis, Syzygium cumini, Duabanga grandiflora Bombax ceiba, Bauhinia purpurea, Sterculia villosa, Dillenia pentagyna, Dillenia indica, Bridellia retusa, Callicarpa arborea.* The canopy cover was around 30-55 percent. Scattered presence of *Alstonia scholaris*, *Trewia nodiflora, Pterospermum acerifloium, Bauhinia variagata, Terminalia bellirica, T. chebula, Careya arborea Oroxylum indicum, Gmelina arborea, Hollarrhena antidysenterica, Bischofia javanica, Lagerstroemia lebbeck* were observed in the forest community. Major ground sciophytic vegetation comprising *Clerodendrum viscossum, Litsea salicifolia, Adhotoda vasica, Calamus floribundus, Tabernaemontana divericata, Phlogocanthus thyrsiflora, Dryopteris paleasea.* severe decline of most of the sciophytes while existing heliophytes *Chromolaena odorata, Leea asiatica, Ageratum conyzoides* covered the forest floor. Of course, dominance of *Murraya koengii, Alpinia allughas, Dryopteris* and *Clerodendrum* were the characteristics of the eastern zone. Presence of *Piper sp., Cynotis cristata, Costus speciosa* was another characteristic of the area.

The mixed dry deciduous forests were comprised of *Bombax ceiba–Callicarpa arborea-Bridellia retusa-Trewia nudiflora-Sterculia villosa* with canopy stratum of 5-12-meter-high and of canopy cover 15-30 percent. The ground vegetation is comprised mostly of *Leea asiatica*, *Chromolaena odorata, Murraya koenijii, Crotolaria albida, Drypteris palaesea, Mimosa pudica, Saccharum spontaneum, Clerodendrum viscossum, Ageratum conyzoides.*

The forests area after the incident undergone was further change due to continuous logging pressure. Baring *Bombax ceiba* and *Laenae grandis*, all other component species depleted. There was complete elimination of *Toona ciliata, Trewia nodiflora, Gmelina arborea, Bischofia japonica, Albizia procera,* and *Albizia lebbeck*.

It was observed that plants like *Clerodendrum viscossum* formed the dominant undergrowth in most of the forest floors in Sukhanjan area. The other co-dominant sciophytic undergrowths were comprised of different species like *Dryopteris palaecea, Paspalum conjugatum, Urena lobata* and *Thysonolaena maxima* and *Chromaelaena odorata*. There was large recruitment of heliophytes like *Leea asiatica, Flemingia strobilifera, Mimosa pudica* and *Ageratum conyzoides* while grass species *Thysanolaena maxima* and *Saccharum ravennae* showed some increase. Most of the sciophytic species had declined even *Litsea salicifolia* was completely eliminated in a span of four years.