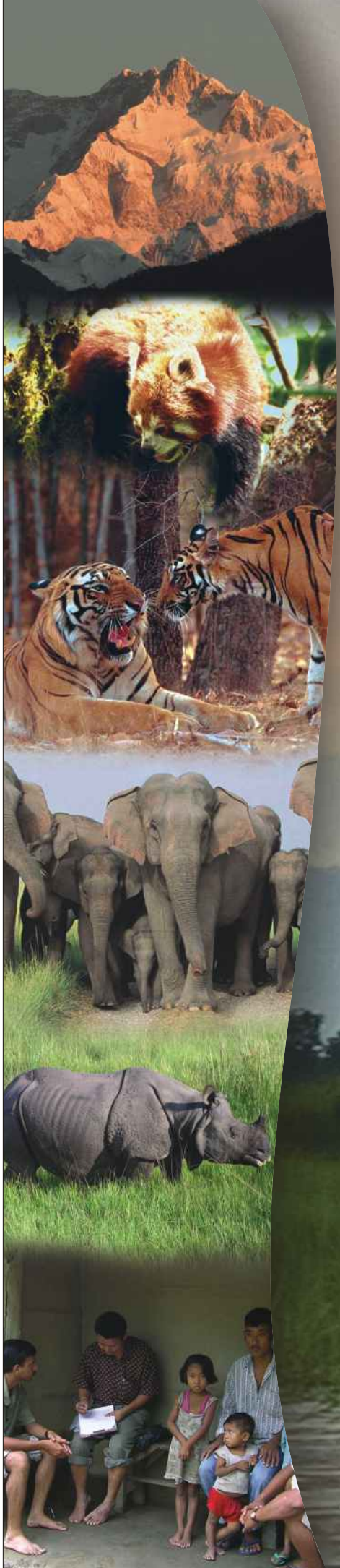

WWF

LANDSCAPES OF HOPE

CONSERVATION OF THE TIGER, RHINO AND THE ASIAN ELEPHANT

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A Review of WWF-India's
Species Conservation Programme

WWF-INDIA
DECEMBER, 2007

Species Conservation Programme

WWF-India Secretariat

Sujoy Banerjee

Tariq Aziz

Dr. Diwakar Sharma

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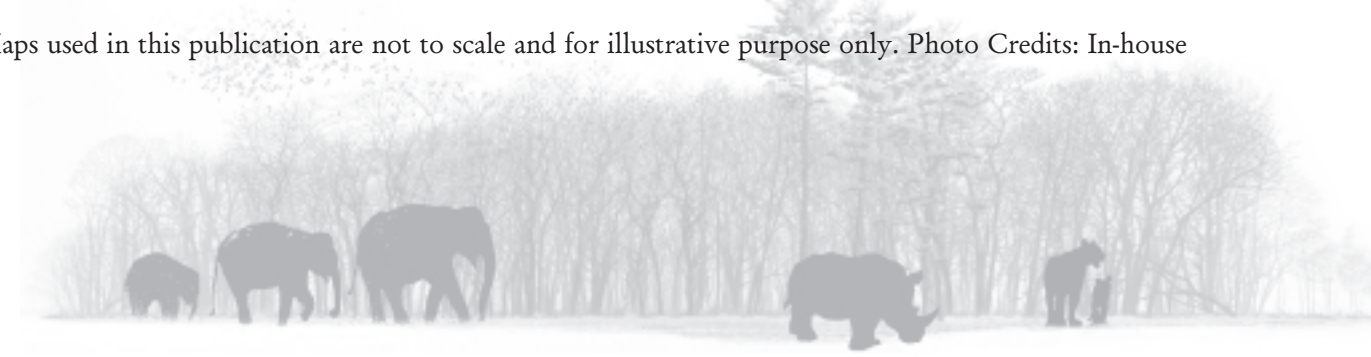

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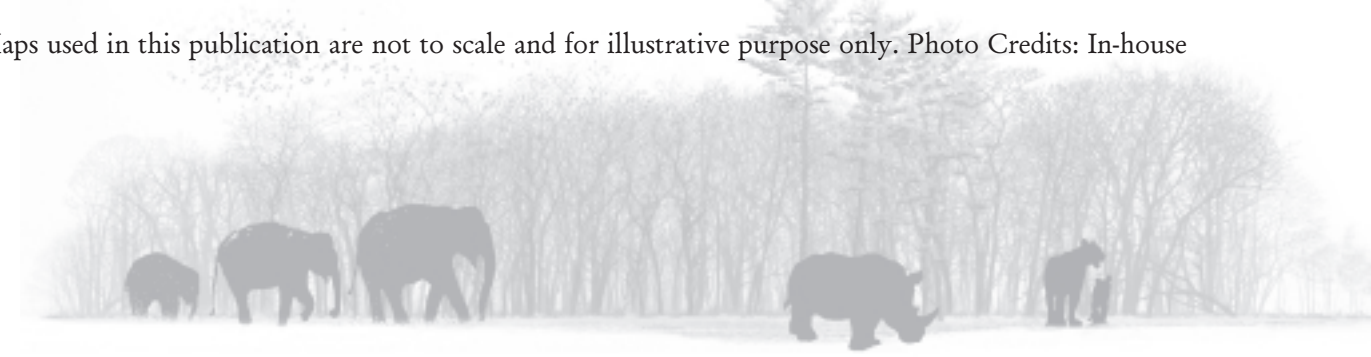

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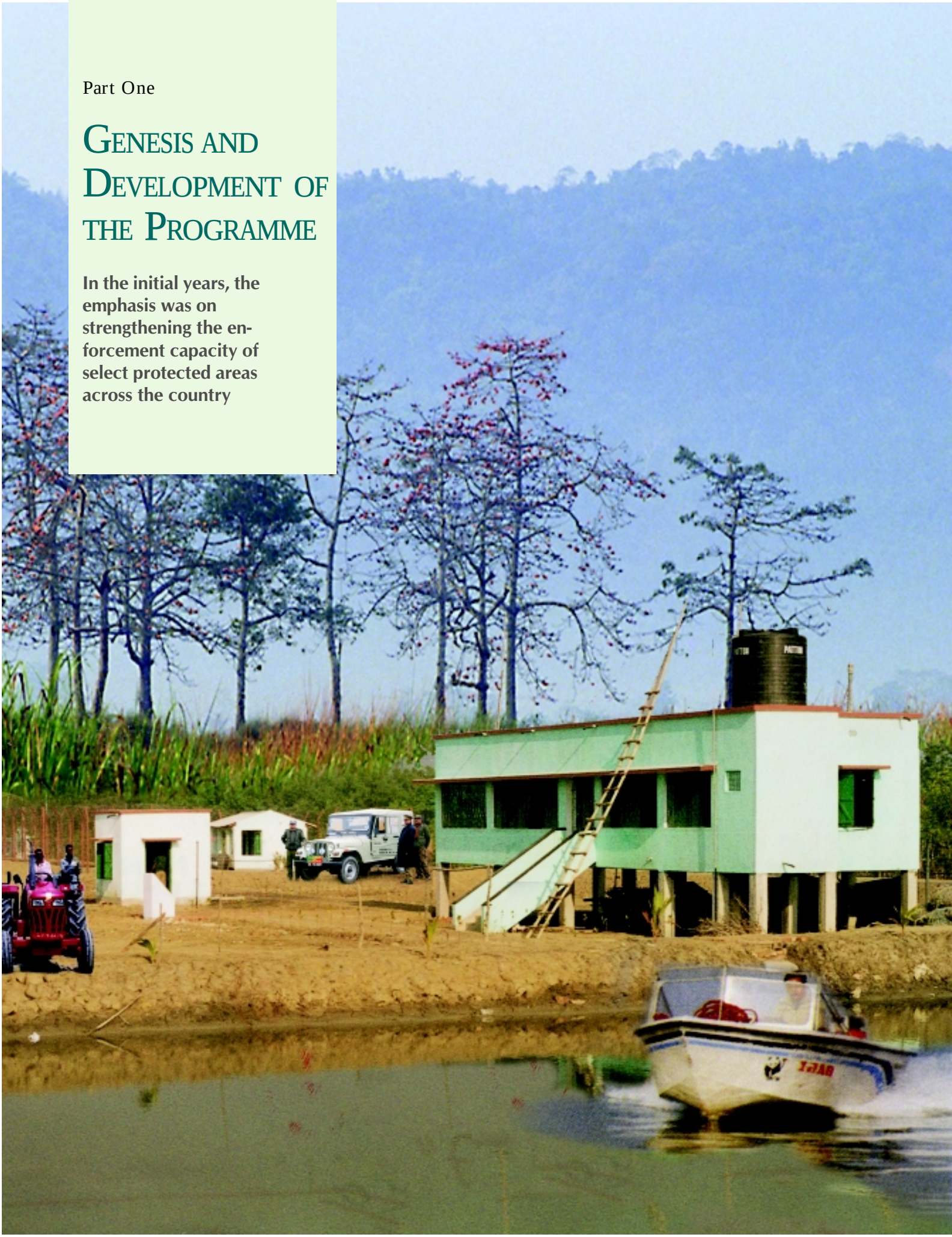
Part One

Genesis and Development of the Programme

In the initial years, the emphasis was on strengthening the enforcement capacity of select protected areas across the country



Chapter 1

The First Five Years

The tiger has always been at the centre of WWF's wildlife conservation efforts. But what is today one of the largest wildlife conservation programmes run by a non government organization, started in mid-1990 in a small way in response to the looming tiger crisis and the international attention it received. After much deliberation, a criteria was formulated, to identify and focus on certain protected areas for immediate infrastructure support and thereby strengthen their enforcement capabilities. Subsequently, initiatives to recognize and reward good work by enforcement staff, training, education and awareness were commenced.

Again in response to the situation on the ground which showed a spurt in retaliatory poisoning cases, a very important quick- response scheme – the Cattle Compensation Scheme (CCS) was begun to supplement the government's compensatory mechanism for people who lost their cattle to predating tigers.

Over the next five years, the tiger conservation programme (TCP) as it was now known, matured and evolved into one of the largest non-governmental intervention to save the tiger and its habitat. Site specific campaigns (like Akhand Shikar), legal redressal workshops, monitoring and wildlife trade related workshops, regional cooperation workshops and a tiger emergency fund (an emergency funding mechanism) a rapid responce mechanism were some components that were incorporated into the programme. The mainstay of the programme continued to be direct infrastructure support to Protected Areas (PAs) which included equipment, vehicles, clothing, patrol camps and the like, and by the year 2000 over 20 PAs across the country were beneficiaries of the programme. Let us look at some of these initiatives in some detail.

» **Cattle Compensation Scheme:** Following media attention on tiger poisoning cases in Corbett and Dudhwa Tiger Reserves, TCP decided to create a system of immediate compensation payment through a network of established local NGOs after necessary verification of cattle kills. The government already had such a scheme in many areas, but the execution of scheme was slow and the amount meagre. By end January 1998, the TCP scheme was functioning in Dudhwa and in a couple of months, covered Corbett and Katarniaghat. Subsequently, with some modifications it was extended to five PAs in Andhra Pradesh, Palamau TR in Bihar and Ranthambhore TR in Rajasthan. In most cases compensation was received by the owner of the livestock in 48 hours. By December 1999, TCP

had compensated some 1260 cattle kills at a cost of approximately Rs. 12.5 lacs. This initiative had a positive impact on retaliatory killing of tigers by aggrieved villagers, particularly in the Corbett, Dudhwa, Palamau TRs and Katerniaghat Wildlife Sanctuary, as an evaluation by the WII confirmed.

» **Campaign to curb "Akhand Shikaar":** TCP's attention was drawn to the ritual hunting known as Akhand Shikaar, by large tribal groups, which would peak in April-May every year and threaten the tiger's prey base. The tribals would also burn down forest areas in an attempt to flush out animals for the ritualistic kill. To curb this practice, TCP in association with local NGOs built direct rapport with head men of three tribes – Santhal, Munda and Ho – and got their commitment against Akhand Shikaar and burning of forests. Senior tribal leaders employed in anti-poaching camps helped to influence the youth and alternatives, such as dancing competition were organized during the hunting period. Local NGOs later continued the campaign as part of their own agenda.

» **Regional cooperation workshops**: A trans-border workshop involving Nepal was organized in February 1999 to orient managers of trans-borders protected areas both in India and Nepal in an attempt to improve cross in border wildlife conservation. An action plan emerged from this deliberation to counteract poaching and illegal trade across the Indo-Nepal border through improved training, intelligence networking and funding.

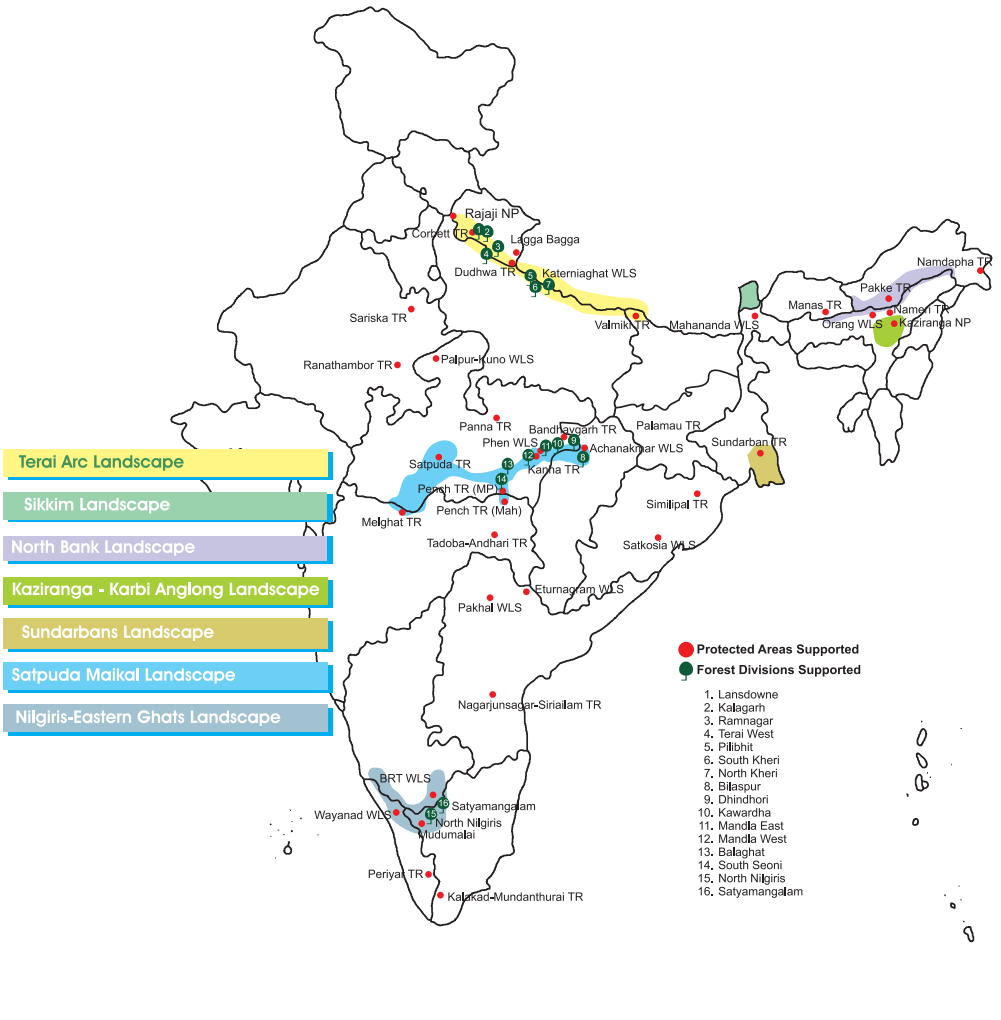
- **Legal addressal workshops:** Workshops are held at different venues to familiarize field staff on legal procedure so as to improve conviction rate and thereby the morale of the staff.

- **Monitoring and control of wildlife trade:** Workshops/Seminars are organized with other agencies of the government involved in monitoring and countering illegal trade in wildlife and its derivatives; support to set up intelligence networks, etc.

- **Awards for exceptional contributions to tiger conservation:** This initiative was undertaken initially by TCP alone, and later with PATA. This is a scheme to recognize meritorious service/contribution by individuals or institutions involved in tiger conservation work. Between 1998 and 2000, the awards for meritorious service were announced and presented thrice.

» **Tiger Emergency Fund (TEF):** A quick response fund was established to help in emergency situations at the field level. One of the first beneficiaries was Kaziranga National Park where devastating floods in 1988 caused havoc to wildlife and emergent support from TEF provided much needed relief measures. Subsequently the fund supported fire control in Panna, anti-poaching in Corbett and drought relief measures in Sariska and Ranthambore.

PROTECTED AREAS AND FOREST DIVISIONS SUPPORTED BY WWF-INDIA



Extremely conscious of the need to monitor and constantly revaluate, WWF-India organized an independent evaluation of the tiger conservation initiatives in 11 PAs in 1999 itself. The experts engaged for this task provided overall a positive feedback with staff morale and efficiency showing a definite upward trend. Expectedly, there were occasional reports of misuse of vehicles, underutilization of equipment and need for further critical assistance. But nonetheless it was apparent that the programme had made an impact in the field, however small or scattered. Most of the PAs supported had managed to improve their enforcement capacity and several of them were able to tide over natural crises with emergent support from the TEF. One of the most encouraging field assessments of the programme was received in February 2003 from the Director, Project Tiger. In a letter to the programme director, he said, "Recently, I visited some of the Tiger Reserves in Central India and Maharashtra [(Kanha, Pench (MP) and Maharashtra)], and was really impressed by the support provided to these field formations by WWF-TCP. In Kanha and Pench the frontline staff have benefited from the bicycles provided to them, since they live in remote patrolling camps away from connecting roads. Likewise, the support given to Pench is also praise-worthy. It goes without saying that such a support would go a long way in complementing the initiatives under Project Tiger and I wish to place on record my deep appreciation of your endeavour in this regard".

On balance, it could be concluded that while WWF-India's infrastructure support to PAs did not show results immediately in quantifiable terms, it allowed the official machinery to function better by filling in crucial gaps and enhancing the morale and efficiency of the enforcement staff. Direct support definitely contributed to curbing poaching in most of the PAs which have been beneficiaries.

Anti-poaching camps

Chapter 2:

Looking at Landscapes: A Critical Milestone

Even as the tiger conservation programme continued to grow and make its presence felt in the field, the winds of change in terms of strategic vision were blowing. The WWF global tiger conservation strategy workshop held in Indonesia in September 2000, was a critical milestone in that it formalized a new vision and approach to the whole issue of tiger conservation in the long term. Small populations in isolated protected areas all over the range states, it was agreed, had a limited potential of survival over the long run, mainly due to adverse consequences of inbreeding and stifled gene pools. The areas with a certain minimum population of breeding tigresses along with a healthy component of males, sub-adults and cubs, offered the best possibilities for tiger survival. This was the underlying reason for the shift of focus from supporting scattered PAs to rebuilding and securing larger landscapes.

The document *Conserving Tigers in the Wild: WWF Framework and Strategy for Action 2002-2010* defines a tiger conservation landscape as "an area of land, regional in scale, that can support and maintain, over the long-term, a viable meta-population of tigers, linked by safe and suitable habitat, together with an adequate natural prey base". Explaining the concept further, the document states: "On the ground, a tiger conservation landscape will often equate to a series of well managed core protected areas (national parks, wildlife sanctuaries, etc.) linked together by dedicated corridors of suitable habitat or by land-use that is tiger-friendly in its status and management."

India has at least seven tiger landscapes that are comparable with the best in all the tiger range states. However, as WWF had to make efforts to conserve all the sub species of the tiger, it selected seven different landscapes across the world. Of these, three fall within India, either completely or partially. These are the "Terai Arc," which is shared with Nepal, the Sundarban, shared with Bangladesh, and the Satpuda-Maikal range in central India. The last is also fondly referred to as "Kipling country".

The Terai Arc and Kipling's country are very large tracts of prime tiger habitat consisting of a

Conserving Tigers in the wild: A WWF Framework and Strategy for Action 2002 – 2010

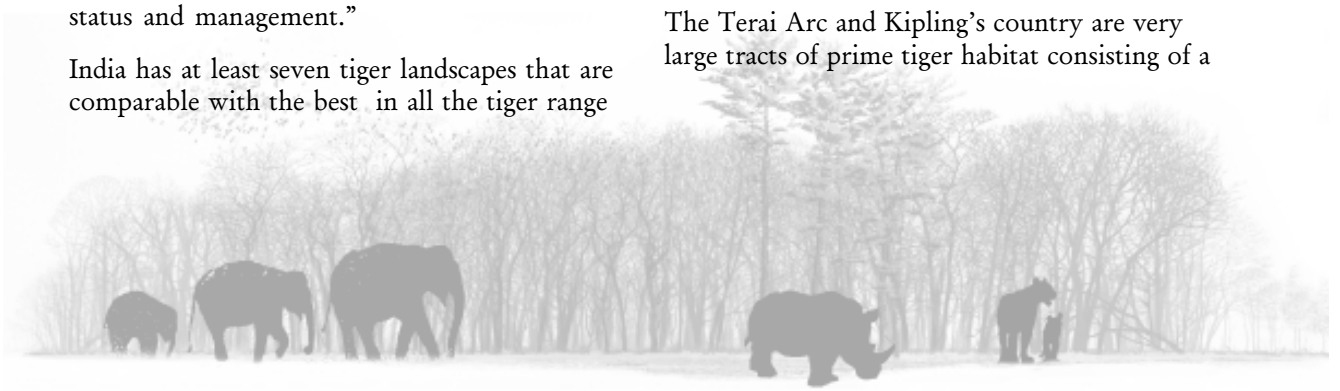
The Vision "Tigers thrive in natural habitats, and people benefit as a result".

The Programme Goal "To conserve viable tiger populations, with public support, in the selected landscapes, and reduce trade in tiger parts and products to a level which is no longer threatening to the survival of tigers in the wild".

WWF Tiger Action Plan: The Targets

Target 1 To establish well managed networks of core protected areas and connecting tiger friendly buffer zones and corridors in the focal tiger conservation landscapes selected from across the tiger's range.

Target 2 To reduce (with a view to its elimination) the trade in tiger and products to a level which no longer threatens the survival of tigers in the world.



series of protected areas interconncted through territorial forest divisions. Protected areas like Rajaji, Corbett, Dudhwa, Katerniaghat, Sohelwa, Suhagi Barua and Valmiki are coverd on the Indian side under the Terai Arc Sukla Phanta, Bardia, Chitwan and Parsa are on the Nepalese side. Kipling's country comprises Melght, Satpuda, Pench (Maharashtra), Pench (Madhya Pradesh), Kanha and Achanakmar along with the connecting forest. The Sundarbans landscape consists of the mangroves of both India and Bangladesh, an area that the considerd unique as a tiger habitat.

The strategic shift and change in vision meant a change of focus in action plans as well. It was no longer enough to strengthen enforcement capabilities, contain human-animal conflict with various mitigation measures and recognize meritorious work of field staff. The vision for the next 5 to 10 years had to be concretized with active cooperation of the local people in habiting the critical landscape areas. Factors like their poverty, sources of livelihood, and their threat perception from wildlife were now to be crucial considerations in any action plan. People living in forests or in proximity to wildlife habitats were now to be both partners in, and beneficiaries of, conservation. Stakeholder workshops were planned and conducted in 2001-02 for the priority landscapes to ensure cooperation and commitment from local communities who were to be affected by the new programme thrust. Simultaneously, TCP took on a wider mandate as the Tiger and Wildlife Division incorporating a special programme for the protection of the Indian Rhino and the Asian Elephant.

Asia Rhino and Elephant Action Strategy

Apart from tigers, WWF-India expanded its landscape approach in 2000 to include the conservation of mega herbivores, the Indian Rhino and Asian Elephant. The Asian Rhino and Elephant Action Strategy (AREAS) is a WWF initiative in response to the recognition that long-term conservation of these endangered species is only possible through a landscape-based approach that goes beyond isolated protected areas and includes the surrounding landscapes and related land-use practices. In fact this was the vision first put across in a WWF/ TRAFFIC Strategy meeting held in Ho Chi Minh City in 1998. Thirteen priority landscapes addressing cross-cutting issues like trade, elephants in domestication and human-wildlife conflict were identified.

WWF-India has now a programme on the conservation of Asian elephants and Indian one-horned rhino in four identified priority landscapes in India. These are the Nilgiris-Eastern Ghats (elephants) in South India, the North Bank landscape (elephants), the Kaziranga-Karbi Anglong (rhinos and elephants) in Assam and Terai Arc (rhino and elephant) in Uttar Pradesh. Notably, these landscapes are refuge to the largest population of Asian elephants and Indian rhinos.

The two landscapes WWF-India took up in the first phase were Nilgiris Eastern Ghats (NEG) and North Bank Landscape (NBL). A brief profile of these two landscapes would be useful.

The Nilgiris Eastern Ghat (NEG) landscape, an area of over 12,000 sq kms, harbours the greatest number of Asia elephants in the world, estimated at 6,300 to 10,000, their habitats range

from evergreen and dry deciduous forest to thorn scrub jungle and grasslands. Other large mammals such as gaur, sambar and the tiger also abound in the landscape. The landscape comprises Elephant Range No. 7 of Project Elephant, a conservation project of Indian government. WWF-India's AREAS programme initially is concentrating on securing the river Moyar elephant corridor, located at the junction of Eastern Ghats and Western Ghats in the Southern part of the India. It maintains the contiguity between the Thallamalai plateau in the east, the Mudumalai Wildlife Sanctuary in the west and Bandipur Tiger Reserve in the north.

Since the landscape comprises three South Indian States (Karnataka, Kerala and Tamilnadu), the issues vary greatly. The implies the need to identify and prioritize them. The stakeholders' workshop that was held in November 2000 was organized with precisely this agenda. Apart from forest departments of the three States, the workshop was attended by research institutions, NGOs and conservation scientists. The participants listed out six major action points with the aim of reaching the following objective: "A landscape with a healthy, viable elephant population co-existing with human development aspirations in the long term."

The North Bank Landscape (NBL) is one of the most important sites for the Asian elephant. The landscape may be home to upto 3000 Asian elephants. The ecological importance of this region goes far beyond the single species level. It is a globally recognized biodiversity hotspot and one of WWF's Global 200 eco-regions. Overlapping Manas-Namdhapa Tiger Conservation unit, it encompasses several WWF Tiger Conservation Project sites and is considered one of the key sites for WWF's strategy for eco-region based conservation. NBL includes a number of protected areas and presents an ideal opportunity for proactive conservation measures.

The North Bank Landscape project aims to secure the elephant population for the long term by maintaining habitat contiguity, significantly reducing existing and potential threats, and building professional and public support for conservation of the elephant population and its habitat.

Other Landscapes

After WWF presence was well established in NBL and NEG two more landscapes were taken up in 2005: the Khanchendzonga landscape in Sikkim with a focus on the Red Panda and Kaziranga Karbi Aglong (Assam), a haven for the larger mammals. The programme in effect, became a full-fledged Species Conservation Programme. Groundwork for both the initiatives has begun and though it is too early to make any assessment of future successes or setbacks, a brief review of the progress is given in part two of this document.

Part Two

Landscapes of Hope : Confrontation to Co-existence

The new strategy now is to look at "an area of land, regional in scale, that could support and maintain, over the long-term, a viable meta-population of tigers, linked by safe and suitable habitat, together with an adequate natural prey base". This automatically implies the conservation of other mega species under threat and bringing people into conservation.

Chapter 3

Terai Arc Landscape

Introduction

The Terai Arc Landscape (TAL) is defined as the area confined between the River Bagmati in the east and River Yamuna in the west, all along the Shiwalik hills in India and Churia hills in Nepal. It comprises Himalayan foothills, the terai flood plains and Bhabhar tracts. Stretching for over 1500 Km TAL straddles across two countries–India and Nepal and includes 14 Protected Areas (PAs). The Terai Arc Landscape includes high density tiger areas and is a priority landscape in the WWF Tiger Action Plan. It is also a priority landscape for the WWF Asian Rhino and Elephant Action Strategy.

In India, TAL lies in three states of Uttarakhand, Uttar Pradesh and Bihar. It comprises of 7 Protected Areas, mostly Tiger Reserves. The Indian part of TAL, besides being rich in its floral diversity, is also key habitat for four globally threatened species of large mammals – the Indian tiger, Asian elephant, the great one horned Rhino and swamp deer.

Despite being endowed with rich assemblage of wildlife species, TAL faces serious conservation challenges. On the one hand they threaten the tiger, elephant and other species of the region; on the other they also affect the local communities that directly depend on the region's natural resources. Conservation objectives in this highly populated zone therefore need to be reinforced by creating stakes for the local communities thereby reducing human-wildlife conflict while allowing sustainable use of and access to natural resources. It is for this reason that the TAL programme addresses socio-economic concerns of local people through economic opportunities, sustainable use of forest and land resources and benefit-sharing from conservation. The programme includes working with the communities in areas such as education, health, alternative energy use, ecotourism, alternative agricultural practices, capacity building, community forest management and maintaining network with different stakeholders.

The landscape on Indian side covers an area of approximately 49,500 sq km. Considering the size of the landscape, existing capacity and available funds for the project, initially two priority critical corridor complexes were selected for intervention. These are:

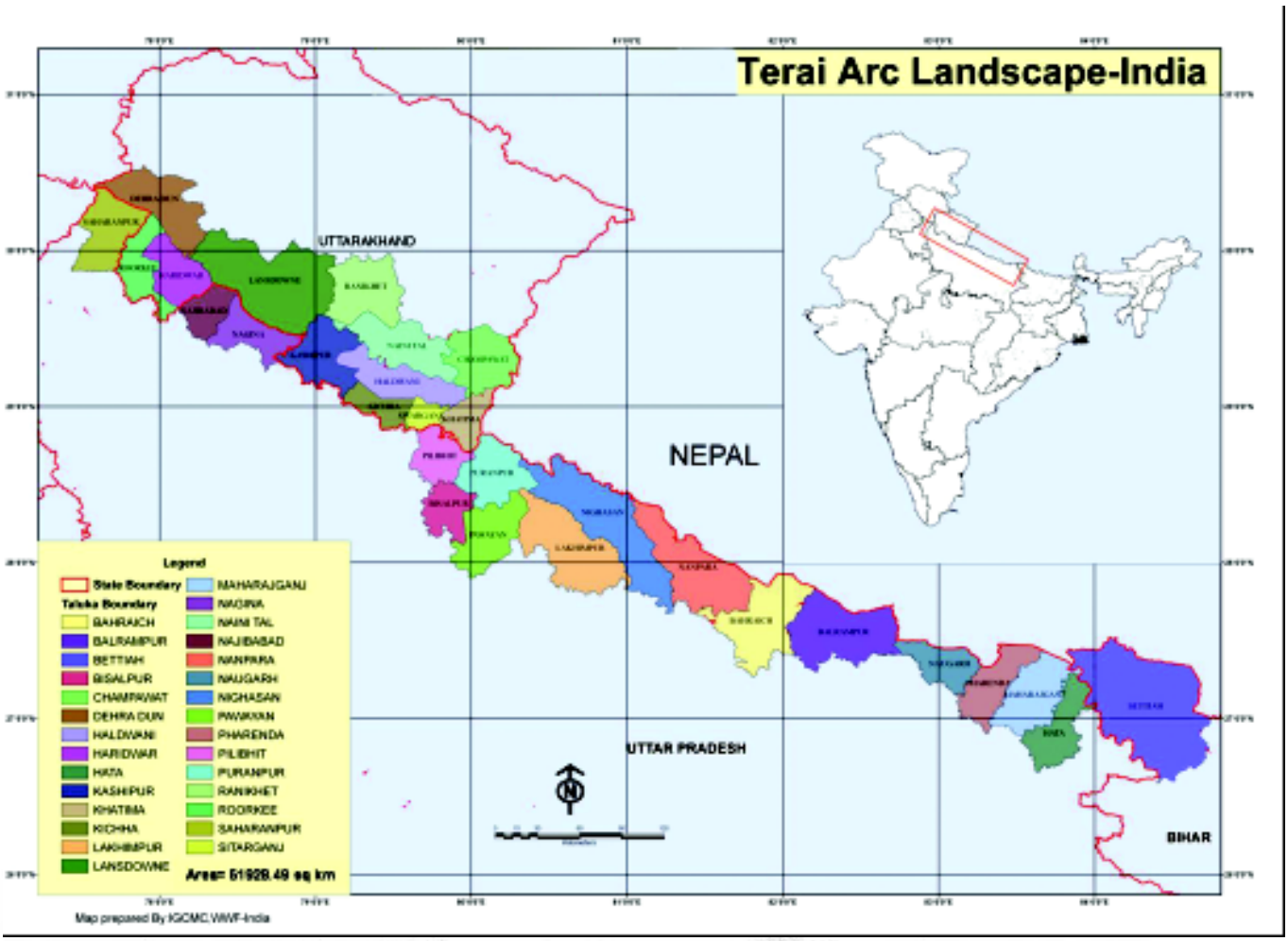
A. Rajaji –Corbett- Ramnagar Forest Division (RFD)

B. Chuka-Lagga Bagga-Kishanpur- Dudhwa Tiger Reserve

Establishing a field presence

The field offices in the TAL have been functional for sometime now and have firmly established the programme's presence in the field. The difficulties faced during the initial stages of WWF's move to the field have been overcome and the functioning of the field offices is significantly improved. The capacity of the project is now relatively well established as also the credibility of WWF. In the past four years, WWF-India has been engaged in various activities ranging from scientific studies, strengthening anti-poaching to community- based interventions. While WWF interventions have been able to check the degradation of the forest and counter some of the negative factors faced by the wildlife, it is apparent that it will take several years of focused interventions to completely arrest the downward slide and pave the way for a full recovery.

A field office of WWF-India was established at Pilibhit in January 2003. WWF-India's field office at Ramnagar started in year 2004 and this team has been working in the corridor adjoining the Corbett Tiger Reserve (CTR), RFD and Terai West Forest Division. Lansdowne, Terai Central, Haldwani and Terai East Divisions.



The project implementation work at present is being carried out in two of the priority and functional linkages of Amdanda-Kunkhet corridor between CTR and RFD and Kotdwar-Duggada corridor between Rajaji National Park and CTR. The selection of these sites was based on stakeholder consultations and a study carried out by the project staff. It was established that various passages for animal movement between CTR, RFD and Rajaji-CTR had been restricted due to human settlements. To prevent further choking in this corridor, an urgent need was felt for conservation initiatives.

The Pilibhit field office under the TAL programme is looking after and coordinating conservation work in the Chuka – Lagga Bagga – Kishanpur and Kishanpur – Dudwa – Katerniaghat linkages that extend from Pilibhit, Lakhimpur Kheri and Baharaich districts. The total forest area of the linkage forests is approximately 3000 square km as against the total 20000 square km geographical area of the three districts. There are three protected areas - Dudwa National Park (DNP), Kishanpur Wildlife Sanctuary, Katerniaghat Wildlife Sanctuary (KWS) and three territorial divisions i.e. Pilibhit Forest Division (PFD), North Kheri (NKFD) and South Kheri Forest Division (SKFD).

Sharing information: empowering villagers

The PFD extends from Chuka to Lagga Bagga, Kishanpur and South Kheri Forests. The forests are contiguous with Shuklaphanta Wildlife Reserve at Lagga Bagga area of PFD. The forests of KWS also adjoin Shuklaphanta Reserve. Rhino, elephants and other ungulates are seasonal migrants to Lagga Bagga area and KWS from Shuklaphanta and Bardia National Park. River Sharda is the major catchment of the area. A number of tributaries drain into river Sharda which ultimately forms the catchment of river Ganges.

Analysis of the earlier eco-development initiatives

Field surveys were conducted in the area to assess eco-development initiatives undertaken by different government and non-governmental organizations working in the area for livelihood generation. Information was collected from various Government Departments, micro-plans prepared by the Forest Department and Forest Development Agency (FDA). It was found that an eco-development committee was formed in many villages and the activities were undertaken through village level institutions.

An assessment of earlier initiatives revealed the strengths and weakness of the eco-development initiatives. Special care was taken while initiating the livelihood activities. Baseline information was collected and prioritization of activities was done in consultation with the local communities. Only activities which were acceptable and had the sense of ownership with the local communities are planned and taken up. Transparency and constant dialogue with the local stakeholders is always maintained and need-based activities are initiated by providing micro credits to individual beneficiaries with a reciprocal commitment for conserving their environment.

Conservation education and awareness

In order to motivate and steer people towards conservation efforts, several meetings were

organized with the villagers.

Educational awareness programmes were organized through puppet shows and villagers were made aware of the benefits of conserving forest resources, preventing forest fires and the importance of wild animals and natural resources in their area. Special awareness programmes are organized at the World Environment Day, Wildlife Week (1-7 October) in collaboration with the Forest department and local NGOs.

The awareness programmes served as a platform for participation of various partners in conservation. The huge participation of the villagers, school children and local NGOs enumerates the success of such programmes. The message of wildlife conservation was effectively disseminated by these different events. The forest department, the local NGOs and the people were brought on a common platform for wildlife conservation and local communities' sustenance through various activities.

In return the villagers extended their support in fighting forest fires and protection of wildlife. The cases of human-wildlife conflict were reported from areas where the interim relief scheme is not presently implemented and resentment towards the mechanism of the government-run scheme was observed.

Assessment of existing institutions

Different village-level institutions including Gram Panchayat, Eco-development Committees and Village-development Committees, Block and several NGOs were assessed for functioning and proper implementation of conflict-mitigation schemes. The strengths and weakness of local NGOs, namely, The Corbett Foundation (TCF), Rainbow Friends for Nature and Environment and Swarnim Social Welfare Samiti, Katerniaghat Welfare Society (KWS), Turquoise Wildlife Conservation Society (TWCS), Parkiti Vanyajeev Samaj Sudhar Sansthan (PVSSS), Terai Arc Conservation Society (TACS) and Corbett Gram Vikaas Samiti- were assessed for their capacity to work for conservation. One important finding was that the Panchayat in the villages were not aware enough of the importance of conservation and had different priorities. The involvement of the Block Development Agency required a lot of effort as their presence on the ground was minimal.

The activity has helped in identifying strengths and specializations of local NGOs which play a role in implementation of the TAL programme. For example, the TWCS is ably conducting awareness campaigns within the village with huge participation of villagers, student, and teachers. The major strength of KWS lies in its leadership abilities and is effectively spreading the message of conservation among the villagers. PVSS is looking after the alternative livelihood options for the people living in the corridor. It focuses on workshops which provide training women in knitting and sewing. TCF has been the partner of WWF-India in implementing interim relief scheme to mitigate human-wildlife conflict in TAL.

These local organizations have been tapped and are being strengthened through proper training and guidance to enhance their strengths. Many

of the local organization are roped in especially for awareness and community-related work

Training sessions were conducted for the local NGOs which are now working in close association with the TAL Pilibhit field office. A three day training programme was organized by the Pilhibit field office where all the local level NGOs (TWCS, KWS, TNCS and PVSS) working with field office participated, and training was given on conducting studies on crop damage by wild ungulates, estimation of fuelwood extraction from the forest, and assessment of grazing by livestock. This programme was followed by another training camp for analyzing raw data obtained from the study.

Socio-economic and ecological studies

A study was conducted to assess fuelwood collection in Pilibit FD and CTR. Four ranges of Pilibit Forest Division (PFD) namely Mahof, Mala, Barahi and Haripur, and two ranges in KWS (Katerniaghat range and Nishangara range).

Based on a well established methods, each of the ranges areas were prioritized as High Pressure Area (HPA), Medium Pressure Area (MPA) and Low Pressure Area (LPA) depending on the intensity of fuelwood collection in headloads and cycle loads by consulting with the Forest Department and the local people. It was estimated that respective weights of headloads and cycle loads are 18–22 kg and 60–80 kg.

Villagers making compost heap at Kunkhet and Carpet weaving training at Chukum

The above study showed that maximum collection of fuelwood in PFD took place in Mahof range followed by Haripur range, Barahi range and Mala range.

About 50% of the people carrying head loads were doing so for their domestic use. The bicycles carried fuelwood to the local markets of Pilibhit, Nueria, Madhotanda, Sherpur Kalan and the Purnpur. In KWS, maximum fuelwood collection took place in Nishangara range followed by Katerniaghat range.

The above study not only quantified the amount of fuelwood collected from the forest in PFD and KWS, it also identified village-wise pressure from fuelwood collection. This has helped to specify management intervention to reduce the pressure of fuelwood collection in the forest. Various activities based on the findings of the study have been designed and a dialogue with the local authorities and communities to reduce the fuelwood pressure has been initiated. The study has helped the Forest department to take effective action against illegal collectors.

In six villages around Corbett Tiger Reserve, it was found that frequency of visits made to the forest is more during winter season and reduces in rainy season. Winter forms the peak season of fuelwood collection as most of the families collect fuelwood in advance for rainy season and hot summer months ahead. One head load (approx. 25 Kg) can be finished in less than one day to almost three days depending on the family size. Approximately 5,835 Kg per day fuelwood is extracted from the study, area and out of seven entry points selected for the study, the maximum biotic pressure was identified at Dhapla gate, which leads to Choti Haldwani township.

Survey for baseline information

A socio-economic survey was conducted by the TAL Pilibhit field office in 22 villages adjacent to Chuka-Lagga Bagga-Kishanpur linkage in order to establish baseline information on structure, demography, landholding, education,

annual income, cattle, resource-dependency and crop depredation. A similar study was conducted in Ramnagar and Kotdwar sectors. The study was mainly focused on villages falling on critical corridors: Amdanda-Kumeriya corridor, Bailparow-Kotabagh corridor, Boar river corridor and Nihal corridor.

Based on the information of the above surveys some specific activities were undertaken by the TAL-Pilibhit office and TAL-Ramnagar field office.

Some of these are highlighted below :

In order to reduce pressure of fuelwood, LPG (Liquified Petroleum Gas) connections were distributed to the villagers. An economic assessment was done to find out the purchasing capacity of the villagers to purchase LPG. LPG connection was given after taking 50% contribution from the villagers. This contribution develops a sense of ownership and responsibility among the villagers while making it economical for the project. About 90 families in Naujaliya village, 50 families in Gaba Sarai village and 56 families in Ramnagra village have been provided with LPG connections. This has obviously resulted in a large reduction in fuelwood requirement by the local people.

In order to find out how many people were actually using LPG an assessment was carried out in the critical sites. Ninety seven percent of the respondents to whom this facility was provided responded that there was reduction of fuelwood consumption, which had dropped 20 – 30% according to their estimates. It was also estimated that 20% of the beneficiaries were refilling the cylinder before one month whereas 20% every month, and 34% every two months. So 74% of the beneficiaries were refilling the cylinder within two months. The remaning people refill cylinder between two and six months. The delay in refilling is also caused due to non availability of LPG. This can then be calculated as a reduction of 10 tons of fuelwood used per year. The villagers are now accustomed to the use of this method. This successful model can be replicated in other villages.

Institution building

As mentioned earlier, WWF-India through its TAL programme has been working in Ramnagar sector now for the last three years.

Initially Kunkhet village in Amdanda-Kumeriya corridor was identified for intervention and gradually the work was extended to other villages (Mohan & Chukum) lying on the same corridor. During second year of the programme villages Choti-Haldwani near Baur corridor and Mankanthpur lying on Kotabagh-Belpraow corridor were selected after assessing the importance of

Awareness activity with school children

Understanding the dynamics of human-wildlife conflict : A programme during Wildlife Week, October 2005

the surrounding forests for elephant movement. Baseline information on these villages were collected and compiled and through various PRA (Participatory Rural Appraisal) tools the existing institutions in the villages were analyzed. After assessing the potential of formation of new institutions and working with the existing institutions steps were taken to identify target groups and bring them on one platform. Initially, a village level institution was formed in Kunkhet village with a person from each house hold as its member. An initial grant was given to the institution for creation of a community asset. This model didn't work and collapsed soon after due to social and political issues. Learning from the experience the strategy was changed and instead of forming single macro institution small homogeneous self-help groups were established.

These self help groups were provided inputs in terms of facilitation, training and linkages to make them self sustainable. The groups at Kunkhet village were supported for activities like stitching and selling litter bags to the Dhangarhi gate of CTR, and poultry. SHGs of Mohan village were linked with Indian Medical Pharmaceutical Corporation Limited (IMPCL) for employment opportunities. Similarly, the groups at Choti-Haldwani were supported for Tie and Dye; packaging of locally grown pulses and spices and poultry. For promoting organic farming and women SHG at village Mankanthpur, TAL-Ramnagar promoted Durga SHG and the associated groups as trainer organizations.

Meeting with hunter-gatherer community

Mitigation of Human-Wildlife Conflict

Crop damage

In the Ramnagar corridor complex, Mohan cluster of villages and Githala were selected for a systematic assessment, on the basis of potential and priority linkages preferred by wild animals, especially elephants. The villages in Mohan cluster are Mohan, Amarpur, Chuklam and Kunkhet where there is high incidence of human wildlife conflict and high dependency on forest for fuel, fodder and other Non Timber Forest Produce (NTFP) leading to greater anthropogenic pressure on key wildlife habitat.

Detailed demographic and socio-economic data were collected in the above villages. The data on resource dependence were collected through household survey, Focused Group Discussion and Participatory Rural Appraisal with the villagers. Field visits were undertaken to carry out meetings and informal exchanges with the community members and leaders. Individual interview were conducted to gather information on awareness level, health status and skills of community members and to understand existing livelihood options in the villages. Animal movement was recorded through direct sightings, data collection by transect method and through secondary information.

The assessment helped in recording the number of cases of cattle kills, crop raiding in terms of scale and seasonality in the villages. Information was also gathered on the socio-economic condition of the villagers, fodder and fuelwood dependency of the villagers and other problems faced by the people. An important finding of this assessment was that cattle kills were more

frequent in the rainy season; crop raiding due to elephants, wild boar and spotted deer took place in the cropping seasons during the months of August–September and December to March. Necessary interventions have to be planned accordingly.

In the Pilibhit corridor complex, a study was conducted to assess crop loss due to wild animals in four ranges of Pilibhit Forest Division (Mahof, Mala, Barahi and Haripur), two ranges in KWS (Katerniaghat range and Nishangara range), four ranges of Dudwa Tiger Reserve (Belreiyan, Sathiana, Kishanpur and Mailani ranges), four ranges of NKFD (North Nighasan range, South Nighasan range, Majgahi range and Sampurna Nagar range), and two ranges of SKFD (Bhira and Mailani ranges). The study was conducted in the winter season.

In each range, areas were categorized as High Pressure Area, Medium Pressure Area and Low Pressure Area depending on the infestation of wild animals to crops by consulting with the forest department and local people.

The assessments showed that the crops loss was more in six villages of the PFD. Meetings were held in the villages of high pressure- area and people were consulted on the situation and the effectiveness of various mitigatory measures. Villagers identified electric fencing as an effective measure for crop protection for which they needed support from government and non-government organizations/agencies and in return pledged to protect wildlife. Based on the assessments Kesarpur – Basantapur Nauner–Barahi cluster of 9.15 km. and Githala were selected for erecting fences. This initiative got tremendous support from the villagers and helped to mitigate human-wildlife conflict. The movement of elephant, spotted deer and blue bull into farms has been stopped by the fence. Even though electric fences have been erected by WWF- India in other parts of the country, these are cases where the villagers contributed both financially and in-kind for erecting the electric fence. The Kesarpur-Barahe length of solar fence is unique as this is an example of the longest working solar fence in India being maintained by the local community.

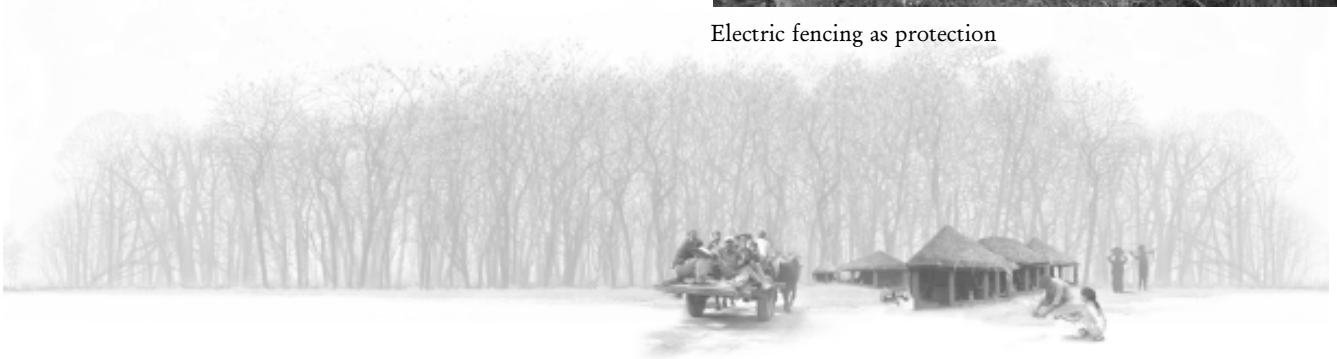
Loss of Human Lives and Livestock

The loss of lives in the villages was assessed with information collected from secondary sources followed by spot verification in some of the incidences. The incidence of tiger and elephant attacks in these areas is not a new one. A study in 2001 reported that 90 persons lost their lives from March 1978 to December 1981 in Kheri district whereas three persons were killed in Pilibhit.

In PFD after a gap of almost 23 years, the tiger killed 10 people from December 2001 to March 2004. All the 10 kills happened during fuelwood collection or thatch grass cutting by the people.

The assessment of human wildlife conflict revealed that if prompt actions are taken to reduce grievances of the local communities a retaliatory situation can be avoided. An ex-gratia payment was provided to the affected family immediately. As a result, despite 33 human casualties (till June 2006) there was no retaliatory killing of the animal.

Electric fencing as protection



The human killing sites were immediately visited by the Forest Department and WWF staff after the incidents. Details of the killing site, habitat type and indirect signs of the animal were studied. In all the cases the issues were discussed between the forest officials, the victims' families and local communities. Sometimes such incidences created resentment and anger among the villagers.

Tiger and elephant attacks on humans have occurred since humans and wildlife lived side by side, one often straying into the other's territory. While payment of small sums of money eases some tension in the aftermath of an attack, it was found that efforts should be instituted to regulate the movement of people into the forests for thatch and fuelwood collection. Alternative sources of such resources or other livelihood options could help reduce incidents of such conflict.

Field inspection of cattle killed by big cat

A new batch of police personnel trained in wildlife protection matters

Assessment of effectiveness of existing compensation schemes

WWF-India under its Tiger Conservation Programme initiated small interim financial assistance to the owner of the cattle killed by tiger or leopard in the buffer zone of Corbett Tiger Reserve (CTR) in 1998 which is still being carried out and continued under the TAL Programme. The Cattle Compensation Scheme was started with the objective of reducing human–wildlife confrontation. The scheme now known as Interim Relief Scheme is running successfully in partnership with The Corbett Foundation, a local NGO and has proved to be successful in eliminating retaliatory killing of big cats.

In the mid 90s, cases of villagers resorting to revenge killing of the tiger by poisoning of cattle carcasses came to light. After the implementation of Interim Relief Scheme by WWF-India, there has been no cases of tiger being killed in retaliation ssreported in last few years.

Information was collected on the number of incidences, during 2004-06 cattle lifting tiger within the area of Dudwa Tiger Reserve. Secondary information was collected from the office of the Deputy Director, Dudwa Tiger Reserve. The number of incidences filed in the office was taken as the source. Within this time period a total of 24 incidents of cattle-lifting have been filed. The above figure shows that the number of cattle killed by the tiger per year is very low in this area. Still, the forest officials have asked to continue the schemes by the TAL office because there are delays in payments of compensation by the park authorities due to lengthy procedures.

In contrast, human killing by tigers is relatively high in this sector of the landscape. *Ex-gratia* payment for human killing by wild animals was

carried out by the TAL Pilibhit field office. Payments of Rs.5000 each were made to the affected families after a joint inspection by the TAL office and the Forest Department within 24 hours of the incident. From November 2003 to June 2006, 33 cases of human killings were observed in PFD, DTR and NKFD. *Ex-gratia* payments were made in all cases. This has been useful in preventing retaliatory killing of tigers by angry villagers.

The existing interim relief scheme and the ex-gratia scheme were found to be beneficial for reducing human - wildlife conflict. The antagonism among the villagers due to human killings by tiger or leopard was largely controlled due to promptness of the *ex-gratia* scheme conducted by the TAL office. This is reflected in the absence of retaliatory killing of wild animals by the villagers despite 33 people getting killed in the years 2003 to 2006.

It is expected that both Forest Department and WWF India should join hands to compensate the victims, which will increase the coverage of compensation for the victim. It was found that unless a better mechanism or a trust fund could be established, the present scheme was the best option available.

Trans-boundary conservation

The trans-boundary conservation issue gains significance in TAL as it is spread across different Indian states and two countries.

The Chuka-Lagga Bagga–Kishanur and the Kishanpur–Dudwa-Katerniaghat Linkage forests are contiguous with the Indo-Nepal border all along from Lagga Bagga, Tatrganj, Basahi, Kaima Gauri, Gauriphanta, Belapersua and Katerniaghat areas.

The documentation process of trans-boundary conflict revealed that the grazing pressure was both inward and outward as the cattle moved freely across the borders from either side. With regard to poaching and illicit felling, it was found that poachers and smugglers cross the border to poach or smuggle wildlife/timber and escape across the border as it is easier for them to cross the border than the enforcement government agencies due to government procedures for crossing international boundaries. Siltation of rivers downstream in India is largely due to the denudation of the hills upstream across the border. A huge area of sal forest dried and changed into syzygium forest and prime areas of Sathaina grasslands were replaced by coarse unpalatable grasses. In order to mitigate this conflict both the national governments are trying to find solutions through periodic trans-boundary meetings. Through the TAL Programme some remedial measures have been taken but much has to be done at a preventive level to address the root cause of conflict.

Field level trans-boundary meetings were held: one from 1-3 July 2004 at Lagga Bagga and another one on 18 April 2005 at Dodhara where the above issues were discussed both by Indian and Nepali officials. A field level meeting was held on 28 April, 2006 at Rampurva FRH, Nishangaraha Range, Katerniaghat WLS in April 2006. In the meetings, the DFO Katerniaghat and Assistant Forest Officer Khata Nepal with several community members, Anti-

Participants at a transborder workshop

Seizures due to information network developed by TAL (Ramnagar office)

S.No	Year	Seizure	Number of Arrest	Forest Division
1	2004	Tiger Skin-1	3	Terai West
2		Leopard Skin-2 Python-1 Sambar Antler-1 Tortoise bones	1	Terai West
3	2004	Meat of Hog deer	2	Terai West
4	2004	Elephant Tusk-28Kg	2	CTR
5	2005	Common Coots	2	Terai West
6	2005	Medicinal plants (worth 2 lac)	7	Ramnagar
7	2006	Leopard skin	1	Terai West
8	2006	Timber	4	Terai West
9	2006	Leopard skin-1 Anteler	2	Terai West

Other Seizures (Pillibhit sector)

Sl No.	Date	Seizures	Location
1	18.2.05	17-18 kg of tiger bone	Bichhia Raliway Station, KWS
2	19.2.05	One tiger skin seized	Bichhia Raliway Station, KWS
3	13.9.04	Swamp deer poaching	Chandia Hazara village of Haripur Range of PFD
4	10.8.04	Wild boar poaching	PFD

Sl No.	Date	Seizures	Location
1	*23-07-2005*	3.7 (kg)Tiger Bone	Gabia Sahrai Pilibhit
2	12-10-2005	3 Leopard, 1Tiger Skin	Sampurnagar, Lakhimpur Kheri
3	27-11-2005	1 Leopard Skin	Gauriphanta, Lakhimpur kheri
4	08-06-2006	8 Kg. Tiger Bones	Nurea Railway Station, Pilibhit
5	15-06-2006	1 Tiger and 1Lleopard Skin	Tulsipur, Balrampur
6	10-07-2006	5 Otter Skins	Ramnagra, Pilibhit

poaching Unit and village devolvement committee members were present. The locals NGOs community members and anti-poaching unit of both the countries agreed to share information and cooperate in trans-boundary wildlife conservation.

A series of meetings were held with forest officials of Uttarakhand and Uttar Pradesh. As a result a mechanism for developing informer network and sharing information was develop. Bijnore Forest Division has taken up joint patrolling with CTR. Bijnore FD is on the boundary of the states of Uttar Pradesh and Uttarakhand.

The Lansdowne Forest Division is a critical forest area due to the several other forest divi-

sions bordering it. Kalagarh Forest Division is towards the east and south eastern boundary, Bijnaur Forest division is towards the southern boundary and Rajaji National Park towards the west. The bordering with several divisions and two important protected areas leads to frequent movement of wild animals through this division. The movement of wild animals in and across the division makes this division sensitive to poaching and wild life killing. Due to the sensitivity of the area, Forest Department and WWF-India's TAL programme decided to conduct monthly joint surveys in the villages bordering Lansdowne division with Kalagarh and Bijnaur divisions. The team for the joint patrolling included the DFO, Lansdowne FD, WWF-India TAL team and forest departments field staff. During the joint patrolling exercise a temporary *gujjar* dera (camp) was found in Dabina beat of Duggada range. The *gujjars* were investigated and were asked to vacate the area immediately.

Uttarakhand state borders both Tibet and Nepal: this is the main trade route for wild life products. Due to the sensitivity of the area, WWF-India TAL Programme initiated the formation of an informer network. In the past three years cases of poaching and trade have been exposed with the help of the informer network developed by WWF-India.

Support to forest department

An informer network of the Forest Department was supported and strengthened in the linkage forest areas i.e. Pilibhit, Dudwa National Park, Kishanpur Wildlife Sanctuary and Katerniaghat Wildlife Sanctuary. Pilibit field office played a key role by providing financial support to this informer network. With enhanced support and capacity this network produced major results thereafter.

The Chuka-Lagga Bagga-Kishanpur and Kishanpur linkages are the two critical corridors for wildlife conservation of the area. The linkage forests are mostly along the international border i.e. the Indo-Nepal border. There is pressure on these forests from the villages within the country and also across the border, from Nepal. To strengthen the Forest Department's infrastructure in communication, mobility and law enforcement, infrastructure support has been provided to the different FD divisions of the linkage forests for better wildlife protection work. The North Kheri and South Kheri Forest Divisions are being provided with infrastructure support for the first time under the Terai Arc Landscape Project.

Wildlife survey training for field-level staff of Katerniaghat Wildlife Sanctuary was given under this activity. The field staff were trained to collect information and analyze data on ungulate censuses. Similar training programmes for ungulate and tiger census were also given in the Pilibhit Forest Division. Thrust is given on information collection and analysis. A training programme was also conducted on wildlife health and diseases with the help of local veterinarians in the area.

Legal training workshops were organized for the field staff of the Forest Department such as the. Ramnagar Forest Division and Lansdowne Forest Divisions in year 2004 and 2005 respectively. After seeing the positive outputs of these legal training by WWF-India, Forest Department wanted to hold such training programmes

A watch tower constructed with WWF-India's support

Details of income generating activities of VDCs		
Villages	No. of beneficiaries	Income generating activities
Naujaliya	21	Value addition to food products, thrashing of paddy to rice, medical shop, sewing, barber shop, confectionary shop, agricultural activities, cycle shop, carpet making
Ramnagar	64	Making food products like *Baddi*, vegetable production, organic food products and manure, saloon, poultry, litter bags of jute, tie and dye articles, articles of *sun* and jute, packaging of locally grown pulses and spices.
Selah	26	Poultry rearing, vegetable production, store, cycle shop, pisciculture, fodder raising, fast food stall, confectionary shop

in other divisions also. In the year 2006 workshops were conducted for Haldwani FD, Terai Central FD and Terai East FD.

Training sessions on wildlife census (mammals and wetland birds), wildlife management and human-wildlife conflict mitigation measures were organized for forest staff of Terai West Forest Divisions, Terai Centre Forest Division and Ramnagar Forest Division.

Livelihood Activities

In order to generate alternative sources of income three villages (namely Najaliya, Ramnagra and Shela) in the corridor of Chuka–Lagga Bagga–Kishanpur were taken on a pilot basis. Looking at the economic conditions and forest resource-dependency these villages were selected for exploring alternative sources of income generation.

This activity was initiated with the formation of Village Development Committees. A series of meetings were held with the villagers. The objective of reducing forest dependency for wildlife conservation was discussed with village people. Alternative options for income generation in order to reduce dependency on key wildlife habitat were discussed in these meetings. The committees in a meeting then decided the beneficiaries who would be provided with micro credits to carry out different income generating activities.

The different income generating activities in the respective villages are given in the table above.

The results of these activities indicate that such activities help villagers in the corridor villages to reduce their dependency on forest resources. The impact of such activities is felt in the long run. It was observed that in all the cases there was an increase in annual income of the beneficiaries. In Naujalia the annual income of one of the beneficiaries has risen as high as Rs. 72000. The recovery of loans clearly indicates the smooth functioning of these committees.

Income Generating Activities : Making fancy products from rope

Similar trend was seen in the Ramnagara village. Here the annual income of the beneficiaries varied from Rs.18000 to Rs.36000. However, in Selha the committee is newly formed and the impact is yet to be assessed.

Health camp initiatives

The villagers residing near the forest areas are far from urban centres which deprive them of availing basic amenities like health facilities. In order to address this issue TAL Pilibhit field office, in one of its activities, undertook health camp initiatives under the community programme.

A total of 81 health camps were conducted in 25 different locations of Pilibhit Forest Division, Kishanpur WLS and Dudwa National Park till June 2006. In the year 2005, vaccination (Hepatitis B) and health camps were conducted for the field staff of Dudwa National Park, Kishanpur and Katerniaghat WLS. A total of 1050 members of field staff and their families were vaccinated and provided with medical check up. Health camps were conducted in 25 different villages and a total of 21,693 persons (including men, women and children) were provided

A child being examined at a health camp

Medical Camps at Ramnagar Sector in the Year 2004-05 (No. of patients by desease)

Month	Diseases													
2004-05	RD	GI	ID	SD	B & M	FD	ND	Eye	ENT	UTI	Dental	CVD	TB	Total Patients
April	9	13	15	1	8	2	1	1	4	2	2	2	1	**61**
May	6	11	6	2	2	1	1	3	0	0	0	2	0	**34**
June	4	4	3	0	4	0	0	2	0	0	0	2	0	**19**
July	2	7	3	1	8	1	0	2	0	0	0	2	0	**26**
Aug	1	4	4	2	4	1	0	2	0	0	0	1	0	**19**
Sep	4	3	1	2	2	1	0	0	0	0	1	1	0	**15**
Oct	2	1	6	4	6	1	0	0	0	1	2	0	0	**23**
Nov	3	6	1	3	2	2	0	1	0	0	0	0	0	**18**
Dec	6	3	4	2	2	2	0	0	0	1	0	2	0	**22**
Jan	5	4	4	3	5	2	0	1	1	0	0	1	0	**26**
Feb	1	1	5	2	1	1	1	1	0	1	0	1	1	**16**
March	9	7	7	4	7	3	1	0	0	2	1	0	1	**41**
April	4	10	9	3	7	2	0	0	0	1	0	0	2	**39**
May	3	4	4	2	1	1	0	0	2	1	1	0	0	**18**
Total	**59**	**78**	**72**	**31**	**59**	**20**	**4**	**13**	**7**	**9**	**7**	**14**	**5**	**378**

RD: Respiratory diseases ; **GI**:Gastro Intestinal; **ID** Intestinal disease; **SD**: Skin disease; **B&M**: Bone and Muscle; **FD** Fungal disease; **ND**: Neural disease; **ENT**: Ear, nose , throat; **UTI**: Urinary tract infection; **CVD**: chronic venereal disease; **TB**: Tubercolosis.

Medical Camps at Ramnagar Sector in the Year 2005-06

Month	Diseases													
2005-06	**RD**	**GI**	**ID**	**SD**	**B & M**	**FD**	**ND**	**Eye**	**ENT**	**UTI**	**Dental**	**CVD**	**TB**	**Total Patients**
July	4	7	6	7	3	-	-	-	1	1	-	1	2	**32**
Aug	4	1	4	6	2	-	1	1	1	1	1	-	1	**23**
Sep	9	3	8	6	3	1	1	-	-	-	-	1	2	**34**
Oct	17	2	4	2	2	-	-	-	2	2	-	1	1	**33**
Nov	7	4	7	2	7	-	-	1	1	-	2	-	-	**31**
Dec	9	6	4	-	5	2	-	-	2	-	-	-	-	**28**
Jan	23	7	10	4	7	2	-	-	1	1	-	-	1	**56**
Feb	24	7	16	8	10	4	1	4	1	-	1	-	2	**78**
March	17	13	10	2	15	2	-	-	1	-	2	-	-	**62**
April	15	12	6	4	10	1	1	1	1	1	4	1	-	**57**
May	10	9	6	5	4	2	-	1	1	-	-	3	-	**41**
June	13	18	14	7	10	1	1	2	5	1	1	4	-	**77**
Total	**152**	**89**	**95**	**53**	**78**	**15**	**5**	**10**	**17**	**7**	**11**	**11**	**9**	**552**

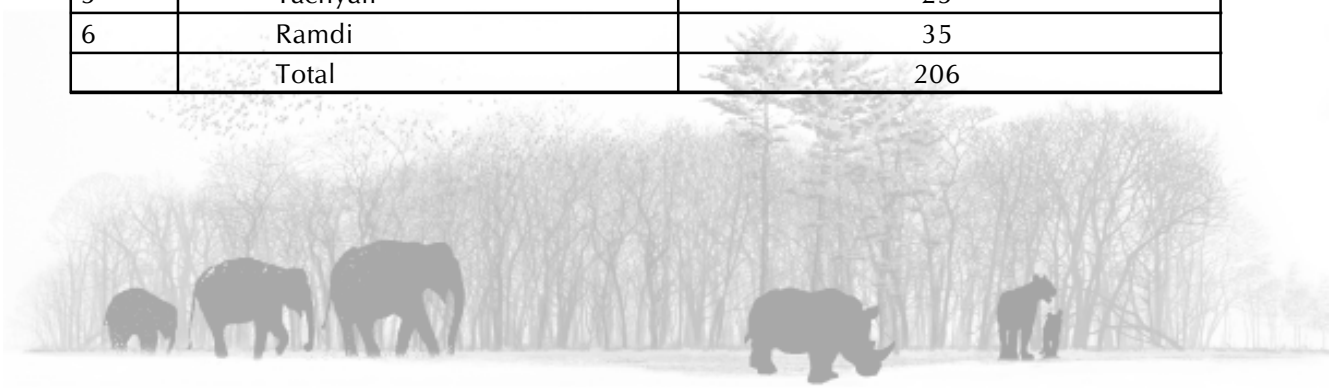
RD: Respiratory diseases ; **GI**:Gastro Intestinal; **ID** Intestinal disease; **SD**: Skin disease; **B&M**: Bone and Muscle; **FD** Fungal disease; **ND**: Neural disease; **ENT**: Ear, nose , throat; **UTI**: Urinary tract infection; **CVD**: chronic venereal disease; **TB**: Tubercolosis.

medical check up and medicines from March 2003–June 2006.

Such health camps in the villages were conducted for the first time and WWF India has been supporting this through funds specifically allocated for health programmes (such as the Johnson and Johnson fund). A survey was conducted to assess the impact of health camps in the villages. Out of the total people who were provided with medical facilities, 94% felt that they benefited from the health camps; 60 % of the people insisted that health camps be conducted every month in the villages while 26% people said they should be held every three months. The villagers agreed that providing them with basic amenities would obviously help in conservation of wildlife. The presence of forest officials in the health camps

Medical Camps at Kotdwar Sector in the Year 2005-06

S.No	Name of Village	Number of people diagnosed
1	Githala	42
2.	Gaujeta	22
3	Pulinda	62
4	Balli	20
5	Tachyali	25
6	Ramdi	35
	Total	206



helped develop a sense of confidence and goodwill among the villagers and presented a different image of the Forest Department. This will hopefully reduce conflicts and suspicion between the villagers and the Forest Department.

Health camps in villages around the Corbett Tiger Reserve were initiated in year 2004 in collaboration with The Corbett Foundation, a local NGO (see tables on 23 and 24). In the year 2005 a similar activity was undertaken in Kotdwar sector.

Mandate, role and operational principles

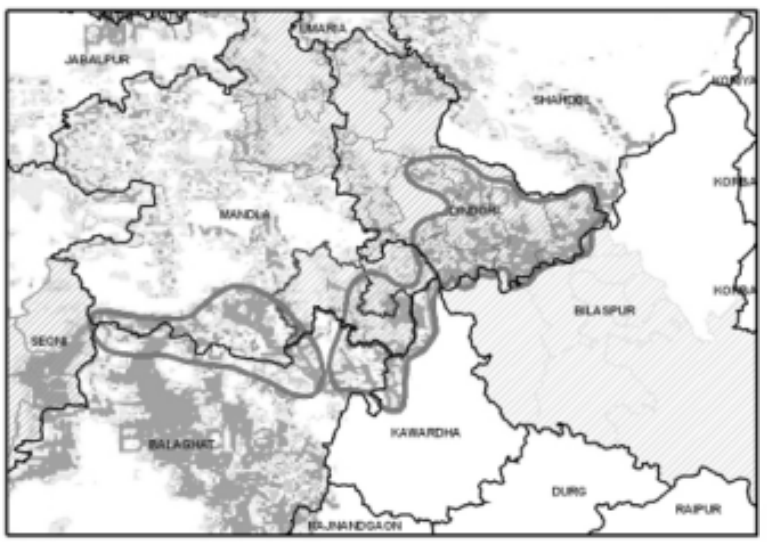
As an operational principle what has been decided is that all activities that would be undertaken under the project would have reciprocal commitment from the local communities. Priorities would be set based on benefits to a larger section or to activities which have direct or indirect bearing on the sustenance of linkages for wildlife movement and reducing resource dependence of the local communities. The roles of different organizations, agencies and institutions were made clear to the local communities and it was decided that the primary role in conservation has to be played by the villagers whereas the WWF TAL team would play a facilitating and coordination role: the Forest Department would play a role of manager as well as enforcing the law in the forest based on the Indian Forest Act and Wildlife (Protection) Act. The village institutions would play a pivotal role in raising awareness, prioritizing actions and activities and regulating resource use.

Chapter 4

Satpuda Maikal Landscape

The Satpuda Maikal Landscape (SML) is situated along the Satpuda and Maikal hill ranges in Central India. It stretches over 500 km between the Melghat Tiger Reserve of Maharashtra and Achanakmar Wildlife Sanctuary of Chhattisgadh encompassing an area over 25,000 Km^2.

The SML project, designed to address the main threats to the tiger populations in Satpuda Maikal Landscape and to safeguard the livelihood concerns of people inhabiting the priority sites, was initiated in October 2002 at selected sites. Considering the vastness of the landscape and the diversity of issues, the project selected three segments in the corridors for priority interventions based on extensive public consultations. The sites were selected from the following priority linkages: **(1) Kanha - Phen - Achanakmar (2) Pench - Seoni - Kanha.**



The nature of work that the project has carried out from mid 2004 has broadly been in two categories:

› Working closely with Forest department, and other Government agencies, and

› Establishing partnerships with local NGOs, local community and like-minded individuals.

WWF has been conducting activities and playing the role of a facilitator to promote conservation oriented activities and action at all possible levels. During the course of past one year the project has developed important partnerships with all stakeholders. The project interventions have been as follows:

- **Support to PAs and Non-PAs**: Infrastructure support to PAs and non-PAs in the landscape has been identified as the top priority, and measures have been taken to adequately address the issue. WWF-India has assessed the situation and provided support that was considered necessary. This is an ongoing process and is continuing.
- **Working with the communities**: A group of villages identified earlier by the project are now partners in implementation of project activities. The project has engaged directly and indirectly with the local community to act in the interest of conservation of the linkages. The project activities have been designed to wean away people from the use of natural resources, through providing alternative sources of livelihood.

Project activities are currently being conducted in four segments of the selected corridors, and the project team is presently working in 29 villages. The interventions vary on the basis of needs and are also based on the location. Approximate demarcation of the area of WWF presence is marked on the map on p.26:

There are several goals towards which the activities are targeted. These are discussed below:

Goal 1 : By 2007, FD and State authorities managing PAs (3,275 Km2) and corridors (6,000 Km2) have enhanced connectivity; habitat quality and security, and revenue generation.

A recent achievement has been that Corridor demarcation has been recognized in state planning documents: Discussions with the State Forest Department officials and the State Biodiversity Board are on to demarcate and recognize the boundaries of corridors connecting Pench-Kanha-Achanakmar Protected Areas. Final maps are under preparation.

Since the activities started frontline staff of PAs and corridor areas have improved knowledge and skills. The important issues as also target audiences among the frontline staff were identified for training. This time the frontline staff from the District Police Department was identified for the training purpose. A batch of 30 police officers was given training in anti-poaching activities. Experts from concerned fields (a forest department official and a lawyer) were invited as resource persons. The following topics were covered in a day-long training programme.

- Different methods adopted by poachers to kill wild animals.
- Major flaws in the current protection system resulting in weak patrolling.
- Developing informer's network and gathering intelligence on wildlife crime.
- Developing small clues into major leads for investing wildlife crimes.
- Lacunae at field level investigation processes which result in weak prosecution and conviction.
- Different relevant clauses related to the Wildlife Protection Act, 1972, and Evidence Act.

The above topics were presented by the resource persons citing field examples. Participants were given handouts for further reading as well as a ready reference. The result of this training programme is now visible on the ground as more and more police officials are taking a keen interest in curbing wildlife crimes.

Crop Protection Trench

Support to Territorial Forest Division

The assessment of equipment and infrastructure requirement of the field staff in three non protected areas (Territorial Forest divisions forming the corridor area) have been completed. The identified infrastructure support would be provided soon. Literature regarding different wildlife species, wildlife crimes, survey and census operations etc. has been provided to the frontline staff (total of 130 staff personnel) of the three Protected Areas as well.

The programme has also tied up with the District Police Department to curb poaching. Technical support for the identification of seized wildlife products, information regarding poaching incidence and improving anti-poaching skills, is being provided by the project. Joint

operations carried out between January - June 2005, resulted in seizures comprising of 2 tiger skins and 2 leopard skins, a few kg of tiger bones, 4 chital skins, one sambar skin, a few antlers. Five poachers were nabbed. They are being prosecuted currently in the local court. Seven poachers caught earlier in November and December 2004 are still behind bars and have been refused bail.

Goal 2: By 2007, residents (farmers, small entrepreneurs and households) of pilot villages in SML have reduced their dependence on the surrounding corridor forests to within levels prescribed in the FD management plans

Ideal Crop Protection Trench

Vermiculture pit

Project recommendations have been finalized in coordination with villagers and concerned Departments. Consultation with the local communities and various departments is an ongoing process. To increase the impact of the project, participation of women groups was also encouraged through separate meetings. The pilot testing of possible development options are being tried out as a part of feasibility tests.

Improved Agricultural Practices

As a part of the Project's efforts to strengthen local agricultural practices, training programmes were conducted with focus on Improved Agriculture Practices. A total of 150 representatives from 10 villages of the Mawai segment participated in one such programme organized in early 2005. Officials from the District Agriculture department and the Regional Publicity Department were invited as resource persons. The focus of the training programme was to:

- Provide improved methods of farming to the farmers to increase productivity
- Promote organic farming to reduce use of chemical fertilizers
- Promote use of bio-pesticides (made of eco-friendly materials) to reduce dependency on harmful and costly chemical pesticides
- Strengthen traditional water conservation methods to increase the scale of irrigation and improve soil-moisture balance.

Creating financial independence(SHGs)

Training programmes were also carried out in five pilot villages to create Self-Help Groups (SHGs) in the first six months of 2005. A total of 12 SHGs have been formed. Each group has 12-15 members and in the initial stages they are being encouraged to raise some capital among themselves. Local cooperatives and nationalized banks have agreed to finance these groups based on their performance in the next six months.

Providing alternative livelihood options

Training programmes were organized for the beneficiaries of two villages of Kharidih segment to provide technical information on poultry and piggery as sources of income. A total of 50 representatives from two villages were brought to the veterinary college of Bilaspur, Chhattisgadh, to provide them with first hand information on these activities. Cross visits for the villagers of three villages of Kharidih segment were also organized. In each visit, 10 representatives from each village were taken on a two-day study tour of the Mawai segment. They had free discussions and saw the different activities happening in the village. More such visits are being organized as a part of knowledge sharing exercise. In January 2006, around 50 individuals were trained in improved agricultural practices in collaboration with agricultural extension wing of the Goverment of Madhya Pardesh.

Equipment and infrastructure needs of the residents were assessed through continuous meetings and discussions. This is an ongoing process and shall continue in the future as well. At the end of the agricultural training programme participants were given necessary tools to implement the knowledge they had gained. Some highlights of the activity were:

- To propagate the use of organic farming farmers were given support to produce vermi-compost manure for their own fields. Around 390 families in 10 pilot villages have been equipped with this facility.
- Since the last three years the project has been working on soil-moisture conservation. Under this activity efforts are being made to harvest maximum rainwater by desilting existing village ponds, making percolation tanks in the fields, creating stop dams across the nullahs and by repairing the canal and diverting its water into farm land.
- Diesel pumps consume a portion of the agriculture income. Improvised "Low Lift Pumps" were distributed to the farmers to pump out water from the wells for irrigation purpose. These pumps are manually operated and can lift water from 20-25 ft depth. Since the water flow is considerably high the water can be channelised into the fields easily.
- The beneficiaries of the poultry and piggery programmes were provided necessary infrastructural support and birds/animals to start their business.

Conservation Significance

The above activities have positively impacted the cause of wildlife conservation. Some important indicators are discussed below:

- In the absence of improved and organized methods of farming the local community members were ill-equipped and this mostly resulted in poor crop yield. This directly resulted in the dependence of villagers on the surrounding corridor forests for collection of fuelwood and Non Timber Forest Produce (to supplement their food supply and income). To increase crop yield the villagers used to expand their agricultural fields into the adjoining forests. As a result of

Hand blower smokeless Chulha

improved farming techniques not a single case of encroachment has been noticed in the pilot villages in the last three years. However, project team has successfully removed an encroachment of an acre in one of the pilot villages in November 2006.

- Due to increased soil-moisture and availability of irrigation facilities more and more families of pilot villages have started growing winter crops in their fields. Increased agricultural activity keeps the farmers in the fields and away from forests; enhanced productivity also results in reduced needs to collect resources from the forest.
- The availability of water within the village has reduced the dependence of cattle on the surrounding forest waterholes. There is less competition with wild ungulates, and lesser chances of predator attacks on livestock.

Under income generating activities more and more beneficiaries are being covered. Support is being given on a returnable basis to make the beneficiaries responsible and self-reliant. Support to small scale entrepreneurships such as grocery, photo-framing, tailoring, etc. is also being provided in all the pilot villages to diversify income sources.

In addition to the existing 8 nurseries, five more have been newly developed in the pilot villages. Every nursery is being looked after by a group of 5-10 villagers. These nurseries mainly produce saplings required for the crop protection trenches, seasonal vegetables which can be sold in the local market and bamboo saplings for forestry operations. All of them have reported good progress in the last two years.

Harvested Honey Chambers

To reduce pressure of fuelwood demand on adjoining forests the project is strongly continuing the alternative techniques and bio-gas plants. As many as 50 percent of the families in all the pilot villages were provided "Hand Blower assisted Smokeless *Chullas* (stoves)" to reduce fuelwood consumption. Survey data has indicated that on an average a family of 5 members consumed about 20-25 kg of fuelwood in a day. A recent questionnaire survey, of project interventions in November- December, 2006, conducted by the team in the pilot villages indicated 40 % reduction in consumption of fuelwood brought from the forests.

Looking at the acceptance level of bio-gas plants among villagers, the project is trying to cover more families in the pilot villages. Between June 2005, June 2006 and 58 more families were covered in five pilot villages under this activity. The Government of Madhya Pradesh has now come forward to provide support of Rs. 3000/- per biogas plant for future installations.

Residents have generated operational funds to gradually become fully self-reliant. The concept of "Money Saved is Money Earned" has received good response from the local communities. Villagers in all the pilot villages are now regularly saving part of the money earned through different activities. A separate bank account has been opened either in the name of "Village Development Committee" or in their "Cluster name" and the savings are deposited in these accounts.The concept of "Labour Bank" has been floated to imbibe the culture of savings, whereby villagers contribute a days wage per week in "Labour Bank" so that they can use the same during the pinch period with a minor interest paid on the withdrawal. This initiative has picked up well in the Mawai Segment.

The practice of giving support to beneficiaries on a returnable basis has also received good response from the villagers. This has helped in generating a corpus in one village, which is being now used to fund other small scale beneficiaries. Support amounts being returned by the beneficiaries is constantly monitored to make sure that people are responsible towards the scheme, and that their funds remain sustainable in the long run.

The project team is also helping villagers to have meetings with the officials of different government departments for procuring other resources. Apart from the forest department, the revenue department and the District Council (Zilla Panchayat), have also been approached and are keen to collaborate and provide maximum support to the Pilot villages. Regular programmes are being conducted with the Directorate of Field Publicity, Government of India to create awareness about various government initiatives so that developmental works may be taken up by these line departments and the team can concentrate more on conservation based activities. This is also an initial step of the withdrawal strategy. To ensure that the awareness generation programmes get an impetus, a tie up has been made with the Nehru Yuva Kendras to accord widespread publicity to environmental concerns. Lately sports tournaments have been organized in pilot villages. These have become an important tool in creating awareness across the rural populace. School children are being trained and educated in environmental education and the best students are recommended to the forest department for being appointed as "Cub Wildlife Wardens".

Residents have secured access to market outlets. Most of the products, be it from a nursery, piggery, poultry, grocery or any other item, have found markets at the local level and therefore, regular income has been ensured. Right from the beginning the project has encouraged only those small scale entrepreneurships which have a market at the local level, since poor transportation facilities has been the biggest negative factor for the villagers residing in remote areas.

So far the project has received good support from all the pilot villages. The participatory nature of activities has been well received by the villagers. It is encouraging to see that the villagers are now ready to share a good part of the cost of all the proposed activities.

The entire SML team undertook an in-house skill upgradation training in forestry and allied issues in December 2006. This has enabled the team to take up greater challenges effectively and efficiently.

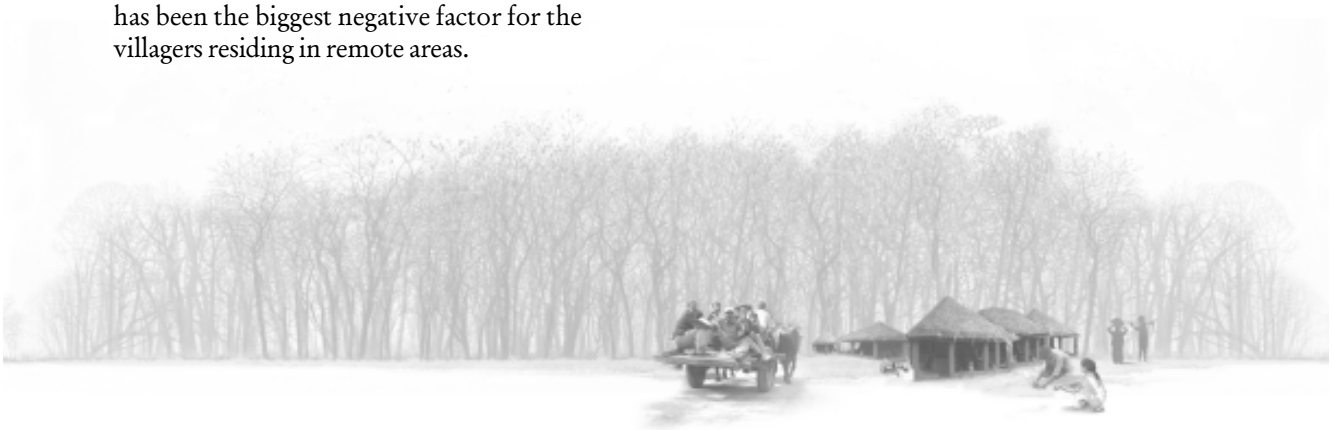
The project is also getting wider support from various Government Departments for its endeavours. Stronger partnerships are emerging. These partnerships are expected to help the project in three ways:

1. Self sustenance and furtherance of project interventions.

2. Building up a withdrawal strategy for the Pilot Villages of phase I.

3. Up-scaling of project activities in other parts of the landscape.

WWF-India won accolades from the State of Madhya Pradesh for putting up the best exhibit at the Manchleswar Fair in Hirdenagar, Mandla, Madhya Pradesh. The fair was held from 26 February to 2 March , 2007 and had attracted around 50,000 visitors from the villages and towns of Madhya Pradesh in Central India. Over 10,000 persons visited WWF-India's exhibit out of which 80% were from rural areas and about 20% from towns. This outreach initiative helped to spread awareness about issues related to tiger conservation. An award was also given to WWF-India for promoting bio-diesel and popularizing it at the local level.



Chapter 5

Sunderbans Landscape Project

The Sundersbans, which spreads across the Indo-Bangladesh border and harbors one of the biggest mangrove forests on Earth, is the last refuge of the largest number of Indian tigers

Canal in project area

(Panthera tigris tigris). This mangrove dominated deltaic lobe at the apex of Bay of Bengal provides a source of living, through agriculture and fishing activities, for the people who inhabit the area. Over the years, the expansion of human habitation leading to increased agriculture, depletion of prey species, poaching and fragmentation of the habitat have been the major cause for the sharp decline in the tiger population in the area. The rapid expansion of shrimp culture activities in mangrove mudflats has aggravated the situation. It is reported that in the Sundarbans mangrove forest, about 3 percent (about 5,000 ha) of the total loss is accounted for by shrimp farming (Silas, 1987 and Sinha, 1999 .This calls for increased cooperation to manage Sunderban's biological resources . This essentially requires a two-pronged approach. On the one hand it is imperative to bring all stakeholders to a common platform through regular workshops, meetings and sharing expertise and information on the issues related to the conservation in general and tiger conservation in particular. The other aspect is to work towards **bio resource conservation by ensuring people's security through diverse livelihood schemes like** tailoring, batik printing, pisciculture, animal husbandry, agriculture etc.

Using this two pronged approach, WWF-India launched the Sunderbans Landscape Project at Mollakhali Island,under Gosaba Development Block in 2003. The project focused on three hamlets - Gobindpur, Hentalbari and Kalidaspur, all located on the fringe of Jhila forest within the Buffer zone of Sunderban Tiger Reserve. Since there was high pressure on the adjacent forests due to illegal felling and

poaching, the Mollakhali island was chosen as the projects site after holding a stakeholders consultation. The components under the project included environment education and awareness programme, rain water harvesting by excavation of canals, plantation, vocational training, installation of solar lights, provision of power tillers and health camps. Gobindapur Pally Unnayan, Samiti, a local club in this case provided local support base. The project also initiated some R&D components like preparation of fish feed from botanical extract and preparation of pig feed from salt marsh grass. that were supported by Calcutta University. Some untapped marine resources like edible oyster found in plenty in Indian Sunderbans region were also brought under culture. It is expected that such alternative livelihood schemes may render it unnecessary for a sizeable local population from entering into the adjacent forests, and will ultimately lead to preservation and eco-restoration.

PROJECT OBJECTIVE

During Phase I of the project two islands, Bali and Mollakhali, were selected in the eastern sector adjoining the Tiger Reserve to carry out the activities of the project. Two more islands have been identified, one adjoining the Sundarban Tiger Reserve (Satjelia Island) and another adjoining the 24-Parganas South Forest Division (Kultali Island) for Phase II of the project.

Sunderbans Landscape Project has adopted a strategy to not only reduce the human-wildlife conflict but also to ensure security to the livelihoods of the local people so that their intrusion into the forest zone is contained. With this background, the objectives of the project activities have been to:

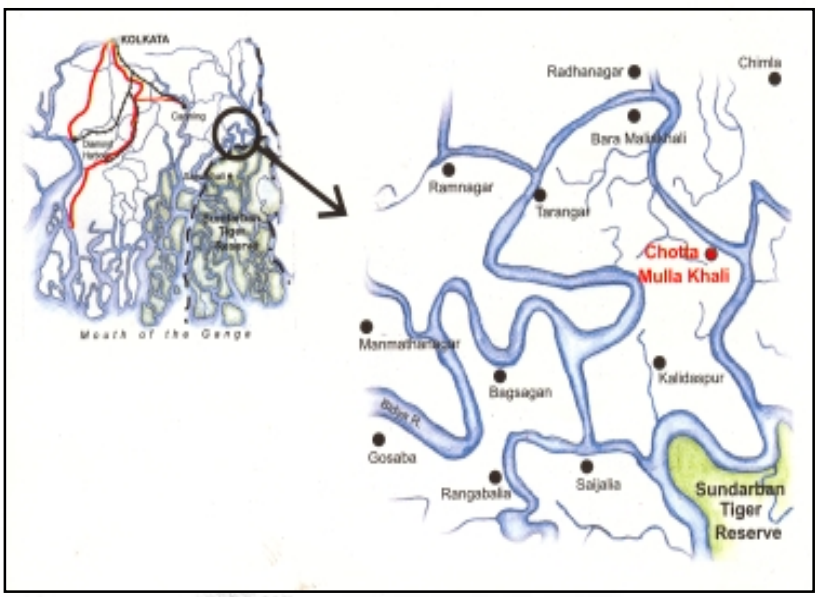
- Ensure protection of the tigers in the eco-region through people's participation in the existing institutional framework.
- Upgrade people's economy through improved method of pisciculture, agriculture and animal husbandry.
- Ensure people's security in terms of health by arranging medical camps on regular basis and use of indigenous medicinal plants.
- Provide better education system through regular awareness programmes, workshops and school building construction.

PROJECT ACTIVITIES AND RESULTS

· Agriculture and extension activity

The Indian Sunderbans is known to be one of the most agriculturally and socio-economically

A Workshop on coastal soil



backward regions of the country. Due to lack of proper drainage facility traditional low yielding rice varieties are followed in almost 96 percent of the cropping area during kharif season. Due to extreme scarcity of irrigation water and high salinity, the production of second crop in the area is meager. The IFAD funded freshwater canals excavated by Sundarban Development Board (SDB) in the 1980s have become derelict and water in rivers and creeks is highly saline in nature. The only alternative is to store rain water during monsoon months and give support through supply of agricultural implements.

Local fresh water prawn (Golda)

Fresh water prawn culture workshop

Keeping this in mind, WWF-India started the canal excavation along with donating agricultural implements to improve the agricultural system at the project site.

Prior to the initiation of the project, the area could produce only single crop but after launching the project, people of the island are able to produce multiple crops, (like chili, potatoes, brinjal, tomatoes, watermelon, cabbages, cauliflower, pulses). The participants of the vocational training scheme were trained with different methods of soil testing and saline and non–saline zones were demarcated. The soil quality was tested with respect to salinity, PH and organic carbon content and people were taught to carry on agricultural activity on the basis of the soil quality**.** The farmers were also taught to use bio-fertilizer from locally available flora (Dhanche) and cyano bacteria present in the mudflats. The local villagers after being trained initiated cultivation in saline soil through fresh water stocked in the adjacent canals. These canals of approximately 1 km were excavated by WWF-India at four different sites in Mollakhali in order to ensure the availability of fresh water during non-monsoon months. In addition, WWF-India has also supplied power tillers; pump sets and tractors, which has had a positive impact on the agriculture productivity of the area. This in turn has led to improvement in the economic conditions and less dependency of the people on the forest resources.

¨ Workshop & Studies

Familiarizing the local people with the natural resource base of their area is critical to garnering public support. To this end many workshops and studies have been conducted. In June 2005, a Workshop on Natural Resources of Indian Sunderbans was organized in which 40 participants, including students and local villagers were present. Local people were familiarized with the biodiversity of the zone and about biomedical and ecological values of selective mangrove flora, oyster and horseshoe crab. A book entitled “

Living Resources of the Sea: Focus Indian Sunderbans" was published in November, 2005 as an outcome of the Natural Resource workshop.

Two feasibility studies were conducted–one on oyster culture and other on medicinal properties of mangrove plants. These studies were done in and around Chotomollakhali island of Indian Sunderbans, in collaboration with Department of Marine Science. University of Calcutta,.The feasibility study on oyster culture revealed the area to be highly suitable for edible oyster culture and four sites were identified for culture of molluscan species. For oyster culture purpose cultch materials (brick pillar coated with lime) were placed in the selected sites for setting oyster spats.

It is expected that this non-conventional bio-resource based and sustainable livelihood would provide economic stability to locals and ultimately reduce dependency on the forests.

- **Direct Support for Cultivation**

Four power tillers and a tractor have been given at Mollakhali Island. Approximately 3000 local people are now able to till about 270 ha of land by paying hiring charges less then the market price. This resulted in increased cost of production. The use of tillers/tractors has boosted the economic returns of the beneficiaries. Furthermore, Rs.80,500.00 has been deposited in the bank for sustaining the process.

The fresh water canals, apart from directly impacting agriculture, have proved helpful to upgrade the local economy as these are also being used to culture fresh water prawn *Macrobrachium rosenbergi* (Golda), which has a ready market. This fresh water prawn species is disease resistant and has good growth rate (about 70 gm in 6 months). WWF has helped to introduce scientific method of fresh water prawn culture in these canals to involve more number of local people in this profitable and sustainable aqua venture.

Excavation of more fresh water canals is planned for the new sites as well. The difference this time is that landless members of the community are also included as the beneficiaries and the modalities are being worked out for them to access land for one crop of paddy during dry winter months when yields are higher.

- **Village Plantation (Checking soil erosion and meeting medicinal needs)**

Plantation is one of the important components of this project. In order to protect the islands from flood or natural calamities and to reduce the pressures on habitat for wild animals, plantations have been carried with the help of

Oyster: Getting ready for the market

Basic infrastructure: tube well

villagers, nature club members, students etc. at different sites – hospitals, schools, river banks and on mudflats. Canal plantation has been carried out in order to check erosion and prevent siltation of the canals. Mangrove plantation (approximately 3000 in numbers) has been carried out in the mudflats of Bali and Mollakhali islands which would help to control erosion and abrupt scouring of the landmasses by tidal surges and wave actions. Training on nursery development is being provided to unemployed youth for starting nurseries.

Working on fish feed

A medicinal plant garden has been established at Chotomollakhali, with the joint effort of WWF-India and ENDEV, a Calcutta based NGO. An agreement has been signed between WWF-India and ENDEV to promote the activity of propogating medicinal plants by the local people. Traditional knowledge of the local people is very sound in this context and plant extracts are used to treat diarrhea, blood dysentery, skin diseases, cough and cold. This activity has opened up new horizons for Ayurvedic mode of treatment which is a boon as there is dearth of allopathic doctors in Sunderbans. About 75 people take the advantage of this garden each month. Seedlings are being sold at the rate of Rs. 1 to 5 per seedling depending on the species. The profit is used for maintenance of the medicinal garden. The garden is managed by w women self help group.


Fully mature fresh water prawn

¨ Solar lights for better quality of life and to reduce human-wildlife conflicts

Most of the Indian Sunderbans has no facility of electricity. Generators are operated for a limited period at the markets and in hospitals during evening. WWF-India has taken the initiative of distributing solar lights in jetty ghats, hospitals, educational Centres and areas inhabited by backward class/communities in two islands, Bali and Mollakhali. These solar lights have not only improved the facilities of communication, but have also helped the students of the area. Apart from children, adults are also regularly meeting under the solar lights after the day's work. Moreover, it has lit up river bank sides adjacent to the forest which helps to ward off tiger and other wild animals.

In the past two years, some 25 solar lights have been provided to Chotomollakhali and one solar light of 75 W has been installed at Satjelia Hatkola jetty. The battery and panel have been placed under the safe custody of persons staying close to the installation site. The beneficiaries pay a nominal fee towards maintenance of these lights.

¨ Vocational Training

The local people of Sunderbans have traditionally depended on natural resources from adjacent water bodies and forests for their livelihood. Extreme poverty has forced them to explore the deep forest for honey, wax, timber, fish, molluscan cell, Horse shoe crab, etc. Many villagers

Training	No. of beneficiaries involved
Tailoring	30 Women
Brakish water Pisciculture	8
Oyster culture	19
Piggery	7
Campbell duckery	52
Kroiler	300
Fresh Water Prawn (Golda) culture	15

also screen the estuarine water for tiger shrimp seed due to which several ecological hazards like finfish juvenile loss, coastal erosion and uprooting of newly planted mangrove seedlings take place. In an attempt to give them sustainable alternatives livelihoods, several vocational training schemes have been imparted. Some of these are described below.

Batik training was given to the women folk involved in shrimp seed collection in 2003-04 and they were able to bring out finished products. But since there is no market, attempts are being made for value addition to the present product so as to capture the market and thereby generate more income for the women. Training has been imparted for making beautiful handicrafts from *shoal* (a plant) which is in great demand on festive occasions and during marriage ceremonies.

Animal husbandry activities have been introduced with the aim of diverting people from intruding inside the reserve forest. In this sector, 1500 kroiler chicks, 300 duck and 20 piglets have been distributed both in Bali and Mollakhali. Kroiler and ducklings have been given to the women folk involved in shrimp seed collection and the piggery sector is being maintained by a group of beneficiaries who earlier used to enter the adjacent forests for procuring timber and honey. A significant aspect of this project is the nutrition of pigs through specially formulated feed manufactured by Bullian Logic Private Limited - Indian counterpart of Norfeed Denmark.

In Phase II, emphasis of vocational training will be provided based on the lessons learnt in past. Institutional arrangements are being worked out for sustaining the enterprise with the involvement of community based organizations and local self-government.

¨ Health care : hoping for a better future

Health camps are being organized almost every alternate month when treatment of the patients is offered under allopathic, homoeopathic and ayurvedic systems of medicine. The first health camp was organized in association with Project Lifeline of Institute of Climbers and Nature Lovers on March 16-17th 2003. The team

Porteracia

consisted of a general medicine doctor and para medics. Doctors of Calcutta Medical College and Gossaba Medical Hospital were involved in organizing the camps. Between 2003-2005, some 20 health camps were organized. More than 300 patients visited each camp. After the success of the first medical camp at Gobindapur, a series of camps were organized at other places with the cooperation of the local clubs. Medicines were given at nominal price and some were distributed free of cost. Three young men from Gobindapur, Hentalbari and Kalidaspur, FPCs have been provided with stipend for a course in Community Medical Service organized by Indian Rural Medical Association.

Till end 2005 23 nature clubs in Bali Island, 17 in Mollakhali and Satjelia islands, 7 at Shamsher Nagar and 4 in Kultali Development Block have been established with the help of WWF-India West Bengal State Office. The total membership, Primary and Secondary, in these clubs is about 5000. Several campaigns on noise pollution, banning plastic use and workshops on use of medicinal plants. have been organized to increase awareness of people on the importance of conserving nature.

The project activities have brought in gradual change in the lives and thinking of the local people in the project area. There is better understanding of the symbiotic relationship that humans have with other species even though they use the same resources. Feedback received from the project participants amply testify that alternative livelihoods ensure conservation through reducing pressures on limited natural resources.

Chapter 6

The North Bank Landscape: Conservation of Elephants in North East India

The North Bank Landscape is the area between the northern bank of the river Brahmaputra (south), the foothills of the eastern Himalayas (north), Sonkosh River (west) and the Dibang River (east). It is ca. 750 km long with largely continuous forests along the foothills of the Himalayan mountains, in the states of Assam and Arunachal Pradesh. The total size of the landscape is ~40,000 km^2 of which about 16,000 km^2 is believed to be used by elephants effectively.

A high species diversity has been noted in the landscape (WWF-AREAS, 2003). The table below presents a summary of the number of faunal species per threat status. A floral study revealed that the forests of the North Bank Landscape are amongst the world's richest (See box on p.43).

The North Bank Landscape has an estimated population of 1,800 elephants (2002/03) and ~150 tigers (2002). A nucleus population of about 40 Indian rhinos are present in Orang NP. Translocation of at least 20 Indian rhinos into Manas NP is scheduled to take place in 2008. These large mammals are wide-ranging and their well being is probably an expression of the well being of the wider ecosystem. Biodiversity in the area is very high. This biological richness has been recognised by WWF which gave the area a priority status as being one of the Global 200 ecoregions of importance. Also Conservation International regards the area's richness highly and recognises the wider Eastern Himalayans as one of the 18 global biodiversity Hot Spots. The area lies on the interaction zone of the Indo-Malayan and Palearctic biogeographical realms and species typical of both zones can be found in the area. The steep topographical variation in the terrain also contributes to species-richness as different organisms specialise to survive at different altitudes. A distinct dry season (November – April)

Table 1: Number of globally threatened mammal, bird, reptile, amphibian and invertebrate species in the North Bank Landscape (possibly present)

Taxa	Global Threat Category according to the 2002 IUCN Red List		
	Critically Endangered	Endangered	Vulnerable
Mammals	1	11	17
Birds	2	3	24
Reptiles	0	2 (1)	3 (3)
Amphibians	1 (1)	0 (2)	0 (2)
Invertebrates	1	0	0
Total	4 (1)	16 (3)	44 (5)

Source: modified after CEPF 2005

probably suppresses species richness somewhat.

About a quarter of the Landscape (~10,719 km^2 out of ~40,000 km^2) bears the status of Elephant Reserve (3) or Tiger Reserve (3). Parts of these reserves consist of protected areas (National Parks (NP) and Wildlife Sanctuaries (WS)) and unprotected reserved forests. By far the largest acreage of the reserves is under nominal protection of notified Reserved Forests. Elephant and Tiger Reserves overlap in most cases.

The fertile alluvial plains along the Brahmaputra are cultivated ever since humans settled here centuries ago. Assamese are the dominant ethnicity and live mainly in the alluvial plains. A diverse mix of ethic and linguistic groups can be found throughout the region, especially in the hills: Bodo, Bengali, Hindi, Nepali, Mishing, Rabha, Karbi and many so called tea-tribes , who arrived from different parts of the country when the estates were formed, some 150 years ago.

In recent history, almost all land in the alluvial plains has been occupied by agricultural fields, supporting a population of about eight million people. In the Assam part of the landscape, 7,878,058 people reside (383 / km^2); in the Arunachal Pradesh State part of the Landscape, 722,418 reside (11 / km^2) (2001 census data). Presently the annual population growth rate in Assam is 1.8% (Government of Assam, 2003). The main crop is rice (one harvest/year).

Photo: A.C. Williams/WWF

Currently, elephants and tigers are found in the northern sections of the landscape, along and in the foothills of the Himalayas.Over time, historical elephant routes accessing the Brahamaputra River have been converted for human use and access to the river through natural vegetation is now an impossibility for elephants. But elephants leave the forest and come onto the alluvial plains in search of food during the wet season. At the far eastern side of the landscape, north-south movement of elephants across the river into the Myanmar area is still possible. The northern half of the landscape consists of the foothills (up to an altitude of 3,000 m) of the Himalayan mountain range, which abruptly spring out of the alluvial plane. This area with steep topography is largely covered by forest. It is mainly in these forests where tigers are found. Situated along the foothills are the teagardens set-up during colonial times.

In the past 10 – 15 years, agriculture has expanded in the landscape at the expense of waste lands and in a lesser extent, forests. Within the elephant range, forest loss is a relatively more important factor than elsewhere. Especially the lowland forests in Assam have been converted (65% loss between 1972 and 2001), and at the moment, very little lowland forest is left. It is the lowland forests however, on which elephants depend for their shelter and food supply; elephants hardly use forests on steep terrain. A. C. Williams/wwf

Towards the eastern part of the landscape, several large infrastructural works are in execution and planning stages. A large hydroelectric dam project is underway in the Subansiri area which is a critical corridor for east-west movement of elephant and tigers.

Focus of the Programme is achieved by concentrating on the elephant range alone (~16,000 km^2).

Within this area, two priority areas for field implementation of activities have been selected (~11,500 km²). These are areas where pressures are most severe (detailed analysis in AREAS-NBLP, 2003) are where WWF's interventions within this enormous landscape will most likely provide the maximum conservation benefit possible. The two priority areas (Map 2) are:

· Kameng - Sonitpur Conservation Complex (~8,400 km²)which includes the Kameng and Sonitpur Elephant Reserves and the Pakke and Nameri Tiger Reserves and which encompass Eagle Nest Wildlife Sanctuary, Pakke Wildlife Sanctuary, Nameri National Park, and Itanagar Wildlife Sanctuary.

· Manas Conservation Complex (~3,100 km²) which includes the Manas Tiger Reserve and the Chirang - Ripu Elephant Reserve and which encompass Manas National Park and Bornadi Wildlife Sanctuary.

After having executed Landscape wide field investigations, the programme has so far concentrated its interventions in the Kameng and

Sonitpur Elephant Reserves, with a base at Tezpur where the main programme office has been located. The Programme has also started to expand and has become more active in the Manas Tiger Reserve and Bornadi-Khalingduar areas. This limitation of expanding slowly was needed because of the limited resources available when compared with the enormity of the area,

Map 1: North Bank and Kaziranga Karbi Anglong Landscapes in North East India

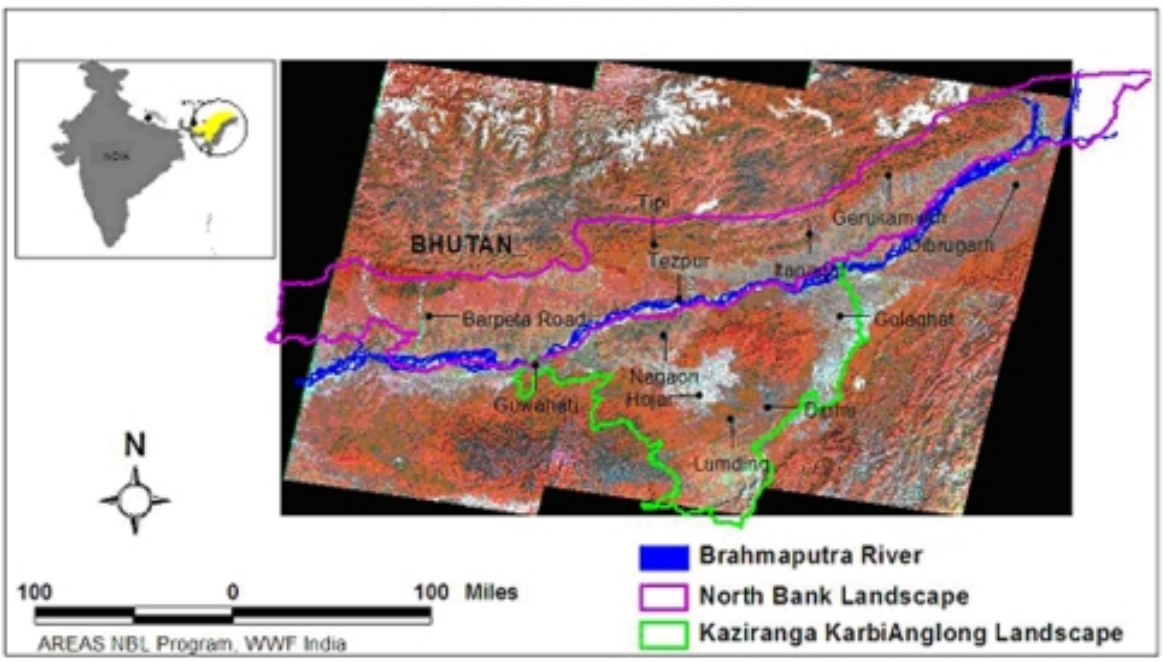


Table 2: Land Use Changes in North Bank Landscape (1991 – 2001)

Land Use Class	1991 (km^2)	2001 (km^2)	Change in Landscape (%)	Change in Elephant range only (%)
Forest	n.a.	n.a.	-2.38	-5.31
Degraded Forest	n.a.	n.a.	1.56	3.19
Agriculture	n.a.	n.a.	8.58	3.20
Tea Garden	n.a.	n.a.	0.35	0.08
Waste & Fallow Land	n.a.	n.a.	-6.66	-0.65
Water Bodies	n.a.	n.a.	-1.70	-0.94
Settlements	n.a.	n.a.	0.08	0.06
Snow & Cloud cover	n.a.	n.a.	0.16	0.37

Source: AREAS North Bank Landscape Programme, 2006 (derived from LANDSAT satellite imagery data)

the long (750 km) extended shape of the Landscape and the enormity of the conservation issues at play in the Landscape.

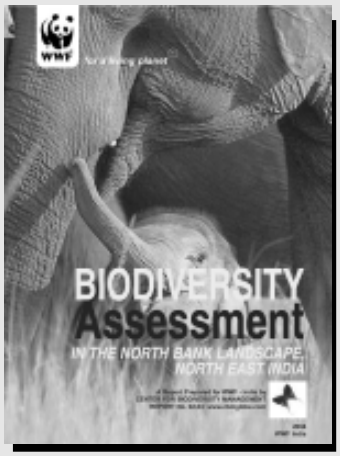
Because conflicts with wildlife, especially elephants, directly impact on people's livelihoods, mitigation of these conflicts is of crucial importance to reduce casualties and damage and thereby prevent public opinion from becoming permanently negative towards elephants and wildlife in general. The Programme has had a three year experience in mitigating conflicts quite successfully and will build on this experience in the years to come. In this period, steps will be put in place to ensure that human-elephant conflict mitigation can be successfully undertaken by local communities with the assistance of the responsible authorities viz. Forest Department and the district administration without further involvement of the WWF Programme.

Kunki Elephants getting ready for drive

Safeguarding corridors and reclaiming encroached land will provide more long-term solutions for easing the elephant's migration and feeding situation and will thus provide a more permanent solution to the situation of conflict. If corridors are permanently broken, the elephant population will become fragmented into genetically isolated pockets, prone to genetic deterioration. Recognising the on-going encroachment onto the landscape's forests, the programme lobbies to raise support and assistance for existing protected areas.

People presently utilising corridors will be targeted for awareness raising activities and in coordination with responsible authorities, permanent solutions for safeguarding the corridors sought together with the people involved.

North Bank Landscape : A jewel in the crown of Indian Forests



A WWF report *Biodiversity Assessment in the North Bank Landscape (NBL)* has established that Forests of Assam and Arunachal are among the richest in biodiversity in the world. In a 200 sq meter plot WWF survey team recorded 107 plant species. This is second only to forest in Sumatra, Indonesia,

The report states: "The NBL covers approximately 14,000 sq km of the Himalayan foothill region north of the Brahmaputra river, which include parts of Assam, Arunachal Pradesh, North Bengal, and Bhutan. It may be mentioned that the area comprises a major part of the Indo-Burma global biodiversity hotspot."

The report prepared by the World Wildlife Fund (WWF) is based on a survey done in technical collaboration with the Centre for Biodiversity Management (CBM), Australia, with support from the Macarthur Foundation and Smithsonian's Centre for Research and Conservation. Two teams from WWF, the Forest Departments of Assam and Arunachal Pradesh, Wildlife Institute of India, and Botanical Survey of India, carried out the appraisal of vegetation and large mammal habitats. As part of the study, fourteen sample locations were studied.

Along with the diverse range of plant species, the survey identified the NBL as a prime habitat for several endangered species including the Asian elephant, tigers, leopards, among others. Wildlife expert Andrew Gillison, who authored the report, described the NBL as "extraordinary...and a jewel in the crown of Indian Forests." Surprisingly, it was only after the preliminary findings coalesced into one whole, that the researchers could comprehend the true importance of the NBL as a concentration of flora and fauna. The NBL has been described as a "strategic conservation zone", and is part of a proposed wider conservation initiative of WWF in the Eastern Himalayas.

This work will concentrate foremost on the protected areas in the Manas Tiger Reserve (including Manas NP, Bornadi WS and overlapping Chirang Ripu ER). This area has probably the best lowland forest cover left in Assam. It has been largely inaccessible due to political unrest. In this period, all Indian rhinos have been poached out of Manas NP. But with the recent establishment of the Bodo Territorial Council is in charge, the area has recently entered a period of rest. This has prompted authorities to step-up law enforcement in Manas TR and Manas NP will be receiving Indian Rhinos within the near future under the Indian rhino Vision 2020 programme. The work proposed in this document for Manas TR feeds directly into these initiatives. Apart from providing equipment to the Forest Department, the Programme will also work with local people living in the vicinity of the protected areas in order to create a better awareness of the conservation situation in their area and to trail alternative livelihood sources which ought to decrease dependency on natural resources. For instance, Bodo youth are actively trying to promote eco-tourism in the area; these are initiatives the Programme would like to support. Also, working closely with the Bodo Territorial Council provides an unique opportunity to ensure political commitment towards conservation.

Other protected areas in the landscape will be assisted first of all by executing analyses of gaps in equipment, infrastructure and training needs. It is not foreseen that the programme will be able to assist all protected areas with filling

NBL staff share information on government provisions

these gaps. But at a minimum, the programme will endeavour to assist the protected areas, in collaboration with the Assam Wildlife Areas and Welfare Trust (NGO), in preparing proposals for funding towards external donors.

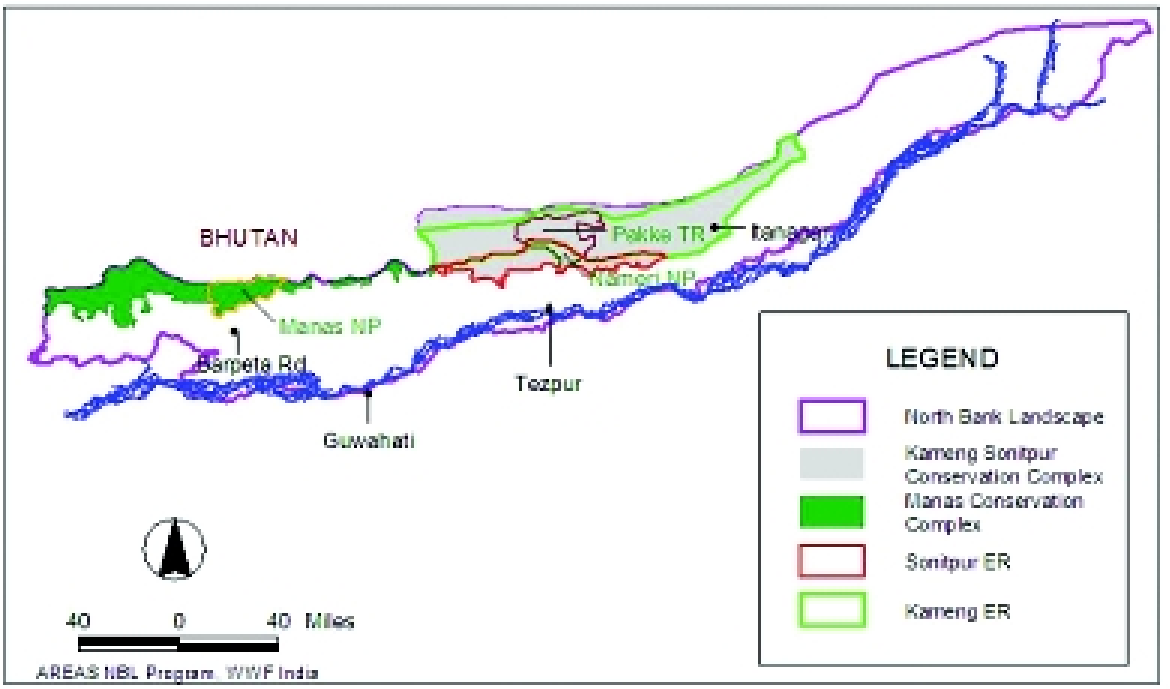
In order to achieve permanent solutions on the corridor rehabilitation and securing protected areas fronts, solid administrative and political support is needed. Therefore, the programme has initiated dialogue with respective State Government agencies. A Conservation Action Plan has been drawn up for Tipi in Arunachal Pradesh and submitted. The matter is under consideration.

In addressing the human pressures on elephants and tigers in the manner outlined above, the Programme works through a set of modules:

- Human – Elephant Conflict Mitigation
- Corridor and Habitat Rehabilitation
- Supporting Protected Areas
- Policy Formulation
- Research
- Awareness Raising
- Programme Coordination and Support

The different modules depend on each other but can be supported separately by different donors if financial resources available are inadequate to support the Programme as whole. The policy and awareness raising modules cut across the

MAP 2: Priority Areas in the North Bank Landscape



other modules and this support human-elephant mitigation work etc. In this way, policy and awareness raising activities are focussed towards achieving the wider programme's objectives. The Wildlife Trade module will be handled by Traffic from the WWF headquarters in Delhi.

In some fields, the North Bank Landscape Programme will be of assistance and benefit to other interventions in the North–East Himalayas ecoregion. Planned human–elephant conflict mitigation work in the Kaziranga Karbi Anglong Landscape, for instance, will use the strategies and set-up of the HEC mitigation model of the North Bank Landscape Programme as a starting point. The work undertaken to secure Manas National Park better, will benefit and is strongly linked to, the Indian Rhino Vision 2020 under which Indian rhinos will be translocated into Manas NP starting from 2007.

Community Institution Building – The NBL Experience

Community institution building (CIB) in NBL was integrated with the NBL elephant conservation strategy in the year 2005 for enhancing community participation in conservation efforts.

In the process of trying out various models of CIB, the NBL programme designed a module on community empowerment and mobilization and organized a couple of workshops on training of trainers (ToT) for the ADS members. The module was designed in consultation with North East Social Trust (NEST), an organization working on grass-root empower-ment in Assam. The module consisted of sessions on social and political citizenship, Panchayati Raj Institutions (PRI), Right to Information (RTI), various government schemes and programmes like PDS, IAY, NREGS.

Unlike other community training programmes, it evoked considerable interest among some of the communities on the issues discussed in the trainings. A steady flow of visitors with enquiries and requests related to the trainings was noticed even when the HEC season was over. The Panchayati Raj institution is very important given its constitutional position and authority. With the understanding that loss of forest cover is also related to unemployment and gainful engagement of the people, Panchayats under ideal conditions, are seen as a way of addressing some of the livelihood issues.

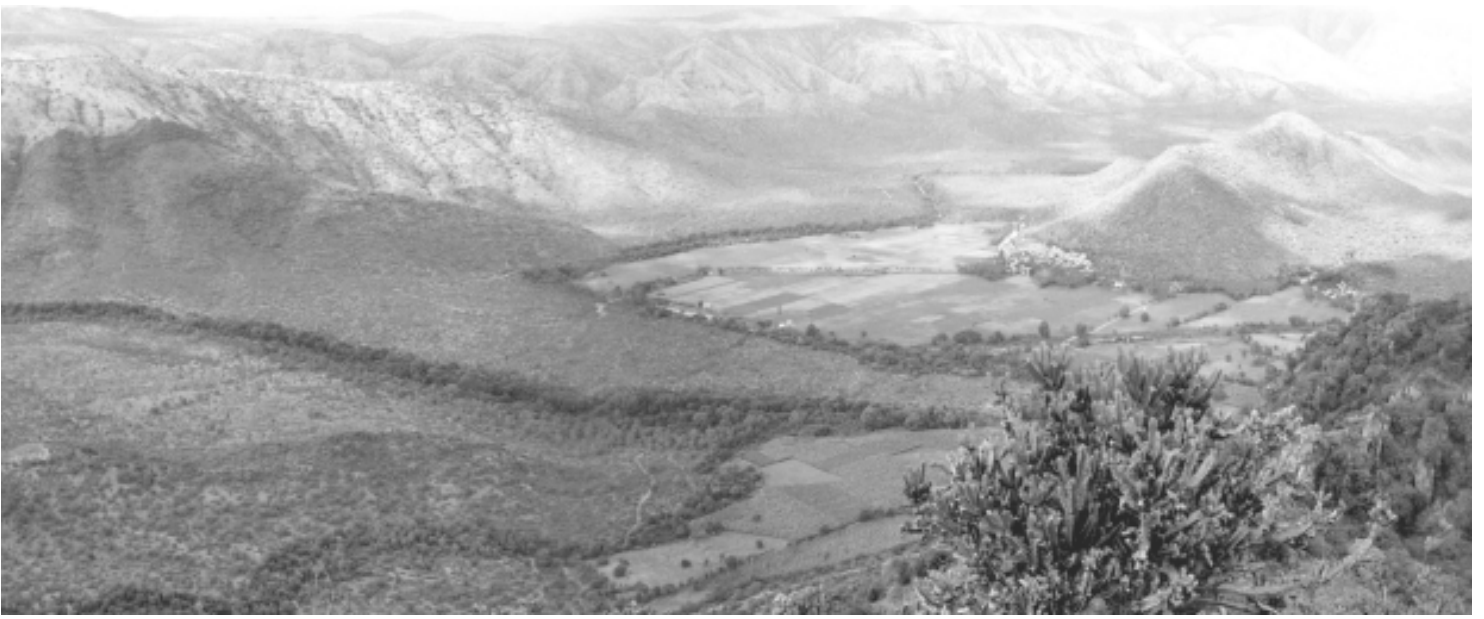
In the mean time District Community Development Programme (DCDP), one of WWF partners and a community based organization in Behali area of Sonitpur came forward to cooperate with WWF-India in this venture while The Hunger Project sanctioned an amount of Rs. 5,34,570 for implementation of the proposed activity to DCDP. This financial assistance was for four months only, starting from September to December. The activities are now underway in 48 villages under six Panchayats in Sonitpur which mostly include village level meetings, street plays, media workshops etc.

A series of activities are also planned for the newly elected members of the Panchayats in the coming year where a stronger component of conservation and sustainable management of resources would be provided to influence the grassroots level of governance.

Chapter 7

Nilgiris Eastern ghats Landscape

There are three major thrust areas in NEG landscape project. The activities addressed there in include: (1) reducing human-elephant conflict, (2) reducing biotic pressure, and (3) awareness building. The field office for this project was established in the year 2003. During the last three years, numerous project activities have addressed mainly the above mentioned three issues which have emerged as the most vital factors that need attention to secure the landscape for the benefit of the elephant and other wildlife that share the same habitat. Let us first look at what has been the overall gain since the landscape approach was adopted in 2001.



Some highlights :

- About 1250 local residents, belonging to 312 families from nine forest and revenue settlements benefited through livelihood programme and erection of solar power fence (as part of controlling human-elephant conflict) in the NEG landscape between 2001 and 2005 and thus, reduced the dependency of these villagers on the forested areas.
- Around 215 acres of agriculture lands were protected from crop depredation by wild animals, especially elephants through community based mitigating measures, i.e

solar power fence in five forest settlements between 2001 and 2005.

- A large number of unproductive cattle were removed from eight forest settlements in the NEG landscape, through WWF India-AREAS and U.S. Fish and Wildlife Service funded projects. Traditional graziers and non-timber forest produce collectors were encouraged to involve themselves in the participatory approach for eliminating cattle between 2001 and 2005. With the reduction of cattle from the NEG, the forest department minimized the issuing of grazing permit and total ban on the collection of non-timber forest produce collection in selected areas.
- Thirty-two males elephants were sighted between 2001 and 2005, indicating the healthy trend of the population. More sightings of males in the Greater Moyar Valley Corridor (GMVC), perhaps related to the establishment of anti poaching camps in several vulnerable locations of the landscape.
- A number of agencies have been brought on board in the effort to create an awareness programme on the management of elephants in the NEG landscape.
- Twenty-two workshops were conducted for the local communities (graziers and non timber forest produce collectors), represented by 562 individuals between 2004 - 2005 to bring them under active decision making role in the community participatory approach. The workshops focused on the issues related to (i) merits and demerits of the participatory project, (ii) necessity for weaning away the cattle and NTFP collection (iii) the significance of the Moyar Valley (iv) conservation and management programme (v) usage of corridors by elephants (vi) establishment of alternate livelihood for various stakeholders to reduce biotic pressure and (vii) co-ordination of various institutions and involvement of policy makers in the corridor management.
- Success in creating an integrated approach to bring various government and non-government agencies under one umbrella for achieving the conservation goals of elephant habitats in a large landscape like NEG.

A study finding clearly shows that the tiger population is being re-established in the GMVC. The incidence of tigers getting back into its original home could be a sign of improvement of prey base along with a good rate of vegetation recovery.

We discuss below some of the main activities and the philosophy behind them which helped to produce the results enumerated above.

Monitoring anti-Poaching camps in sector one of the GMVC

Protection measures were taken up in 2004-05 with establishment of new anti-poaching camps and also renovating the existing camps in the NEG. Two camps (Mangalapatti and

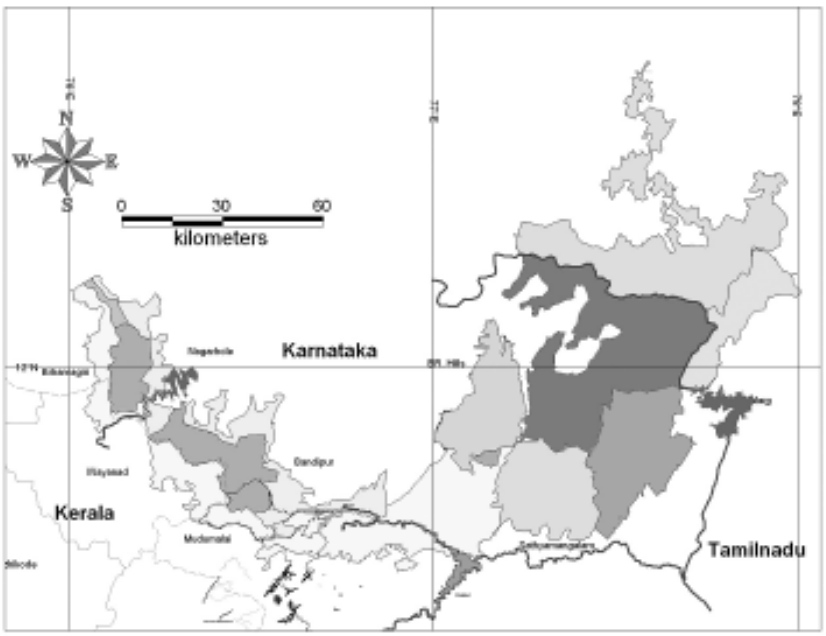


TABLE 1: ANTI-POACHING SUCCESSES

a) Number of poaching camps destroyed:	4
b) Encounter with poachers:	3
c) Number of accused brought under court:	4
d) Number of seizures:	4 (tusks 2; weapon 1; tiger skin 1; Giant Squirrel skin 1; tiger trap 1.)

Gulithuraipatti) were established and the results were apparently visible in the recent months in terms of encounters with the poaching gangs. Incidence of illegal activities prevented by the anti poaching field personnel after the establishment of camps are presented in table 1.

Other infrastructure facilities offered by the WWF India AREAS programme such as communication network (wireless sets, walkie-talkies), vehicle (diesel jeep) and two motor cycles have also helped the elephant reserve of the NEG.

Reducing Human-elephant conflict and biotic pressure in sector one of the GMVC.

An elephant herd caught in tranquillity

Several activities were undertaken

- Removal of scrub cattle by addressing livelihood concerns of the graziers families
- Removal of illegal wood gathering for commercial exploitation and collection of NTFP
- Erection of an elephant proof electric fence.

Stakeholders of the elephant reserve: Graziers

A study under the project had focused on the impact of scrub cattle and collection of non-timber forest produces on the Greater Moyar Valley Elephant reserve. The cattle number was monitored besides their grazing impact in different areas.

The impact of scrub cattle and its disturbance to the elephant corridor was studied to demonstrate significance of the community participatory programme for elephant conservation in the NEG. Forest settlements namely Boothikuppai, Doddakombai, Hallimoyar, Kallampalayam, Kembarai, Sujalkuttai, Thengumarahada and Uppupallam in the GMVC were taken up for eliminating the scrub cattle (unproductive scrub animals).

Number of scrub cattle population owned by each traditional grazier and cattle owner was collected based on questionnaire to assess the population from each focal village. The cattle population was 4,593 during the 2001 survey. After the implementation of the incentive schemes for the graziers, there was a decline in the overall cattle population in almost all the

villages. Between 2001 and 2005 (March), this number was almost halved in the focal study villages.

The overall reduction of cattle from eight focal villages within the elephant reserve of the Moyar Valley has significantly reduced the denudation and maintained the integrity of quality of elephant habitats. It has ensured greater availability and diversity of browse species to elephants, particularly regeneration and recruitment saplings of favoured food species.

Villagers received support under an incentive scheme belonging to six villages from June to March 2005. Funds from the WWF India AREAS programme were used for creating income generation activities for the graziers. A case report for each beneficiary (Incentive bond) was prepared based on bench mark survey. The incentive scheme fund was distributed to each member to create livelihood scheme identified by them. Through this scheme, all the graziers belonging to the six villages were proferred land based activities as an alternate livelihood to enable them to drop traditional activity of grazing of scrub cattle.

Indirect benefit

The prime goal of NEG landscape is to minimize the human induced disturbance levels to "zero" for the benefit of various species. Wildlife in GMVC between Mangalapatti and Bhavanisagar appears to have been badly affected for more than three decades because of the impact of grazing pressures from cattle pennings, a livelihood scheme for specific pastoral nomad communities who manage huge numbers of cattle inside the forests.

Cattle penning used to be common in this tract until 1986. The severe impact of cattle population in the elephant reserve directly influenced the density of herbivore assemblages into minimum level leaving them in a localized distribution. With the result of poor density of herbivore diversity coupled with the human induced threats, the tigers have practically disappeared from GMVC and forced to confine themselves in the less disturbed areas of the NEG landscape (protected areas of Mudumalai, Bandipur, Nagarhole and Wayanad). The AREAS programme has taken up various management oriented conservation measures and that could indirectly benefit the tigers.

One of the major activities of the AREAS programme in the NEG landscape is to monitor the density of herbivore assemblages (sambar, chital, blackbuck, Gaur) in the transect lines (9 transects of each 2 km) laid permanently in the GMVC. Forest roads (total length: 97 km of four road transects) were also covered systematically to record both direct and indirect signs (scats, kills) of tigers. The evidence of tigers from Bhavanisagar to Sigur-Anaikatti tract is being monitored to document the possibility of tiger population getting back into its earlier lost home in the GMVC.

Tigers were sighted by project field staff in three occasions on closer proximity to the forest settlement areas between Kallampalayam-Gulithuraipatti-Doddakombai from where cattle pennings were removed with the help of the forest department. The occurrence of tiger scats in various transect areas were systematically recorded using the GPS co-ordination. Thus, the evidences of tigers were seen in the vicinity of forest settlement areas where the disturbance levels were curtailed.

Stakeholders of the elephant reserve: NTFP collectors

The study on the community participatory programme for elephant conservation has enabled the forest managers to bring out the impacts of NTFP on the GMVC. The outcome of this study has helped to bring about changes in the management policy towards elephant conservation in the corridor site. The common NTFP species collected in this area are; Albizia amara, Azadirachta indica, Solanum tarvum, Sapindus emerginatus, Phyllanthus emblica and Ziziphus mauritiana. Some of the NTFP species

are eaten by elephants also. The over exploitation of selected species of NTFP and movement of villagers for collection confined and prevented the free movement of elephants in the corridor areas.

Forest settlements such as Kallampalayam, Gulithuraipatti, Hallimoyar and Ramaranai were selected to assess the impact of collection of NTFP by the villagers. The aim was to determine the extent of traditional villagers involved in the NTFP collection (Table 2).

Surveys were made in each target village to identify number of traditional NTFP collectors daily visiting the elephant corridor. The project staff accompanied the NTFP collectors during their visit to the corridor. On most occasions villagers have to travel extensively to gather their choice of NTFP in relation to seasons. Only traditional NTFP collectors visiting the corridor for collection were identified based on their total dependence so as to enable them to obtain incentive schemes.

The intensity of collection of NTFP by male and female was considerably varied in the study site during the dry season. Generally, women communities have been involved more themselves in the collection of NTFP than males. The villagers of Kallampalayam and Hallimoyar were mostly involved in the collection of NTFP. Among the tribal communities, the NTFP was mostly targeted by tribal of Kallampalayam forest settlements followed by Gulithuraipatti. The villagers from Ramaranai have also involved in the collection of NTFP.

NEG staff engaging with NTFP collectors

The study revealed that only a few species were common. Those were; *Prosopis juliflora*, *Albizia amara*, *Hardwickia binnata*, *Commiphora caudata*, and *Bauhinia racemosa, and* these species were important food trees to elephant population during the migrating season. This clearly showed that elephant corridor could also be subject to threat because of the collection of NTFP. The over exploitation of NTFP collection of a few species shared by elephants would reduce the availability of browse species to the pachyderm.

It was found that there were fourteen species of shrub species identified along the NTFP trails in the Greater Moyar Valley Corridor, which included six species used by elephants. Therefore, shrub varieties of NTFP are also important food species to elephants and their regeneration and revival might be affected by the impact of collection of NTFP by the villagers apart from the impact of grazing.

Threat reduction: NTFP

The villagers from Kallampalayam, Hallimoyar, Ramaranai and Gulithuraipatti have abandoned their visit to the forests for collection of NTFP. The forest department also banned the collection of elephant fruit tree species such as Tamarindus indica, Ziziphus mauritiana from the GMVC. The ban on NTFP collection from the crucial elephant corridor was an encouraging step by the forest department.

Monitoring vegetation

To assess the rate of vegetation recovery after the removal of unproductive cattle, six one-hectare plots were laid with different treatments around the vicinity of forest settlements.

TABLE 2: TRADITIONAL VILLAGERS INVOLVED IN THE COLLECTION OF NTFP FROM VARIOUS FOREST SETTLEMENTS (%).

S. No	Villages	Male		Female		Total members	
		(n) 71	(%)	(n) 133	(%)	(n)204	(%)
1	Kallampalayam	32	45.0	76	57.1	108	53.0
2	Gulithuraipatti	16	22.5	27	20.4	43	21.0
3	Hallimoyar	13	18.3	18	13.5	31	15.2
4	Ramaranai	10	14.1	12	9.0	22	10.8

The overall objective of the plant monitoring studies was to assess the rate of vegetation re-colonization, especially improvement of fodder species to elephants and to other herbivores with the reduction of scrub cattle. The following vegetation treatment areas were established for monitoring vegetation diversity and comparison among the plots.

a) Control plots using solar power fence: Two plots of one hectare in size

b) Open plots with access to cattle grazing, herbivores and elephants: Two plots of one hectare in size

c) Open plots with access to herbivores and elephants but without cattle: Two plots of one hectare in size in each treatment plot.

Variation in the plant diversity was noticed among all the control plots. The data from the control plot (fenced areas) could not be compared with the other two treatment areas because it was not totally accessible to grazing.

A notable increase in the occurrence of tree species was observed in the vegetation plot without cattle grazing. There was a marginal increase in the availability of food species and fruit tree species to elephants in the same treatment plots also. Shrub and grass cover in terms of species richness was more in the treatment areas of without cattle grazing than other open site (Table).

The treatment plot of without cattle grazing has more proportion of grass and shrub cover than other plots. Herbaceous cover and weed plants were more in the plots where grazing by cattle was common.

With the impact of cattle grazing, the area had more barren surface without any plant cover. The herb cover re-colonized in a rapid manner in the fenced plot and that had its negative influence over the growth of grass cover and other shrub layer. This needs further monitoring and time scale to substantiate this finding. Low occurrence of plant weed in the fenced area could be related to the total absence of grazing pressure by domestic and wild herbivores over a period of one year.

Sharing information with the public

TABLE 3: STATUS OF GROUND COVER IN VARIOUS TREATMENT AREAS AFTER THE ELIMINATION OF SCRUB CATTLE IN THE NEG.

S.No	Ground cover variables	Fenced Control plot (%)	Open plot Without Cattle %)	Open plot With Cattle(%)
1	Grass	29.05	59.00	36.40
2	Herb	33.28	13.65	23.81
3	Shrub	8.69	8.95	6.15
4	Weed	10.60	12.35	16.13
5	Barren ground	18.38	5.15	17.37

Human-elephant conflict

One of the major issues addressed by the project between 2001 and 2004 in the NEG site was to develop various mitigating measures towards human-elephant conflict in the selected forest settlements. The Greater Moyar Valley Corridor was chosen on a priority basis towards conflict mitigating measures. This issue was taken up by involving local communities in mitigating measures of conflict in order to improve the status of the villagers and ensuring economic sustainability.

The efforts are being continued as apart of monitoring exercise to assess the overall success of the human-elephant conflict containment. New forest settlements are being taken up for addressing human-elephant conflict measures in the extension phase of the project funded by the NEG AREAS programme.

Community based solar power fence was done for the forest settlements of Hallimoyar, Pudukadu, and Ramaranai in the NEG as part of human-elephant mitigating measures. Some 215 acres of agricultural lands were protected from the crop depredation by elephants; 235 families belonging to three villages were directly benefited through this management approach in collaboration with the Tamil Nadu Forest Department. Thus, the impact on the elephant reserve was dramatically reduced with the development of community solar power fences for the sensitive crop damaging areas.

There was a dramatic variation in the visits by elephants to the crop sites before and after the erection of solar power fence among the focal forest settlement villages. Family herds were more responsible for damaging the fence lines than solitaries in all the fences irrespective of villages. After the fences, incidences of damages to crops fields were absent for all the villages, except Hallimoyar. Poor maintenance could be the reason for elephants' attacking the Hallimoyar fence.

Nevertheless, the damage to the crop fields by elephant in the focal four tribal settlements was reduced to a great extent. The economic benefits to the villagers through the community solar power fences have generated a desire among the local communities towards conservation of elephant and their habitats. This could solve the problems of crop damage by elephants in the long run and that would indirectly minimize the overall trend of man-elephant conflict issue.

The success of the mitigation measures to contain man-elephant conflict was evaluated based on the information furnished by the local communities before and after the erection of community solar power fence for the two forest settlement villages. On the whole, it is shown clearly that the economic development of the local communities has notably improved with the fences.

The greater success of mitigating measures for

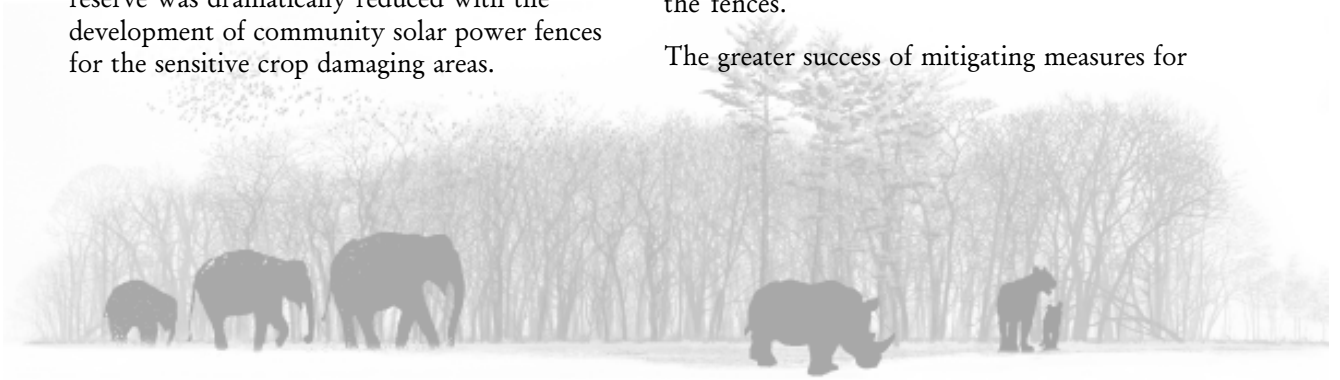


TABLE 4: EXTENT OF CROP DEPRADATION

BEFORE ERECTING THE FENCE				
Name of Villages	Total Visits by elephants	Total damage Incidences occurred	Demography	
			Family herds	Male
Hallimoyar	1,049	618	34	12
Pudukadu	130	87	7	0
Gulithuraipatti	297	234	16	0
Ramaranai	132	111	18	7
Total	**1,608**	**1,050**	**75**	**19**

AFTER ERECTING THE FENCE				
Name of Villages	Total Visits by elephants	Total damage Incidences occurred	Demography	
			Family herds	Male
Hallimoyar	126	97	11	2
Pudukadu	0	0	0	0
Gulithuraipatti	0	0	0	0
Ramaranai	0	0	0	0
Total	**126**	**97**	**11**	**2**

reducing the crop damage by elephants through involving the local communities have attracted many other forest tribal settlements in the NEG Landscape to avail similar programme benefits. This mechanism would help the forest department to protect the elephant reserve in close harmony with the local villagers in the long-run. This could be an achievement in terms of reducing the human-elephant conflict in forest settlements and thereby shift the villagers' dependence on the forest resources to land based agriculture activities.

Water augmentation for Elephant Reserve in NEG

To ensure water sources during the dry season for migrating elephants in the GMVC, work was done on ponds (creating new water holes and de-silting the old ones). The work was executed by the NGO (The Nilgiri Wildlife and Environmental Association, Nilgiris). Water augmentation programme valued at $ 6500 was executed between 2002 and 2004 for the benefit of migrating elephants in the GMVC. The provision of water sources for migrating elephants in the GMVC during the dry season is part of future vision. The internal funding agencies from the Government of India and State Government will be approached for such an exercise.

Conservation and Awareness programme: Workshops

Organizations involved in the workshops for local schools, village councils, and government

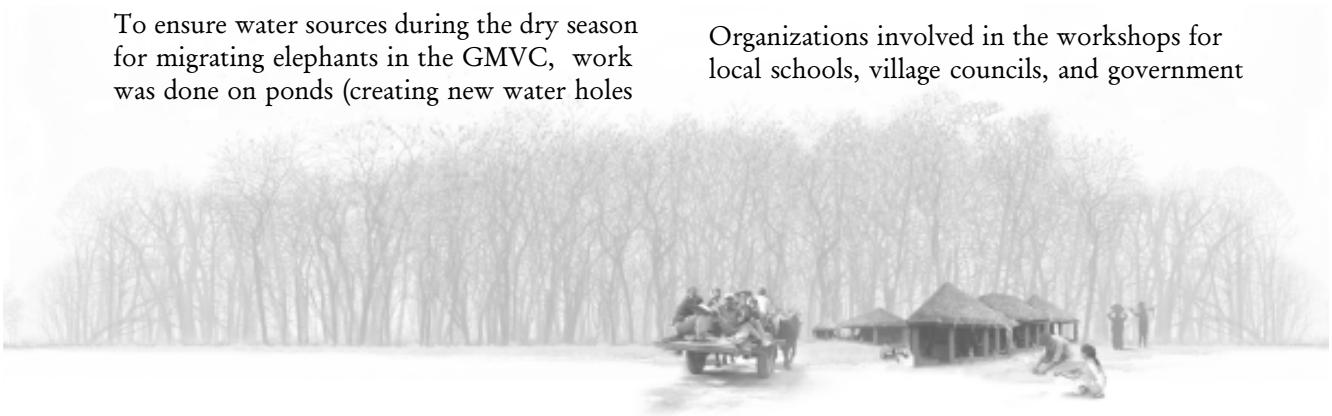


TABLE 5: THE WORKSHOP PROFILE (JUNE 2004 - JANUARY 2005)

Name of the villages	Number of Workshops conducted	Number of people attended	Number of organizations
a) Hallimoyar	2	55	2
b) Kallampalayam	4	165	3
c) Thengumarahada	8	120	2
d) Ramaranai	8	163	3
Total	**22**	**503**	

functionaries included - Tamil Nadu Forest Department, Village Forest Council members, District Sericulture Department, Animal Husbandry Department, District Health Department, District Education Board.

The following themes were discussed in the workshop:

- Role of elephants in the forest eco-system
- Migration of elephants
- Impact of development activities on elephant reserve
- Involvement of local communities in managing elephant reserve
- Necessity for weaning away the scrub cattle
- Co-ordination of various institutions and involvement of policy makers in the corridor management.

Buffer Zone Activity

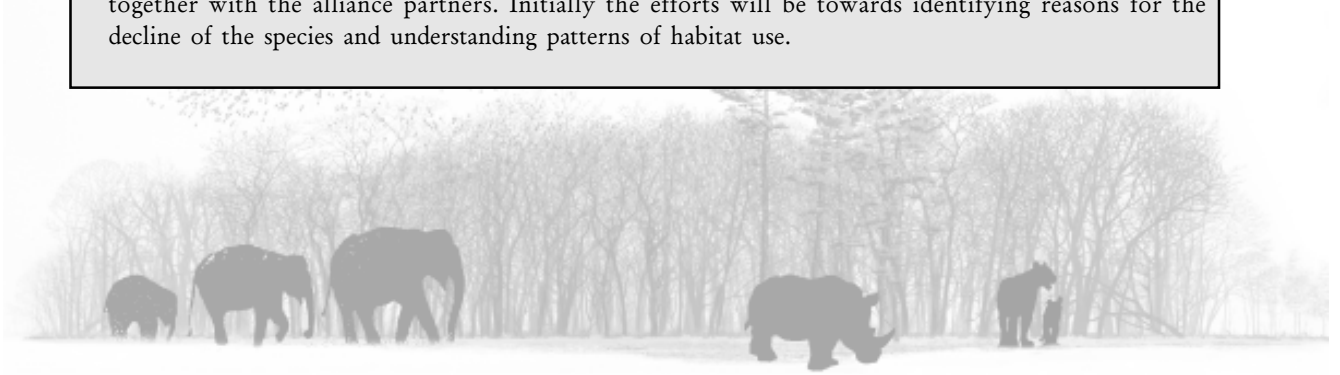
The forest divisions of Nilgiri North, Sathyamangalam, Mudumalai Wildlife Sanctuary, and managed forests are prime locations for elephant population in the NEG. Buffer zone activities were carried out by the forest divisions in order to minimize the forest dependence by the villagers and to minimize human-elephant conflict. Activities such as land based schemes, livelihood schemes, and infrastructure facilities were provided to the forest settlements in the GMVC to reduce the people's dependence on the elephant reserve. Sericulture, fodder nurseries and support with agriculture seeds have helped poor families in the buffer zone specially to move towards self-reliance.

Conservation of the Endemic Nilgiri tahr

WWF along with like minded conservationists/agencies/institutions including the Tamil Nadu and Kerala Forest Departments and NGOs have created a "Conservation Alliance" for ensuring long term survival of the Nilgiri tahr.

The Nilgiri Tahr (Hemitragus hylocrius/Nilgiritragus hylocrius) once abundant in the southern Western Ghats, now precariously survives in small mostly disjunct units southwards from the Niligiris till Kanyakumari Hills along the crest-line of the Western Ghats in the states of Tamil Nadu and Kerala.

Responding to the decline of the species even in the best of Protected Areas WWF has initiated efforts together with the alliance partners. Initially the efforts will be towards identifying reasons for the decline of the species and understanding patterns of habitat use.



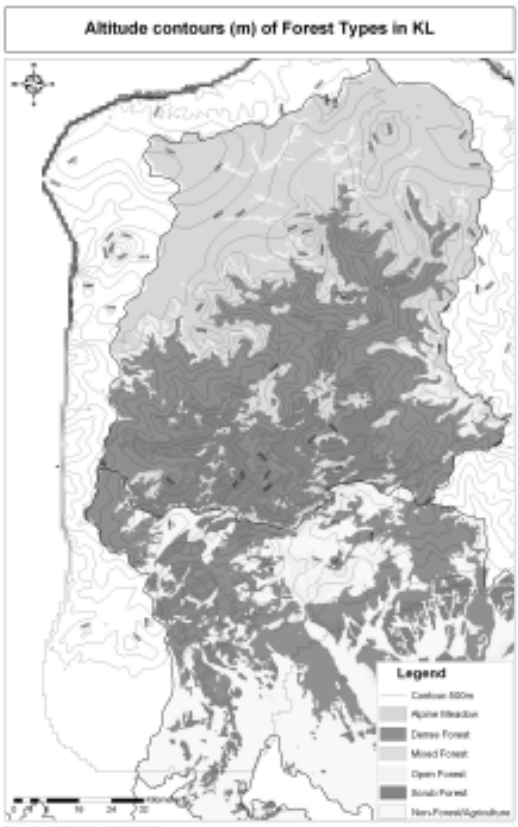
Chapter 8

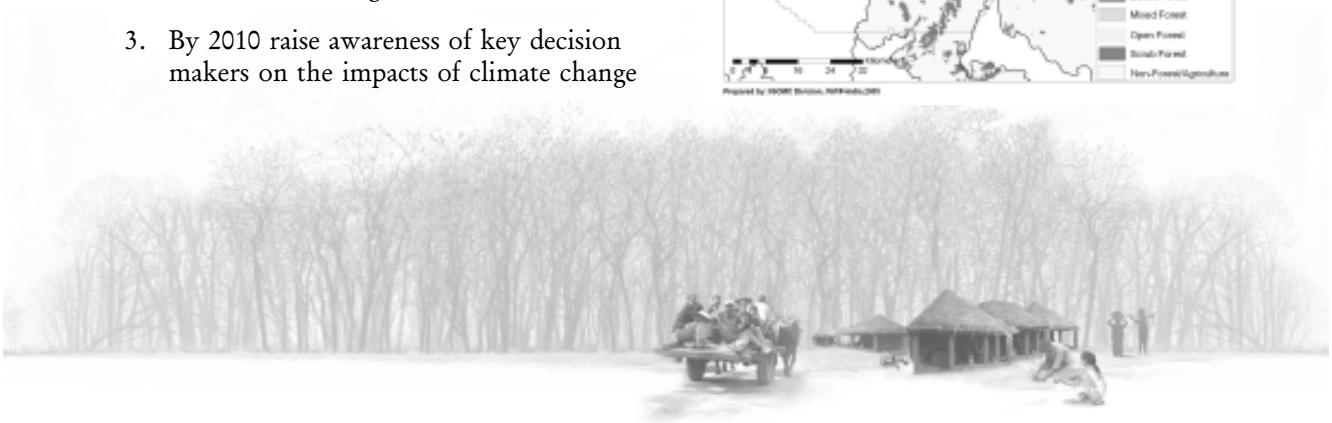
KHANGCHENDZONGA LANDSCAPE PROGRAMME (SIKKIM AND ADJACENT AREAS)

In dedication to our commitment to Sikkim and the high altitude region, the KL programme which commenced in 2005, looks at the goal of maintaining the biodiversity values and cultural integrity of the Khangchendzonga Landscape in India.

Overall targets

1. By 2010 conservation strategies of key species developed
    - By 2010, habitats of key species mapped and ground truthed
    - By 2010, populations of key species estimated and their habitats mapped
    - By 2010, potential habitats and interlinking corridors of key species identified and strategies developed
2. By 2010, 100,000 ha of PAs and critical corridors under effective and participatory management
    - By 2010 capacity of PA managers and field staff strengthened
    - By 2010 Strenthen and empower Eco-development Committees to play effective role in PA management
    - By 2010 Committees in place for joint forest management strengthened for corridor management .
3. By 2010 raise awareness of key decision makers on the impacts of climate change on species, ecosystems and people of the state
    - By 2008 feasibility assessment of climate change on glaciers
    - By 2010 Climate Change prediction model applied to Sikkim (based on outcomes of above)

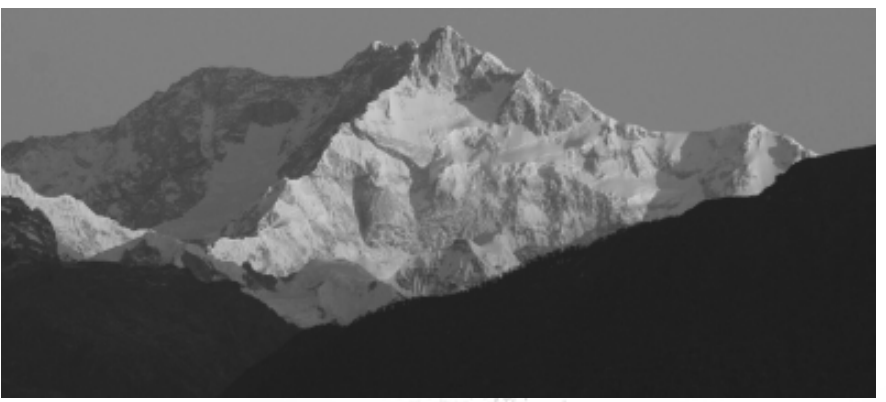




- By 2010 Communication and outreach straegy developed
- By 2010 recommendations for developing future adaptation strategies

4. By 2010 illegal wildlife trade significantly reduced in KL-India
   - By 2007 status of wildlife trade documented in KL-India
   - By 2010 strengthen networks of key stakeholders for controlling wildlife trade
   - By 2010 strengthen capacity of key stakeholders to control wildlife trade
5. By 2010 HAW conservation in KL-India strengthened

The elusive Red Panda



The majestic Khangchendzonga

   - By 2010 at least 10 HAWs designated as wetlands of national or international importance
   - By 2010 at least two community based wetland management models in place
   - By 2010 Effective implementation of state guidelines for HAW conservation
6. By 2010 Policy Recommendations supporting conservation and sustainable development in key gap areas
   - By 2008 Awareness on impacts of major infrastructure projects on Wildlife, ecocyctems and people
   - By 2010 a model policy on human wildlife conflict is in place for Sikkim
   - By 2010 Potential for synergy between Traditional Institution and Conservation demonstrated
7. By 2010 enhanced knowledge and awareness among key stakeholders on conservation and sustainable development issues in the KL-India
   - By 2010 Strengthen existing conservation curriculum in secondary schools in Sikkim
   - By 2010 ten public awareness events, functions and campaigns organized
8. By 2010 innovative approaches to watershed management involving benefit sharing measuring cover (50,000 ha)
   - By 2007 awareness & buying of key stakeholders on PES for watershed management is built
   - Model for PES developed at selected site by 2008
   - PES accepted at policy level by state govt. by 2010

Some achievements

- Status and distribution maps of red panda in GIS domain : Data collection work initiated in October 2005 and GIS work initiated in January 2006, ground truthing work ongoing.
- Maps and forest cover with changes in the last ten years along with key red panda habitats and critical linkages are ongoing.
- District maps and semi detailed maps of critical linkages : Maps collected, work will be completed by December 2006.
- Sikkim conservation alliance: Conservation alliance in place with the Forest, Enviroment and Wildlife Management Department (FEWMD), The Indian Army, other prominent NGOs like The Mountain Institute (TMI), khangchendzonga Conservation Committee (KCC), Ecotourism and Conservation Society of Sikkim (ECOSS), Sikkim Development Foundation (SDF) etc. working for wildlife conservation in Sikkim.
- Maps and documentation illustrating the threats to the landscape and possible mitigation strategies: Documentation of threats related to forest fire have been done, a short film has been made and burnt patch was mapped.
- Feasibility assessments for red panda ex-situ conservation ongoing.
- Assisted the Sikkim Forest Dept. in prepairing a work-plan for "conservation of large mammals in the state of Sikkim"
- Published a report titled "People's opinion on the impacts of Ban on Grazing in Barsey Rhododendron Sanctuary, Sikkim, India" that eventually garnered support of the state's politicians to support the eviction of cattle and cattle graziers from the Protected Areas.
- Field staff of two Protected Areas of Sikkim were trained for animal population estimation
- WWF-India along with TMI assisted the FEWMD for formulating the Sikkim Wetlands Conservation Policy that has been notified by the state govt.
- Communication materials for the users of the wetlands are being developed
- Capacity building of the frontline field staff of the FEWMD, Sikkim Police and Customs and Excise Dept. being undertaken for controlling wildlife trade

Progress of Activities

The progress is discussed under the different heads.

1. Species conservation

The first species targeted in this landscape was red panda and the work was initiated during Aug 2005. The field study of red panda habitat was conducted at Maenam WLS (MWS) during October-December 2005. Southern part of the 35 sq km. Maenam WLS was surveyed following plot-centred sampling technique tor vegeta-

Typical landscape of Sikkim

tion data collection. The general vegetation type, altitude, cloud cover and slope aspect data were noted on the pre-designed datasheet. Tree data were collected from a plot measuring 10m x 10m, these data included canopy cover, GBH of trees and an estimation of height of the trees and also the flowering and fruiting of the trees. Species of trees were also noted. Similarly a 3mX3m plot was selected for collection of shrub data within which the percentage of shrub cover, shrub species along with shrub height, flowering and fruiting were studied. Further a lm x 1m plot was selected for the study of (percentage) herb cover, herb species, herb height and flowering and fruiting pattern of the herbs. Data were also collected for the occurrence of wild animal species, based on direct and indirect sightings. Finally threat data were also collected from the same plot which included distance (km) to the nearest human habitation, distance to nearby 'goth' or shepherds hut and grazing ground, number of cut and lopped trees, number of wildlife dropping piles and number of cattle dung piles. Data collection exercise was carried out along the existing trail and on both sides of the trail up to one km, at every 200m within the southern part of the sanctuary.

During 2006, similar field surveys were conducted at Barsey Rhododenrdon Sanctuary, Kyongnosla Alpine Sanctuary and southern part of Khangchendzonga National Park (KNP). A short study on the captive red pandas were done at the Himalayan Zoological Park, Bulbulay, Gangtok. Coordinates were obtained from field using the Garmin etrex GPS and data was analysed using Arc view 3.2 software. Shape files for the vegetation and contours of the area surveyed were made which will be subsequently modified.

WWF-India also collaborated with FEWMD, TMI, the Wildlife Institute of India, KCC and the International Centre for Integrated Mountain Development (ICIMOD) for a survey of the biodiversity in the northern part of the KNP during Jul-Aug 2006. The prime focus was to obtain evidences of snow leopard and its prey species.

Results of the survey:

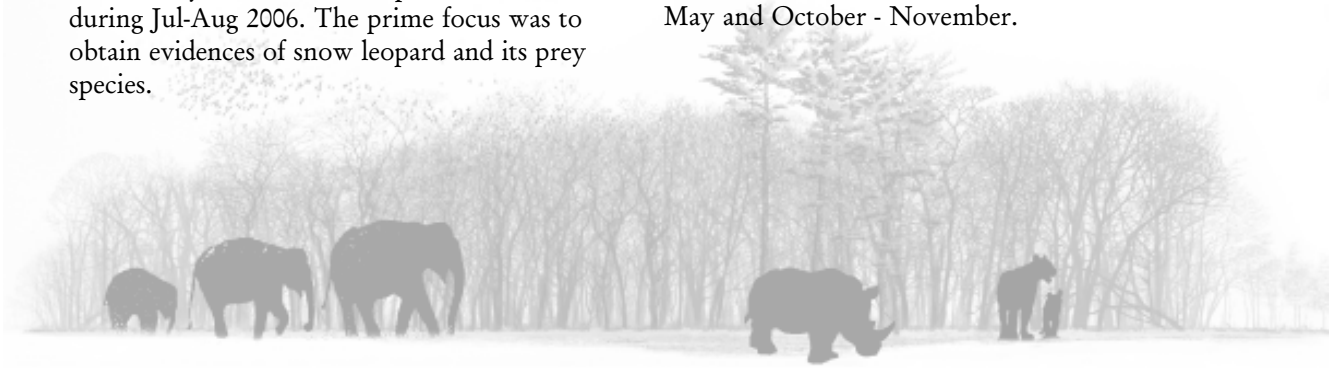
Habitat data collection was carried out from morning throughout the day. In addition to this, bamboo forest was also visited during dawn and dusk keeping in mind the repuscular behaviour of red panda.

Five broad vegetation types were identified within MWS, these were – sub-tropical forest dominated by *Quercus* sp., *Castanopsis* sp.and *Prunus* sp.; temperte forest dominated by *Rhododendron* sp., *Machilus* sp.; bamboo forest with *Arundinaria* sp., coniferous forest with fir, pine and *Taxus* sp. And sub-alpine forest with *Rhododendron* shrubs and meadows – these five types of forest were distributed within varied altitudinal range between 2000m - 3100m.

Among the tree data, canopy cover was highest (65%) in sub-tropical forest and was the least (38%) in sub-alpine forest.

Shrub height was highest in sub-alpine forest that was contributed to rhododendrons.

Till the year 2000, MWS used to have more than 50 odd shepherds' (goth) huts located inside. However, a strong policy of the state government, backed by the actions of the dedicated forest staff and strong political will, all the shepherds were relocated outside the sanctuary by 2001. The cattle were driven out of the boundaries of the MWS. Remains of the goths could still be seen within MWS. Therefore, illegal grazing apparently does not pose a problem at the southern part of the sanctuary. However, the movement of tourists in the southern part of the sanctuary through the bridle path from the check-gate on the Ravangla-Ralang road to Maenam Monastery and Bhale-dhunga might cause adverse impacts on the wildlife and its habitat. The trail was also found strewn with waste materials left behind by tourists. This would need more monitoring by the wildlife department especially during the tourist season from March - May and October - November.



Barsey Rhododendron Sanctuary (BRS) is contiguous with the Singalila National park in West Bengal. Its western boundary along the Singalila range is also the international border with Nepal. The area in Singallila is a famous trekking route bringing visitors from Indo-Nepal Border upto Phalut which forms the tri-junction between Sikkim, Sikkim and Nepal. The route from Phalut extends up to Chewabhanjyang. BRS has very good pure strands of Rhododendron, mixed Rhododendron Silver fir forest and large patches of oak forest. The survey was carried out in Nov-Dec 2006 using hilley area as the base the entire area was surveyed and data was collected on the vegetation as well as the animal presence. The rhododendrons here showed distinct altitudinal changes. Apart from Rhododendrons other tree species were also studied to understand the general health of the forest in terms of vegetational diversity. Herb and shrub species were also surveyed and the diversity was noted.

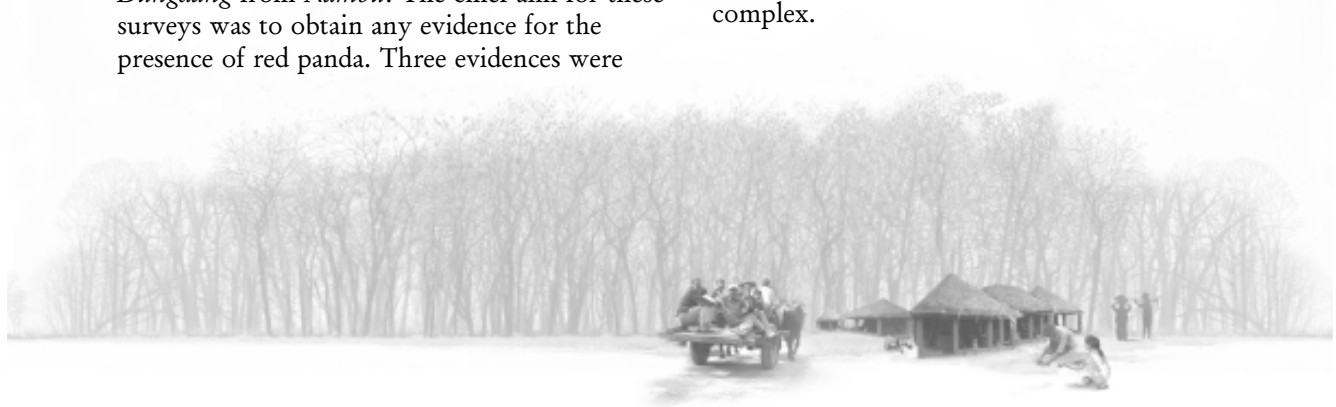
Inspite of the fact that a wide area was covered in this tour no red panda sign whether primary or secondary was seen. It was also disconcerting to note that the last time a red panda was sighted in this area was a pair which had come out during a forest fire. Last time a panda was sighted by the forest guards in this area under normal circumstances was way back in 2001. The chief cause for worry is that though the habitat at first see is almost too perfect for the animal yet it remains so elusive. Given the fact that it being shy animal, chances of a direct sighting is a matter of luck. But the simple fact that even scats or browsing signs are conspicuous by their absence adds to the problem. More careful assessment of the situation will be done during spring-summer of 2007.

The area of KNP was surveyed in November 2006 and January 2007. The historic trekking trail, *Yuksam* to *Dzongri*, was taken and area up to *Tsokha* as well *Labdang* and the trail to *Dungdang* from *Nambu*. The chief aim for these surveys was to obtain any evidence for the presence of red panda. Three evidences were found in *Dungdang* in the form scats and pugmarks. These evidences were found amidst *Arundinaria aristata* and Silver fir forests. The entire area was snow clad and a surprise that the animal has not gone down to snow-less patches so late into winter. The most heartening fact here was that the two occasions during which this area was surveyed abundant evidences were found and there were fresh pugmarks as well as fresh scats around suggesting the presence of a resident red panda population. in other areas though excellent in terms of floral condition, the species were constantly conspicuous by their absence.

During the trip to Green Lake areas of northern KNP, evidences of snow leopard was found in the form of scat samples and remains of kills. Herds of prey species like blue sheep were also found. The survey came up with recommendations like notification of species conservation zones and detailed survey on winter habitat use of wildlife and competition with cattle in northern part of the state. Following these, a study on the winter habitat use of wild and domestic animals was collaborated with the Wildlife Institute of India and a researcher and assistants are based in north Sikkim during the winter of 2006-07. Preliminary results show recent records of snow leopard and moderate densities of its prey species.

Work on mapping and change detection of forest cover is ongoing as it took some time in procuring the satellite imageries and toposheets.

As part of the ongoing work on red panda, experiences were shared with the landscape coordinators from Arunachal Pradesh, Nepal and Bhutan and it was recognized by all concerned that red panda is a focal species in the Eastern Himalayas. A document on this line was prepared and was sent to the Species Unit of WWF-International which finally resulted in red panda being selected as a WWF "Priority Species" in the Eastern Himalayan Ecoregion complex.



2. PA management

While collaborating with the FEWMD, WWF-India arranged training for field staff of two PAs, namely Maenam Wildlife Sanctuary and Fambong-Lho Wildlife Sanctuary by eminent wildlife biologist Dr. A. J. T. Johnsingh on wildlife population estimation and monitoring. WWF-India's project officer (red panda) participated in a capacity building tour to West Sikkim along with the staff from The Mountain Institute, where they informed the villagers about the threatened status of red panda, their habitat conservation measures, legal issues for contravening the Wildlife (Protection) Act of India, 1972 etc. A meeting was also convened by WWF-India in order to prepare a strategy for large mammal conservation in Sikkim. Work is ongoing to develop a manual for training the frontline field staff of FEWMD on biodiversity monitoring.

3. Wildlife trade control

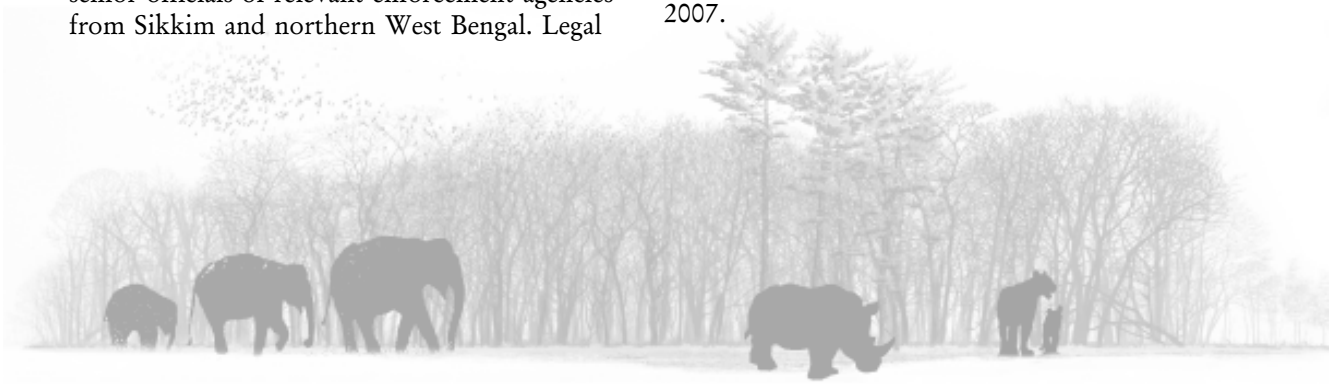
Four joint stakeholders' meetings were organized in Gangtok, Sikkim and Sukna, Darjeeling district, West Bengal in order to have a consensus about controlling wildlife trade in KL-India through collaborative efforts. It was suggested that instead of conducting first-hand intelligence gathering initially, stress will be given in capacity building of the frontline staff of the enforcement agencies for controlling wildlife trade. The different activities planned for a period till mid-2007 was prepared and shared with relevant stakeholders in Sikkim and West Bengal and an agreement reached. WWF-India also initiated investigation on extraction and trade in natural resources in the areas in and around Nathula, East Sikkim District, Sikkim in collaboration with the FEWMD, Govt. of Sikkim. Wildlife crime data was collected from Forest Dept. in northern West Bengal (Wildlife Division I and II). Technical training for wildlife crime control was provided to the senior officials of relevant enforcement agencies from Sikkim and northern West Bengal. Legal training for wildlife crime control provided to the officials of different enforcement agencies in Sikkim. Preparation of a brochure on wildlife crime control is undergoing.

4. High altitude wetlands conservation

As an initiative of the conservation coalition with the Forest Dept. and TMI, WWF-India assisted in developing the "Guidelines for Lake Conservation in Partnership with Gram Panchayats and Pokhri Sanrakshan Samiti's (PSS) in Sikkim", which is now notified by the Government of Sikkim. For GIS work field visit and ground truthing along with lab-work is ongoing. WWF-India also identified 11 lakes/ clusters of lakes for long-term conservation intervention, preliminary data on biodiversity of these lakes have been collected. These lakes are Gyamtshona, Gurudongmar and Seema Tshoka in North district; Tamze cluster of lakes, Tsomgo Lake and Bidang Tsho in East district; and Lam Pokhari, Majur Pokhari, Laxmi Pokhari, Sungmoteng Tsho and Khecheopalri Lake in West district of Sikkim. Work is ongoing for pubishing factsheets on these lakes. Information on the sacred and cultural values of the lakes collated. Tsomgo lake has been identified as the lake in need of urgent conservation intervention. A stakeholders meeting was convened in this regard, and work is ongoing in collaboration with the FEWMD for conservation of Tsomgo lake through participation of the local people.

5. Policy supporting conservation

Work was initiated during December 2006 for assessing the present status of human-wildlife conflict in KL-India. Problem animals were identified by the villagers as wild boar, Asiatic black bear, crested porcupine and rhesus macaque. More public hearings and villagers' meetings in collaboration with TMI, KCC and Sindrabong Khangchendzonga Ecotourism Society (SKES) is being undertaken till summer 2007.



Chapter 9

Kaziranga – Karbi Anglong Landscape: Conservation of Large Mammals

The state of Assam is home to the endangered Asian elephant, one horned rhinoceros and tiger. The gradual depletion of various natural resources as well as habitat due to various anthropogenic pressures is becoming threat to many of these species of wildlife putting them to danger of extinction in the region. Shifting cultivation, encroachments, development projects are some important factors for fragmentation of natural habitat and isolation of wild animal populations. Significantly, the conflict between wild animals and humans is also increasing alarmingly in the state. WWF-India launched the AREAS Programme to develop a strategy for conservation of these endangered species and their habitats in specific sites across the country.

The North Bank Landscape in Assam(and Arunachal Pradesh) in North East India was selected as one of the priority conservation areas particularly for Asian Elephants. The first phase of activities has been successfully completed. This success in North-east India has inspired a serious effort to undertake another similar conservation programme in the south bank of Brahmaputra particularly in Kaziranga-Karbi Anglong Landscape (KKL) area. The vision for this landscape is to establish connectivity between the protected areas to facilitate the movement of large mammals (Asian elephant, one horned rhinoceros, and tiger). Issues linked with it include habitat loss, conflict sites, apart from other threats to landscape. A major field study was launched in KKL in 2005 which has brought out some critical information that can be used for designing future conservation strategies.

Local people are being involved in a big way in this programme. The programme managers are trying to develop a WWF's highest for conservation Gift to The Earth status for the landscape through the participation of local ethnic communities.

Summary of the Project Findings

1. The landscape provides a very good habitat for the pachyderms.

2. The foothills of the landscape are very much preferred by the elephants.

3. The movement (traditional) of elephants in the contiguous belt of forest in this landscape is under severe threat at some critical sites (corridor) which needs immediate interventions for protection.

4. If these critical sites of movement cannot be protected immediately the elephant population of the area is likely to get fragmented.

5. The illegal logging and extraction of other forest resources cause serious effect on wildlife habitat.

6. Insurgency continues to have its impact in various pockets of the area.

7. The forest department with poor infrastructure, fund and manpower is not able to play a vital role for protection and management of the forest.

8. People in the concerned localities are not involved in the protection and management of the forests and the animals.

9. There seems to be a lack of awareness and consciousness among the general population regarding the value of the rich flora and fauna of the region.

10. Support and cooperation from the local people is indispensable to carry out any conservation management exercise in the landscape.

11. The conflict between human and wildlife mostly with elephant is gradually increasing and particularly prominent more towards the edges of the identified landscape boundary. Golaghat district has been identified to be the most threatened areas on the basis of conflict record.

12. Community development programme is very essential to improve the livelihood condition of the people and ultimately initiate community based conservation programmes.

13. The development and activities of the tea growers both small and large should be monitored as they seem to have a large impact in many good elephant habitats in the landscape.

14. Encroachments are coming up in and around some protected areas by ignoring the temporal official eviction drives.

Quarrying poses a constant threat

A. Field Activities

Numerous field activities/surveys were undertaken to generate the outputs/results till date. The field activities were undertaken to generate six major types of results viz.,- document the status of distribution of major wildlife species in the area by conducting a presence-absence study for three key mammal species- rhinoceros, tigers and elephants; document the vegetative diversity of the region; document the status of habitat contiguity and emerging threats by identifying major tracks/corridors used by elephants; undertake ground-truthing exercise to derive the landcover/landuse status of the area from satellite data; and analyse the pattern of human wildlife conflict in the area giving emphasis on the man-elephant conflict which is showing an increasing trend in recent years.

The presence/absence of wildlife in the landscape has been primarily done for three major species in the area, and a rapid survey technique was employed to obtain the findings. The study on rhino has been mainly concentrated in areas adjoining Kaziranga National Park, Laokhowa and Burhachapori WLS. The study has been mainly confined itself to finding out their range of movement by determining their presence in

the adjoining areas. Similarly, the presence of tiger has been tried to be determined either through reliable informants or by direct observation of signs. The study on elephants has been done to find out their presence/absence in different parts of the landscape and also to find out areas/tracks popularly used by the elephants for moving from one forest patch to the other. The survey has been conducted either through vehicular tracks or on foot depending on the possibilities and ground situations. During tracks, signs of presence or absence have been geo-recorded with global positioning system or records have been taken on a suitable time/distance interval. The presence was established on the ground by direct sighting, tracks, dung, feeding signs and body rubbing marks on trees.

The vegetation and forest types of the landscape were studied through the direct field observations and classified by following standard method of classification. The dominant plant species are identified to categorize the forest types.

An attempt has been made to establish information on habitat contiguity by looking into the movement pattern and habitat utilization by the elephants. Corridors used by elephants have been identified and established by identifying popular movement tracks used by elephants. The movement stretches have been identified in the field and recorded with GPS to be mapped. The mapped tracks have been overlaid over the forest layer to find out the most crucial tracks / corridors in the landscape for further study and analysis. Visible hurdles acting as obstacles in the elephant tracks is also documented as and where possible. Developments affecting existing habitats are also documented to develop conservation strategies.

Ground-truthing of satellite data is also being carried out to confirm the land cover mapped under seven broad classes. A class based ground-truthing exercise has been conducted in about two hundred locations all over the landscape barring the central inaccessible areas.

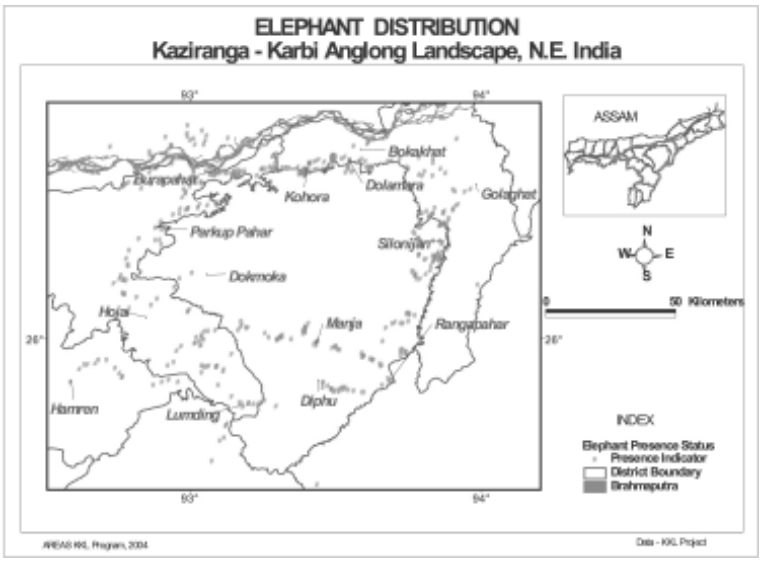
Human wildlife conflict has been studied by recording the incidence of man and elephant conflict in different parts of the landscape. The occurrence of elephant raiding as a seasonal phenomenon along with the killing of humans and elephants has been recorded in the field with the help of GPS to find out the pattern of conflict. The intensity of the conflict has been also looked into by recording the frequency of raiding instances over an area.

B. GIS Activities

The vector data on different layers of information has been generated from multiple sources. The base maps have been generated from topographic maps, forest department maps and administrative boundary maps from government sources.

The layers on water bodies, roads, railways, contour, etc., have been generated from information available in topographic sheets covering the area. The notified Forest Area map showing reserve forest, proposed reserve forest, wildlife sanctuaries and national parks have been built from multiple sources viz.- the topographic

Wood lots ready to be shipped out



maps, forest department maps and government district planning maps, etc. The base maps prepared have been ground tested and the digital data has been generated using onscreen technique in ArcGIS environment.

Wildlife Documentation

Elephant Distribution

The elephant population in the landscape is found to be distributed unevenly over a major portion of the area. The distribution is found to extend from Kaziranga National Park in the north of the landscape through the Karbi Plateau in the central portions to almost all parts of the landscape. The distribution probably extends to the adjoining areas in the states of Nagaland in the south; to Kamrup (east and south-east) through the adjoining areas of Meghalaya. The elephants generally inhabit the inter-mountain valleys and plains and move along the foothill areas and the rivers criss-crossing the landscape. The highest concentration of elephants is observed within the Kaziranga NP (1000+ population) and adjoining areas towards the north. In the other areas a good distribution of elephants is observed as well. Elephants in good numbers have been observed in the Nambor area in the west-central part and in the Lumding area in the south and south-western part of the area. Presence of a good number of elephant population are also observed in and around the prominent forest areas namely Kollonga, Kheroni, Daldali, Dhansiri, Daboka and Kaki, to name a few.

It is noteworthy that the pattern of distribution of the pachyderms has been changing during the last couple of years. Many areas previously preferred by the pachyderms are experiencing various forms of anthropogenic pressure leading to their movement in comparatively less disturbed areas. As an instance, the elephant population in KNP area has immensely risen in the last decade and tends to stay confined within the park or areas adjoining.

Elephant Movement & Corridor Identification

The increasing population pressure and various

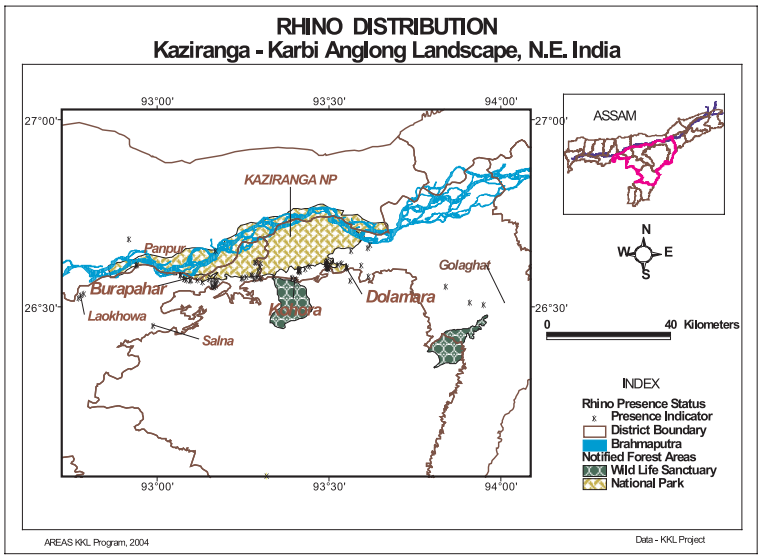
IDENTIFIED ELEPHANT MOVEMENT TRACTS IN KAZIRANGA KARBIANGLONG LANDSCAPE			
1	Kanchanjuri - Ruthe Pahar	9	Haldibari – North Karbi Anglong
2	Lumding – Langting Mupa	10	Burapahar - Bagser
3	Lumding – Amreng	11	Panbari – Dolamara
4	Kaki – Lumding	12	Rangsali – Deopahar
5	Longnit – Marat Longri	13	Nambor WLS - Nambor west block
6	Lumding – Barlangfar	14	Khonbamon - Daldali
7	Marat Longri – Dhansiri	15	Daldali - Dhansiri
8	Upper – Lower Doigurung		

developmental activities have fragmented and shrunk the many natural suitable forested areas for elephants and other wild animals in the landscape. Being a foraging animal, elephants tend to maintain some of their traditional tracks for their movement. The Kaziranga National Park has contiguity with the forested areas of Karbi Anglong, Golaghat and Nagaon districts in the landscape. As per historical records elephant herds traveled through long distances in this landscape to even move into forested areas in Myanmar through Nagaland to the east; and also towards the west to Meghalaya. But such long prominent movements are not being observed now. The movements though seems to follow the same alignment and pattern and is curtailed to smaller portions/stretches connecting two popular habitats as observed in the field till present.

It is observed that the elephants from Kaziranga National Park generally prefer to use five prominent tracks through which they move southwards to other parts of the landscape during flood/rainy seasons and also during the harvesting period. For moving to the adjoining habitats/forests in the southern portions of Karbi Anglong and adjoining districts they usually prefer three portions to cross the national highway (NH 37) for their temporal/ seasonal migration. The elephants from the park also move along the two banks of the river Brahmaputra to the adjoining areas and inhabit the river islands as well: they also often cross the river to enter the north bank areas near Panpur as well.

Two major trends of movement are believed to exist in the landscape – one from KNP area through the internal areas in Karbi Anglong upto Intaki NP in Nagaland through Nambor and Dhansiri; the second from the KNP area through the internal areas in Karbi Anglong upto Meghalaya through Doboka, Kaki, Lumding and Kollonga.

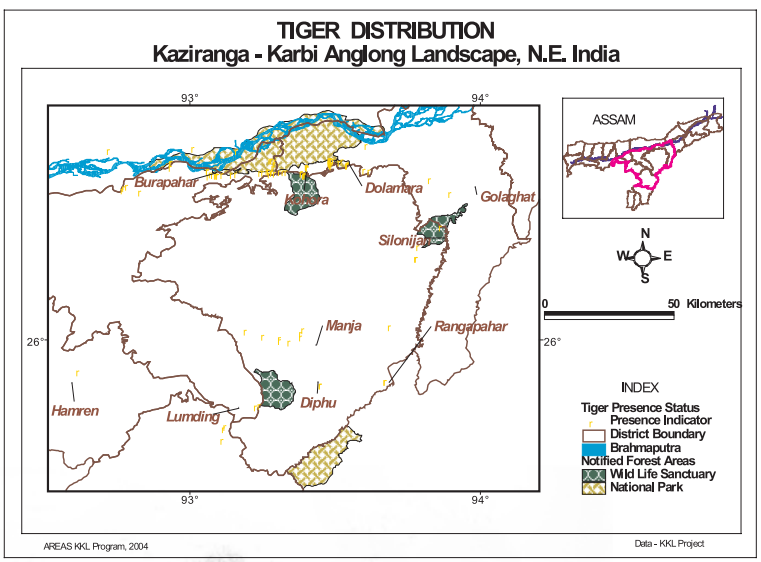
The major critical elephant movement track/ corridors have been identified during the study



period. The monitoring of elephant movement has been started in some of these critical areas like Panbari-Dolamara, Kanchanjuri, Hojai-Kumurakata, Lumding-Kheroni area, etc.

Rhino Distribution

The Indian one horned Rhinoceros prefers the flood plains of Brahmaputra River with the alluvial grasslands of some particular areas in



Assam. The distribution is not continuous due to their unique habitat type and presently the distribution is restricted to a few protected areas like Kaziranga National Park, Orang National Park, and Pabitora Wildlife Sanctuary. Once the Manas National Park, Bura Chapori WLS and Laokhowa Wildlife Sanctuary were giving shelter to a good number of rhinos which were poached and caused a sharp decline of the population. But it is still good rhino habitat. Rhino is still recorded to inhabit the Bura Chapori and Laokhowa WLS.

In the landscape the movement of rhinos is mostly restricted to the areas under Kaziranga National Park and adjoining areas. Occasionally they move eastwards up to Dergaon-Kumargaon area and also westwards up to areas near Laokhowa and Burha Chapori WLS in South bank of Brahmaputra. Rhinos also at times move northward from the sixth addition areas under KNP and also has records of moving north to Gohpur area in the North Bank of the river Brahmaputra. Outside the KNP the movement of rhinos is verified at the nearest tea gardens like Burapahar, Methoni, Hatikhuli, etc. which is preferred during the high flood and eastward movement at Dhansirimukh, Dergaon and Khumtai in South Bank and Gohpur in North Bank. The south and south-west movement is recorded from Dolamara, Ruthe Pahar, Salona and Parkup Pahar area towards Karbi Anglong district.

Foraging elephants

Tiger Distribution

The landscape has a good spatial distribution of tiger population as the records show. The concentration of tigers is highest in the area under Eastern Assam Wild Life Division covering Kaziranga National Park (85 as per 2001 census) within the wildlife divisions in the area. In terms of the territorial divisions the highest number of tigers is recorded in Karbi Anglong (East) followed by Hamren.

Habitat Loss and Encroachment

From field surveys the intimidating issue of habitat loss has come to light in different parts of the landscape. The severity is perhaps more perceptible in the adjoining areas of Nambor North, Dayang and Kaki. If the new settlements in the forest areas (encroachments) are not controlled, and vegetation rejuvenated, the situation can be devastating in near future. The shrinkage in vegetation cover has resulted in fragmentation of the forest which was contiguous in the past. Equally threatening to the landscape are the settlements on the foot hills, which are otherwise movement tracks of elephants. Serious human elephant conflicts are in store for the future if nothing much is done. Shifting cultivation on the hill slopes, particularly in the districts of Karbi Anglong and N.C. Hills is another issue that demands immediate attention. Moreover, people have also started to practice commercial farming in the hill slopes by cultivating horticultural crops. Apart from rapid loss of primary forests, the aspect of soil erosion also must be taken care of promptly. . Further, logging is taking its own toll on the whole scenario and rapidly changing the land cover. The recent rise in quarrying activities in the areas adjoining KNP, Longnit and many other parts have caused enormous harm particularly to the elephants as these are near or along the movement tracks. The commercial extraction of bamboo and expansion of tea gardens are also posing a threat to the animal movement, and their habitat in general.

Human wildlife conflict in the landscape

The occurrence of Human-Elephant Conflict (HEC) has been increasing in many parts of Assam. In many places crop raiding has increased drastically in areas surrounding protected elephant habitats. The areas in KKL are no exception to this phenomenon. Perhaps the most prominent reason is the shrinking of elephant habitat and its fragmentation into pockets. The cases of conflicts are getting intensified, and newer areas are experiencing the phenomenon. This has been listed as a threat here, as elephant conservation programmes world over is facing the greatest challenge from this particular aspect. The incidence of HEC has been identified to be more prominent and decisive in some areas under Golaghat, Silonijan, Bokajan Lanka, Lumding, Kathiatoli, Doboka, Hojai, Nambar, Salna, Parkup Pahar, Silanijan, Manja and Kheroni forest ranges within the landscape.

The major conflict hot spot areas have been identified as Golaghat – Silanijan and Hojai – Kheroni areas

Indian Rhino Vision 2020:

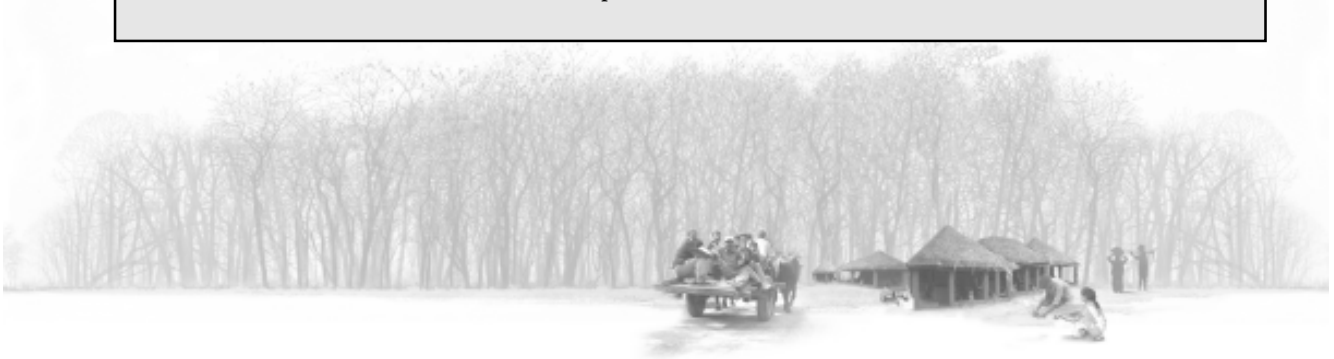
The study on the habitat suitability for a potential rhino habitat within Assam was initiated in the Dibru-Saikhowa NP in the beginning of the KKL programme. This initiative drew the attention of the department of Environment and Forests, Government of Assam and a new government programme i.e. the Indian Rhino Vision 2020 (IRV 2020)was launched. The objective: "*To increase the total rhino population in Asom State from about 2,000 to 3,000 over the next 15 years (i.e. by the year 2020) and to ensure that these rhinos are distributed over at least 6 Protected Areas so that long term viability of an Assam meta-population of Indian rhinos is assured*." WWF-India in collaboration with International Rhino Foundation is extending all possible support to the Assam Government for the IRV 2020 (see page 68).

THE KAZIRANGA CHARTER

Conservationists from the world over came together at Kaziranga National park to celebrate one hundred years of its continuous conservation successes. The event was the Kaziranga Centenary Celebrations. The conservationists reaffirmed their commitment for securing Kaziranga's biodiversity for posterity.

The conservationists recognized the need to look beyond Kaziranga NP for it long term survival and recognized that the landscape of Kaziranga – Karbi Anglong as part of a globally recognized biodiversity hot spot. WWF has been working in this landscape and this recognition of Kaziranga – Karbi Anglong Landscape as a single entity from the conservation community and the Government of Assam was a major win.

The Charter also recognized the Indian rhino as the flagship species of Kaziranga, and that ensuring the long term survival of which is a continuous challenge. WWF efforts towards meeting this challenge got a gain in from the Government of Assam on recreating rhino populations I areas where they have been exterminated. This another major win at Kaziranga Centenary Celebrations has now grown into the Indian Rhino Vision 2020 programme that has an objective of increasing rhino numbers in Assam to 3000 in seven of its protected areas



INDIA RHINO VISION 2020 (IRV 2020)

The Vision: Attain a population of 3000 wild rhinos in Assam distributed over seven of its PAs by the year 2020

The project

The conservation of Indian one-horned rhino (Rhinoceros unicornis) in Assam and India has been a great success. In 1905, numbers of the species in Assam had declined to 10-20 rhinos in Kaziranga National Park. Through strict protection, this population has recovered to over 1700 individuals. A smaller (about 100) but still secure and growing population of rhinos also occurs in Pabitora Wildlife Sanctuary.

However, the conservation of rhinos in Assam has also had major problems and setbacks. Restriction of 85% of the rhinos to a single Protected Area in Kaziranga exposes the species to stochastic risks. The population in Pabitora has already exceeded carrying capacity and the population needs to be reduced both to protect the habitat and to mitigate the increasing human-rhino conflicts as animals move into agricultural areas. Moreover, a significant population of rhinos was exterminated in Manas National Park during the 1990s in the wake of a poor law-and-order situation and ethnic conflicts. Likewise, poaching has eliminated the species from Laokhowa, which once contained 50 plus rhinos. Moreover, the population in Orang has been reduced to fewer than 40 with the threat still looming large

Hence, there is a need to:

(1) improve security in all rhino areas in Assam

(2) expand the distribution of rhinos to reduce the risks of stochastic catastrophes

(3) reduce the population in Pabitora so that it is within the ecological and sociological carrying capacity of the Reserve. The sociological carrying capacity is the number of rhinos that a protected area can sustain without significant human-rhino conflict.

Objectives:

The vision of the programme is to increase the total rhino population in Assam from about 2000 to 3000 by the Year 2020 and just as significantly ensure that these rhinos are distributed over at least 7 Protected Areas (PAs) to provide long term viability of an Assam metapopulation of rhino.

The overall vision of the programme envisages the following objectives:

- Improving protection of rhinos in all the rhino areas.
- Translocating rhinos from two source populations (Kaziranga and Pabitora) into 3 or 4 target Protected Areas (Manas, Laokhowa – Buracharpori – Kochmora, Dibrusaikhowa, and possibly Orang). (Orang still has a nucleus of 20-40 rhinos and may be able to achieve its target population of 100 through improved protection).

The first phase of the programme involving both the above objectives will require three years (July 2005 to June 2008) of intensive field work and will entail:

- Improvement of rhino protection in all source and target protected areas
- Translocation of 20-30 rhinos from Pabitora and Kaziranga to Manas National Park where they will be protected and monitored.

IMPLEMENTING AGENCIES

The Indian Rhino Vision 2020 will be implemented by the Department of Environment and Forests of the government of Assam. The Bodo Autonomus Council will be an active partner in the programme. The programme will be supported by WWF-India, WWF AREAS (Asian Rhino and Elephant Action Strategy) Programme. The International Rhino Foundation (IRF), Save the Rhinos Campaign of Zoological Institutions worldwide and a number of local NGOs.

The task force for translocation of rhinos within Assam Department of Environment and Forests, Government of Assam, Dispur, Guwahati

- Chief Wildlife Warden, Assam (Chairman)
- A representative from MoEF
- Representative of State Board of Wildlife
- Chairperson of WWF India Arunachal office
- Representative of Aaranyak(NGO)
- Representative of Deptt. of Botany, D.R. College, Golaghat
- Representative of Forest Department, Assam
- The Forest Officers in charge of the Protected Areas bearing Rhino
- DGP, Assam
- Representative of Wildlife Institute of India, Dehradun
- Coordinator AREAS programme, WWF-India

Protected Area Support

To ensure better protection and management of wildlife, WWF-India has a component called the Protected Area (PA) Support under which, infrastructural support is provided to the Forest Department and its staff.

Even though the name suggests that this component is for PAs (National Parks and Sanctuaries) only, the ambit of the programme also includes Forest Divisions which have not been declared as PAs, but contain critical wildlife corridors.

Over the past ten years, a support of more than Rupees eighty million have been provided to the Forest Department covering more than 53 areas in 15 states of India including major National Parks, Tiger Reserves and Wildlife Sanctuaries.

The major infrastructural support provided under this component include jeeps, trucks, motorboats, tractors, motorcycles and cycles for patrolling, Wireless sets, handsets and mobile phones for better communication and camps, check-posts and other infrastructure to ensure better presence of Forest Department staff to deter poacher. To improve the motivation of the field staff for better execution of their duties, WWF-India is providing field dress, shoes, winter jackets, torches and searchlights, water-bottles, raincoat, binoculars, field guides and books, etc. Facilities such as solar panels, mosquito nets, tents and camping gear helps in providing better living conditions inside the forests, thereby elevating the morale of the field staff. Funds for monsoon patrolling is also being provided under this programme.

Pankaj Sarmah Memorial Centre for Wildlife Conservation

In a significant decision taken on the 3rd of November 2006, Darrang College and WWF India decided to create a facility at Darrang College to train young students in wildlife conservation and prepare them for making a career in conservation of nature. In a meeting held after the memorial service to celebrate the life of Pankaj Sarmah who was working with WWF India in Assam and had studied in Darrang College, the SG and CEO, WWF India and the Principal of Darrang College decided to create such a facility in his memory.

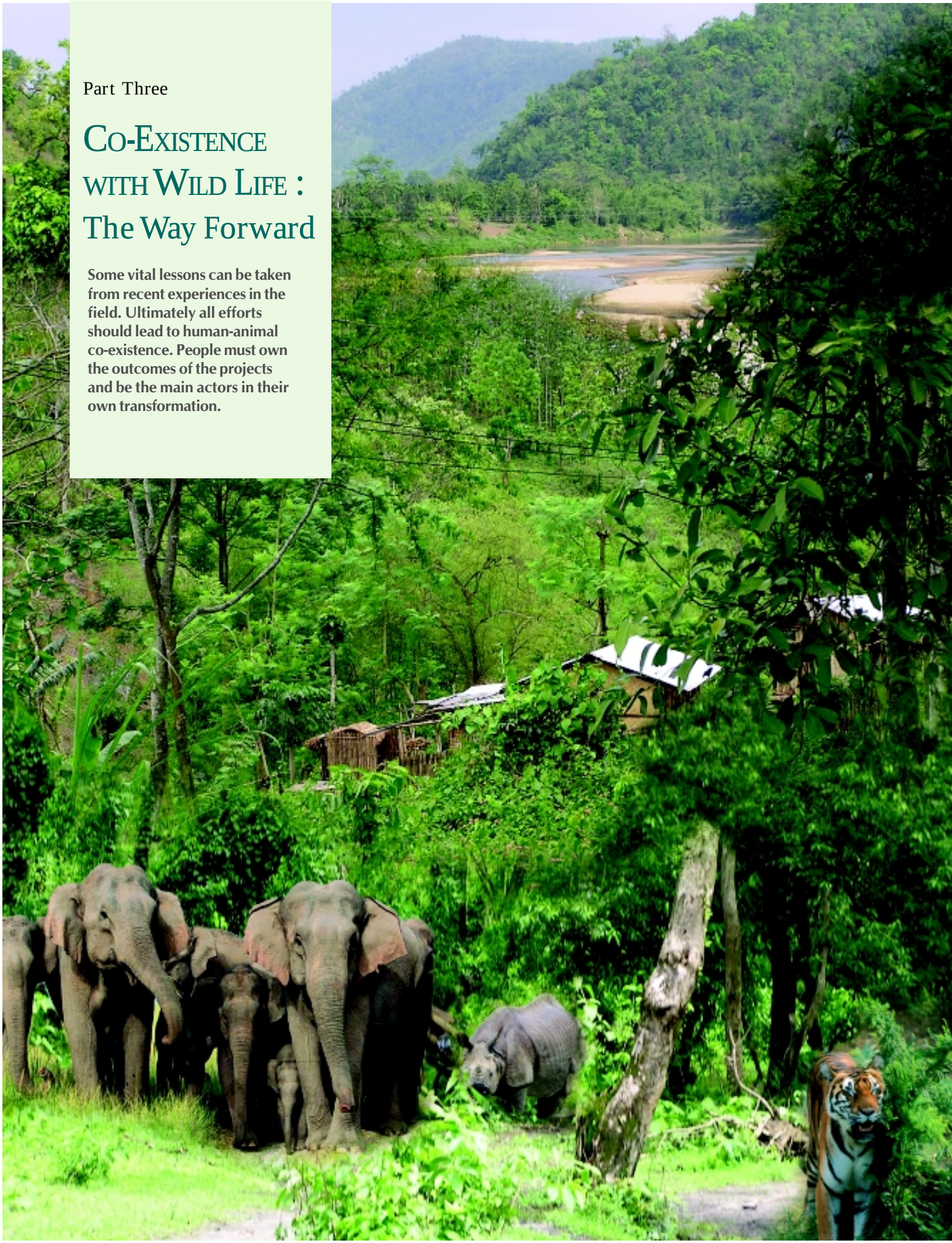
Pankaj was associated with North Bank Landscape (NBL) Conservation Programme since 21st June 2001 and was one of the earliest recruits in the programme. He expired on 3rd October 2006. To recognize his service to conservation, a memorial in his name was planned which will be a Centre of learning for students in the field of conservation. Pankaj was a student of Darrang College, Tezpur, where he is fondly remembered.

An MoU has already been signed between WWF India and Darrang College where WWF India had committed financial support for creation of infrastructure including construction of classroom, library and computer facility in addition to provide software support like guest faculty and assistance in field activities. Darrang College will run the facility with its existing faculty and all other in house support. Initially a three months post graduate certificate course on *Wildlife Ecology* will be provided for couple of sessions for which syllabus has been finalized. However, a full fledged two years Diploma course on Wildlife ecology is also under consideration.

Part Three

Co-Existence with Wild Life : The Way Forward

Some vital lessons can be taken from recent experiences in the field. Ultimately all efforts should lead to human-animal co-existence. People must own the outcomes of the projects and be the main actors in their own transformation.



Chapter 10

Some Thoughts On The Way Forward

The landscape programme started in 2003 after a period of groundwork which involved wide stakeholder consultations, setting up field offices with suitable staff and, most importantly, achieving a level of local acceptance. The teething problems at this stage were in themselves a learning process. The programme gradually grew and evolved to cater to a much wider scope and focus than what was conceptualized earlier. This document attempts to give an insight into the strengths and weaknesses of our activities undertaken in the field and also to draw a tentative roadmap for the future. This document also stand a testimony to the dedicated field staff, whose hearts lie in conservation and who draw immense satisfaction for being able to garner a change in the area, which they can see it for themselves on a day to day basis.

Wildlife conservation through the landscape approach is indeed a complex and tortuous path to the ultimate goal. India's size and diversity in terms of cultures, faiths and beliefs, languages, and lifestyles is ironically often as much a bane as it is a boon. Add to that the priorities of poverty reduction and controlling a burgeoning population. This gives an idea of the canvas on which WWF's wildlife programme is being carried out. The landscapes being envisaged to be covered are large and the presence of WWF-India's activities is restricted to only a small fraction of these landscapes. Therefore, as the sum of what the lessons have been till now, wisdom dictates that one should look at the present projects as pilots or demonstrative projects with a portfolio of micro level activities that may be replicated in similar situations and circumstances on a larger scale. But despite the limited availability of resources and infrastructure at its disposal, the impact of the activities of WWF-India's work on the ground is substantial and exemplary.

While each landscape has its own unique problems and prospects, there are some broad common goals which emanates from the overall mission: To create contiguity of habitat for the tiger, rhino and elephant and secure their future with the support of populations that share the same habitat.

It is obvious that winning the confidence of local people through a mix of livelihood security, welfare activities and awareness building and converting them to partners in conservation is the most critical component for the success of the programme. The experience till now has been varied and highly educative. While Specific activity has done well in one area it has not achieved the desired results in another. Some

activities showed great promise initially but for various reasons petered out subsequently. At the same time some activities have generated tremendous enthusiasm and cohesiveness in the local population leading to perhaps indirect but sustainable impacts. It is now time for reflection and introspection which can help us assess to some extent our level of success or failure. Be that as it may, one thing is clear - in the Indian context, the period of hand holding for ambitious projects of this kind has to be long, preferably 6-10 years. And the process of withdrawal needs to be as carefully planned and executed as the process of initial intervention.

SUNDARBANS

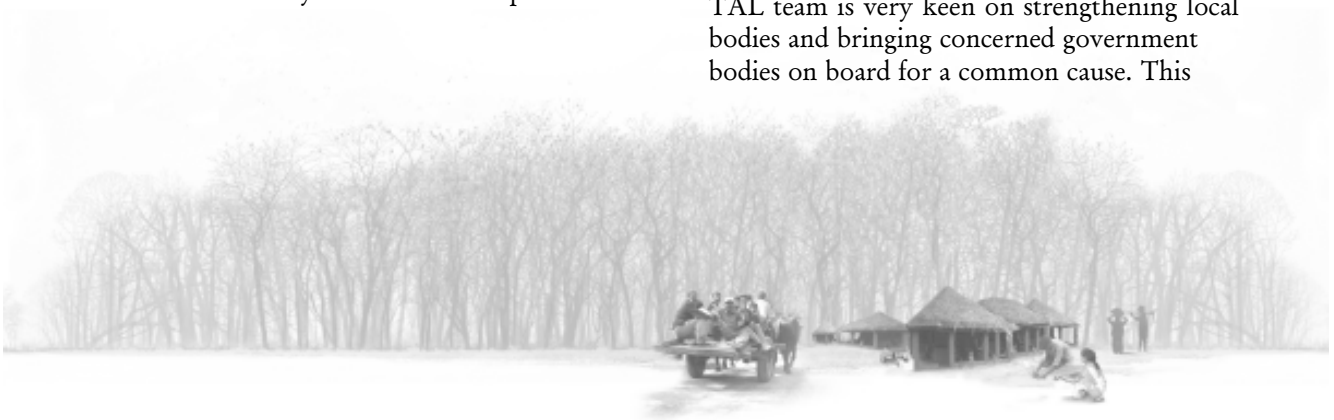
In the vocational training component the support with sewing machines for tailoring of different products did not succeed initially as it could not compete in the market with mass-produced goods. The beneficiaries were then asked to produce simple products for the local market. They are also making mosquito nets for staff of PAs for which subsidy through direct orders is coming from the project. This activity can sustain if products are made to cater to the local market or demand. The activity of medicinal plants through a project supported nursery, is also a partial success as it has not taken off as expected. However, it is likely to meet demand for popular Ayurvedic medicines in the future and therefore should become a sustainable enterprise if properly managed. Both these examples need us to improve our processes for market linkage in local areas so as to further assist the commuity.

TERAI ARC LANDSCAPE

This landscape is a good example of the reducing the dependence of local people on natural resources that can be brought about by working closely with them. The field offices in the landscape have clearly established their own role as that of a catalyst that would help to show the path for economic emancipation of the local population, while at the same time garner their support for biodiversity conservation. While supporting the conversion from fuelwood to LPG through a partial subsidy, the programme is giving additional incentive for educating girls to ensure they spend less time in the forests. An important insight that has been gained is that smaller groups like Self Help Groups (SHGs) are doing better than Village Development Councils which are larger and more formal bodies and thus vulnerable to internal conflicts. The SHGs are empowering the local villagers, especially women groups, to become self-reliant thereby reducing the time that they spend in the forest areas for fuelwood and fodder collection. Constant interaction on common platforms has brought the forest department and the villagers closer with a better understanding of each others' perspective.

A noteworthy achievement in the region has been the establishment of an effective intelligence network which has had a dramatic impact in increasing proactive action against poaching as also the number of seizures. It is critical that this network is nurtured and sustained. The ongoing interim scheme for loss of cattle as also *ex gratia* for human casualties or injuries has proven that prompt action with partial compensation is more effective in preventing retaliatory action against wild predators. It is imperative that villagers have the firm belief that others (including government agencies) care for their life and property. But a stable mechanism for replacing the interim scheme needs to be found.

A variety of methods are also being tested out by villagers to protect their crops and property. An electric fence more than nine kilometers long, has been erected with contribution from the community and the maintenance of the fence is being undertaken by them. This probably one of the longest functional electric fence in the country for wildlife management. The TAL team is very keen on strengthening local bodies and bringing concerned government bodies on board for a common cause. This



would ultimately make for sustainability a long term sustenance.

SATPUDA MAIKAL LANDSCAPE

The success of this landscape hinges around working in close cooperation with the local people and the Forest Department. While the project is working towards providing better livelihood opportunities to the local villagers through a host of income-generating activities such as mushroom cultivation, lac cultivation, poultry, piggery, fisheries etc. the basis is also to reduce the dependence of the local villagers on the forest resources. The other interventions such as providing them with improved *chullahs* (stoves) for better utilization of fuelwood collected improved honey collection methods, where the honey is drained through a small cut made in the hive so that the hive can continue producing honey on a long term basis are examples of initiatives of how forest produce can be harvested sustainably. Coupled with opportunities of better agricultural practices by equipping them with techniques such as vermicomposting and use of organic pesticides and channelizing of existing government subsidies and schemes in the villages that WWF-India is working with, has helped the local villagers into inculcating a pro-conservation approach. WWF-India is working closely with the Forest Department in the landscape and has even been invited by the Government of Chhattisgarh state to help them with conservation management inputs.

The marketing of the produce generated out of the livelihood initiatives remains a challenge; if potential markets can be targeted, the activities will always remain lucrative thereby ensuring sustainability in the long run.

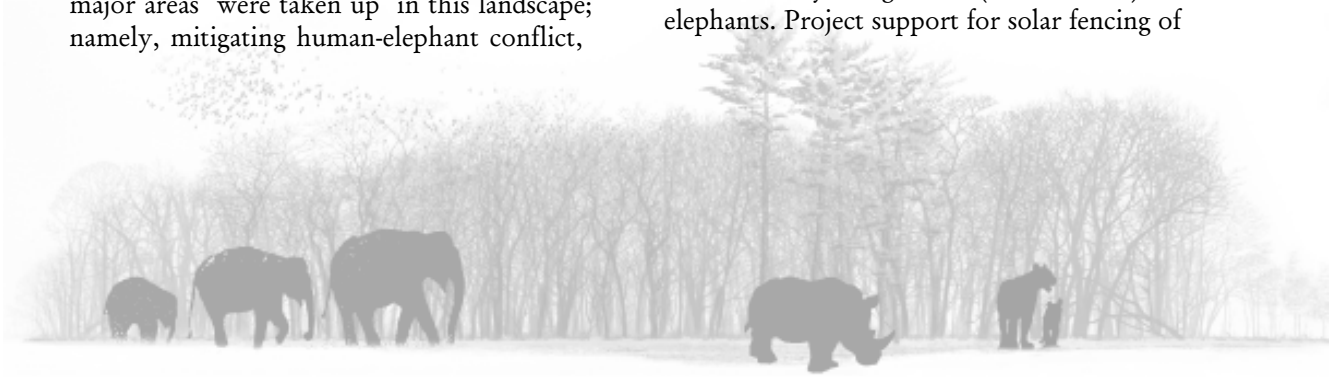
NILGIRIS & EASTERN GHATS LANDSCAPE

As mentioned earlier, activities under three major areas were taken up in this landscape; namely, mitigating human-elephant conflict, reducing biotic pressure on the target corridors, and awareness building with focus on integrating all government and non government agencies under one umbrella . Lessons emerging from detailed study of the human-elephant conflict situation and various measures adopted to protect human life and property have been documented exhaustively. The reduction in the scrub cattle numbers not only implies better health for the forest cover, but alternative livelihoods adopted successfully by many villagers are attracting the attention of others. A very important achievement is the baseline information collected through survey and field studies. The focus is on the Greater Moyar Valley in many ways representative of the situation in the landscape. This data is helping in scientific mapping of the area in terms of forest cover, human settlements and the main occupation of local people, elephant movement routes, critical and threatened corridors that desperately need protection. Any future intervention for biodiversity conservation in the area would need this information.

While much of the work undertaken in the landscape was in the state of Tamilnadu, WWF-India is now looking forward to expanding its work in the state of Karnataka for mitigating Human-Wildlife conflict and reducing poaching.

NORTH BANK LANDSCAPE

The major focus under this project has been the range of mitigation measures tried out to ease the human-elephant conflict situation in Sonitpur district of Assam. Mitigation of elephant-human conflict and creating a sense of security among the local population were identified as the most important measures in the short term. WWF-India has come up with a "Sonitpur model" of mitigating Human-elephant conflict, which is being implemented by the Forest Department of Assam, which is a combination of driving wild elephants back into the forest areas by using *Kunki* (domesticated) elephants. Project support for solar fencing of



croplands in several pilot villages have also proved to be a success and, seeing the benefit, local people are willing to contribute to its maintenance. Since the last two years, average elephant and human death due to conflict situation has gone down and crops and property worth millions of rupees has been protected. Studies undertaken in the area have revealed that efforts of WWF-India has resulted in saving crop damage worth more than 80 times the investment made for mitigating Human-Elephant conflict. WWF-India is working towards building a database of Human-elephant conflict on the landscape. All major crop raiding tracks and the hotspots from where the elephants enter human habitations have been identified. Work on raising awareness and know-how among key stakeholders including the forest department, police, local communities and other NGOs is being carried out. A landscape level strategy for dealing with Human-Elephant conflict at a regional level has also been devised and is currently in its implementation stage.

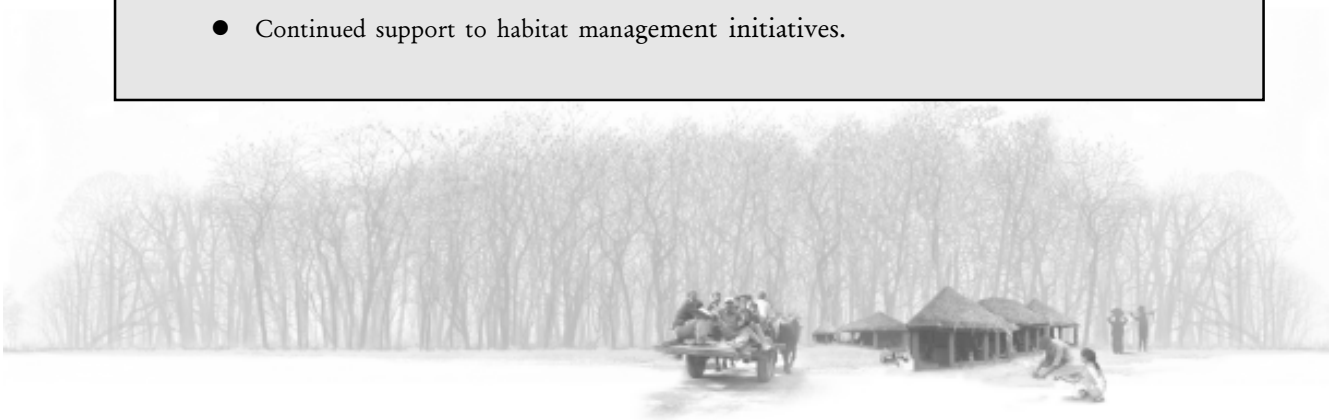
PROFILE OF NEW INITIATIVES

Most of the landscape programmes have now reached a stage from where the work needs to be consolidated and upscaled. There have been some significant achievements made in the recent past. Working in close coordination with the Forest Departments, as well as other line departments of the government has provided an avenue to magnify the impact of WWF-India's work. TRAFFIC-India has become fully operational and is working closely in tandem with WWF-India. The governments of Assam and Karnataka have invited WWF-India to provide solutions for mitigating Human Elephant conflicts.

It is vitally important that WWF-India's experiences in the field should be shared for the benefit of the endangered species that walk the brink of extinction in a planet that was given to us all to share. This publication makes a modest contribution to that end.

Future Plans

- Support packages and community benefiting initiatives in Ranthambhore and Sawai Man Singh Sanctuary, Rajasthan
- Support for mitigating conflicts and protecting lions in Gir National Park, Gujarat
- Conducting studies in human-animal conflicts areas of India
- Conservation inputs to selected areas in Orissa
- Continued support to Forest Departments in India both in developing capacity and with critical equipment
- Supporting dialogues and combined inputs and sharing best practices with staff and government agencies in Nepal, Bhutan and Bangladesh and Sri Lanka.
- Assisting other State Governments on human-elephant conflict, using the experiences of lessons learnt
- Up scaling educational and awareness activities across the landscapes and other areas
- Expanding our reach to support additional critical corridors in our landscapes
- Continued support to habitat management initiatives.



MILESTONES: 1996-2007

JUNE- DECEMBER 1996

- WWF- India establishes a Tiger Conservation Cell with a grant of US $ 100,000 from WWF- UK
- Publication of 'Tiger Conservation Strategy and Action Plan'
- Publication of 'Tiger Call'

1997

- WWF International and WWF India agree to set up WWF Tiger Conservation Programme (TCP) with a committed grant of Swiss Francs 1.8 million for three years.
- Thomas Mathew takes over as the first Director
- Six months Work Plan formalized and the following seven tiger areas selected for support and evaluated:

  Corbett Tiger Reserve, Dudhwa Tiger Reserve, Periyar Tiger Reserve, Palamau Tiger Reserve, Kaziranga National Park, Bandhavgarh Tiger Reserve, Manas Tiger Reserve
- Support to first seven Parks commences.
- The following nine additional PAs selected for TCP support in consultation with the State Forest Departments and the needs assessment of the nine additional PAs begins:

  Kalakad-Mundanthurai Tiger Reserve, BRT Wildlife Sanctuary, Satkosia Gorge Wildlife Sanctuary, Tadoba-Andhari Tiger Reserve, Valmiki Tiger Reserve, Mahananda Wildlife Sanctuary, Katerniaghat Wildlife Sanctaury, Pakhui Wildllife Sanctuary, Nameri Wildlife Sanctuary.
- Support to the PAs is initiated after receiving approval from the respective State government.

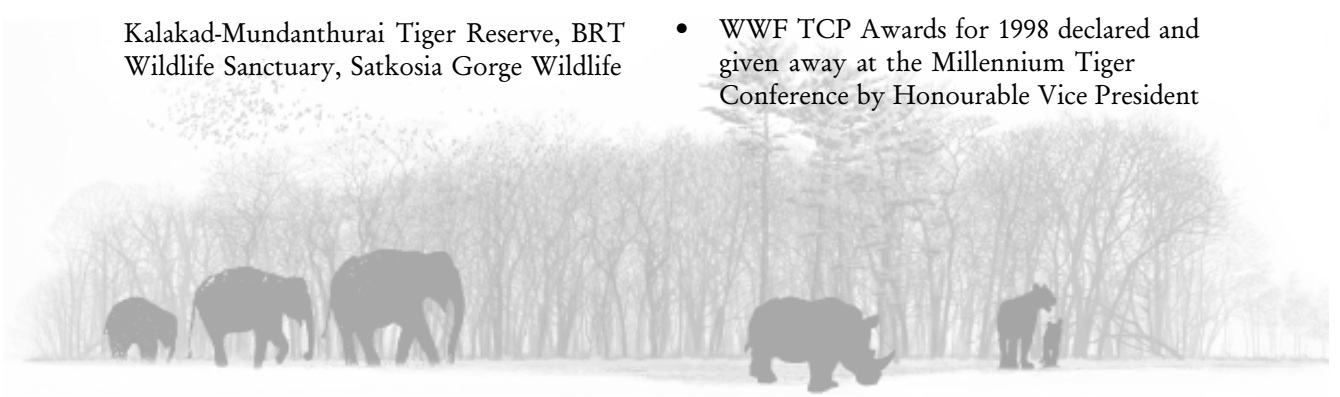
1998

- Controlled major tiger poisoning crisis in the terai. Field situation evaluated and the highly successful Cattle Compensation Scheme launched scheme continues.
- Scheme launched to curb Akhand Shikar in Similipal Tiger Reserve. This was subsequently taken over by local NGOs.
- Support from Tiger Emergency Fund (TEF) reaches Kaziranga to help fight the devastation caused by floods.
- Support to the already selected 16 PAs continues
- The following additional PAs selected for TCP support:

  Sariska TR, Orang National Park.

1999

- Indo-Nepal Meeting held for Trans-border cooperation.
- WWF TCP Awards for 1998 declared and given away at the Millennium Tiger Conference by Honourable Vice President



of India Sri Krishan Kant .

- 'Tracking Tigers-A field guide for estimating Tiger populations in the wild' published.
- Legal training for field staff in selected PAs carried out.
- WWF TCP Awards declared and presented for 1999 by Honourable chief minister of N.C.T Delhi Smt. Shiela Dixit
- Additional Park supported:

Sunderbans Tiger Reserve

- 'WWF Tiger Conservation Programme - Three Years and Beyond' a publication of the TCP released.

2000

- WWF meeting in Jakarta on landscape approach for tiger conservation and selection of tiger landscapes in India.
- MOUs signed with Nepal and WII for collaboration in the Terai Arc landscape
- TEF support to Panna TR.
- Rajaji NP evaluated and support was initiated
- AREAS India Programme placed under the Tiger Division.
- Additional support to PAs continues.
- WWF-India and PATA Tiger Conservation awards for 2000 are announced and presented.

2001

- TEF support to Corbett Tiger Reserve.
- TEF support to Dudhwa Tiger Reserve.
- Additional support to PAs continues
- AREAS: NBL and NIlgiris Landscape work started

2002

- WWF-India and PATA Tiger Conservation awards for 2001 are announced and presented jointly by Honourable minister of Tourism Shri Jagmohan and Shri N.D.Tiwari.
- Support provided to the following additional Parks:

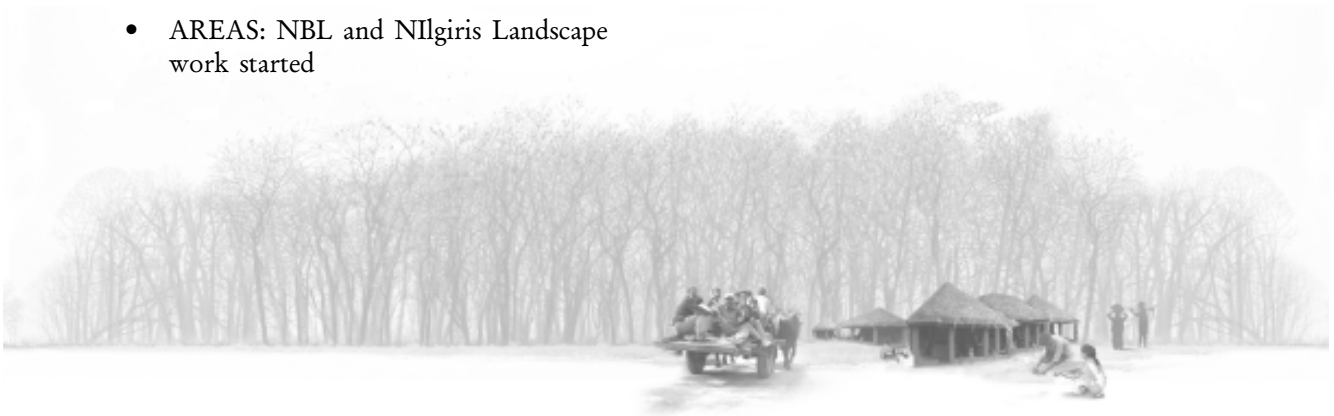
  Satpuda TR, Kanha TR, Phen WLS, Melghat TR, Achanakmar WLS, Similaipal Tiger Reserve, Bilaspur Forest Division, Additional support to PAs continues.
- Launch of landscape projects with the establishment of field offices in Satpuda Maikal Landscape and Terai Arc landscape.
- Sundarban landscape work started.
- Funds to Sariska Tiger reserve for water management in the face of a drought.

2003

- AREAS: NBL Phase one completed with a workshop in Guwahati.
- TEF support for Ranthambhore Tiger Reserve and Sariska Tiger Reserve to avert major water crisis situation.
- Support provided to the following additional Parks:

  Panna TR, Palpur-Kuno WLS, Pilibhit Forest Division -Lagga Bagga, Bhoramdeo Wildlife Sanctuary,

  Kawardha Forest Division and Chilpi Range.
- Funds to Kaziranga for flood relief.
- TAL Corbett (AREAS) work started.
- AREAS: NBL Second phase started.



2004

- Self Help Groups formed under TAL programme to ensure participation of local communities in mitigating human-wildlife conflict.
- 28 Kg ivory, two leopard skin and one tiger skin seized with the help of informer network developed by TAL-Programme.
- CTR and Ramnagar Forest Division were evaluated and direct infrastructure support extended.
- Self Help Group at village Kunkhet initiated stitching and selling jute bags for garbage disposal to the Corbett Tiger Reserve.

2005

- Establishment of TAL field office in Kotdwar to deal with major linkages between Rajaji National Park- Lansdowne Forest Division- Corbett Tiger Reserve.
- Under TAL programme Eco-clubs were formed to ensure participation of youths in conservation endeavor.
- To mitigate crop damage by elephants, solar fence was erected in Githal village of Kotdwar sector of TAL Programme.
- After evaluation direct support extended to Lansdowne Forest Division (LFD) and Terai West Forest Division (TWFD) for enhancing the anti-poaching capabilities.
- First time elephant reported in Ampokhra range of Terai West Forest Division
- Medicinal plants worth Rs. Ten Lac were seized TAL-Ramnagar.

2006

- IRV 2020 Programme was launched.
- Capacity building in NEG launched.
- Conservation alliance of NGOs in Assam launched.
- Community activites in SML consolidated.
- TRAFFIC India starts operations in India.

2007

- A nine kilometer long electric fence commissioned in TAL
- WWF-India invited to assist in preparation of management plans for Chhattisgarh.
- WWF-India approached by the state governments of Assam and Karnataka to find practical solutions to Human Elephant Conflict.
- WWF-India launches signature campaign to support the cause of tiger conservation.
- WWF-India starts conservation work on critical species: The lions and Nilgiri Tahr.

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