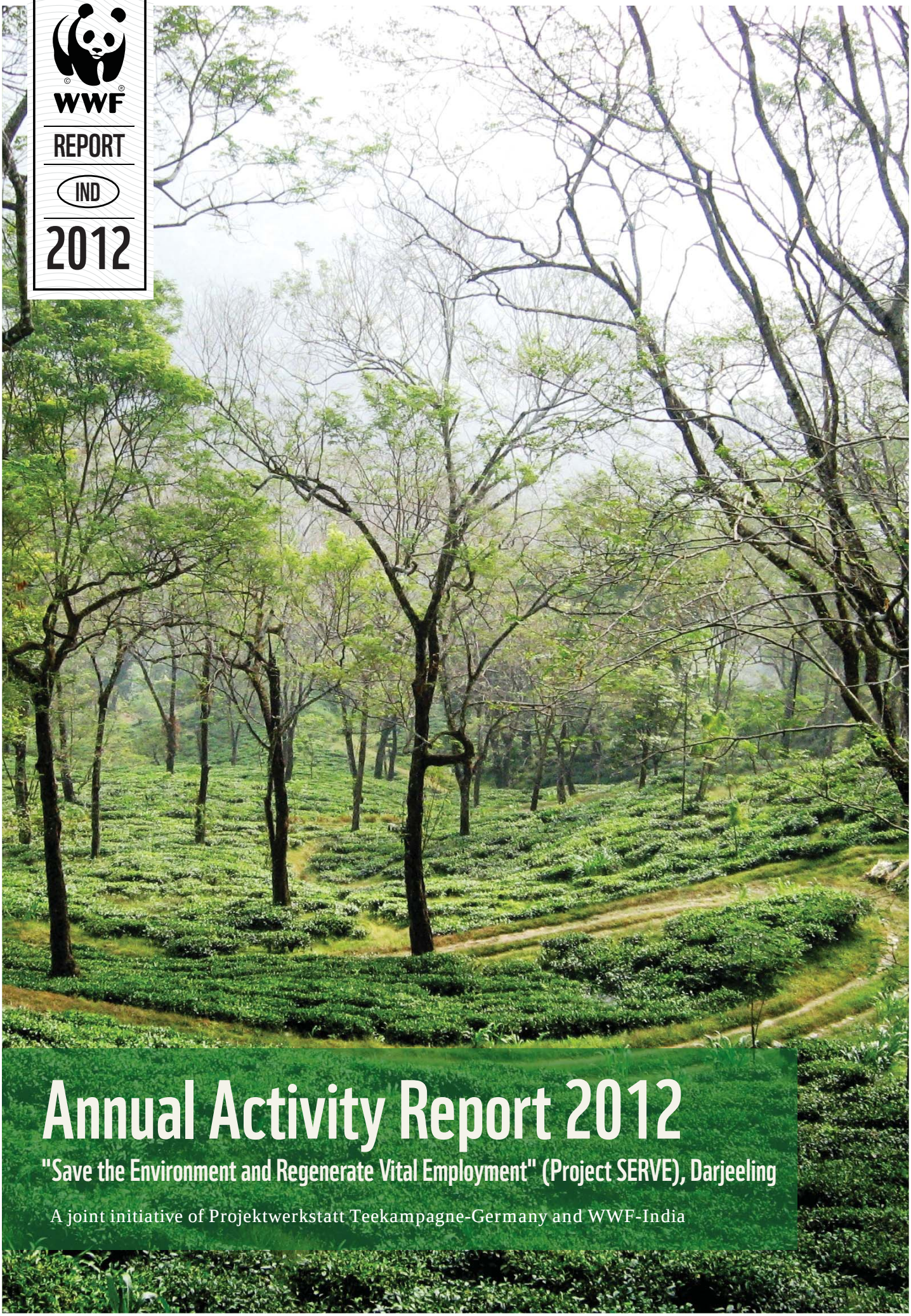
WWF

REPORT

IND

2012



Annual Activity Report 2012

"Save the Environment and Regenerate Vital Employment" (Project SERVE), Darjeeling

A joint initiative of Projektwerkstatt Teekampagne-Germany and WWF-India

Published in September 2013 by WWF-World Wide Fund For Nature
(Formerly World Wildlife Fund), Darjeeling, India.

Designed by: Aspire Design, New Delhi

Front cover photo: © Deependra Sunar / WWF-India

Annual Activity Report 2012

"Save the Environment and Regenerate Vital Employment" (Project SERVE), Darjeeling

A joint initiative of Projektwerkstatt Teekampagne-Germany and WWF-India

TABLE OF CONTENTS

FOREWORD

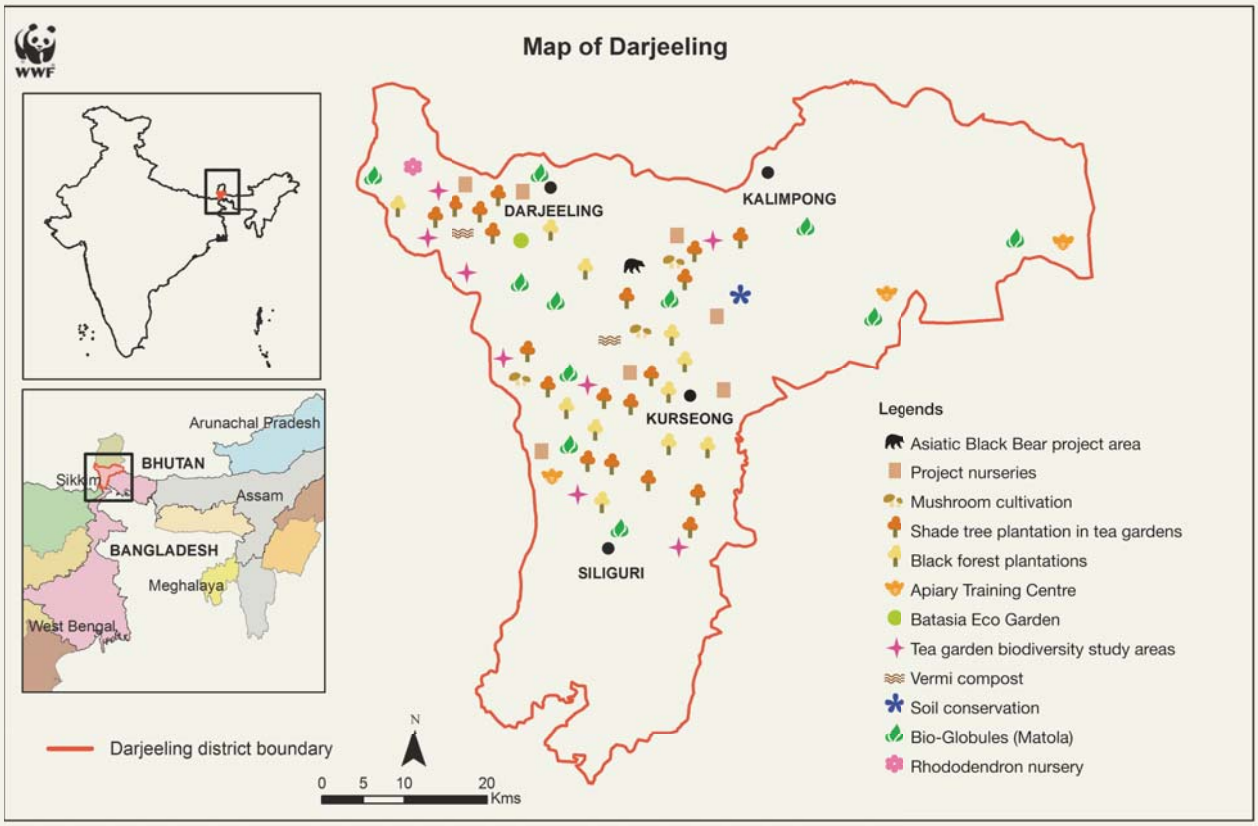
"The one land that all men desire to see, and having seen once by even a glimpse would not give that glimpse for the shows of the rest of the world combined." Mark Twain

I would like to join Mark Twain in his praise for Darjeeling. However, we must be aware that the beauty of Darjeeling's flora and fauna is a very fragile one. For far too long, we have literally bitten the hand that feeds us. Thus, it is very comforting to know that with our Project SERVE, we have a very committed team that ignites the flame of environmental awareness among all stakeholders of Darjeeling. Be it reforestation activities or endeavours to improve the livelihood for the local communities – the list of activities is impressive.

This richly illustrated report gives you a notion of the work and I hope that you enjoy reading and looking at it as much as I did.

Prof. Dr. Günter Faltin
Projektwerkstatt GmbH/Teekampagne

PROJECT AREA PROFILE



Location
Darjeeling District, West Bengal, India

Total Area of the District
3148.74 Sq Km.

Geographical Location
270 16' 05´& 260 27' 10" N Latitude and 880 53' 0" & 870 59' 30" E Longitude

Altitudinal variation
130 m– 3660 m

Geological formation
The rocks forming the hills covered by the forest are mostly crystalline gneisses, granites or metamorphic and schist.

Physical features
Darjeeling hills are divided into two by the deep gorges of the river Teesta. To the east of it, lie the Kalimpong hills, with mountain peaks rising to over 2000m. Rivers radiate in all directions from these hills and flow into the Teesta. Tiger hill is the tourist hub and the following spurs radiate from it in all directions: 1) Darjeeling ridge to the north, 2) Takdah spur to the east 3) Dowhill ridge to the south and 4) Ghoom ridge to the west.

Soil Texture
Brown earth soil here is mainly sandy loam and porous with poor holding capacity. Soil reaction is acidic (pH 4.2-5.8) in most places. Erosion of soil and leaching of bases is heavy. Micronutrient deficiency is common.

1. INTRODUCTION

The Project “Save the Environment & Regenerate Vital Employment” (SERVE) has been implemented in Darjeeling hills by WWF-India since 1996 with funding support from Projektwerkstatt Teekampagne, Germany. The Project aims for nature conservation through people’s participation in its reforestation programmes, community based livelihood augmentation activities, strengthening local community based organizations in conservation initiatives, beneficiary oriented nurseries and nature education campaigns.

Darjeeling is the northern most district of West Bengal, located at the foothills of the Eastern Himalayas; surrounded by Sikkim state in the north and three neighboring countries (Nepal, Bhutan and Bangladesh) in the west, northeast and southeast, respectively. Darjeeling covers an area of 3149 sq. km, with an altitudinal variation of 92 meters to 3636 meters, where species diversity varies from tropical to sub alpine habitats.

The Eastern Himalaya is among the youngest, largest, highest and most complex mountain systems in the world, covering about 3000 km, from east to west. During the last 3 decades, the increasing biotic pressure has become hazardous, which has accelerated landslides and soil erosion. Himalayan mountains support successively sub-tropical, temperate and alpine vegetation in response to increasing altitude and at the same time they are helpful in preserving soil systems. Moisture rich, broad-leaved forests of Himalayas are considered vast reservoirs of water since time immemorial. These forests are particularly important because they protect soil cover and areas downstream from excessive floods and other harmful fluctuations in stream flow. But the denudation of Himalayan forests in the recent past has resulted in recurrent soil erosion in these mountains, which in turn has resulted in the drying up of springs and increasing intensity of floods in adjacent plains.

The Eastern Himalaya region is suffering from severe ecological problems as a consequence of deforestation that has threatened subsistence of the population in the region. The region also suffers from fierce development processes. The impact of tourism, unplanned infrastructure development, increased need for fodder, use of chemical fertilizer both in agriculture and tea gardens, lack of employment opportunities and volatile political situation has led to immense environmental degradation in this region.

Through Project SERVE, more emphasis is being given on educating the masses on consequences of deforestation, the after effects of climate change, global warming and the need for working together to combat the existing situation.

2. PROJECT OBJECTIVES

The main goal of Project SERVE is to reinstate the environment of Darjeeling hills with active participation of general public, government officials, local community members and groups, nature club students and teachers of schools, Army personnel, local NGOs, tea garden management, media and local elected administrative bodies at block levels.

The project has the following four objectives:

- Ecological restoration of Darjeeling Hills - This is done by improving and protecting the floral and faunal habitats and water sources.
- Generating income and employment - Carried out through reforestation and farming based on people's knowledge for alternative livelihood programmes.
- Environmental education - This is done through awareness programmes for communities and schools.
- Conserving threatened species - This is carried out in collaboration with the forest department and local communities.

The project works with marginalized people, with majority of the target population coming from villages around Protected Areas and tea gardens. They are mostly dependent on agriculture, forest produce and tea gardens.

3. ACTIVITIES

3.1. Ecological Restoration

© PEMBA BHUTIA / WWF-INDIA

Forests play an important role in the conservation of our complex environment. They offer better protection to the soil and water regimes. The depletion of forests not only degrades our environment, but it also has negative effects on our economy. Forests are under pressure from various degrading forces, either "natural or anthropogenic". The natural disturbances are landslides, earthquakes and natural competition between species and diseases which are responsible for the depletion of flora of the region. The anthropogenic disturbances occur in form of grazing, lopping for fuelwood and fodder, fire and deforestation. The overexploitation of plant and animal species plays an important role in the destruction of the habitat.

Plantation of indigenous species is a major initiative of Project SERVE in Darjeeling. There has been much pressure on the natural environment in a part of the area. To restore the degraded, eroded and infested lands was a tough task. Coordination with government agencies, local communities and various stakeholders like tea garden management, educational institutions, local elected administrative bodies and community organizations was very important in building up the initial foundation for restoration work. The work involved acquiring approval of the site from various departments like forest department, wildlife division, tea gardens and educating local people about the need to conserve the area for future generations and the importance of their participation; forming a strong local group and training them on different technical aspects of reforestation and conservation; giving them enough space on planning, monitoring and evaluation of these projects; helping them gain a sense of ownership, and guiding them for long term strategic planning.

© SANJEEB PRADHAN / WWF-INDIA

Since the inception of Project SERVE in 1996 in Darjeeling, the project has planted 28,79,203 saplings so far including shade tree species.

Annexure-1: Details of saplings planted by Project SERVE since 1996-2012

3.1.1. Block Forest Plantation (BFP)

Block Forest Plantation (BFP) is one of the major activities of Project SERVE. Plantation of indigenous tree saplings in areas identified by local communities, tea garden management and government officials as degraded and prone to landslides, important to wildlife habitat, water catchments and sources. Most of the plantation sites are in a bad state and pose a threat for possible future erosion which needs tremendous support of local people, both in terms of time and effort. The involvement of all key stakeholders and partners are critical factors in the implementation of Project SERVE restoration programme. This year a total of 83,000 saplings of mixed forest species have been planted in different areas of Darjeeling.

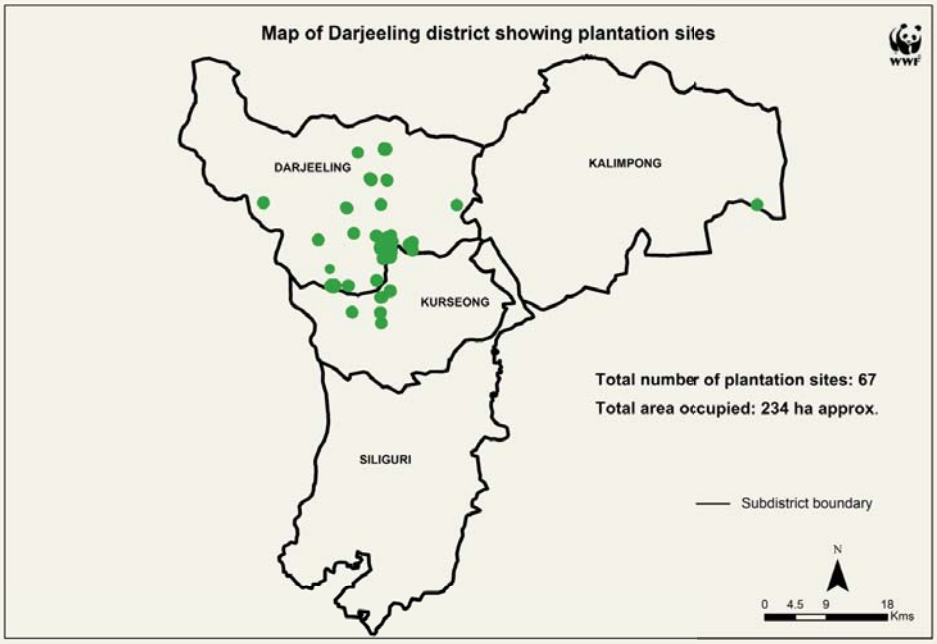
Map showing total area occupied by Gorabari Landslide Plantation: 47.6 Hectares

BFP is carried out in a systematic way. At first the restoration site is selected and a map of the area is prepared with the help of coordinates obtained through a GPS unit. Other essential activities like weeding, cleaning and pit digging are done prior to the monsoon with the involvement of local people and other stakeholders. Seedlings for plantation are supplied from Project SERVE's community nurseries located at various locations. Plantation is done during the monsoon period of June-July. Cleaning, bush cutting, and infilling of the site are done twice after plantation during Oct-Nov and Mar-Apr. Maintenance work of the BFP site is done continuously for 3-4 years before it is handed over to the local community, tea garden management or the Forest Department according to its ownership.

Map showing total area occupied by Paschim Plantation: 10 Hectares

After 17 years of plantation on various site conditions, most of them degraded, eroded and infested, project staff surveyed some of these sites to understand the survival status of the planted saplings. The abstract of the survey process is mentioned below:

a. Permanent sample plots were established using GPS and measuring tape on each BFP site.



b. The number of plots was determined with the area of the site from 10 to 30 plots assuming 30 percent representation of the whole plantation area.

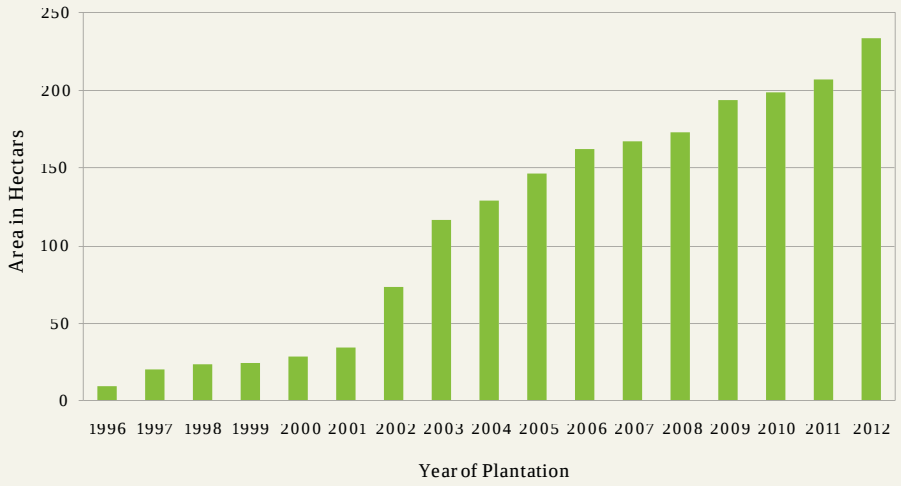
c. A plot size of 10 mt by 10 mt was marked and a reading of Latitude, Longitude and Altitude was recorded.

d. The number of planted saplings along with their height and the dead saplings were counted and noted down on a data sheet.

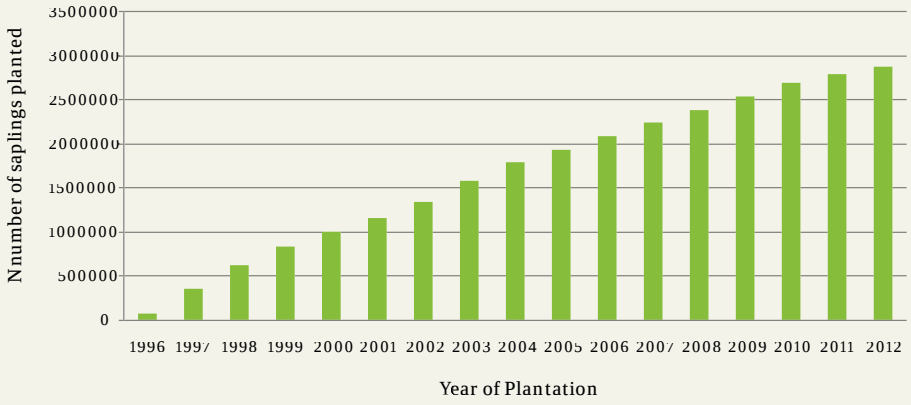
e. These data of each individual plot were then computed to represent the survival percentage of the site.

f. Each year the same process will be used on selected permanent plots to understand the growth and survival pattern.

Progressive increase of area of BFP

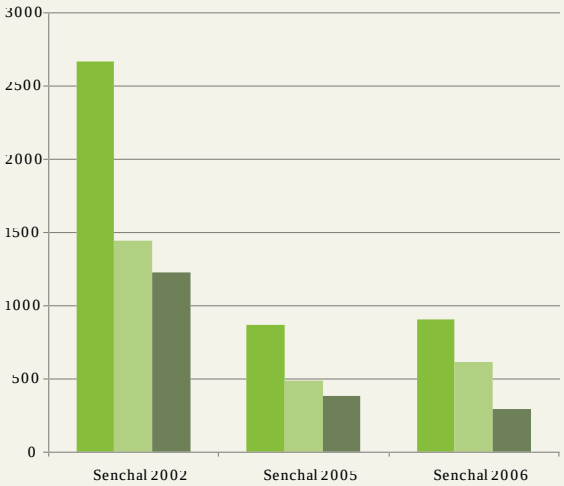


Progressive increase in number of saplings planted



A study will be undertaken to understand the sustainability of the plantation work and based on that a decision will be taken for future work.

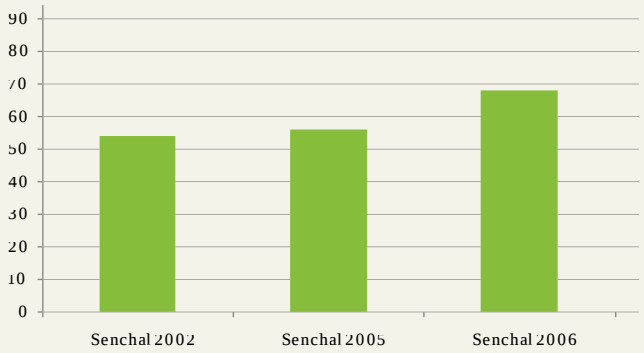
Plantation Details



Details of the total saplings planted had different sites and the total no of saplings that survived and died at each sight

The survival percentage of some of the project BFP sites are as follows:

Survival Percentage



The graphs shows that the survival percentage of saplings has increased over the years suggesting an improvement in plantation techniques and post plantation care of plantation sights.

Annexure-2: Details of Block Forest Plantation -2012

Annexure-3: Block forest plantation areas of Project Serve BFP

3.1.2. Shade Tree Plantation in Tea Gardens of Darjeeling Hills

Tea cultivation was started in 1840 by Dr. Campbell and within a short time Darjeeling tea achieved the world wide popularity. Due to the favorable climate, adequate rainfall, sloping terrain and above all the cultural heritage of hill people working in the tea gardens for their livelihood, Darjeeling tea became one of the world's most preferred beverages.

In the long history of Darjeeling tea gardens, focus has been mostly on the production of quality tea to cater to the demand from European markets with little attention paid to the management of biodiversity of the area. WWF-India through Project SERVE has been collaborating with tea gardens of the Darjeeling hills for conservation of the tea garden environment and distribution of shade tree saplings for plantation.

The beneficial effects of shade trees in tea plantations were realized long ago in Northeast India. The "Siris" (*Albizzia chinensis*) was the first leguminous species with fertilizing properties. Gradually, other leguminous species were introduced as shade trees in tea gardens. Since early 1940s, extensive investigations were carried out on various effects of shade trees on tea plants related to leaf temperature, light interception, photosynthesis, portioning of assimilates, incidence of pests/diseases, moisture conservation, addition of nutrients to soil, root aeration and nitrogen fixation. The information generated showed the following benefits of shade trees in tea gardens:

© SANJEEB PRADHAN / WWF-INDIA

- A tree sp. with a single layer canopy composed of small leaflets which intercept 30-50% of the available sunlight in the form of sun-flecks is considered an ideal shade tree. The *Albizzia chinensis* meets this requirement the best.
- Optimum population of shade trees helps to conserve soil moisture by 1-3 % during the dry season and lowers the leaf temperature by 2-4 ^{0}C.
- Deep rooted shade trees help in conserving soil moisture during period of stress.
- Shade trees (*Albizzia chinensis*) add 2500-5000 kg/ha/per year of organic matter to the tea fields through dropping leaves, twigs and pods.
- The rate of development and proliferation of feeder roots of tea is high under shade trees.
- Shade trees absorb/reflect over 70% of harmful infra-red radiation from the solar spectrum thus protecting the tea bushes from sunscorch damage.
- Positive effects contributed by shade trees cannot be replaced by additional application of nutrients.
- Optimum shade density reduces transpiration loss of water and enhances photosynthetic efficiency and helps in the mobilization of nutrients.
- Under shade trees a large proportion of assimilates is diverted to pluckable shoots thereby increasing the yield.
- Effective shade reduces the incidence of red spider and other mites.

During 2012, Project SERVE planted 2,800 saplings of shade tree species (*Albizzia sp. and Melia azadirachta*) in Takdah, Rohini and Selimbong, 3 different tea gardens of Darjeeling. Till date, since 2004, Project SERVE has planted 3,51,445 shade tree species in various tea gardens.

Annexure-4: Details of Shade Tree Plantation by SERVE since 2004-2012

Annexure-5: Details of Shade Tree Plantation-2012

3.1.3. Soil conservation at landslide affected areas

© PEMBA BHUTIA / WWF-INDIA

Soil conservation is a set of management approaches for prevention of soil erosion from the Earth's surface. It is a combination of methods of management and land use that safeguard soil against depletion or deterioration by natural or man-made factors. It most often attempts to prevent soil from eroding and washing out. Due to various anthropogenic disturbances, many areas of the Darjeeling hills are affected by landslides and soil erosion.

WWF-India through Project SERVE identified some areas adjoining the Protected Areas which are ecologically significant to the conservation of flora and fauna of the region. These areas were Chatakpur and Rampuria forest villages. Vegetative measures of soil conservation techniques were undertaken at both the sites with the help of local people and forest department officials. Soil binding species such as *Symingtonia populnea* (pipli), *Eriobotrya petiolata* (maya), *Alnus nepalensis* (utis), *Syzygium tetragonum* (khapal) etc were planted along the eroded sites. Vegetative check dams were constructed first with the help of bamboo stacks each at a distance of 1.5 meters along the eroded sites. These structures help in binding the top soil and prevent further runoff during the monsoon thus safeguarding the area from further erosion.

3.1.4. Training and distribution of bio-globule (briquette) molding machines

Bio-globule or briquette is an efficient and environment friendly fuel substitute for cooking and heating. It is a blocks of compacted material suitable for burning in household stoves/ hearths. It is made by making coal out of waste twigs, weeds, wooden chips, and mixing it with soil and water and pressing it into compact materials in a molding machine which are then left to dry before use in cooking and heating.

© RIKCHEN ZIMBA / WWF-INDIA

These briquettes can be used as a fuel needed for heating instead of charcoal, firewood or electricity and cost less as the materials are easily available in and around villages. They burn cleaner than charcoal without producing smoke and are thus good for health as well. They are an attractive source of energy because they reduce waste as well as the demand for non-renewable fuel and cut down the pressure on forests for fuel wood requirement. Further, invasive plants like *Eupatorium, Lantana, Bidens pilosa,* etc. can be partially decomposed and used for making these briquettes. This will ultimately help in clearing

© SANJEEB PRADHAN / WWF-INDIA

of such weeds and restore healthy forest environment. They are also a good replacement for fossil fuel such as oil and coal and produce warmer, long lasting heat. Besides being environment friendly, the surplus briquettes can be sold in local markets, thus enhancing livelihood of rural people.

Annexure-6: List of training and distribution of briquette making machines

3.1.5. Conservation of Rhododendron species

Rhododendrons are one of the most beautiful and significant plant species of Darjeeling Himalayas. They play an important role in the ecosystem of the hills. Rhododendron comes from the Greek words 'Rhodos' meaning 'Rose' and 'Dendron' meaning 'Tree'. It is the largest genus of the 'Ericacea' family with as many as 1200 species found naturally.

However, deforestation, loss of habitat, and extraction for firewood purposes has threatened the survival of this species and resulted in a steep decline in the wild. Therefore, Project SERVE initiated Rhododendron conservation by educating people and by raising saplings in Project supported nurseries at Tonglu and Chatakpur villages. This year 2500 rhododendron saplings were planted at various BFP areas of the project.

3.1.6. Biodiversity study of tea gardens of Darjeeling Hills

The biodiversity study of tea gardens was done at randomly selected 12 tea gardens from Darjeeling District. They were Arya, Avongrove, Dhajea, Ging, Marybong, Rohini, Selimbong, Shree Dwarika, Sourini, Teesta Valley, Tukdha and Tukvar.

© RIKCHEN ZIMBA / WWF-INDIA

A total of 417 species of plants were reported from the study area, out of which 149 were trees, 68 were shrubs and 200 were herbs. The trees of *Albizzia chinensis, Albizzia lebbek, Melia azadirachta, Macaranga* sp, *Alnus nepalensis, Cryptomeria japonica, Engelhardtia spicata* were reported from all the gardens. *Albizzia* species and *Melia azadirachta* were planted in gardens to provide shade to the tea bushes at lower altitudes. In the case of shrubs, *Artemesia indica, Rubus mollucana, Thyanolena maxima, Urnea lobata* were recorded from almost all the studied tea gardens. In the case of herbs, *Ageratum conyzoides, Bidens pilosa, Centella asiatica, Crassocephalum crepidioides, Drymaria cordata, Eupatorium adenephorum, Oplisminus* sp, *Oxalis corniculata, Polygonum chinensis, Polygonum runcianatum* were recorded from almost all the studied tea gardens.

The frequency of occurrence (%) was calculated of major trees, shrub, herbs and ferns. Out of 149 trees, the highest frequency of occurrence among trees was that of *Albizzia chinensis, A. lebbek, Schima wallichii, Alnus nepalensis, Cryptomeria japonica, Engelhardtia spicata, Macaranga* sp, *Melia azadirachta*. Out of 68 shrubs, highest frequency of occurrence was that of *Rubus mollucans, Thysanolena maxima, Urnea lobata, Artemesia indica, Dichora febrifuga* and *Lantana camara*. Out of 200 herbs, the highest frequency of occurrence was that of *Drymaria cordata, Eupatorium adenophorum, Oxalis corniculata, Polygonum chinensis, P. runcianatum, Ageratum conyzoides, Bidens pilosa* and *Crassocephalum crepidioides.*

In the case of mammals, only barking deer, Himalayan striped squirrel and Indian hare were directly sighted. The other animals reported to be present by the locals were goral, Chinese pangolin, leopard cat, jackal, Assamese macaque, common leopard, Asian elephant (Rohini Tea Estate), Himalayan palm civet, wild boar, yellow throated marten and Himalayan crestless porcupine. Most of the birds directly sighted were chestnut crowned warbler, great hill barbet, blue whistling thrush, red vented bulbul, common green magpie, black bulbul, oriental turtle dove, long tailed shrike, little pied flycatcher, verditer flycatcher, black drongo, rufous treepie, greater flameback, pied bushchat, Himalayan bulbul, common hoopoe, Indian roller and crested serpent eagle. Some of the bird species which were not directly sighted but were reported by the locals are Khaleej pheasant, red jungle fowl and Indian peafowl.

3.1.7. Nursery raising training at Chamong and Chatakpur

Project SERVE provided a two days practical training on nursery raising techniques to the farmers of selected villages of Darjeeling and Sikkim. First training was organized at Chamong Tea Estate during June 2012 and second

event was held at Chatakpur project nursery during February 2012. The farmers from Dhajea TG, Nagri Farm TG, Chamong TG and Lanku Valley were trained on all the aspects of raising forest saplings in the nursery.

The following topics were covered during the training:

a. Nursery site selection
b. Seed collection techniques
c. Seed treatment
d. Nursery bed preparation
e. Sowing and planting
f. Mother bed preparation
g. Transplanting and potting
h. Watering, composting, weeding and soil working
i. Lifting for plantation

3.2. Livelihood & Income Generation Activities:

In order to reduce the dependence of local communities on forests and provide them with alternate and sustainable livelihood options, WWF-India through Project SERVE has been carrying out the following livelihood activities:

3.2.1. Apiculture training and workshop

Apiculture comes from the Latin word 'Apis' meaning bees. Beekeeping or apiculture is the preservation of honey bee colonies in hives, by humans. People rear bees in order to collect honey and other products of the hive including beeswax, propolis, pollen and royal jelly, to pollinate crops and flowering plants, or to produce bees for sale to other beekeepers.

© RIKCHEN ZIMBA / WWF-INDIA

Since the inception of Project SERVE in Darjeeling, promotion of apiculture as an alternate source of livelihood has become a major activity. The objective

© PEMBA BHUTIA / WWF-INDIA

of this programme is to provide technical training leading to skill development of the farmers and to enhance their income through honey production. It also aims to improve the environment of Darjeeling hills.

Project SERVE conducted a 3 day technical training to the farmers in two different phases. Apiary equipment like ISB Newton type bee box 10F size, honey extractor machine, rubber hand gloves, bee veil, knife for comb cutting, queen gate standard, smoker, queen cage and drone door among other things.

Annexure-7: List of Apiary training participants 2012

3.2.2. Sapling raising in Project SERVE nurseries

© RIKCHEN ZIMBA / WWF-INDIA

Nurseries are places where planting stocks are produced – seedlings and saplings of forest trees and shrubs which are ultimately planted in degraded areas.

A total of 86,900 saplings of various indigenous plants were raised and distributed to different areas for plantation. Before deciding on the species and location of the nursery, the objective of plantation is first decided upon, whether the seedlings are required for soil conservation, for shade trees or for the purpose of developing a mixed forest. This year, 12 different nursery sites were selected for raising various species for different purposes. The nursery site also varies in altitude, starting from 900 meters (Singla) to 3070 meters (Tonglu).

© RIKCHEN ZIMBA / WWF-INDIA

Project SERVE supports these nursery farmers with necessary equipment like agro nets, silpauline, water cans, polypots and some seeds of important species like Rhododendron, *Juglans regia*, *Alnus nepalensis*, *Quercus* and more during the establishment of a nursery. Apart from raising forest saplings, Project SERVE is also helping in improving the livelihood of these farmers by paying them Rs 2.00 per sapling that they provide.

Annexure-8: Major species grown in Project SERVE Nurseries

Annexure-9: Details of seedlings supplied by Project SERVE Nurseries-2012

3.2.3. Participation at agriculture fair

WWF-India participated in the agriculture fairs organized by the district administration and the Agriculture Department of Darjeeling at Jamune and Mangphoo. The Sunakhari Self Help group of Phoobsering TG and Apiary and Agro Beneficiary Committee of Bungukulung village participated in the fairs and trained all the visitors in apiculture and briquette manufacturing. They also sold their products at the fairs.

© PEMBA BHUTIA / WWF-INDIA

3.2.4. Mushroom cultivation

© DEEPENDRA SUNAR / WWF-INDIA

Project SERVE initiated mushroom cultivation in the villages adjoining the Protected Areas and tea gardens, namely Nirmal farm of Rangbull forest village, Shree Ganesh Self Help Group (SHG) of Rampuria forest village and Makhamali SHG of Chamong Tea Estate. The project organized a 3 days technical training in each of these villages and also supported these groups with mushroom seeds and other accessories like silpauline, straw, and medicines.

The two important objectives behind mushroom cultivation are:

a. To generate a relatively cheap source of high protein food for the people living close to the Protected Areas of Darjeeling and

b. To conserve the biodiversity of the area and maintain a balanced ecosystem.

Annexure-10: List of mushroom cultivation units

3.2.5. Vermi-composting

Majority of people in the region are reliant on agriculture in the hills. Due to the lack of technical knowledge on management of farmlands, farmers use chemical fertilizers which are easily available in the local market. These synthetic chemicals have long term negative effects on the soil, environment and health of the people. Project SERVE has been educating local people about the consequences of using such chemicals and helping out the local farmers in using vermi compost in agriculture. Vermi composting is the method of turning waste materials into humus, which will lighten and enrich the soil and balance the environment. Further, the food produced thus is healthy for consumption. Farmers can also sell the readymade compost to nearby villages. There is, in fact, a huge demand for organic compost in the tea gardens of Darjeeling.

WWF-India through Project SERVE carried out an awareness campaign in local villages and schools about the need to produce and utilize organic compost in place of traditional chemical fertilizers and helped the farmers in vermi compost pit construction. This year vermi compost pits were constructed at Rampuria Forest Village and Chamong Tea Estate.

3.3 Environment Education & Awareness

Project SERVE has 20 institutions registered under the Nature Club of India programme. Environment Education is the back bone of Project SERVE.

Various environment awareness programmes were conducted with students of Nature Clubs.

In Urban Areas:	**In Rural Areas:**
St. Robert's HS School	Shantirani School
St. Teresa's HS School	Rungbull Jr. School
Maharani Girls HS School	Cinchona Primary School
Sardeswari Girls HS School	Bungkulung Jr. School
Army School	Senchal Madhyamik Siksha Kendra
BSMI School	Siksha Sangh HS- Ging
Sunrise School	Saraswati Primary school
Gyanoday Niketan	Dhotrey Primary School
Nepali Girl's HS School	Mahendra MSK-Tukdah
Kanchanjanga Publich School	Poobung MSK- Poobung

3.3.1. World Environment Day celebration

World Environment Day (WED) was established by the United Nations General Assembly in 1972 to mark the opening of the Stockholm Conference on the Human Environment. Since then, WED has been celebrated throughout the world to inspire awareness on the environment and augment political attention and public action. World Environment Day is a people's event, to empower general public to become active agents of sustainable and equitable development, promote an understanding that communities are fundamental in changing attitudes towards environmental issues, and advocate partnership, which will ensure that all nations have the benefit of a safer and more prosperous future.

With the theme for the year 2012 being **'Green Economy: Does it include you?**, WWF-India celebrated this event by organizing an interactive one day trek to Senchal Wildlife Sanctuary in collaboration with the Forest Department, Wildlife Division I. The objective of the event was to make the students aware about the natural wealth of Senchal and the important role the biodiversity of this area plays on Darjeeling and its people. Forest officials; Mr. Bhuwan Giri and Mr. Phurba Sherpa emphasized on the role of students in the conservation of environment in the region.

Annexure-11: List of participants in World Environment Day Celebration-2012

3.3.2. Reforestation by Nature Club members

© SANJEEB PRADHAN / WWF-INDIA

Project SERVE has been educating students about the importance of reforestation every year. Over 60 Nature Club students and teachers of St. Robert's HS school, Shiksha Sangh HS, Sunrise School and BSMI School took part in a reforestation programme organised by WWF-India at the denuded hills of Phoobsering Tea Garden. Project SERVE supplied 5000 saplings of various indigenous tree species such as *Eriobotrya petiolata*, *Alnus nepalensis*, *Prunus ceracoides*, *Syzygium tetragonum*, *Syzygium operculutum*, *Symingtonia populnea*, *Termenelia myriocarpa* etc. The objective of this reforestation was to protect the area from landslides, improve water sources and to develop avian and other faunal habitat.

3.3.3. Environment Awareness Camp for guides, porters, tour operators and hotel association of Singalila National Park

WWF-India organized an awareness programme in collaboration with Wildlife Division I for guides and porters of Singalila National Park. The main focus was to increase their awareness about the consequences of environmental degradation and their role in conservation. Mr. Lalit Pradhan, Range Officer, Singalila National Park, Wildlife Division I coordinated the event .

© RIKCHEN ZIMBA / WWF-INDIA

3.3.4. Training SSB Personnel in controlling wildlife crime

The Singalila National Park covering an area of 76.8 sq.km is susceptible to poaching and illegal wildlife trade due to its porous international border.

© WWF-INDIA

Trade in any flora and fauna (or parts thereof and derivatives) that grow in the wild is understood as wildlife trade and it is the second largest illegal trade in the world after drugs and arms. Forest department alone cannot stop this trade and needs the support of local partners such as hoteliers, tour operators, nature guides, porters, tourists, and the Sashastra Seema Bal (SSB). SSB is paramilitary force and its personnel are posted all along the Indo-Nepal border and their mandate is to curb any kind of illegal activity.

WWF-India officials and forest officers lead by Mr. Lalit Pradhan RO and Mr. Dipen Subba BO of Wildlife Division–I, visited each individual SSB camp (*Pashupati phatak, Manebhanjang, Megma, Tumling, Gairibas, Batasia, Kalpokhari, Sandakphu, Thokum, Molley, Phalut & Rimbik*) and organized a training cum awareness programme on controlling wildlife crime and smuggling along the Indo-Nepal Border and sensitizing jawans about their role and responsibility in conservation of the Park. The field personnel were also trained in possible methods of smuggling, the major species that are threatened due to smuggling from SNP, and the main areas of smuggling. A pocket sized '**Biodiversity Monitoring Field Note Book**' was also distributed to the army personnel. The book comprised detailed information about the important flora and fauna of Singalila National Park with pictures and tables for documenting the information on a particular species and also highlighted some important sections of the Wildlife (Protection) Act of India, 1972. The book will now be used by the paramilitary personnel during their patrolling duty.

3.3.5. Maintenance of Batasia Ecological Garden (BEG)

Batasia Eco Garden, on the outskirts of Darjeeling town is a major tourist spot where thousands of tourists visit every year. The loop is an interesting example of engineering where the toy train takes a very unique turn and halts for a panoramic view of Mt. Kanchanzanga. The garden also has The Gorkha Martyr Monument, a war memorial commemorating soldiers from Darjeeling.

Project SERVE has been actively involved in landscaping the area. An eco garden has been laid out, where rare and indigenous plants are nursed. It houses many species of threatened plants like Gingko biloba, several species of Rhododendron and rare orchids, medicinal plants like *Taxus baccata*, hemlock (*Tsuga dumosa*), silver fir (A*bies densa*) and many seasonal flowers. There are also demonstration plots of organic tea plants.

The garden also plays an important role as a research ground for school students. They often go to learn the process of preparing compost, gain knowledge of local medicinal plants and their uses, and enjoy the beauty of flowers and view of Mt. Kanchanzanga.

Project SERVE has been maintaining BEG since 2000 with the following components:

1. Medicinal plants demonstration plots
2. Compost pits- vermi & vegetation
3. Seasonal flower gardens
4. Organic tea beds

Annexure- 12: List of medicinal plants raised by Project SERVE

3.3.6. Hornbill conservation programme at Lanku Valley

On the invitation of local youth working for environment and biodiversity conservation at Lanku Valley, under Sitong Village, Kurseong Devision, WWF-India conducted an awareness campaign on hornbills and their conservation on 3rd March 2013. The Lanku Valley and adjacent areas are known to be a prime habitat and breeding ground for hornbills, particularly, the great hornbill (*Buceros bicornis*). The local youth group led by Mr. Bishnu Thapa expressed their concern at the dwindling numbers of these beautiful birds and their habitat in recent years. The team from WWF-India led by Sanjeeb Pradhan visited the area for an assessment of the ecological damage and discussed the measures that could be taken to revive the habitat so as to grant sanctuary to the hornbills.

Mr. Pradhan made the local people aware of the different activities of WWF India, Darjeeling Field Office and made a presentation on alternate sources of livelihood that could be initiated in the area. He emphasised the need for a conservation based approach. Mr. Saibal Sengupta made a presentation on hornbill species found in the region, their preferred habitat, food plants, breeding behaviour and general ecology.

There are plans to start a nursery in the area catering to the specific needs of hornbills, whereby preferred food plants would be grown and planted by the local community. Mr. Pemba Tshering Bhutia shared his expertise on nursery raising, afforestation, livelihood programmes and the need to conserve the perennial sources of water in the area. WWF-India and the local community plan to work together to restore the forest in the area and create a model habitat for hornbills and other forms of biodiversity in the area.

3.3.7. Bird watching and awareness

WWF-India through Project SERVE organized a workshop cum field ornithology programme for Nature Club students of Darjeeling. The workshop focused on the basics of bird watching and techniques of correct bird identification in the field. After the theoretical session, all the children were taken for a day trip to Senchal Wildlife Sanctuary for developing their skills and hands on experience in the field.

© RIKCHEN ZIMBA / WWF-INDIA

The objective of this event was to increase awareness among students about the diversity of birds in the area, enhance their skills in identification of birds and to learn the importance of birds.

Annexure-13: List of birds sighted during the field visit

3.3.8. Butterfly awareness workshop and field visit

Butterflies are insects that belong to the group Lepidoptera, which means "*Scaly Wings*". Unfortunately, many species of butterflies are threatened due to poaching, habitat loss, and climate change. Butterflies act as environment indicators as each species has a specific larval food plant on which they lay eggs. Darjeeling is home to a large number of butterfly species.

© SANJEEB PRADHAN / WWF-INDIA

Project SERVE initiated awareness on butterflies by organising a 2 day workshop cum field visit for the students of rural villages of Bungkulung. The event was coordinated by Mr. Saibal Sengupta of St. Roberst's HS School. A poster titled "**100 Beautiful Butterflies of Darjeeling**" was released by Fr. Peter Lingdamo, Headmaster, St. Robert's School. The poster on butterflies has been published by WWF-India, Darjeeling Field Office as education material and will be distributed to schools, colleges, forest and other concerned departments.

Annexure-14: List of participants of butterfly awareness workshop cum field visit

In 2012, Project SERVE has increased as well as consolidated its work in Darjeeling. Some highlights from the year include the Rhododendron nursery giving results. Mapping of BFP areas and calculation of the area done for the first time. Training and distribution of bio-globule machines, which was also replicated in other landscapes of WWF-India like Sunderbans and Terai Arc Landscape.

In the next year, apart from scaling up existing activities, Project SERVE is planning to initiate a carbon sequestration study of BFP areas to understand the capture of carbon by these plantations.

4. ANNEXURES

Annexure 1

Annex-1: Detail of Saplings planted by SERVE since 1996-2012			
Sl. No	**Year of Plantation**	**No. of Salpings planted**	**Remarks**
1	1996	65000	
2	1997	286000	
3	1998	266157	
4	1999	211500	
5	2000	173890	
6	2001	156714	
7	2002	181291	
8	2003	244879	
9	2004	206965	Including shade trees
10	2005	146025	
11	2006	147332	
12	2007	152350	
13	2008	152500	
14	2009	150000	
15	2010	158000	
16	2011	90900	
17	2012	89700	
Grand total		**2879203**	

Annexure 2

Annex-2: Detail of Block Forest Plantation-2012					
Sl. N0	**Plantation Site**	**Area in hectare**	**Year of Plantation**	**Total saplings planted**	**Remarks**
1	Naya Busty	10	2012	26000	New creation
2	Chatakpur rly siding	10	2012	25500	New creation
3	Phoopsering Tea estate	5	2012	11900	New creation
4	Nagri Farm TE	5	2009	11500	New creation
5	Naya Busty		2011	4000	Maintenance
6	Chatakpur rly siding		2011	3400	Maintenance
7	Phoopsering Tea estate		2011	2200	Maintenance
8	Gorabari Landslide		2010	2100	Maintenance
9	Harsing SHG			300	Free distribution
Grand total		**30**		**86900**	

Annexure 3

Block Forest Plantation areas of Project SERVE			
Sl. No	**Name of Area**	**Area (Hec)**	**Year**
1	Gorabari	4.35	1996
2	Miling	1.43	
3	Rajahatta	0.78	
4	Chatakpur	1.56	
7	Via-Tukvar	0.22	
8	Rangeroon	0.98	
9	Pulungdung	1.49	1997
10	Gorabari	2	
11	Miling	1.43	
12	Harsingh-Dabaipani	2.22	
13	Mall Road	3.44	
14	Gothels school	2.62	1998
15	Caselton Tea Estate	1	
16	Chatakpur	0.4	1999
17	Singell	2	2000
18	Dhoteray	1.69	
19	Badamtam	1	
20	Gorabari Wildlife Divn 1	1.5	2001
21	Singell	1.5	
22	Margaret's Hope	1.11	
23	Badamtam	0.5	
24	Casalton Tea Estate	1.02	
25	Paschim	30	2002
26	Gorabari	2	
27	Singell	0.57	
28	Margrets' Hope	1.41	
29	Upper Mamring	5	
30	Paschim	30	2003
31	Gorabari	2.72	
32	Upper Mamring	5	
33	Ghoom-Bhanjyang	1.98	

34	Pugung	1.49	
35	Dhajey	2.01	
36	Upper Mamring	7.9	2004
37	Gorabari	2.72	
38	Kumai	0.61	
39	Badamtam	1	
40	Paschim	10	2005
41	Upper Mamring	5	
42	Gorabari	2.72	
43	Paschim	13.49	2006
44	Badamtam	1	
45	Margret's Hope	1	
46	Upper Mamring	1.21	2007
47	Aloo Bari	0.96	
48	Bungkulung	0.93	
49	Makai Bari	0.86	
50	Avon	0.38	
51	Teesta Valley	0.4	
52	Chatakpur	1.75	2008
53	Gorabari	2.72	
54	Badamtam	1.5	
55	Gorabari	19.86	2009
56	Badamtam	1	
57	Gorabari	4.96	2010
58	Badamtam	0.23	
59	Chatakpur	3.79	2011
60	Phoobsering	2.08	
61	Tonglu	2	
62	Naya Busty	0.72	2012
63	Chatakpur	2.45	
64	Phoobsering	2	
65	Nagari Farm	21.95	
	Grand total	**233.61**	

Annexure 4

Annex-4: Detail of Shade Tree Plantation since 2004-2012			
Sl. No	**Year of Plantation**	**Name of TG**	**No. of Saplings planted**
1	2004	Gopaldhara, Rohini, Barnesbeg, Gel, Badamtam, Marget's hope, Dhajea	22800
2	2005	Selimbong, Arya, Dhajey, Nagri	16200
3	2006	Castelton, Marget's hope, Rangeroon	10000
4	2007	Singell, Marget's hope, Castelton, Phubtshering, Nagri, Avon, Selimbong, Rangeroon, Rohini, Montiviot	30000
5	2008	Selimbong, Avon, Sungma. Selim hill, Rohini, Castelton, Singell, Ambotia, Monteviot, Shree Dwarika, Ging, Rangeroon	70000
6	2009	Avon, Rohini, Monteviot, Shree Dwarika, Ging, Soureni, Barnesbeg, Singell, Some, Selimbong, Dhajey, Takdah	67340
7	2010	Arya, Avon, Selinbong, Nagri, Rohini, Gopaldhara, Singell, Takdah, Monteviot, Shree Dwarika, Ging, Gell, Soureni, Dhajey, Teesta, Marrybong	75000
8	2011	Selimbong, Some,Seyok, Sangma, Marget's Hope, Balasan, Monteviot, Castelton, Gel, Gopaldhara, Avon Groove, Lingay, Merrybong, Rohini, Ging	57305
9	2012	Takdah, Rohini, Selimbong	2800
		Grand total	**351445**

Annexure 5

Annex-5: Detail of Shade Tree Plantation-2012		
Sl. No	**Name of the tea garden**	**Total seedling**
1	Selimbong Tea estate	1000
2	Rohini Tea estate	1000
3	Takdah Tea estate	800
	Grand total	**2800**

Annexure 6

Annex-6: List of training and distribution of briquette making machine		
Sl. No	**Name of village**	**No. of Participants**
1	Limbu Busty	40
2	Chenga Busty	38
3	Upper Mamring	20
4	Jaldakha Govt School	195
5	Gorubatha	50
6	Giddabling	15
7	Souneni Forest Village	26
8	Sanibaray busty	15
9	Dalim Forest Village	18
10	Mayalu busty	15
11	Simsary busty	12
12	Ahalay busty	12
	Total	**456**

Annexure 7

Annex-7: List of Apiary training participants 2012			
Sl. No	**Date of Training**	**Name of Village**	**No of Participants**
1	May-12	Marget's Hope	8
2		Ambotia	2
3		Naxalbari	2
4		Dhajai TG	5
5		Singbuli TG	1
6		Kalimpong	1
7		Chenga busty	9
8		West Sikkim	4
9		Bing Busty	2
		Total	**34**
1	6th-8th Nov-2012	Souneni Forest Village	26
2		Sanibaray busty	5
3		Dalim Forest Village	8
4		Mayalu busty	4
5		Simsary busty	5
6		Ahalay busty	2
Total			**50**
		Grand Total	**84**

Annexure 8

Annex-8: Major Species grown in Project SERVE Nurseries			
Sl. No	**Local name**	**Botanical name**	**Uses/ purpose**
1	Kapasi	*Acer campbelii*	Agricultural impliment, fodder, timber, furinture, plywood
2	Putli	*Acer laevigata*	Timber, fruit, fodder, agricultural impliment
3	Tata siris	*Albizzia lebbek*	Timber, flower, shade tree
4	Seto siris	*Albizzia procera*	Timber, flower, shade tree
5	Utis	*Alnus nepalensis*	Timber, soil conservation
6	Katus	*Castonopsis indica*	Timber, fruit, charcoal, agricultural impliment
7	Sinkowlo	*Cinnamomum obtusifolium*	Timber, fodder, medicine
8	Lal Chandan	*Daphniphyllum himalayense*	Timber, firewood, furniture, fruits
9	Badrasae	*Elaeocarpus lanceaefolius*	Timber, fruit, medicine
10	Maya	*Eriobotrya petiolata*	Fire wood, fodder
11	Okhar	*Juglans regia*	Timber, furniture, medicine, fruit
12	Lapche Kawlo	*Machilus edulis*	Timber, fruit, medicine
13	Chiplae Kawlo	*Machilus gammieana*	Timber, charcoal
14	Goge chap	*Magnolia campbelii*	Timber, foliage, flower
15	Bogana	*Melia azedarach*	Foliage, pestiside, fruit, shade tree
16	Tetae chap	*Michelia cathcartii*	Timber, fodder, furniture
17	Mitae Chap	*Michelia exelsa*	Timber, furniture, fruit, flower
18	Payoon	*Prunus ceracoides*	Flower, fruit, fodder
19	Arupatae	*Prunus nepaulensis*	Timber, furniture, foliage, flower
20	Buk	*Quercus lamellosa*	Timber, furniture, foliage, flower, fodder, fruit, charcoal
21	Phalant	*Quercus lineata*	Timber, fodder, fruit, charcoal
22	Adkowlo	*Quercus spicata*	Timber, firewood, furniture, fruits
23	Lali Guras	*Rhododendron arboreum*	Fire wood, medicine, flower
24	Gagun	*Saurauria nepalensis*	Fodder, fruit
25	Chilawnae	*Schima wallichii*	Plywood
26	Pipli	*Symingtonia populnea*	Timber, fodder, foliage, charcoal,
27	Kyamuna	*Syzygium operculutam*	Fruit, fire wood, fodder
28	Kaphal	*Syzygium tetragonum*	Fodder, fruit
29	Pani sajh	*Termenelia myriocarpa*	Timber, furniture, plywood, fodder, flower

Annexure 9

Annex-9: Detail of seedlings supplied from Project SERVE Nurseries-2012			
Sl. No	**Name of Farmers**	**Nursery Site**	**Total Seedling Supplied**
1	Pasang Sherpa	Paschim Forest Village	9000
2	Sumi sherpa	Paschim Forest Village	5000
3	Phurba sherpa	Paschim Forest Village	7500
4	Lochan Rai	Chatakpur Railway siding	15000
5	Nima dorjee Glan	Chatakpur Railway siding	7500
6	Rakhi tamang	Chatakpur Railway siding	7500
7	Kalpana sherpa	Chatakpur Railway siding	19200
8	Singla Nursery	Singla	2800
9	Phoobsering	Phoobsering	15000
10	Private	Sonada	1200
		Grand total	**89700**

Annexure 10

Annex-10: List of Mushroom cultivation units					
Sl. No	**Name of SHG**	**Village**	**Quantity produced- Kg**	**Duration**	**Earning-Rs**
1	Shree Ganesh Self Help Group	Rampuria , Senchal Wildlife Sanctuary	600	one year	48,000
2	Nirmal Farm	Rangbull	600	one year	42,000
3	Makhamali Self Help Group	Chamong Tea Estate	300	one year	24000

Annexure 11

Annex-11: List of participants on World Environment Day Celebration-2012			
Sl. No	**Name of the School**	**Address**	**No of Participants**
1	Kunchanjanga Public School	Takvar- Darjeeling	11
2	St. Terasa's Girls HS School	Darjeeling	11
3	St. Robert's HS School	Darjeeling	12
4	Sardeswari Girls School	Darjeeling	10
5	Forest Officials	Senchal Wildlife Sanctuary	10
6	Reshab Eco Dev. Committee	Reshab, Senchal	10
		Grand Total	**64**

Annexure 12

Annex- 12: List of Medicinal Plants raised by Project SERVE			
Sl. No	**Local Name**	**Scientific Name**	**Uses**
1	Abijalo Drymaria cordata	*Drymaria cordata*	Sinusitis, fever, throat pain, pneumonia
2	Ainselu	*Rubus ellipticus*	Fever, malaria, colic, dysentry
3	Amilo jhar	*Oxalis corniculata*	Diarrhoea, epilepsy, cough, gastric colic
4	Ban lasun	*Allium wallichii*	Whole plant: Cholera, dysentery, cough & colds, altitude sickness, reduce blood colesterol
5	Banmara	*Eupatorium adenophorum*	Whole plants: Typhoid, cough, pharyngitis, asthma, gastritis, atrophy
6	Barha	*Actocarpus lacucha*	Dysentry
7	Basak	*Dichroa febrifuga*	Root & leaf: Fever
8	Betlauri	*Costus speciosus*	Urinary Tract infection
9	Bhangre sisnu	*Gerardiana diversifolia*	Blood pressure, fever
10	Bhuin Champ	*Kaempferia rotunda*	Fracture, dislocation, dropsy- root
11	Bhut Kesh	*Selinum tenuifolia*	Carminative, coutgh, rheumatism, gastritis,
12	Bikh	*Aconitum spp.*	Rheumatism, asthma, bronchitis, cardic weakness
13	Bojo	*Acorous calamus*	Skin Disease, tuberculosis, pneumonia, influnza
14	Bon Bihin	*Solanum spp*	Toothache, piles, jaundice, hepatic complaints,
15	Buhari jhar	*Momosa pudica*	Whole plant: Goitre, kidney and bladder stone, leucorrhoea, diabetes, fever, rheumatism
16	Buro Okahti	*Astible rivularis*	Body Pain, Dysentry
17	Chhatiwan	*Alistonia scholaris*	Malaria, diarrhoea, dysentry, ulcer, asthma
18	Chilaunae	*Schima wallichii*	Bark, leaf & fruit: Cuts, fastric flatulence, ringworma,intestinal worms, sore throat
19	Chimphing	*Heracleum wallichii*	Inflorescence & fruit: Headache(fruit), Influenza, boadyaches, typhoid
20	Chirowto	*Swertia chirayita*	malaria, Fever, Diabetes, Skin disease
21	Chutro/ Keshari	*Mahonia napaulensis*	Berry, root & bark: Dysentery, urinary troubles,cardiac weaknessbronchitis, headache
22	Dhatura	*Datura suaveolens*	Whole plants: Hydrophobia, insanity, convulsion, toothaches, gastritis, sexual disorder
23	Dhengre Sall	*Taxus baccata*	Leaf, frit & bark: Breast cancer, epilepsy, diabetes, gastric spasm, cough, contraception, fever
24	Dhungri jhar	*Hydrocotyle nepalensis*	Throat infection, tuberculosis, pneumonia
25	Ghanti phul	*Abutilon indicum*	Fever, Urinary trouble, Sore
26	Ghew Kumari	*Aloe vera*	Leaf: Burns, Soothing oint, gout, liver complaints, indigestion, constipation
27	Gingseng-pachpatay	*Panax pseudoginseng*	Rhizome: Aphrodisiac, Diabetes, liver cirrhosis, gastric ulcer, diarrhoea, dysentery
28	Golpatta	*Hydrocotyle himalaica*	Throat infection, tuberculosis, pneumonia
29	Gurjo	*Tinospora cordifolia*	Blood pressure, fever, insect bite
30	Ghurpis	*Leucosceptrum canum*	Root & leaf: Epilepsy, wounds
31	Haledo	*Morinda angustifolia*	Jaundice

32	Haledo	*Gureuma longa*	Jaundice-roots
33	Halhale	*Rumex nepalensis*	Leaf, young shoots & roots: Skin disease, Gastric irritations, urinary disturbances, minor burns, scurvy, swelling
34	Jangle halide	*Curcuma aromatica*	Indigestin, dyspepsia, weakness
35	Jaringo	*Phytolacca acinossa*	Body ache, food poisoning, snake bite, sprains
36	Kuchoo	*Thysanolaena maxima*	Root: Asthma, cough, tuberculosis, broncchitis, contraception
37	Kukur tarul	*Dioscorea prazeri*	Preparation of diosgenin
38	Kurkery Jhar	*Equisetum sp.*	Insecticide,
39	Lalgari	*Abrus precatorius*	Skin disease, emitic
40	Laliguras	*Rhododendron arboreum*	Corolla: Pheumonia, diarrhoea, dysentery, bone fracture, throat trouble
41	Lalupatae	*Euphorbia pulcherrima*	Leaf, flower & latex: Post natal complaints, produce normal stools, skin complaints, cuts, wounds
42	Lankhoree	*Fraxinus floribunda*	Gout-Bark, laxative
43	Lata Gulfa	*Dicentra thalictrifolias*	Amenorrhoea
44	Latte sag	*Plantago major*	bodyache, food poisoning, fever, muscle rupture
45	Lokta	*Daphne cannabina*	Antidote
46	Majito	*Rubia manjith*	Shoot, root, fruit
47	Mutu jhar	*Dicentra scandens*	heart trouble, gastritis
48	Nagbelli	*Lycopodium clavatum*	Diuretic antiseptic
49	Nakima	*Ophiopogon intermedius*	Dropsy
50	Padamchal	*Rheum emodi*	Tonic, piles, urinary disturbances, sciatica, gout
51	Paiyun	*Prunus cerasoides*	Bone fracture, toothache
52	Pakhanbet	*Berginia ciliata*	Roots: Boils, diarrhoea, dysentery, menstrual disorder, tooth & gum ache.
53	Panchaunlay	*Orchis latifolia*	Tonic, Body ache, Cuts
54	Papari	*Podophyllum hexandrum*	Blood purifier, Ematic-Root
55	Patlay sisnu	*Laportea terminalis*	Blood pressure, heart trouble
56	Phacheng	*Curcuma amada*	Head ache, eye complaints, piles, cough, gastritis,
57	Pinasay lahara	*Clematis buchananina*	Sinusitis,
58	Pipla	*Piper longum*	Tonic, Asthma, Rheumatism-Fruits
59	Pudina	*Mentha viridis*	Fever, Bronchitis
60	Ratnowlo	*Persicaria capitata*	Insect bites, stings
61	Sarpagandha	*Rauvolfia serpentine*	High Blood pressure
62	Satmuli	*Asparagus racemosus*	Tonic impotency-root
63	Siltimur	*Litsea citrata*	Stomach disorder- Fruit
64	Sisnu	*Urtica dioica*	Whole plant: Blood pressure, liver trouble, bone fracture,dysentery, jaundice, piles
65	Tal Muli	*Curculigo orchioides*	Asthama, piles, juandice-stem
66	Tamarkay	*Stephania hernandifolia*	Fever, Urinal Disease
67	Tuki phool	*Taraxacum officinale*	Whole plant: Jaundice, dysentery, induces flow of urine, gall bladder complaints, indigestion
68	Ultokuro	*Achyrenthes aspera*	Piles, boils, measles, leucoderma
69	Urilo	*Hypericum uralum*	Wound, bruise

Annexure 13

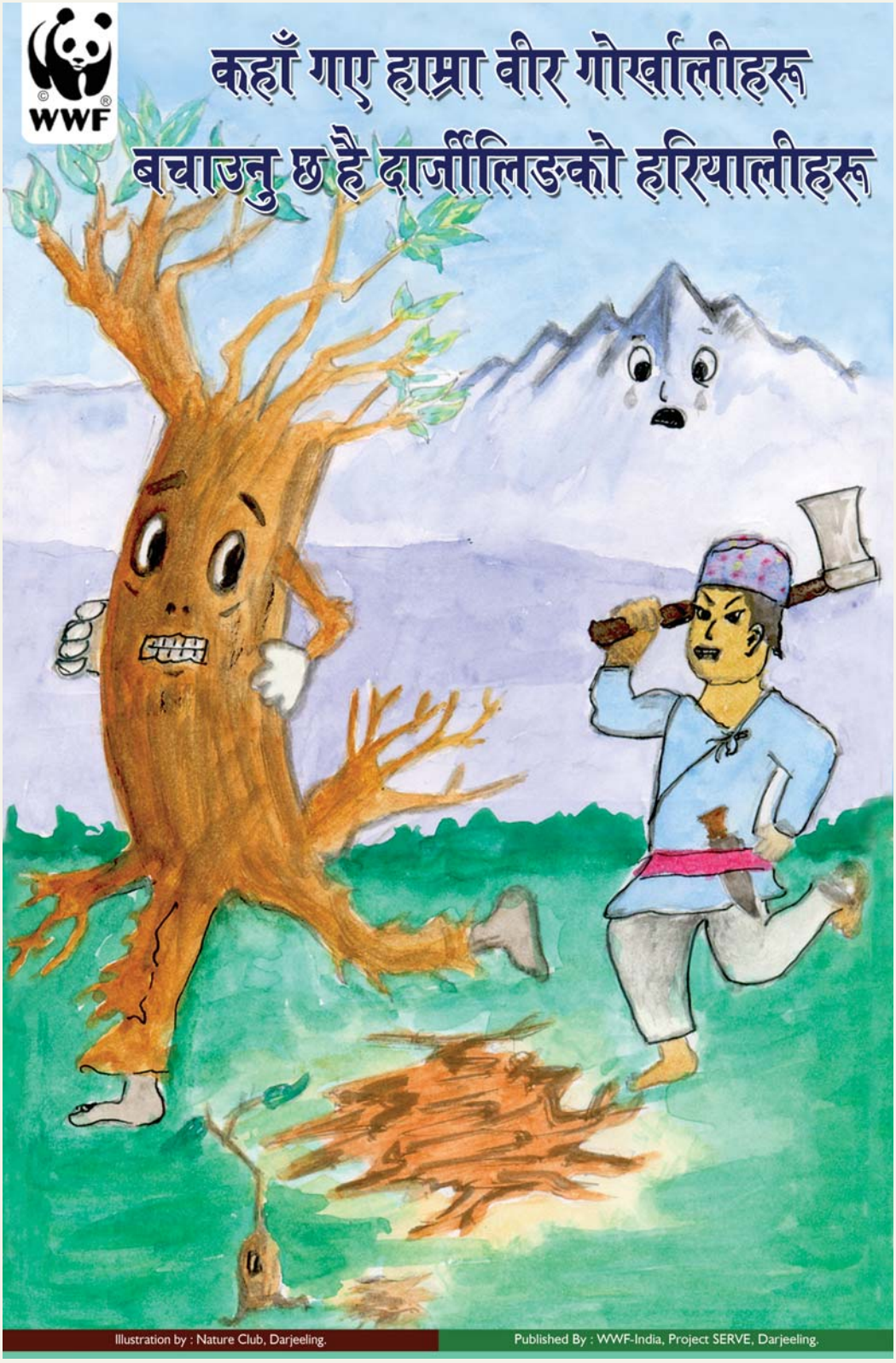
Annex-13: List of Birds sighted during field visit				
Sl. No	**Common Name**	**Scientific Name**	**Local Name (Nepali)**	**No. of spp sighted**
1	Chestnut Tailed Minla	*Minla strigula*		10
2	Blue Whistling Thrush	*Myophonus caeruleus*	Kalchuda	2
3	Kaleej Pheasant	*Lophura leucomelanos*	Kaleej	1
4	Brown Finch			4
5	Slender Billed Scimitar Babbler	*Xiphirhynchus superciliaris*		1
6	Chestnut-crowned Laughing Thrush	*Garrulax erythrocephalus*	Katus Towkae Torigara	4
7	Golden Throated Barbet	*Megalaima franklinii*		1
8	Paddy-field Pipit	*Anthus rufulus*	Aalee Chuiya	2
9	Rufous Vented Yuhina	*Yuhina occipitalis*		8
10	Black Throated Tit	*Aegithalos concinnus*		3
11	Great Hill Barbet	*Megalaima virens*	Nayoul	1
12	Great Tit	*Parus major*	Khirae Chichingkote	3
13	White Capped Water Redstart	*Chaimarrornis leucocephalus*		1
14	Greater Flameback	*Chrysocolaptes lucidus*	Gardan Thople Lachae	1
15	Verditer Flycatcher	*Eumyias thalassina*	Harine	1
16	Plumbeous Redstart	*Rhyacornis fuliginosus*	Nilambar Jalkhangeri	3
17	Little Forktail	*Enicurus scouleri*		1
18	Large Billed Crow	*Corvus japonensis*	Kaag	1
19	Golden Breasted Fulvetta	*Alcippe chrysotis*		10
20	Hill Partridge	*Arborophila torqueola*	Pewra	1
21	Winter Wren	*Troglodytes troglodytes*	Chitri	1
22	Whiskered Yuhina	*Yuhina flavicollis*	Junge Jurali	1
23	Rufous Sibia	*Heterophasia capistrata*	Sibia	1
24	Green-tailed Sunbird	*Aethopyga nipalensis*	Balchi chara	1
25	Eurasian Tree Sparrow	*Passer montanus*	Bhangera	2
26	Brown Dipper	*Cinclus pallasii*		1
27	Oriental Turtle Dove	*Streptopelia orientalis*	Dhukkur	1
28	Ashy Throated warbler	*Phylloscopus maculipennis*	Phusro kantae fista	1

Annexure 14

Annex-14: List of participants on Butterflies awareness workshop cum field visit			
Sl. No	**Name of the School**	**Address**	**No of Participants**
1	Bungkulung Prathhimak Pathsala	Bungkulung	20
2	Elephant Thought School	Bungkulung	10
3	Ever Shine School	Bungkulung	15
4	Bungkulung HS School	Bungkulung	25
		Grand total	**70**

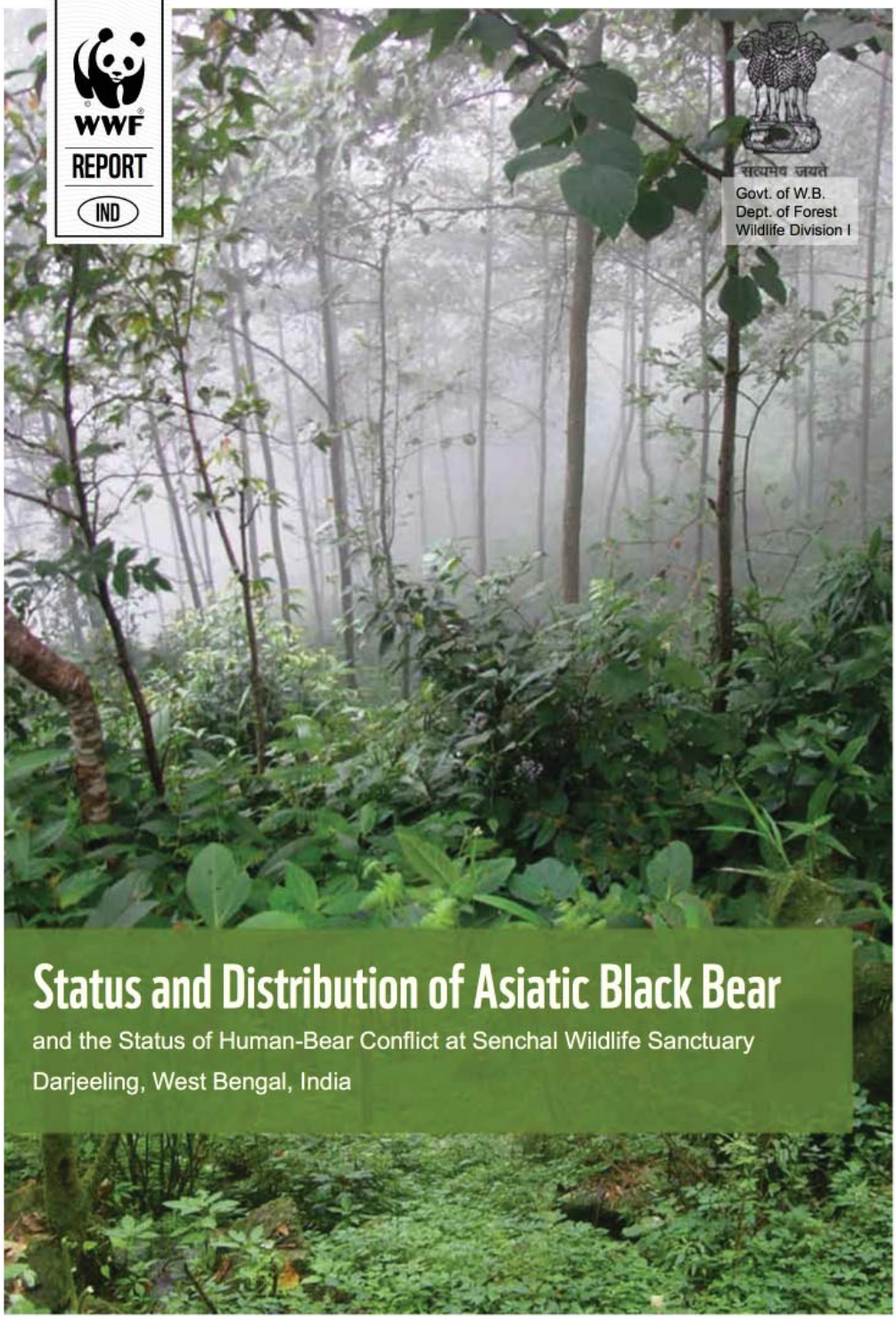
Publications

Save the nature



100 beautiful butterflies of Darjeeling

Asiatic black bear survey report published



Project SERVE Team at WWF-India Darjeeling Field Office

Mr. Sanjeeb Pradhan	:	Asst. Coordinator
Mr. Deependra Sunar	:	Project Officer
Mr. Pemba Tshering Bhutia	:	Field Officer
Ms. Rabina Gurung	:	Asst. Admin Cum Account Officer
Mr. Rikchen Zimba	:	Field Asst. Cum Driver
Mr. Narendra Sharma	:	Office Attendant

100% RECYCLED

+86,900 saplings

Indigenous saplings planted in over 30 hectares in 9 different areas.

2,800 trees

Number of shade trees planted in different tea estates to provide ecological services.

+89,700 seedlings

Seedlings raised in 9 different nurseries.

+456 people

People trained in briquette making from 12 different villages.

WWF

Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

www.wwfindia.org

WWF-India Secretariat
172-B Lodi Estate
New Delhi - 110003
Tel: 011 4150 4814, Fax: 011 4150 4779