

Eastern Himalaya

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Scarcity of Water A reality of the Hills

An image of a green cover with the complementing swampy and marshy area with semi-aquatic habitats can only be a utopian imagination in the context of Darjeeling today. "Areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt" (<http://www.ramsar.org/>) is of immense value to us, in terms of the social, environmental and cultural services they provide.

Senchel dhāp/sim-sār (Bog, marsh, large expanse of low-lying land) in Darjeeling due to its altitude and strategic location is an important site that has been sustaining the urban populace of Darjeeling supplying water to the entire town. This site, which is also one of the protected areas, plays an important role in trapping and retaining water in several marshlands and moors that form the catchment that eventually feed many perennial streams flowing into the three man-made reservoirs meant to supply water to the entire urban populace of Darjeeling.



Nature Club member at the Senchel catchment area

However, many of these wetlands have disappeared or are degraded with devastating impacts on the springs that feed the reservoirs. "There were 30 springs feeding the lakes but now there are

only 22, others have dried up" caretaker of the Reservoir in Senchal. According to him, there was a time when "the streams fed around 50-60,000 (189-227m³) gallons of water to the lakes, but now it barely supplies 15,000 gallons (57m³) of water". These effects have been attributed to change in forest cover and climatic variation in the region. Forests have been cut down and there is an invasion of the open area by the local bamboo species which makes regeneration of trees almost impossible. Changing rainfall patterns especially long dry periods have impacted the forest conditions. According to the caretaker in 2017 the rainfall was not adequate and many sources were diverted by people, so there is less water in Senchel.

Thus scarcity of water is a glaring reality in the Hills today in both rural and urban spaces. As much as climatic variations contribute to the water situation, the area has had an impact due to anthropogenic interference – rising human population, human induced forest fire, degradation of land, littering, thus leading to loss of recharge areas of these wetlands.

Commemorating the World Wetlands day and aligning with the theme, Wetlands for a Sustainable Urban Future, Ashoka Trust for Research in Ecology and the Environment (ATREE), Darjeeling focused on building awareness among eighteen students from three schools, between 7th to 10th standard along with the Nature Club members from St. Robert's Higher Secondary School. The students went on a field visit to Senchel catchment area to get a firsthand experience of how a catchment works and why it is important to conserve our wetlands. The students observed the environmental degradation that the wetlands are subject to in the Senchel area and also drafted a basic portfolio of the lake (vegetation, birds, insects, litter, pollution, human induced disturbance, etc.), photographic observations of biodiversity in and around the wetland and summarized the day through their presentations - linking the issue of state of wetland to the future water supply in urban Darjeeling.

- Dr. Rinzi Lama (rinzi.lama@atree.org)



Phibsoo: Camera trap monitoring Farmers Knowledge Exchange Visit

Sikkim to Darjeeling

The purpose of this project is to study the presence-absence of different wildlife in Phibsoo Reserved Forest through ATREE, NGO partner "Green Forest Conservation" based in Kachugaon, Kokrajhar District (BTAD) of Assam. This rapid survey is sought to be achieved by using a combination of Cuddeback Attack, Moultrie D-55 Camera Traps. The whole exercise was completed within 50 days. The areas were surveyed for animal signs and records were documented using standard data sheet and GPS.



Camera Trap images (clockwise from top left): Indian Elephant (*Elephas maximus*), Leopard (*Panthera pardus*) and Leopard Cat (*Prionailurus bengalensis*)

After sign survey, a single camera trap was placed in each 2 sq km grid, in a total sampling area covering 34 sq km. Locations were chosen within each grid to maximize the probability of detection while keeping in mind accessibility and security for the cameras. The cameras were kept operational for 24 hours a day and checked at regular intervals. The interesting finding is the first Photographic record of Spotted Deer (*Axis axis*) in Ripu- Chirang Elephant Reserve, which comes under the eastern most range for this species. Other important findings from the camera traps were Leopard, Leopard Cat, Gaur, Elephant, Sambar, Barking deer etc. A detailed analysis of the data will be done subsequently. We expect that this rapid survey will help to create a meaningful conservation intervention in this ecologically sensitive region.



Green Forest Conservation volunteer recording data in the field

-Dr. Dhritiman Das (dhritiz@gmail.com)



Villages around Kitam Bird Sanctuary and Barsay Rhododendron Sanctuary in Sikkim have been experiencing intense crop depredation for the past 20 years. Various attempts have been made to mitigate this problem which is adversely impacting the livelihoods of these rural communities. As part of understanding the drivers of this problem especially in the backdrop of climate and other changes we are trying to understand the coping mechanism of the farmers. One of the most popular methods of mitigation is the construction of "live fences" around the perimeter of agriculture land. A knowledge and experience sharing visit was organised for farmers from 7 villages around these protected areas in Sikkim to visit a village in the fringe area of Singalila National Park in the adjacent Darjeeling district. The objectives of the programme were i) to learn and discuss the current mitigation strategy adopted by the community in Darjeeling district along with issues, challenges and potentials of bio fence; ii) to understand the dynamics of convergence among various government departments for mitigation work.



Participants during an interaction session in the field

Communities shared their experiences of the problem, its impacts and drivers and the status of agriculture in their villages. Farmers observed the Live Bio Fence constructed by the farmers in Darjeeling district. This was done by convergence with two sectors -Forest Department and the Rural Development Department through its flagship programme-Mahatma Gandhi National Rural Employment Generation Scheme. ATREE was responsible for coordinating this convergence process. Communities from Sikkim were determined to form a group and initiate mitigation using the convergence pathway as implemented by the village in Darjeeling.

-Vikram Pradhan (vikram.pradhan@atree.org)

Climate-Resilient Agriculture for Rural Livelihood in Darjeeling Himalayas

Retrospect and Prospects

Agriculture planning and policy in West Bengal is not always based on an in-depth understanding of the hill/mountain conditions, resources, environment and the socio-cultural setting. For the farming community in the mountains, farming conditions have been changing rapidly. These changes are happening simultaneously with rapid environmental (climate and others) changes, economic changes, socio political and demographic changes including a risk of disruption of rural culture and livelihoods. In the midst of such changes, mountain agriculture has very often than not been marginalized in the state policy thus a local level discussion on policy recommendations was found to be essential.

The Assessment and Planning Workshop on Climate-Resilient Agriculture for Rural Livelihood security in Darjeeling Himalayas was organized by ATREE on 13th April 2018, as part of the Managing India's forest and Bio-diversity for Human Wellbeing Project (FBWB), project supported by USAID. This workshop was organized by ATREE in collaboration with the District Agriculture Department, West Bengal. The Deputy Director, Agriculture Department proactively mobilized the Agriculture Department for their participation and interaction with forty farmers from our project villages and outside.



Release of the "Climate Smart Agriculture and Crops Manual"

The workshop focused on Agriculture practices in the region -assessing the current agriculture situation and with the aim of developing future prospects for mountain agriculture. ATREE has been working on agriculture issues in this landscape – fringe villages of Senchel Wildlife Sanctuary and Singalila National Park since 2014.

The deliberations for the workshop was based on three registers – Ongoing issues in agriculture, the strategies adopted so far to cope with rapid changes and a critique on the Climate Smart Agriculture techniques adopted by the farmers. Discussions on these three aspects established the base for future planning in agriculture. These sessions highlighted various aspects- from the Farmer's perspective and also brought forth the problems of State agriculture policies – which have sidelined the Mountain agriculture issues.

The discussions highlighted the need for multiple local strategies in the region – with the need for

participation and co-operation of relevant local and state bodies within the Agriculture Department and outside which was outlined during the discussion session. The issues discussed during this workshop will be taken forward with the relevant stakeholders and the farmers to bring about the required change.

- Dr. Rinzi Lama (rinzi.lama@atree.org)

Assam Biodiversity Portal Orientation Programs



Workshop participants during field sessions

The state of Assam is an integral unit of the Eastern Himalayan Biodiversity Hotspot and the climatic condition and wide variety in physical features in Assam have resulted in the sustenance of wide ranging floral and faunal species. Despite the fact that the biodiversity of Assam is fairly well documented, the information primarily exists in peer reviewed journals, reports and PhD thesis which is difficult to access and utilize. The documentation has involved the scientific research community, but the participation of the general citizenry has not been explored to its full potential even though citizen science initiatives to document biodiversity have been active in the state. Assam Biodiversity Portal is an initiative by ATREE that provides a platform for the participation of diverse stakeholders such as the general public, planners, practitioners and nature enthusiasts in documenting, sharing and using the biodiversity information of Assam.

As part of the campaign activities ATREE collaborated with various colleges and universities across 15 districts of Assam to organize - 26 orientation events. These were targeted at academicians, students and researchers. The key objectives of the events included:

- To popularise Assam Biodiversity Portal to make students and researchers register in ABP and upload information to populate the portal.
- To build the capacity of students and researchers on technology based tools like web based biodiversity portal in storing, sharing and retrieving biodiversity information.

Project Outputs

- Over 2,100 individuals from comprising of academicians, biodiversity experts, students from colleges and universities and also nature enthusiasts participated in these events.
- Participants were trained on how to use the portal, both to upload their observations as well as to access and view biodiversity information.
- Increase in the number of participants registered in Assam Biodiversity Portal for uploading biodiversity information.
- Over 1,700 participants registered as users during these orientation programs.

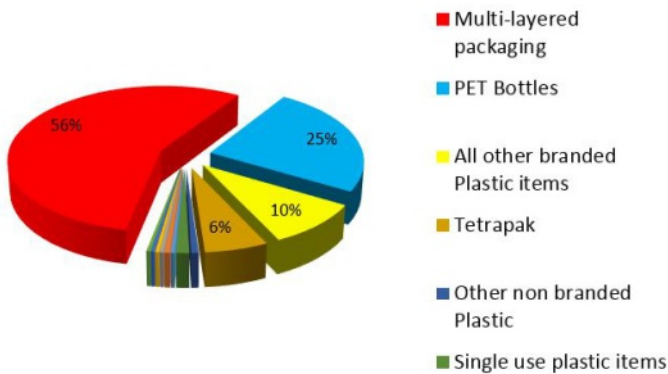
- Chandan Bhuyan (chandanbhuyan010@gmail.com)



Beat Plastic Pollution Himalayan Cleanup

As part of the Himalayan Cleanup, ATREE organized Cleanup in 20 sites in different villages around Sanchel Wildlife Sanctuary (SWS) and Singalila National Park (SNP). This pan Himalaya cleanup drive, was anchored by Integrated Mountain Initiative (IMI)/Zero Waste Himalaya, across 12 mountain states as an effort mainstream the issue of plastic pollution in policy discourses.

We mobilized various village based organizations (samaj), associations; self-help groups, and schools bringing together more than 300 volunteers for conducting the cleanup. This was followed by a waste audit in which waste was segregated into 14 different categories (Fig 1). 39,460 pieces of waste collected during the campaign.

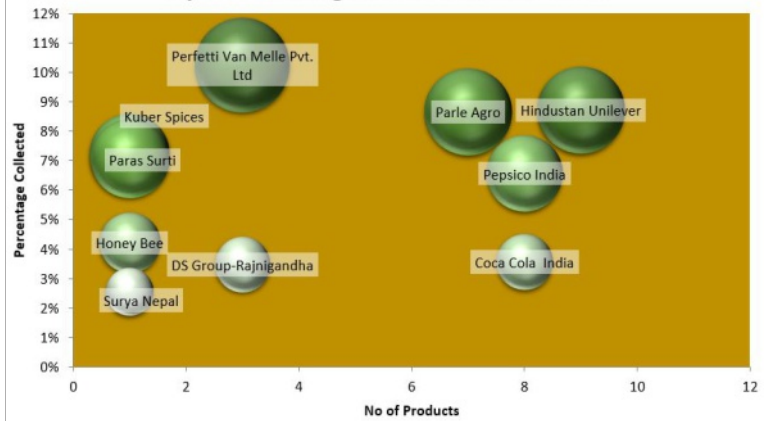


A brand audit was conducted on four main categories of the solid waste collected from these villages - PET Bottles, Multi-layered packaging, Tetrapak and all other branded Plastic items. A total of 22,658 pieces of branded plastic and multilayered waste was collected from which the top 10 manufacturers/brands were ranked according to the percentage of waste collected to the number of products per manufacturers. International brands - Perfetti Van Melle Pvt. Ltd topped the list followed by Hindustan Unilever, Parle Agro and Pepsico India.

These results were presented at the Interpretation center (Forest Department), ManeyBhanjyang (SNP) on World Environment Day to the community members and school children who

participated in the cleanup. As a culmination of the cleanup some of the waste collected was converted into a roadside wall art installation by local artists and volunteers.

Top 10 Polluting Brands-Manufacturers



Alongside, training on bio-degradable waste management through vermicomposting was conducted by Mr. Tshering Dorjee Bhutia in Camellia School, Darjeeling. As a result the school has installed a vermicompost unit in the school and abolished the sale and use of single use plastic and multilayered items within the school premises.



Volunteers segregating waste for the audit

Waste is a critical issue in all the mountain areas especially because there is an effective waste management systems in the region. Waste generated is simply rolled down the mountain sides into river and water systems or burnt. These efforts were initiated to combat plastic pollution in the region. At the national level, the Himalayan Cleanup has been able to bring together stakeholders from all across the IHR to communicate about the seriousness of plastic waste. Policies for mountains have to incorporate this to eventually stop the usage of single use plastic and phase out multilayered plastic. There is a need to establish an extended producer responsibility to provide sustainable alternatives to multilayered plastics, PET and tetrapack. Tourism and defense, which form the major sector in the region must be integrated into waste management systems and special resource is needed to support the idea of beating plastic pollution in a region which already has challenges with respect to geography and connectivity. To achieve this at a landscape level, collective and individual responsibility is required- "refuse, reduce, reuse and recycle".

-Pasang Lepcha (passang.lepcha@atree.org)



Wild edibles in Darjeeling town

A rapid assessment of wild edibles was done as part of my summer internship with ATREE. Wild edibles in the mountains and hills are known to contribute to food security, nutrition and sustainable livelihoods of local communities in the rural as well as urban areas of Darjeeling. I assessed the availability of wild edibles from the hawkers and vegetable sellers in Darjeeling town. I divided the town into three parts- upper, middle and lower parts based on localities. 70 sellers of wild edibles were interviewed, and the products currently found in the prevailing season (monsoon) were recorded. The sellers were further divided into three types - vendors, street hawkers and weekly hawkers.



A vendor in Chowk Bazaar, Darjeeling

The assessment showed that wild edibles were supplied by communities from the surrounding rural areas of Darjeeling. 28 wild edibles were recorded during the surveys. Most of these were used as vegetables by the urban communities of Darjeeling. Many of the vendors informed me about the decline in the quantity of wild edibles that are supplied to the shops from the rural areas and some also informed me that 3 wild edible species are no longer available in the market.

Most of the forest areas surrounding Darjeeling town are either protected areas or reserve forests and the collection of these wild edibles are prohibited. However an appropriate policy framework is necessary for promoting sustainable use of these products. I realised how important these products were while doing the survey as they have cultural importance, nutritional benefits, and their economic value has the potential to reduce poverty. The products have reduced over the years, and will continue to do so unless action is taken for sustainable use of these products.

- Pratik Dahal(pratikdahal28@gmail.com)
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USAID meeting in Delhi

A one day national workshop was organized by ATREE, IORA Ecological Solution and Centre for Youth & Social Development (CYSD) in New Delhi on the 7th of May under the USAID's Innovations for Forest Resources Management (InFoRM) program. Three priority areas were identified as a part of this InFoRM program - strengthening systems for forest resource management by understanding sustainable harvesting levels of NTFP's and fuelwood, supporting innovations for fuelwood management and increasing income of forest dependent communities. The key objective of the workshop was to disseminate project insights, experiences and learnings to an array of stakeholders and encourage discussions on strategies for future scaling-up.

A key highlight of the workshop was a special session by community representatives from all project landscapes on community perception on conservation and livelihood enhancement. Mr. Maitiraj Rai of Srikhola Mahadevthan shared his experience of ATREE's intervention in the region - training on ICS, Bee-Keeping, various agricultural trainings which has had an impact in his life and the villages in Darjeeling. He emphasized on continuing the work in forest resource conservation activities even after the completion of this InFoRM program.

The workshop provided a holistic view of the innovations in conservation work carried out under the InFoRM program by the organizers.

-Poonam Rai (poonam.rai@atree.org)

International Day for Biological Diversity, 2018 at Manas National Park

Manas National Park is surrounded by densely populated villages in the southern boundary. Yet very few students or even community members from these villages have visited the park for its rich faunal and floral diversity or experienced the habitats and ecosystems found in the Park. Tourists from all over Assam, India and even overseas visit the National Park to enjoy the rich biodiversity and diverse habitats found in the Park. In order to conserve this natural heritage, the young people who represent the next generation of stakeholders



need to value what Manas National Park represents. With this in mind ATREE in collaboration with Manas Park Authority, Swmkwr Mittinga Onsai Afat and Manas Development and Jeep Safari Association observed the International Day for Biological Diversity (22nd May) 2018 at Bansbari Range, Manas National Park. 45 students and 8 teachers from 8 different schools, 8 local nature guides and conservation volunteers from local organisations participated in this event. The students were taken on a 22km Jeep Safari inside the park. Various species of mammals, birds, butterflies, spiders and plants were observed and or identified by the participants under the guidance of local nature guides and resource persons. Some of the interesting sightings were:

Mammals: Asian Elephant, Greater One-Horned Rhinoceros, Wild Water Buffalo, Capped Langurs, Black Giant Squirrel;

Birds: Crested Serpent Eagle, Green Bellied Malkoha, Lesser Yellownape Woodpecker, White-rumped Shama, Oriental Pied Hornbill, Great Hornbill, Indian paradise flycatcher, Red Jungle Fowl, Common Hoopoe;

Butterflies: Common Imperial butterfly, Tawny Rajah, Constable, Three Yellow.

Various resource persons also talked to the students about the biodiversity of Manas National Park, the threats faced by the Park and the measures that need to be taken to conserve this natural heritage.

-Brojo Kumar Basumatary (brojo.basumatary@atree.org)

New Staff

1 Ms. Sulochana Thapa joined the Regional Office as a Project Associate for the Rain Forest Alliance Project.

2 Aditya Pradhan and **Thangsuani Naulak** joined the Regional Office as Junior Research Fellows for the NMHS supported project "Key ecosystem services and biodiversity components in socio-ecological landscapes of Darjeeling - Sikkim Himalaya: Deriving management & policy inputs and developing mountain biodiversity information system from National Mission On Himalayan Studies.

Project Updates

1 In congruity with the project timeline and the project partners, a launch event for Assam Biodiversity Portal (ABP) was organized in collaboration with the APFBCS/Assam State Biodiversity Board to launch the portal and share the outputs of the 12 month project with the participants. The Assam Biodiversity Portal along with the formally launched by Assam Minister for Environment & Forest, Shri Parimal Suklabaidya along with the other notable dignitaries which included Additional Chief Secretary, Environment & Forest Shri Alok Kumar, PCCF Assam N K Vasu and eminent biologist Dr P C Bhattacharjee

2 A project inception meeting and stakeholder consultations for the project: 'Key ecosystem services and biodiversity components in socio-ecological landscapes of Darjeeling - Sikkim Himalaya: deriving management & policy inputs and developing mountain biodiversity information system' was organised on 4th July 2018 at the Central Heritage Hotel (Fortune), Darjeeling by ATREE in collaboration with Sikkim University. The key objectives for the workshop were- i) to communicate with relevant stakeholders from different sectors about the objectives and outputs of the project; ii) to identify partners among stakeholders who can be active supporters/participants in the Project; and iii) to receive feedback/insights on the project implementation especially with regards to policy. Thirty-six participants representing local different universities, colleges, government departments, NGOs together with researchers and students were present in the meeting.

3 A closing meeting for the project- "Integrated Approaches to enhance livelihoods sustainability of communities in the fringe areas of Manas Tiger Reserve (MTR), Assam" was organized in Musa Resort, Barengabari, Assam on 29th June 2018. Major outputs of the 4-year project were presented by the Field Coordinator. Project beneficiaries, community leaders, Eco-development Committee members, officials from Manas Tiger Project and partner NGOs participated in the meeting.

ATREE's mission is to promote socially just environmental conservation and sustainable development by generating rigorous interdisciplinary knowledge that engages actively with academia, policy makers, practitioners, activists, students and wider public audiences. ATREE's Northeast/Eastern Himalayas Office has a direct presence in the Darjeeling and Sikkim Himalayas and Assam, and works with a range of local partners in the other states of north east India.

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