

Eastern Himalaya

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Is “climate change” driving soil ecosystem service provisioning: Studies in a South Sikkim catchment.

The past few decades have seen an intense focus on global change in climate driven by human activities – ever since the Earth Summit (Rio de Janeiro, 1992) and Kyoto Protocol (Japan, 1997) pushed nations to act on their sovereign contributions to emissions of green-house gases (GHGs), and resultant global change and atmospheric warming. While the UN Framework Convention on Climate Change (UNFCCC) focuses on global and national contributions, the research and action needs to be democratized to the community level for eventual success.

With the above in mind, we, took up a project in a small catchment in South Sikkim for studying soil dynamics. Soils are a large store of carbon – and the stratum for growing our food. Soil erosion has long been researched from the productivity stand point, the focus now needs to include its contributions as a carbon repository. There is potential for releasing this carbon as atmosphere warming CO₂ as we intensify disturbance with agricultural and infrastructural land use.



Tea pickers headed to the factory
- by Dr. Nirmalya Chatterjee

A pilot project on estimating soil erosion – a key mode of degradation which can release the trapped carbon, was undertaken (in 2015-16) for the 1989 ha

Papung khola watershed. It encompasses 87% of tea planting area of the Temi Tea Estate. Additionally, there are seasonal agriculture on terraces, road building between the Singtam-Namchi route and infrastructure building for tourism and domestic use. Though almost three quarters of the watershed is still under forests, the area is not free from development pressures.

Our initial estimates, based on empirical calculations and short-term (3-year) weather data show around one lakh tons of sediment movement in the ~2,000-hectare catchment. While, this amount of sediment does not move into the Teesta River downstream, the situation will worsen with current trends of more extreme rainfall days, and further human disturbances. Erosion not only affects soil productivity for agriculture or forest vegetation, it also affects the basic structural integrity of land – making it prone to slips, stream bank failures, and degrades surface water quality.

In our next stage of work, we plan to bring in the community (the catchment has 5 villages and 2 census towns) for a survey of multi-decennial environmental changes and aggravation of ecosystem provisioning – as perceived by them. As a further refinement of the scientific understanding of soil-water issues in the catchment, we also will set up weather monitoring instrumentation with citizen participation and collaborate with the government to improve our erosion and stream flow models. Community outreach and education initiatives are also planned for improving seasonal land cover and for planning interventions to regulate overland water flow in the catchment. The interventions and knowledge dissemination process will be an ongoing target as we get more data on the catchment, better understand the natural processes and efficacy of interventions, adapt to changing needs of the inhabitants and the practical limits being set by the climate at the scale of our catchment.

-Dr. Nirmalya Chatterjee (nirmalya.c@atree.org)



Springs of Darjeeling Town

The current Darjeeling urban water infrastructure was meant for a population of only 15,000 people. The same infrastructure more or less exists despite the town population having reached a figure of 120,000+. For the past two decades the town has been under severe drinking water stress especially during the dry periods (December - May). The volume of water in the storage system - which depends on the natural springs within Senchal Wildlife Sanctuary - has decreased drastically due to various factors. These include degradation of forests in the source areas, infestation with invasive species like bamboo, land use changes and probably changes in precipitation patterns being experienced in the hills- longer dry spells with fewer winter rainy days. At present even during monsoon, out of the recorded 26 only 8 springs actively drain into the water storage lakes.



Water distribution from Lal Dhiki spring in Darjeeling
-by Francis Darlong

There are more than 90 natural springs in and around Darjeeling town used by the people to access water for their daily needs. Of these 32 natural springs are within the municipality area. Some of these have now become seasonal and are inactive in dry periods. These springs at an average give around 20,000 gallons of water per day (Rasaily, 2004). Most of these springs are governed and managed by the Gaon Samaj (village/local society). These local institutions play a critical role in management, maintenances and equal distribution of water to every household and regulate use particularly during dry seasons.

As per information obtained from the Municipality, the water system has only 35 km of transmission line from source, 83 km of main distribution line excluding service line. About 95% of the pipelines were laid during the British period. This the system has not kept pace with the rate at which the town has spread spatially as well as increased in population size. According to some recent studies about 50% of the population of Darjeeling is dependent on the Municipality water supply while the rest is dependent on these natural springs. However these natural springs are seldom mentioned or considered in the larger context of the water discourse within the government system that is responsible for governing the town of Darjeeling. There is an urgent need to document these springs

geo-spatially, study their hydrology and recharge areas and have in depth knowledge about local management of these vital resources to develop a



Twins Lake in Senchal Wildlife Sanctuary

plan to conserve them.

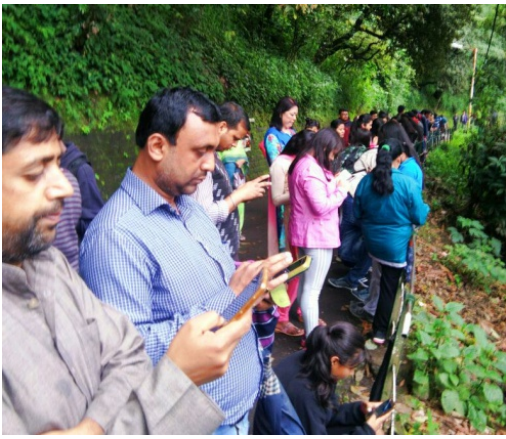
-Francis Darlong, MSc. Vth Semester, Tata Institute of Social Sciences, Guwahati, Summer Intern at ATREE;
(francisdarlong5@gmail.com)

100+ days of shut down in Darjeeling

Around noon on the 8th of June, 2017, Darjeeling town reverberated with the sounds of gunshots and rising of plumes of tear gas smoke. ATREE project office had to be vacated by 1:00 PM. The shots marked the retelling of the old story, demanding the right to an independent state within India, with fresh vigor and a reworked narrative. This story was a familiar one-for it was heard in the 1980s-echoed once again in 2008 and 2014. Today we look back at 104 days of shutdown as a part of the demand for a separate state of "Gorkhaland". Then began days with rallies, picketing with no sign of fatigue and continued with heightened hopes. Many of those days were marked by different forms of violence.

From 15th June, internet services were blocked in the Hills of Darjeeling and mobile connectivity became weak and intermittent. Communication with the outside world was severely affected. This resulted into a routine of spending several hours a day trying to connect to the feeble internet connection available from the Jio tower on the opposite hill in Sikkim. This 50 m stretch where hundreds of people stood for internet connectivity was aptly named Jio dara (Jio Hill).

Given the complete shutdown, visits to the field areas by the associates as well as field assistants to implement project activities as well as for monitoring were severely affected. This indefinite shut-down led to a serious scarcity of basics like food and medicines, and visits by the associates had to be geared more towards understanding the deteriorating living conditions of the people rather than for project related work. The indefinite strike with ban on internet access, lack of conveyance, shut down of banking facilities, inaccessible medical facilities, non-operational public distribution system, among others led to immense hardship for people in the rural areas. On the work front, this severely disrupted ATREE's work like training, monitoring and outreach activities. The relationships built by ATREE through years of engagement in the landscape with various government sectors at the district level and line departments need to start afresh.



People trying to access the internet at Jio Tada
- Image from WhatsApp

Today, despite the withdrawal of strike the rupture in the fabric of everyday lives is still being strongly felt. However, in a different vein, during this upheaval when the market supplies from the plains were completely cut-off, there were local communities from the *bastis* (the farmlands) who were the source of fresh green vegetables and meat, for the urban population. People in the urban and the semi-urban areas of the Darjeeling Hills are dependent on the regulated market of the plains for food items. But all through the shutdown, it was the local supply of fresh vegetables from the *bastis* that came to our rescue and this alternative form of market structure showcases the importance of local production as not merely viable, but also adequate. In addition, it is also these people from the *bastis*, who constitute a major part of the population that moved towards wage labor from farming. With the indefinite shut-down they were forced back to their farmlands in the absence of work. This hundred days of struggle, as much as it brought discourses about land, identity, the Gorkhas and Gorkhaland, it also compelled some of us to think about the viability and sustainability of local agriculture production and its importance in the local food systems. We tend to forget about them during normal times!

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

Assam Biodiversity Portal: Project Update

Compared to other states in Northeast India the biodiversity of Assam is fairly well documented. However, the emphasis has been on protected areas, certain key wetlands and forests and also confined to certain groups of flora and fauna. Documentation of biodiversity in the state has mainly involved the scientific research community and the academia. The participation of general citizenry has not been explored to its full potential. Where biodiversity information exists, access to this information is not available and therefore this wealth of information cannot be used by researchers, practitioners, nature enthusiasts or the general public.

In view of this, a project titled "**Building of a Biodiversity Information System for the State of Assam - Assam Biodiversity Portal (ABP)**" has been initiated by the Assam Project on Forest and Biodiversity Conservation Society (APFBCS) in collaboration with Assam Forest Department and Assam State Biodiversity Board (ASBB). This project provides a

Legend

ABP Workshops

• District

★ Regional



Assam Biodiversity Portal Workshops in Western Assam

platform for the participation of diverse stakeholders in documenting, sharing and using the biodiversity information of Assam. The project will provide an opportunity to researchers, students, practitioners, academicians, policy makers and biodiversity enthusiasts in documenting and disseminating biodiversity related knowledge.

In this project, ATREE is responsible for popularizing the portal and capacity building, primarily through workshop across Assam. An inception workshop was organized in Guwahati on the 30th of June to flag off the project. Following this, ATREE has organized 3 regional workshops and 7 district level workshops with a total of 98 and 347 participants respectively. In the coming months we will be organizing 2 more regional workshop and 10 more district workshops.

-Rohit George (rohit.george@atree.org)

Annual Work Seminar 2017

Annual Work Seminar (AWS) was organized by ATREE from 2nd to 4th August 2017 in Bengaluru. The ATREE Regional Office was represented by 7 staff who presented 3 talks and 3 Poster presentations. Rohit George talked about "Citizen Science" for documenting the biodiversity of Northeast India. Vikram Pradhan's presentation described crop depredation and the tolerance of communities towards different depredators in Darjeeling Himalaya. Dr. Sourya Das presented the case of access to water in Rammam village and water shed management implemented by villagers.

Tshering Bhuitia presented a poster on Climate Smart Agriculture (CSA) which stressed on improving agriculture productivity. Energy resilience through Improved Cook stove in fringe villages of protected area in Darjeeling hills was presented by Nayan Thapa which highlighted the decrease in consumption of fuel wood which minimizes the carbon footprint. Uden Lhamu Bhutia presented on the Critically Endangered Pangolins in Areas outside Protected Areas (AOPAs) of Darjeeling Himalaya based on the use of camera traps.

-Nayan Thapa (nayan.thapa@atree.org)

IInd Indian Himalayan Youth Summit 2017

Tshering Dorjee Bhutia participated in the 2nd Indian Himalayan Youth Summit 2017 held in Aizawl, Mizoram, from 18th to 20th September, 2017. The theme of the meet was "Climate Change and Mountain Cities" hosted by the Mizoram Sustainable Development Foundation (MSDF).



Participants at Indian Himalayan Youth Summit - 2017

Around 50 youth from the different mountain states of Indian Himalayan Region participated in the summit to share their knowledge, perspectives and recommendation to sustainable life and well-being of mountain states and communities. Biodiversity, livelihoods, out-migration, waste management, health issues, disaster management, water scarcity, indigenous seed banking, agricultural marketing etc. were the main issues discussed during the program. Group work among the participants from different regions facilitated a hands-on learning experience and in-depth discussion on various issues. The group discussions demanded a commitment to sustainable ways of life; strongly recommended mountain specific planning management and governance; support the conservation of the unique biodiversity; promote waste free society; recognize the value of traditional knowledge and practices and reaffirm the need to streamline it into education and technology. Towards the end, the group recommendations were compiled and submitted for discussion during VI Integrated Mountain Initiative Summit held from 20th to 22nd September 2017 at Mizoram University.

-Tshering Dorjee Bhutia (tshering.bhutia@atree.org)

Northeast Butterfly Meet, 2017 – Season IV

A TREE supported the Northeast Butterfly Meet – Season IV, organized in Namprikdang, Dzongu Valley, North Sikkim from 3rd to 5th September, 2017 by the Butterflies of North-eastern India group (a Facebook group). The objective of the event was to provide a common platform for butterfly enthusiasts, to discuss and or exchange knowledge on butterfly diversity, range distribution and conservation issues. Apart from these the event aimed to explore lesser known areas with rich butterfly diversity so that an inventory or baseline data of butterfly diversity could



Clockwise from left: Dark Tinsel, Angled Forester & Yellow Jezebel by Brojo Basumatary

be developed. 35 participants from different states of India including Sikkim participated in this event. 163 different species of butterflies were recorded during the programme of which some species like, Dark Tinsel, Khaki Silverline, Himalayan White Flat, Purple Spotted Flitter, Northern Jungle Queen, Evans Snow Flat and Jungle Glory were some of the rare and interesting species.

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

Ziro Butterfly Meet IV



Clockwise from left: Dark Forester, Blue Peacock & Participants at Ziro Butterfly Meet, 2017 - By Rohit George

A TREE supported the Ziro Butterfly Meet (ZBM) held at Pange, Talle Valley Wildlife Sanctuary, Lower Subansiri district, Arunachal Pradesh from 22nd to 24th September, 2017. This is an annual event organized by one of our partners in Ziro Valley - Ngunu Ziro. In this edition of ZBM, the focus was on spreading awareness about butterflies among local youth and providing basic information on observing, identifying and documenting butterflies. The participants at this meet were mainly school and college students particularly from Ziro valley and a few from Yazali, a nearby town.

Representatives from Ziro Biodiversity Management Committee and Apatani Students Union were also present. Mr. Kemo Lollen, Deputy Commissioner Lower Subansiri and Mrs. Koj Rinya, DFO, Hapoli Division flagged off the meet at an inaugural function in Ziro. The participants then made the 8 km. trek up to Pange, documenting all the butterflies they could find. The program over the following two days of the meet was divided between theory sessions and field visits to record butterflies. 70 species of butterflies were recorded by participants. This was lower than expected mainly due to inclement weather at the site. Although participants were not able to document some of Pange's famous species such as the Bhutan Glory (*Bhutanitis lidderdalii*), Kaiser-i-Hind (*Teinopalpus imperialis*) and Brown Gorgon (*Meandrusa lachinus*), they were able to document others like Manipur Junglequeen (*Stichophthalma sparta*) and the Giant Hopper (*Aposticopterus fuliginosus*). The latter being documented for the first time from Pange.

-Rohit George (rohit.george@atree.org)



New Projects/Initiatives

1 Exploration and inventories as means to strengthen taxonomy, biodiversity science, and Monitoring in Northeast India. This is a pilot project in Manipur and Mizoram states in collaboration with Institute of Bioresources and Sustainable Development (IBSD), Imphal. With funds from Department of Biotechnology, ATREE will be working on this pilot project in the Blue Mountain/Phawngpui National Park Lawngtlai district Mizoram.

2 Mainstreaming Sustainable Management of Tea Production Landscapes. This is a Rainforest Alliance and Tea Technologies Outsourcing project. ATREE will be responsible for implementing key actions outlined in the Landscape Action Plan developed as a collaborative approach to improving tea productivity, addressing land degradation, and driving sustainable development in Darjeeling, India.



New Staff



1 Dr. Nirmalya Chatterjee joined the Regional Office as a Fellow Level 1. Nirmalya has a Ph.D in Soil Science from Washington State University and will be working on Climate Change mitigation and adaptation issues in Sikkim and Darjeeling Himalaya.



2 Mr. Chandan Bhuyan joined the Regional Office as Project Associate, Assam Biodiversity Portal Project from 1st July 2017 based out of Guwahati. Chandan has completed his Masters in Geography from Gauhati University and is interested in nature photography.



New Office Coordinates

ATREE

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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 Programme 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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