

EASTERN HIMALAYA

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Rural communities: Invisible infrastructure for water security in Sikkim



Private water source at a *devithan* in Sumbuk, South Sikkim

In the urban areas of Sikkim, we have easy access to water despite the acute shortages we face seasonally. Access to water in urban areas is made easier with well-functioning water distribution infrastructure and the purchasing power of most people. In spite of having several glacier fed rivers and streams, and numerous springs there are still places in rural Sikkim where people do not have reliable and easy access to water. This barrier to water security can be attributed to the difficult topography of the mountains, drought prone conditions, landslides impacting water infrastructure, scattered distribution of households along different elevations and water governance and management issues. Water is thus an interdisciplinary subject which requires geohydrological, ecological, socio-political and gender lenses for holistic understanding. We are presently conducting a study about drinking water security in the rural areas of Sikkim. This article reflects preliminary insights from the field work at three sites- Yuksom, Sumbuk and Mellidara- where we completed 28 in-depth interviews with multiple stakeholders.

In rural Sikkim, the Rural Development Department (RDD) is the nodal agency for supplying drinking water. However, water supply is not uniform throughout the Gram Panchayat Units (GPUs) and there were households where the supply was extremely irregular. This led local people to construct their own private water connections either from public or private water sources. There are power dimensions at play in the access to water depending on land ownership, economic class and distance from the source. The adaptive capacity of rural communities who independently work towards maintaining their water connections are the invisible infrastructure actualizing the supply of water at their homes but are never acknowledged in any research or policy discourses. Examples of these include-Sumbuk: where a group of households draw water from a private source and are in the process of permanently buying the water source. In another village cluster in the same GPU households fetch water from a faraway spring and do all the washing at a public place. They occasionally buy water for carrying out construction work. These people belong to the scheduled caste community and are socio-economically weaker. In Mellidara GPU there households have been informally managing the distribution of water supply from a source that was established in the 1980s.

The Central government has allocated large budgets for water supply infrastructure through the Jal Jeevan Mission (JJM). JJM strives to provide functional household tap connections in the rural areas. "Unless the local communities are given the ownership or are made to pay for the water resource, the distribution system would be a failure" remarks an interviewee. New schemes can construct necessary infrastructure but ensuring the uninterrupted flow of water in the pipelines is the main challenge. If such water infrastructure are

ineffective, it will potentially lead to building more infrastructure by the communities. Thus more space will have built-up structures which is evident from the numerous non-functional tanks and pipelines in the rural landscape. In Yuksom, JJM has reached about 50-60% households. The scheme includes building new infrastructure for villages adding to the existing infrastructure from previous schemes. "JJM has not investigated the environmental impacts of the scheme and has only increased the pressure on the streams from where water is already being drawn through the existing old water infrastructure" says a resident of Yuksom.

The RDD is a very robust department with engineers at various levels working in collaboration with the GPU members in implementing the JJM. They are the pioneers in the country in the successful implementation of the Dhara Vikas initiative which is a springshed management activity that is still practised for source sustainability. In Mellidara GPU spring rejuvenation activities were carried out in the upstream area where the communities face water scarcity, but the downstream people enjoy the benefits of stream rejuvenation activities. One of the major barriers to gauge the impact of this activity on water security is the lack of long term systematically collected data.

Sikkim undoubtedly has a well-functioning Panchayati Raj system which is meant to be a bridge between the public and the government. However, major communication gaps seem to exist, among government officials and local communities as observed through the multiple stakeholder interactions we had. For instance the Panchayats in GPUs were not able to rectify the number of schemes in their wards, Technical persons in one block could not edit the name of villages under the JJM schemes. The service providers' aim is limited to completion of the construction without being aware about the larger picture, Village Water Sanitation Committees work in silos, and the local users refuse the 5% contribution to the cost of the schemes being implemented in their villages through JJM. An overarching framework to bind the whole institutional, socio-economic and governance related issues is the need of the hour to address barriers to sustain drinking water security in rural areas of Sikkim.

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In search of the White-bellied Heron (*Ardea insignis*) in Namdapha Tiger Reserve, Arunachal Pradesh



WBH perched in a Hullong tree at 62nd mile, NTR

White-bellied Heron (WBH) is considered to be one of the rarest and Critically Endangered birds in the world yet very little is known about the species. In India Namdapha Tiger Reserve (NTR) is considered a stronghold for the WBH yet 80% of its area is yet to be surveyed. Surveys along the river Noa-dehing along 35 transects (1-2 km) yielded 6 new sites for WBH where it was previously not reported. Interacting with the Yobin/Lisu communities was useful as they had knowledge about the bird's behaviour and habitat preference and called it "Ajingeh-ekeshe-fish" translating to water bird with long neck.

The bird is globally moving towards extinction due to habitat destruction of its riverine habitat along its distribution range. In NTR the ongoing construction of the Miao-Vijaynagar road has resulted in disturbance along the pristine WBH habitat. We hope this is a short-term threat which will discontinue after this road construction is completed. Other threats to the species observed were-conversion of forest land into agriculture land, grazing and unsustainable fishing and disturbance in the habitats.

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Camera Trap Monitoring of Chinese Pangolin in Rangbhang Valley, Darjeeling

Darjeeling Himalaya, a part of the Eastern Himalaya Biodiversity hotspot is where the world's most fabled tea was born. 87 lush green tea-gardens nestling in the Darjeeling Himalayas not

only add charm to the district's natural beauty but also form a major habitat for one of the most trafficked and Critically Endangered mammals-the Chinese Pangolin (*Manis pentadactyla*). Imperilled by rampant poaching for trafficking and habitat degradation, pangolins are small, elusive, and mostly nocturnal mammals. It is a very challenging species to study. Through our project, a study on this species is being conducted in 5 of the tea plantations of Rangbhang valley, Darjeeling.



Pangolin image captured through camera trapping

Camera trap surveys are an effective method for collecting data on wildlife species to address questions on ecological and conservation interests. To study our focal species, the study area was systematically scanned for signs of Pangolin, and based on the survey a single camera trap was placed in each 1 sq km grid spanning the total area of 15 sq km. Probable locations were chosen in each grid to maximise the chance of detection. Camera traps were operational 24 hours a day and checked at regular intervals. The camera trap survey revealed the presence of many wildlife species like Yellow-throated marten, Masked Palm Civet, Large Indian civet, Golden Jackal, Melanistic forms of Common Leopard and Barking deer to name some, and our focal species Chinese Pangolin.

The Chinese Pangolin, despite being a heavily exploited species, has been subject to limited research. Only a few camera trapping studies have been conducted on this species. Further data analysis will help us explore new paradigms within the ecology of the Chinese Pangolin and help develop meaningful conservation interventions in this area. A detailed analysis would also facilitate the identification of spatially explicit priority areas to improve the conservation of the Chinese pangolin in this valley.

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Inception Meeting with beneficiaries and stakeholders



Participants at the Inception Meeting

As part of the project “Transforming lives through Efficient Energy Technologies and restoration of degraded lands in the Tea landscape of Darjeeling, ATREE organised two (26th May 2022, 28th June) project inception meetings with stakeholders from tea garden management, community representatives, social workers and SHGs. The Inception meeting was conducted to communicate about the project goal, objectives, expected results and activities to be implemented.

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Sharing meeting on the research “Impact of changing agricultural practices on food systems in Dzongu, Sikkim”

ATREE organised a sharing meeting on the “Impact of changing agricultural practices on food systems in Dzongu, Sikkim” which is a part of the Sustainable and Healthy Food System (SHEFS) research project on May 18th 2022 at the Krishi Vigyan Kendra, Mangan North Sikkim. Findings of the research were presented to the stakeholders which was followed by discussion and feedback sessions. Some recommendations and feedback from the local stakeholders and the participants were:

1. Incentivise farmers to cultivate local landraces and collect data on remaining rare and endangered local landraces.
2. A community centre or a platform, particularly for selling the agricultural products to be established.
3. Farmers' specific events such as festivals and farmers markets need to be organised to showcase and sell local products.
4. Include field studies in the primary education curriculum, sensitising children about local crops and information related to them.



Participants at the sharing meeting

5. Policy on utilising barren and fallow land to enrich the agro-biodiversity of the region and create a community farm that will help local farmers.
6. Promote biodiversity friendly traditional farming practices incorporating modern farming techniques.
7. Sensitise farmers to opportunities of marketing and entrepreneurship.

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Participants taking notes during a field visit

identification through various technical and field sessions, guided by the resource persons. During the training, 23 species of birds were sighted and identified by the participants.

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Bird Guide Training in Badamtam, Darjeeling

Badamtam Range under the Darjeeling Forest Division represents one of the last remaining lowland forests of Darjeeling Himalaya. The area is located very close to the Kitam Bird Sanctuary, an Important Bird Area (IBA) in Sikkim. The region is characterised by the free flowing stretch of the River Greater Rangeet, and it's perennial tributaries- River Jhepie and River Rungdung. River Rangeet in the Darjeeling-Sikkim Himalaya is culturally significant in the landscape, while its confluence with the River Teesta is an important tourist destination, known for its outdoor river-side camping site. In terms of bird diversity, the area is known to host a number of important birds like the Rufous-necked Hornbill, Oriental Pied Hornbill, woodpeckers which could be of interest to bird watching tourists. Further, bird tourism can be linked with bird conservation, making it crucial for the overall conservation of biodiversity in an area.

With this outlook, ATREE in collaboration with Badamtam Forest Range, Darjeeling Forest Division, Government of West Bengal organised a two-day Bird Guide Training on 9th and 10th April, 2022. 24 participants including local community members and local staff members of the forest department were trained in this workshop. The participants were introduced to the basics of bird watching and bird

Strengthening resilience and reducing vulnerabilities of rural communities of Africa and Asia



Participants preparing bio-fertilizer

A new grant from NOREC for 2022 - 2023, will work with 300 women farmers in 6 villages of Sittong 3-Gram Panchayat in Kurseong Subdivision of Darjeeling District to integrate traditional zero budget farming, climate smart farming, efficient energy and rural tourism through training and demonstration. This builds on the work we have done through previous NOREC (Norwegian Agency for Exchange Cooperation) support. We plan to promote 10 homestead gardens for food diversity and nutrition. Enterprises focusing on women through bio-briquettes and value addition will also be targeted for additional household income for communities.

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Rapid assessment of invasive alien plant species in Darjeeling and Kalimpong districts, West Bengal



Some of the invasive species recorded during the assessment: (Left to right) *Ageratum* spp, *Lantana camara*, *Hypoestes phyllostachya*

Invasive species are one of the biggest intractable threats to biological diversity and bio-resources in the Eastern Himalayas. Alien invasive plant species have invaded vast tracts of land, both agricultural and forests and water bodies in the country, either introduced during the colonial period, trading agricultural and allied products.

ATREE has initiated a project supported by the Department of Biotechnology, under Himalayan Bioresource Mission. The project intends to map invasive species and to promote the use of invasive species as a short-term measure to prevent their spread. This includes value-added products that can benefit community livelihoods. Rapid assessment was conducted for listing and mapping invasive plant species based on their abundance, potential for use, and threats to the natural ecosystem. We surveyed 17 villages from Darjeeling and Kalimpong districts located in different altitudinal gradients ranging from 500 m-2500 m. We documented 20 species of alien invasive plants in the agricultural landscape as well as outside protected areas during this field session. Among the recorded species the most prevalent species were *Ageratum conyzoides*, *Chromolaena odorata*, *Mimosa pudica*, *Eupatorium adenophorum*, *Ageratum* spp., *Lantana camara*, *Hypoestes phyllostachya*, *Mikania micrantha*, *Galinsoga parviflora*, *Bidens pilosa*, *Persicaria nepalensis* and *Rumex nepalensis*.

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Celebrating Biodiversity Day 2022



Documenting pollinators in Dzongu, North Sikkim

Pollination by animals is an essential part of global food production and pollinators are critical in maintaining the productivity of agroecosystems and natural ecosystems. Among animal pollinating agents, insects (bees, wasps, moths, butterflies, flies, beetles) are the most common, but as many as 1,500 species of vertebrates such as birds and mammals also serve as pollinators.

On 22nd May 2022 to commemorate the International Day for Biological Diversity 2022 ATREE Eastern Himalayas conducted an initiative to document insect pollinators. As a part of this year's theme "Building a shared future for all life" ATREE worked with community members across Sikkim and Darjeeling districts to document insect pollinators that provide pollination services to key crops in the agriculture landscape. 411 observations were made across 4 sites in the two districts. A total of 138 species were recorded from 8 different insect groups.

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Restoration activity in Chamong Tea Estate, Darjeeling on World Environment Day 2022

We observed World Environment Day 2022 in the small hamlet Malatney of Chamong Tea Garden. More than 75 people, majority of whom were women from Self Help Groups came together to restore a patch of degraded land allotted for the event by the Tea Garden Management. 1600 saplings of local tree species having multiple use values to the communities were planted in a 1.41 ha patch of degraded land.

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Participants planting saplings during the World Environment Day program

Known Unknowns:

Chala Village Sanctuary Conservation Society: This community-based organisation was started by Mr. Manas Shyam, and Mr. Pyoseng Chowlu to stop the rampant felling of endemic trees. Hailing from around Chalapothar Shyamgaon, in Charaideo district, Assam this group has been conserving the 680-ha forest patch in coordination with the local Forest Office. People from this region belong to the Tai Khamyang ethnic group and have traditionally depended on these forests for their sustenance, culture and well being. This reserve forest under the Sivasagar Forest Division was declared as the Chala Village Sanctuary and a committee of 22 members began conserving illegal logging and poaching which was rampant at that time in the forest. This community based movement for conservation was inspired by the monks of the 153 year old Buddhist monastery in Chalapather Shyamgaon. Since then under the guidance of the Society men and women from the surrounding villages have been protecting the forest, monitoring the forest resources and even restoring degraded and denuded patches in the forest.

Grants

1. Ms. Pema Yangden Lepcha (Research Associate) received a grant from the Rufford Foundation Small Grant for "Wild edible plants of Dzongu Valley, Sikkim, India: Conserving diversity, traditional knowledge and practice for sustainable use"
2. ATREE Eastern Himalaya has been awarded infrastructure credits from Hollie's Hub for Good from Digital Ocean. This will cover all our web-hosting and server expenses for the next year.

New Staff



Kajal Limboo joined as Project Associate in the project 'Political Economy Analysis for Natural Climate Solutions (NCS) in India' for Sikkim and Assam sites. She is a graduate in Political Science from the University of North Bengal (NBU), and

pursued post-graduation in Peace and Conflict Studies from Tata Institute of Social Sciences (TISS), Guwahati.



Norden Lepcha, joined as Project Coordinator in the project "Value added products from invasive plant species for improving the livelihoods of marginalised communities in India Himalaya". He completed

his MSc. in Agricultural Extension from Bidhan Chandra Krishi Viswavidyalaya, West Bengal and has submitted his PhD thesis on "Characterising family farming in the Hill ecosystem of West Bengal" from from Uttar Banga Krishi Viswavidyalaya, Cooch Behar, West Bengal.

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 Himalaya with a range of local partners in the other states of North East India.

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