Emerging zoonotic disease risks in Darjeeling-Sikkim Himalaya

The novel zoonotic disease COVID-19 took the world unawares. It shook the very core of life on earth, disrupting the economy, livelihoods, social life, and all norms people knew of. A recent TRAFFIC report aptly states, that the transmission of zoonotic diseases falls into the low probability-potentially high impact category and challenges many fields of risk management policy, an observation which is reiterated by the current experience of COVID-19.

The world situation currently triggered by COVID 19 comes with a lesson that risks emerging from zoonotic diseases require serious preemptive actions, extensive drive for baseline database generation of eco-epidemiology of the key reservoir animals/hosts, pathogens along with events of their interactions with humans, the socio-economic settings of the population and other factors facilitating emergence and transmission of zoonotic diseases. This strategy must also target biodiversity-rich, remote areas where the interaction of human-wildlife in the broader ecosystem is higher.

Darjeeling Sikkim Himalaya is a case in point, where we propose to investigate the emergence of zoonotic diseases. This landscape is part of the Himalaya Biodiversity Hotspot, which is predominantly agrarian, rural and transboundary. The region merits attention, because like other mountain areas, have limited medical facilities and infrastructure, crowded urban spaces and rising rural population due to returning migrants.

Our ongoing work shows that the region is very rich in mammal diversity with species-rich Orders like Chiroptera, Rodentia and Carnivora. Reports show that zoonotic diseases like Scrub typhus, Nipah, Encephalitis, Dengue, Rabies emerged and re-emerged in the region. This is a reminder that these seemingly pristine regions should not be undermined in their role in zoonotic threats. The unseen brewing of zoonotic diseases falls under the ‘low probability’ category of management attention. However, it is also known and seen that the zoonotic disease, once it emerges, falls under the ‘high impact’ category.

Hence, understanding the need and urgency, we at ATREE EH are looking forward to studying and better understanding the emerging zoonotic diseases in Darjeeling-Sikkim Himalaya under the One Health concept, which recognises that human health is dependent on their interactions with animals and the ecosystem at large, and needs concerted collaboration to reduce the occurrence of zoonotic threats.

-- Dr. Sunita Pradhan,
(sunita.pradhan@atree.org)
When a nationwide lockdown was announced people in remote villages of Darjeeling were not prepared to face the consequences. Fear of this new disease peaked due to growing rumours and rising fake news spread through social media. It took some time for the community leaders to comprehend the situation, make arrangements by organizing village meetings on strategies for awareness building and preventive measures.

In the initial months communities of Rampuria put restrictions on travelling to urban areas and letting outsiders enter the village. We also had debates about whether the milk we sold to local markets should be stopped. Some suggested barricading the road leading to the village. In hindsight some of the measures we proposed and discussed were too severe and impractical! We were too scared and wanted to do anything to prevent the pandemic from entering our small village.

These proactive approaches and strict actions have prevented any transmission so far. Hygiene and sanitation measures which were not priorities before COVID 19 are religiously practised and use of masks and hand sanitizers are routine. Hugging and handshakes are rarely practised in the villages, younger people who practised this have also stopped. In one of the community meetings, we went as far as deciding to stop brewing local alcohol at home!

Return of migrant workers from large cities that have high rates of infection brought yet another debate among communities. A series of meetings were organised to discuss the return of the migrant workers and ways to avoid stigmatisation.

Once we received the dates of the arrival of migrant community members, we started to build temporary sheds 50 meters away from their houses with facilities for essential cooking, sleeping, and a proper bathroom. Returnees were quarantined for 21 days. Families who were not able to provide for themselves were supported by four different Self-Help Groups with groceries and essential household items. Thus this small community has come together and is managing the crisis brought about by COVID 19.

-- Narrated by Rajen Chettri, Field Assistant, ATREE to Poonam Rai (poonam.rai@atree.org)

COVID 19 : Insights from rural areas of Darjeeling hills

The first 41 days encompassing phase 1 and 2 of the nation wide lockdown for COVID 19 brought a sense of fear and insecurity to those of us living in the rural areas. My insights from the experience during these times are both negative and positive. I realised that the traditional farming practices that we have adopted since the time of our forefathers are the best as we rely on resources that are found in our villages. It also made me realise the value of the land we have, especially in such shocks like the pandemic. I live in a village which is surrounded on all sides by Senchal Wildlife Sanctuary, Darjeeling and during the monsoons these forests are teeming with wild edibles (mushroom, ferns, herbs, bamboo and cane shoots, variety of leafy greens, wild fruits etc.). Every year we collect these as they are a key part of our food, but during this pandemic I realised the value of living close to abundant natural resources - we are never short of nutritious food. People in the urban areas may be confined to their houses but here we are fully immersed in farming and looking after our livestock. There is this sudden demand for locally grown farm produce from the urban areas as the main supply chain to Siliguri is disrupted. Of course there is suffering, stress and frustration due to uncertainties and movement restrictions. Lots of people from my village work as wage labour to augment their household income but these employment opportunities are few and far in between. I am worried about the future of our children who have not attended school for the past 3-4 months. I also wonder what employment...
opportunities will there be for young people coming back from large cities across the country. This will perhaps add to the prevailing unemployment burden in the Darjeeling hills.

While I am grateful for the serenity and peaceful environment in my village, the impacts of COVID 19 on the lives of our communities worry me.

-- Prakash Tamang, Field Assistant
Translated by Sanjeeb Pradhan and Sarala Khaling (prakashtamangrampuria@gmail.com, sanjeeb.pradhan@atree.org & sarala.khaling@atree.org)

Rapid assessment on the impacts of COVID 19 on rural livelihoods

93% of households were not able to plant some of their seasonal food and cash crops due to unavailability of seeds as the markets shut down with the sudden declaration of lockdown. Movement restrictions leading to disruption in supply chains impacted the agriculture income of farmers which ranged from Rs 5,000 - Rs 95,000 with majority of the households losing Rs. 5,000 - Rs 15,000/- in the period between the end of March to mid/end of April. The farmers also lost cash crops ready for the market due to lack of storing facilities in the villages. Supply chains which have conventionally catered to external markets only were not able to adapt quickly and cater to the growing local demands.

One of the key risks identified by these small holder farmers was food insecurity during the pandemic. Staples like rice and wheat were distributed through the Public Distribution System, or by local NGOs and local administration (Gorkha Territorial Administration). Although most people felt that the distributed food materials would last them for more than a week, these were not adequate to meet the dietary requirements and they had to use their savings to purchase other food items from the market.

Since the food system is largely dependent on external markets, people faced an extra burden as they were without a steady income in the lockdown period. If food was largely produced locally perhaps their food system would have been more resilient to mitigate the impacts of such shocks. Therefore people perceived shortage of food and loss of income as the key immediate impacts of the pandemic. In the long-term, people worried about their financial condition, food and nutritional security and access to health facilities/services.

This rapid assessment was helpful in providing us insights on the impacts of COVID-19. We expect this to help us in identifying pathways to enhance sustainable and resilient livelihood strategies in the villages that ATREE continues to engage with.

-Sarala Khaling
(sarala.khaling@atree.org)

Mustard greens in Phedikhola, Darjeeling by Tenzing Sherpa
Using Digital Technologies to Train Farmers on post-harvest management during lockdown

COVID 19 has impacted many of our project activities of which training and capacity building have been impacted the most. We wanted to explore ways to use digital technology to reach out to the farmers we work with. We therefore organised a training on 2nd May for farmers. This included training for enhancing productivity and post-harvest management for mustard.

The training included a 14 minutes video which was shared with more than 60 farmers through the Mustard Producer Groups WhatsApp on 2nd of May, 2020. This was further shared with other farmers. 131 farmers downloaded the video and watched the training instructions. Of these 73 farmers sent feedback and also questions about mustard post harvest management. According to our field staff who are based in these villages the farmers have started applying the post-harvest techniques part of the training because this is the mustard harvesting season in these villages. We will be using phone-based platforms to organise more training and interactions with farmers.

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

Diversity of butterflies in an organic tea estate of Darjeeling

The tea plantation system is one of the important land-use systems based on agroforestry practices in tropical landscapes. In Darjeeling, it is a major land-use and covers an approximate area of 17,542 ha. It is typically represented by a tea plantation area, where small-leaved Chinese variety of tea - Camellia sinensis var. sinensis that reaches a height of 0.5-1m are grown with uniformly interspaced shade trees of native species, and surrounding secondary forest which is contiguous with the natural forests.

Makaibari Tea Estate located in Kurseong, West Bengal is an organic tea estate, which was established in 1859 and became the first tea estate to be certified organic in 1988. It is one of the few tea estates that maintains a forest cover of approximately 70% of its total area of 248 ha, at an elevation range of 400-1,100m. These characteristics make Makaibari an ideal site for studying the diversity and conservation potential of butterflies in a human-modified landscape.

71 species and subspecies across 43 genera belonging to five families were recorded in Makaibari. Of these seven are protected under the Wildlife (Protection) Act of India, 1972. These findings highlight the potential of an organic tea estate surrounded by forest in the conservation of butterflies in Darjeeling hills, and shows that tea plantation and secondary forest systems are important in the conservation of butterflies.

- Aditya Pradhan, (aditya.pradhan@atree.org)

Mammals through history in the Darjeeling-Sikkim Himalaya

Historical records dating from 1841 onwards showed that 174 species of mammals from 11 orders are known to occur in Darjeeling-Sikkim Himalaya. Of these, 24 species are listed under Threatened categories in the IUCN Red List, 58 species under CITES Appendices, and 112 species under the Indian Wildlife Protection Act, 1972. These were recorded from 91 different sources which included journals, books and reports. The records reveal the occurrence of 54 species of bats in this landscape which accounts for almost 50% of India’s bat diversity. However, no systematic studies have been carried out in recent years.
An old journal dating to 1935

Notable records include the Critically Endangered Pygmy Hog *Porcula salvania* which was first recorded in 1849 by Hodgson in Darjeeling-Sikkim; the Chiru *Pantholops hodgsonii* which was recorded in areas bordering Tibet and North Sikkim in 1854 by Hooker; and Blue Sheep (*Bharal*) *Pseudois nayaur* which was recorded in Phalut in the Singalila area in 1955 by Dutt-Mazumdar; Presently the first two are considered locally extinct while the third one does not occur in the historically recorded site. Much less studied are the small mammals, except for the taxonomic studies in the late 19th and early 20th century. This is also evidenced from our finding that there are more species recorded from the Order Carnivora than Order Rodentia, inconsistent with the current mammal list of India.

Records of the presence/absence of these mammals tells us the history of this landscape and the habitats and ecosystems that have been lost and altered in the past 178 years. Attempts are being made to document lesser studied mammals but we may have already lost a number of species without their occurrence ever recorded.

-- Thangsuanlian Naulak
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**Unknown Knowns: Khyanjeet Gogoi, Rupai, Tinsukia, Assam**

Khyanjeet Gogoi from Tinsukia district of Assam is passionate about orchids. In one of our biodiversity documentation field work, he came back with only names of the orchids he had recorded! He is a Science teacher in a High School, and owns a collection of 700+ species of orchids. He was instrumental in setting up the orchidarium in Kaziranga and Duliajan Numaligah Pipeline Limited in Duliajan, Assam and has worked with the Forest Departments of Assam and Arunachal Pradesh. He helped to set up the orchid trail of Talle Valley Wildlife Sanctuary and is documenting orchids of Ziro in Lower Subansiri district of Arunachal Pradesh. He has written 5 books and published more than 120 papers on orchids. He has been working tirelessly for conserving wild orchids in their natural habitat for the past 25 years. “Floriculture and particularly orchids have a great potential for enhancing livelihoods of local communities in North Bengal and Northeast India, thereby conserving these highly traded rare and threatened species of orchids in their natural habitat” says Khyanjeet.

**News Links**

1. Involving farmers to save pollinators in Sikkim-Darjeeling Himalaya, India

2. Mountain farmers of Sikkim-Darjeeling dealing with COVID & nature

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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