# Fostering Grass-roots Conservation in India - A Rufford Initiative

*The Rufford India Conference, Corbett*

*2019*

**FOUNDATION FOR ECOLOGICAL RESEARCH ADVOCACY AND LEARNING**
**AND**
**THE RUFFORD FOUNDATION**

***8 to 11 February 2019***
***The Corbett Tusker Trail Resort, Ramnagar - Uttarakhand***

# Fostering Grass-roots Conservation in India - A Rufford Initiative

The Rufford Foundation has played a crucial role in the field of nature conservation in developing countries worldwide. Its small grants have offered immense opportunities to young professionals and amateurs to explore and contribute to wildlife research and nature conservation. The Rufford Foundation has supported more than 1000 research and conservation projects in the Indian sub-continent. Since 2012, The Rufford Foundation has been holding conferences in collaboration with local organisations in different parts of the world with the aim to facilitate direct communication between their grant recipients. These conferences have been providing a forum to discuss ideas, problems, and issues and create invaluable networking opportunities.

This year the conference is being organised in Corbett in collaboration with the Foundation for Ecological Research, Advocacy and Learning (FERAL) from 8$^{th}$ to 11$^{th}$ February 2019. This is the fifth conference that is being organized in India for the Rufford grantees, and the fourth Rufford India conference that is being organised in collaboration with FERAL. The previous conferences were held in New Delhi and Bengaluru in the year 2013, Sawai Madhopur, Rajasthan in 2017, and Goa in 2018.

This conference is aimed to provide a common platform for the RSG grantees from Indian sub-continent to meet at one place and share and learn from each others' conservation experiences. The conference provided an opportunity for the grantees from **three different countries**, India, Nepal and Bangladesh to interact with each other and learn on-ground conservation challenges and opportunities from each other. One of the major outcomes of this conference was **the collaboration between the researchers from India and Nepal** in implementing elephant early warning system, developed by Indian grantee (Sanjoy Deb, Road kill detection device) to address human-elephant conflict issues in Nepal (Roshan Thakur). The conference was attended by 30 Rufford grantees – 25 from India, three from Bangladesh and two from Nepal. The grant recipients presented their work as oral presentations

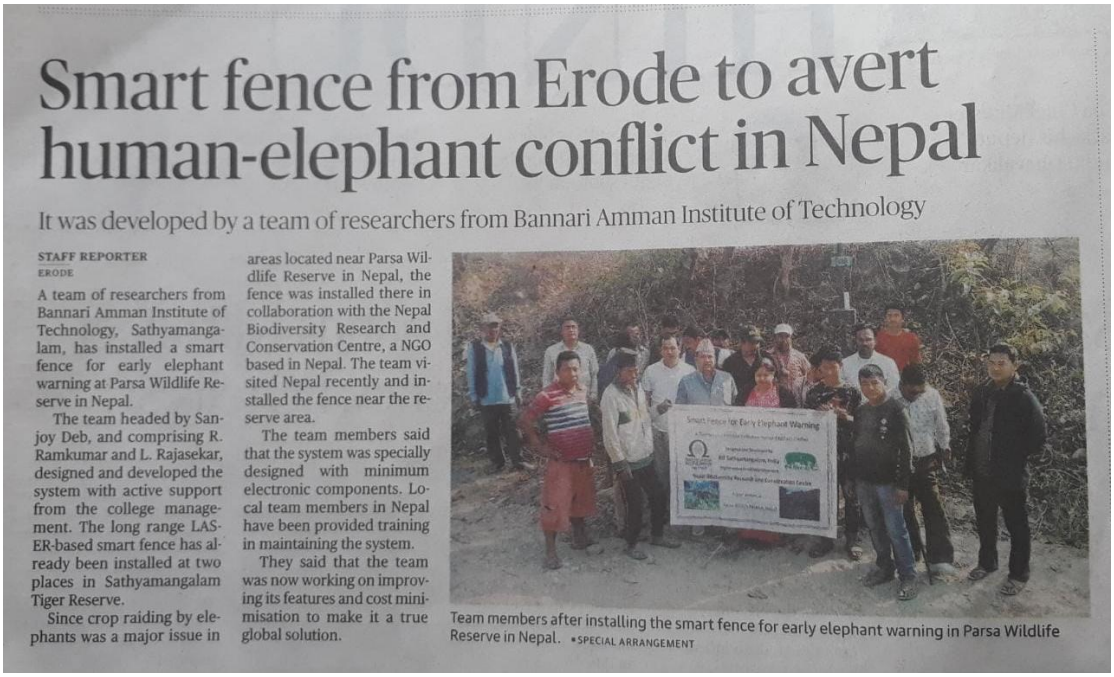
(long talks of 18 minute and speed talks of 8 minute) and Videos (15-20 min). On the first day of the conference we had an interactive session where participants introduced themselves and their work through photographs of their study landscape and work. We also had a session where we screened a movies related to wildlife trade and conservation and a discussion on this topic.

**Mr. Rajat Ramakant Nayak** (Research Associate, FERAL) welcomed all the participants. He explained the aim and objectives of the RSG conferences and emphasised on the role played by the RSG in the careers of young researchers.

Apart from presentations from grant recipients, the conference included workshop by Ipsita Herlekar, Science Communication Co-coordinator, International Centre for Theoretical Sciences, Bengaluru.

## Workshop

**Ms. Ipsita Herlekar** (International Centre for Theoretical Sciences, Bengaluru) took a workshop on – How a scientist can communicate with the press? She spoke about the importance of a press release and the structure and the key points that need to be included in a press release. She emphasized on not using technical terms and explaining findings using simple words and sentences. As a part of the exercise all the participants wrote a press release of their respective study.



# Smart fence from Erode to avert human-elephant conflict in Nepal

## It was developed by a team of researchers from Bannari Amman Institute of Technology

STAFF REPORTER
ERODE

A team of researchers from Bannari Amman Institute of Technology, Sathyamangalam, has installed a smart fence for early elephant warning at Parsa Wildlife Reserve in Nepal.

The team headed by Sanjoy Deb, and comprising R. Ramkumar and L. Rajasekar, designed and developed the system with active support from the college management. The long range LASER-based smart fence has already been installed at two places in Sathyamangalam Tiger Reserve.

Since crop raiding by elephants was a major issue in areas located near Parsa Wildlife Reserve in Nepal, the fence was installed there in collaboration with the Nepal Biodiversity Research and Conservation Centre, a NGO based in Nepal. The team visited Nepal recently and installed the fence near the reserve area.

The team members said that the system was specially designed with minimum electronic components. Local team members in Nepal have been provided training in maintaining the system.

They said that the team was now working on improving its features and cost minimisation to make it a true global solution.

Team members after installing the smart fence for early elephant warning in Parsa Wildlife Reserve in Nepal. • SPECIAL ARRANGEMENT

**Figure 1. A news article on the collaboration of researchers from India and Nepal in implementing elephant-early warning system as a tool to addressing human-elephant conflict in Nepal. The Rufford conference, Corbett provided a platform for these researchers to share their work and ideas, leading to this collaboration.**


**Figure 2. Rajat Ramakant Nayak giving Welcome Remarks**

**Figure 3. Participants introducing themselves and their work through photographs in the interactive session**


**Figure 4. Ipsita Herlekar conducting a workshop on communicating research findings with the press.**

## Presentations by grant recipients

We had 28 presentations by the Rufford grantees, 20 oral presentations, six speed talks and two video presentations.

The range and variety of work done by grantees was extensive. It highlighted the important role that The Rufford Foundation has played in its support of young researchers and conservation projects in Indian sub-continent. The studies ranged from obtaining baseline data on species distribution and population status, biodiversity assessments, studying and developing mitigation measures for human wildlife conflicts to determining environmental flows and landscape studies to awareness, education and outreach programs.

Human wildlife conflict management still remains a grey area for conservation. In countries such as India and Nepal which have high human densities and large bodied animals sharing the same landscape, it is of immediate need to address this issue. Several of the grantees are working in this field trying to understand the nature of conflict and the best possible ways to reduce/mitigate these conflicts. **Iravatee Majgaonkar**, with her second Rufford grant is studying the interactions between wolves and shepherds in the drier landscape of Central Karnataka. Her study suggests that people in this landscape are tolerant to wolves and consider them as an integral part of nature. She found incorporating religious values of people in to conservation could be an effective way to address human-wildlife conflict issues in these landscapes. Working in the Northern Bengal, **Aritra Kshettry** also found that religious belief towards elephants is the important factor that supports elephant in human dominated areas, and this belief could be used effectively for conservation of these big mammals. Study by **Subhransu Bhusan Swain** suggested changing cropping patterns and growing non-lure crops as a possible solution to reduce crop damage by elephants. **Roshan Kumar Thakur**, who is working in Nepal, found honey bees as effective deterrents to keep elephants away from the crop field, and thus reducing the conflict in his study region.

Figure 5. Participants presenting their work at the conference

**Sanjoy Deb**, demonstrated the performance of sensors that he had developed as a measure to prevent roadkills in forested areas. His innovation has been used as an 'early warning system' to detect presence of elephants and send warning to local forest department and villagers and thus reduces interactions of humans with elephants. **Prakash Mardaraj**, studied the effectiveness of Community participation for the sloth bears conservation in the state of Odisha. He found positive attitude of people towards bear conservation in his study. **Gaythri Venkataraman** is studying the patterns of livestock depredation by tiger in South Western Ghats. Her study suggested that most of the people had negative attitudes towards wildlife and the perceptions of local communities should be considered in formulating management plans and mitigation measures to reduce conflicts. **Mrunal Ghosalkar** showed a video which intended towards creating awareness and educate village people about the behavior of leopards living in the human dominated landscapes and things 'to do' and 'not to do' to reduce leopard encounters and mitigate any possible conflicts.

RSGF supported projects that involved documenting the biodiversity. Several of these studies resulted in generating important biodiversity information for the landscape and in identifying new species or subspecies from India. **Vishal Santra** surveyed the venomous snakes in the Himalayan region. Genetic analysis of snake venom helped in identifying new sub species of snakes from India. His work also recorded of several species hitherto not reported from India. Identification of new species also suggests a need for developing separate set of anti-venoms. **Vivek Sarkar** studied the diversity of less known taxa, cicadas in the state of Meghalaya. He recorded more than 60 species of cicadas among which 44 are new report for Garo-Khasi-Jaintia Hill complex, eight are new report for India, and tentatively 11 of them are new to science.

RSGF has been supportive in funding landscape and ecosystem studies and supporting work on species and ecosystems that are traditionally difficult to fundraise for. **Shawn Dsouza** studied the effect of bycatch on diet habits of sea-snakes along the West Coast of India. **Deyatima Ghosh** studied the effect of

agricultural intensification on the herpetofauna and found more species in the low intensification agricultural areas when compared to high intensification agricultural areas. **Pooja Pawar**'s work highlighted the importance of plantations for breeding of hornbills in tropical fragmented forests. **Dhawal Mehta** studied the distribution of four-horned antelope in the Gir National Park. **Tijo K Joy** is studying the effect of land use change on foraging behavior and population of endangered fruit bats in the southern Western Ghats. **Caleb Daniel Gnanaolivu** studied adaptability of Spiny tailed lizard *Saraa hardwickii* to changing habitats and anthropogenic pressures. His work suggests that livestock grazing might be facilitating spiny tailed lizards by replacing the role of wild herbivores. **Vikram aditya** studied the threats and distribution of Indian Pangolin in the Eastern Ghats. His work highlights the threats facing the Indian pangolin from hunting and illegal trade in the Eastern Ghats, and the importance of working with local forest dwelling communities for their conservation. **Hassan Al-Razi** surveyed the distribution of Bengal Slow Loris in Bangladesh and he found habitat destruction and hunting and light pollution as the main threat to slow loris. **Ravi Jambhekar's** work included understanding the influence of landscape factors and resource abundance on the distribution and densities of butterfly populations in the human dominated forested landscapes. **Shubham Banerjee** studied the factors that affect grassland distribution in the Manas National Park. He found hydrology and fire as the main factors that influence succession of grasslands by woody shrubs. **Tanvir Ahmed** is studying the distribution and population status of Phayre's Langur in the Northern Bangaldesh. He has identified 22 groups of Langur totaling 231 individuals in the landscape and recommends changing of agrcicultural practices and providing alternate livelihood opportunities to local people in order to reduce their dependency on forested areas and thereby conserve langurs.

Several of the Rufford projects involved community participation for nature conservation. Conservation education and awareness were integral part of most of the projects that were presented in the conference. **Jignasu Dolia** studied the nesting ecology of the longest venomous snake in the world, the King Cobra. This is

the only snake which builds a nest for its eggs. He involved village communities to monitor and protect nests and eggs of King Cobra in the state of Himachal Pradesh. While studying the forgaing ecology of slaty wood-peckers, **Sarabjit Kaur** found sal stands as important habitats for the conservation of wood peckers. She also initiated conservation work with the help of local community. As part of her study, **Joyeeta Singh** studied the perception of people about the insect pollinators. She found that people were unaware of the pollinators and their role. She stressed on the importance of conducting more awareness programs. **Shankar Dutt**'s work showed the strength of community participation and community activism for the conservation of Mahseer and other biodiversity. **Rashmi Singh** did an extensive study of socio-economic changes associated with ban on grazing in Himalayan protected area and effect of grazing restriction on ecology. The project by **Prabin Bhusal** aimed to promote awareness of agroforestry practices in the farm, degraded and unused lands for livelihood improvement of local farmers and biodiversity conservation.

**Khima Nanda** studied the mortality of vultures due to electrocution in the Himalayan foothills and initiated efforts to reduce electrocution and conserve the endangered vultures. His initial work suggests a reduction in mortality due to electrocution by 80-90% and he aims to undertake similar conservation measures in the entire state.

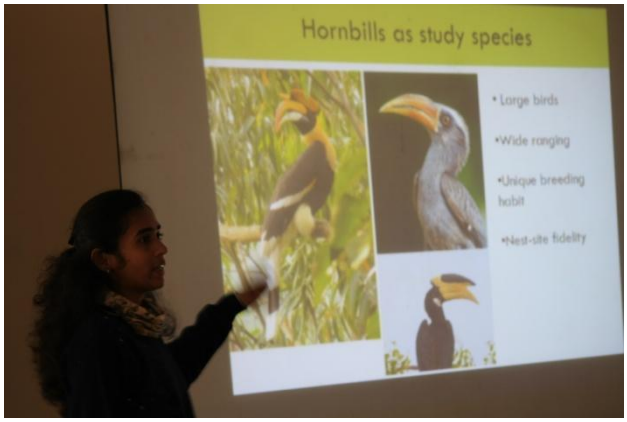
**Figure 6. Participants of the Rufford India Conference, Corbett 2019.**


**Figure 7. Partcipants presenting their work.**


Abundance and Distribution of
the Four-Horned Antelope in
Gir Protected Area
Dr. Dhaval Mehta
Rufford


Rufford
Conserving the soundscape
of the land of cloud


Terai Ecosystems of the
Geographical extent: Eastern Himala
Vegetation: Swampy and dry grassla
sub-tropical forest
Climate: Indian monsoon with heav
seasonal floods, strong
Geology and Soils: Bhabar soils (high
Terai soils (high in alluvial


Hornbills as study species
• Large birds
•Wide ranging
•Unique breeding
habit
•Nest-site fidelity


Towards understanding local community perception
on native pollinator insects in high altitude settlements of Kedarnath wildlife sanctuary in Uttarakhand Himalaya
Rufford


Foraging ecology of Great slaty Woodpecker
(Mulleripicus pulverulentus)
Rufford

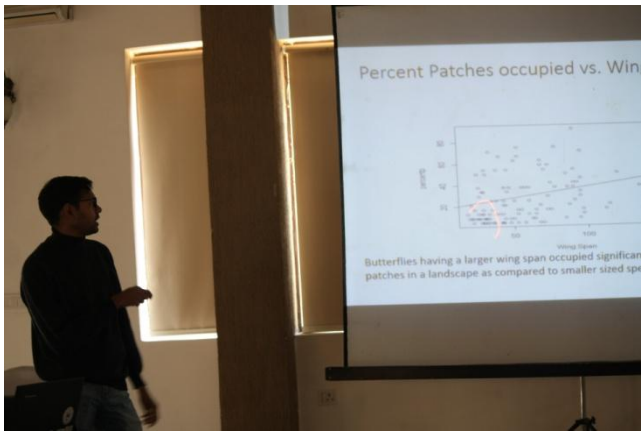

Percent Patches occupied vs. Win
Butterflies having a larger wing span occupied significan
patches in a landscape as compared to smaller sized spe

Figure 8. Corbett Landscape and the wildlife sighted during the field trip

**Figure 9. Field visit to Corbett Tiger Reserve**

# Appendix I

## List of Rufford grantees

| Name | Email address | Organisation | RSGF support |
|---|---|---|---|
| Aritra Kshettry | kolkatalife@gmail.com | Wildlife Conservation Society-India | Travel, food and accommodation |
| Caleb Daniel Gnanaolivu | caleb992@gmail.com | Indian Institute of Science | Travel, food and accommodation |
| Deyatima Ghosh | meetdeyatima@yahoo.com | University of Calcutta | Travel, food and accommodation |
| Dhawal Mehta | dhawalbmehta@hotmail.com | Independent Researcher | Travel, food and accommodation |
| Gayathri Venkatramanan | gayathri.v@sacon.in | Salim Ali Centre for Ornithology and Natural Histo | Travel, food and accommodation |
| Hassan Al-Razi | chayan1999@yahoo.com | Jagannath University, Dhaka | Travel, food and accommodation |
| Iravatee Majgaonkar | iravati.m@gmail.com | Wildlife Conservation Society-India | Travel, food and accommodation |
| Jignasu Dolia | jdolia@gmail.com | Independent Researcher | Travel, food and accommodation |
| Joyeeta Singh (Chakraborty) | joyeeta.u@gmail.com | Forest Research Institute, Dehradun | Travel, food and accommodation |
| Khima Nand | knbalodidoon@gmail.com | Doon University, Dehradun, Uttarakhand | Travel, food and accommodation |
| Marjan Maria | marjannature@gmail.com | | Food and accommodation |
| Mrunal Ghosalkar | mrunal8ghosalkar@gmail.com | Wildlife Conservation Society-India | Travel, food and accommodation |
| Pooja Yashwant Pawar | pawarpy.1992@gmail.com | Nature Conservation Foundation, Mysore | Travel, food and accommodation |
| Prabin Bhusal | pbhusal@iofpc.edu.np | Institute of Forestry, Tribhuvan University, Nepal | Travel, food and accommodation |
| Prakash Mardaraj | pmardaraj@gmail.com | IUCN SSC-Bear Specialist Group | Travel, food and accommodation |

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|---|---|---|---|
| Rashmi Singh | rashmi89singh@gmail.com | Ambedkar University Delhi | Travel, food and accommodation |
| Ravi Madhav Jambhekar | ravijambhekar04@gmail.com | Indian Institute of Science | Travel, food and accommodation |
| Roshan Kumar Thakur | rosanthakur@gmail.com | Nepal Biodiversity Research and Conservation Centre | Travel, food and accommodation |
| Sanjoy Deb | deb_sanjoy@yahoo.com | Bannari Amman Institute of Technology | Travel, food and accommodation |
| Sarabjeet Kaur | 23tanyanarula@gmail.com | Wildlife Institute of India | Food and accommodation |
| Shankar Datt | dattshankar@gmail.com | Shramyog | Travel, food and accommodation |
| Shawn Dsouza | shawn.dsouza@dakshin.org | Dakshin Foundation | Travel, food and accommodation |
| Subham Banerjee | sb16rs005@iiserkol.ac.in | IISER Kolkata | Travel, food and accommodation |
| subhransu bhusan swain | subhransu1963@yahoo.com | Paribartan | Travel, food and accommodation |
| Tanvir Ahmed | shaikot2023jnu@gmail.com | Department of Zoology, Jagannath University, Dhaka | Travel, food and accommodation |
| Tijo K Joy | tijokjoyz@gmail.com | Sarah Tucker College, Palayamkottai, Tirunelveli | Travel, food and accommodation |
| Vikram Aditya | vikram.aditya@atree.org | Ashoka Trust for Research in Ecology and the Environment (ATREE) | Travel, food and accommodation |
| Vishal Santra | vishal.herp9@gmail.com | Simultala Conserationists (Foundation for Wildlife) | Travel, food and accommodation |
| Vivek Sarkar | viveksarkar87@gmail.com | North Orissa University | Travel, food and accommodation |

## Appendix II

## Schedule

## Rufford India Conference: Fostering Grass-roots Conservation in India - A Rufford Initiative, 2019

**8 February, 2019**

| SESSION | TIME | EVENT |
|---|---|---|
| *Post-lunch session* | 12.30 – 14.30 | **CHECK IN, REGISTRATION and LUNCH** |
| | 15.00 – 15.15 | **WELCOME ADDRESS** |
| | 15.15 – 17.00 | **INTERACTIVE SESSION** |
| | 17.00 – 18.30 | **OUTDOOR ACTIVITY** |
| | 19.30 – 21.00 | **DINNER** |

**9 February, 2019**

| SESSION | TIME | EVENT | |
|---|---|---|---|
| *Morning session* | 08.30 – 09.30 | **REGISTRATION** | |
| | 09.30 – 10.30 | **ORAL PRESENTATIONS** | |
| | | Iravatee Majgaonkar | *Assessing interactions between wolves and pastoral groups in Koppal, northern Karnataka* |
| | | Aritra Kshettry | *Mahakal blessed my crop: Religious beliefs influence perceptions towards crop losses to Asian elephants* |
| | | Prakash Mardaraj | *Handholding of community towards sloth bear conservation in Eastern India* |
| | 10.30 – 11.00 | **TEA BREAK** | |
| | 11.00 – 13.00 | **ORAL PRESENTATIONS** | |
| | | Roshan Kumar Thakur | *Using honeybee as an Eco-Deterrent for Crop Raiding Elephants in Central Nepal* |
| | | Shawn Dsouza | *The trophic ecology of sea snakes off the Sindhudurg coast of Maharashtra: Overlap with fisheries and its implications* |
| | | Vishal Santra | *Surveys of venomous snakes and other reptiles in the Himalayan biodiversity hot-spot* |

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|---|---|---|---|
| | | Rashmi Singh | *Political interventions and ecological realities in the Pastoral landscape of Western Himalayas, Sikkim* |
| | | Prabin Bhusal | *Agroforestry promotion for livelihood enhancement and biodiversity conservation (Project in the community forest user groups in Kavre, Nepal)* |
| | | Siddhartha Pati | *Horseshoe crab by catch, trade and traditional medicine threatens Indian Horseshoe crab populations* |
| | 13.00 – 14.00 | **LUNCH** | |
| **SESSION** | **TIME** | **EVENT** | |
| ***Post-lunch Session*** | 14.00 – 16.00 | **WORKSHOP**<br>*Communicating with Press*<br>Ipsita Herlekar<br>Science Communication Co-ordinator<br>International Centre for Theoretical Sciences, Bengaluru | |
| | 16.00 – 16.30 | **TEA BREAK** | |
| | 16.30 – 17.00 | **SPEED TALKS** | |
| | | Dhawal Mehta | *Abundance and Distribution of the Four Horned Antelope in Gir Protected Area* |

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|---|---|---|---|
| | | Tanvir Ahmed | *Status and Conservation Initiative of Phayre's Langur in Northeast Bangladesh* |
| | | Gayathri Venkatramanan | *Patterns of human-tiger interaction at the human-wildlife interface areas of Western and Eastern Ghats of Tamil Nadu* |
| | 17.00 – 17.30 | **VIDEO PRESENTATION**<br>Mrunal Ghosalkar<br>*Doodling the Cat (Sequel II): Using youth as a strong community connection to sensitise people on safely sharing space with leopards to reduce negative interactions and create greater understanding of human-leopard interactions.* | |

**10 February, 2019**

| SESSION | TIME | EVENT | |
|---|---|---|---|
| *Morning session* | 08.30 – 09.30 | **REGISTRATION** | |
| | 09.30 – 10.30 | **ORAL PRESENTATIONS** | |
| | | Vikram Aditya | *Burrowing to oblivion: integrating field surveys and community knowledge to assess the threats facing the Indian pangolin and its distribution in India's northern Eastern Ghats* |
| | | Hassan Al-Razi | *Population Status, Threats, and Conservation of Bengal Slow Loris (Nycticebus bengalensis) in Northeast Bangladesh* |
| | | Khima Nand | *Mitigating the risk of electrocution mortality to threatened vultures in the Terai region of Uttarakhand: some preliminary results* |
| | 10.30 – 11.00 | **TEA BREAK** | |
| | 11.00 – 13.00 | **ORAL PRESENTATIONS** | |
| | | Sarabjeet Kaur | *Foraging ecology of Great slaty woodpecker (Mulleripicus pulverulentus)* |
| | | Ravi Madhav Jambhekar | *The influence of landscape composition on butterfly populations* |

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|---|---|---|---|
| | | Vivek Sarkar | *Conserving the soundscape of the land of cloud* |
| | | Subham Banerjee | *Landcover dynamics of Manas National Park : elevation & fire incidents control the Woodland-Grassland transitions* |
| | | Deyatima Ghosh | *Effect of agricultutal intensification on herpetofauna* |
| | | Jignasu Dolia | *King Cobras of the Kumaon hills, Uttarakhand: Nesting Ecology and Conservation* |
| | 13.00 – 14.00 | **LUNCH** | |
| **SESSION** | **TIME** | **EVENT** | |
| ***Post-lunch Session*** | 14.00 – 14.30 | **SPEED TALKS** | |
| | | Pooja Yashwant Pawar | *Old, older and oldest- monitoring hornbill nests in the Anamalai hills* |
| | | *Joyeeta Singh (Chakraborty)* | *Towards understanding local community perception on native pollinator insects in high altitude settlements of Kedarnath wildlife sanctuary in Uttarakhand Himalaya* |
| | | Sanjoy Deb | *Innovative Technological Solution to Roadkill: A Success Story* |

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|---|---|---|---|
| | 14.30 – 15.45 | **ORAL PRESENTATIONS** | |
| | | Subhransu Bhusan Swain | *Adoption of Non-lure crop* |
| | | Tijo K Joy | *Study on Chiroptera Specifically Focusing on Endemic and Endangered Species Conservation Status and Ecosystem Service in the Mountains of Southern Western Ghats* |
| | | Caleb Daniel | *A tale of how spiny-tailed lizards and people co-exist* |
| | | Adhavan | *Developing Technology for Successful Transplantation of Seagrass in India with Respect to Climate Change* |
| | 15.45 – 16.15 | **TEA BREAK** | |
| | 16.15 – 16.45 | **VIDEO PRESENTATION**<br>Shankar Datt<br>*A case for indigenous community-centric buffer zone management* | |
| | 16.45 – 17.30 | **DOCUMENTARY SCREENING AND DISCUSSION**<br>*A Brush with Death*<br>Facilitators: Iravatee Majgaonkar & Pooja Pawar | |

**11 February, 2019**

| SESSION | TIME | EVENT |
|---|---|---|
| *Morning session* | 06.00 – 11.00 | **FIELD VISIT** |
| | 11.00 – 13.00 | **LUNCH and CHECK OUT** |

# Appendix III

## Abstracts

**Assessing interactions between wolves and pastoral groups in Koppal, northern Karnataka**

*Iravatee Majgaonkar*

The semi-arid human use landscapes in peninsular India are home to the Indian grey wolf *Canis lupus pallipes* and pastoral communities. A major part of the wolf's diet here consists of livestock and this brings pastoral groups and wolves together where they interact with each other. Because these are human-use landscapes, interactions like these prove very critical to understanding whether large carnivores can persist in these areas. We aimed at following groups of shepherds in the landscape to track livestock losses to various factors to be able to quantify the magnitude of predation by wolves. It was found that predation by wolves was a very minor proportion of the total losses faced by pastoralists. Semi-structured interviews revealed cultural drivers of how they respond to these predation events and why monetary compensation is not always a successful tool in conservation. The survey finding sheds light on the fact that negative interactions are not central to shepherd-wolf relations and that this probably plays an important role in letting wolves persist in this landscape.

**Mahakal blessed my crop: Religious beliefs influence perceptions towards crop losses to Asian elephants**

*Aritra Kshettry*

Human-wildlife cohabitation is an unavoidable result of increasing interface between people and wildlife especially in densely populated countries. Such interactions may turn hostile when people face losses due to potentially dangerous wildlife and this in turn impedes conservation goals. Economic losses due to elephants are a serious conservation challenge and monetary compensation is a widely used strategy to mitigate such losses. The efficacy of the strategy has received research attention from the perspective of loss incurred versus amount of compensation and the overall effect of the compensation paid on attitude towards the species. However, there exists a vast lacuna in understanding what makes people claim compensation or factors that prevent people from receiving losses from agencies. In this study we look at how religious beliefs affect propensity to claim compensation and also test the efficacy of compensation in alleviating conflict in the region through detailed narrative interviews. We conducted 120 semi-structured interviews across 30

villages of 4 communities in the tea-landscapes of West Bengal state where people and elephant share space despite heavy loss of life and property. Our results indicate that religious beliefs regarding the elephant God prevents people from claiming compensation and may drive acceptance towards certain wildlife species even in human-use areas. Furthermore, we also found that compensation claim payments are slow and often subjective to assessments of local authorities, thereby underscoring the need for a more objective and efficient method for assessment and disbursements.

**Handholding of community towards sloth bear conservation in Eastern India**

*Prakash Mardaraj*

Shrunken wildlife habitats due to increased in human interventions often force animals to foray into human-dominated landscapes causing human-animal conflict. This study focuses on the effectiveness of Community participation for the sloth bears conservation in Swarnachuda reserve forest in Nilgiri Range of Balasore wildlife division, Odisha Eastern India. Poor people residing along the fringe of PAs depend on forest for NTFP. They collect both for consuming and earning a livelihood. A mixed method of a Questionnaire survey, Key Person's Interview (KPI) and site visits/photo documentation, drawing method were also used to collect data. Painting competitions were organized with school children in the conflict-affected villages.

We collected information on the socioeconomic status with their perceptions on the conservation of forest. Results indicated that the performance of Community Outreach Programs (OP) and cooperation between forest staff and people are weakening geared by several factors. In the same line data was collected from 525 households who were known to be affected by bears and important village representatives in 22 fringe villages of Swarnachuda RF. Significant number of villagers agreed that bears represented a healthy forest while few declined. School children of the area are key stakeholders in future of wildlife management. Students had diverse stories to share their artwork but the need for conservation was voiced in unison. Basing on observation and analysis of data, the results and future strategy are suggested in shaping local people attitudes towards bear conservation.

**Using honeybee as an Eco-Deterrent for Crop Raiding Elephants in Central Nepal**

*Roshan Kumar Thakur*

Human elephant conflict (HEC) is an unsolvable issue which disrupts the speed of conservation of elephant. The problem solving issue of Elephant is so fast and easy

that human trial mechanical deterrence methods and still fails. In Africa, honeybee fence method has shown positive change among communities and researchers. In Nepal, Human Elephant conflict is a serious problem. So to solve this problem, I used honeybee as bio fence to deter crop raiding in Central Nepal. Out of 30 intrusion attempts, elephants were deterred by 80% i.e. 24 times.

The other social statistics were studied to see the perception and status of communities living with giants. Out of total respondents (n=48) only the farm holders with beehive and nearby farmers had following statistics. 50% were illiterate, 25 % were educated up to primary, and 25% were below SLC. 40% of respondents had occupation as agriculturists, while 28% livestock; 32% labor. 52% of respondents used nearby forest as a source of fuel wood, 39% used the forest for fodder collection and 9 % used it as place for animal husbandry. 25 % of respondents used fireball and drum beating as mitigation measure for human elephant conflict mitigation. While 30 % of respondents believed fence wire with no current can be used as elephant deterrence. 58% revealed that HEC trends at current time have decreased. 100% recommended that solar fencing is required to mitigate elephant intrusion.

**The trophic ecology of sea snakes off the Sindhudurg coast of Maharashtra: Overlap with fisheries and its implications**

*Shawn Dsouza*

Fisheries are amongst the widest ranging and most impactful of human activities in the marine environment. Overfishing and bycatch of non-target species, in particular, marine megafauna, have been highlighted as major issues. Bycatch refers to the incidental capture of non-target species in fishing gear. Significant effort has been directed towards quantifying the impacts of bycatch on marine ecosystems, communities, and populations of threatened species. However, there is limited knowledge about the drivers of bycatch and its effects on the ecology of these species. Here, we study the impacts of small-scale gillnet and beach seine fisheries as well as commercial trawl fisheries on the diet and trophic ecology of two species of sea snakes, beaked sea snake (*Hydrophis schistosus*) and Shaw's sea snake (*H. curtus*) commonly found as bycatch in Malvan, Maharashtra. We characterise and compare the diet and niche of these species encountered in trawlers, gill nets and shore seines using stable isotope analysis to determine overlap in prey base with commercially targeted fish species. Our preliminary results suggest that both species of sea snakes occupy a similar trophic niche but differ in niche breadth. Their prey species are also targeted by gillnets and beach seines as well as encountered in low-value bycatch from trawlers. We hypothesise that this increased competitive

pressure combined with high mortalities from bycatch may be driving assemblage shifts in sea snake communities on the west coast of India.

**Surveys of Venomous Snakes and other Reptiles in the Himalayan Biodiversity Hot-Spot**

*Vishal Santra, Dr. Anita Malhotra, Dr. Omesh Kumar Bharti, John Benjamin Owens, Sourish Kuttalam*

Himachal Pradesh, a northern Indian state is a biodiversity hotspot. Having extensively surveyed and studied for plants, mammals, birds and other life forms, reptiles have been somehow missed. We intended to fill this long gap. Thus in the year 2018 we initiated an extensive and daunting task of surveying different areas of Himachal Pradesh. We spent more than 50 days and nights in the middle of monsoon surveying for venomous snakes and other reptiles in Himalayan landscape. Venomous snakes were an important part of our survey as we had snakebite as one of our research focus. This was the first time that reptiles found in the state have been studied in the molecular aspect revealing possible new species and also discovery and documentation of species for the first time from the area. We discuss the findings and results of our work in our presentation. We also discuss the challenges and necessary help required to continue the research and why it is absolutely essential.

**Political interventions and ecological realities in the Pastoral landscape of Western Himalayas, Sikkim**

*Rashmi Singh*

High altitude rangelands are unique grassland ecosystems harboring a rare assemblage of wild fauna and flora. Pastoralism is the most dominant livelihood practice in these rangelands. Socio-economic changes and development have influenced the pastoral practices in high-altitude rangelands across the world. Conservation discourses associated with socio-economic changes and effects of livestock grazing on rangelands, in general, have translated in political actions in Indian Trans-Himalayas in the form of restrictions of pastoral movements in the protected areas. With this background, my study is broadly aimed at exploring the socio-political changes in and around the Barsey Rhododendron Sanctuary, West Sikkim that has influenced the pastoral resource use and livestock herding in the region. In order to engage with the associated debates over the role of pastoral use and grazing in the Indian Himalayas, I am exploring the ecological responses to altered resource use practices in the study site. I have used a mix of quantitative and

qualitative methods, drawing from social anthropology and ecological methods to attain the objective of the study.

**Agroforestry Promotion for Livelihood Enhancement and Biodiversity Conservation (Project in the community forest user groups in Kavre, Nepal)**

*Prabin Bhusal*

Agroforestry combines trees, crops, fodder, fruits, and livestock within the farming system to enhance long-term yields and sustainable farming practices. The project aimed to promote awareness of agroforestry practices in the farm, degraded and unused land for livelihood improvement of local farmers and biodiversity conservation. It stressed on the positive effect that agroforestry can bring to farmers through better land management in central mid-hills of Nepal. The project area covered two Community-Forest User Groups (CFUGs) in Kavrepalanchok district, mid-hills of Nepal. The project employed Participatory Action Research (PAR) and the reflective learning process, with a formal research design including control sites and surveys to generate robust evidence. It assessed the potential and challenges of the community to adopt the agroforestry and build the learning innovations in fostering suitable practices. The activities included reflective learning and discussion series, the revival of small farmers groups, observation visit, establishment of demonstration plots, training and capacity building of community and dissemination of community conservation efforts. The understanding and preparedness of users and farmers have been increased with increased Agroforestry initiatives. More than 90% users planted at least 10 fodder and fruit species in and around their home and crop field. Formation of the Program Management Committee with the participation of local farmers, leaders and teachers and sub-committees for Demo plot management has enhanced the sense of ownership among the farmers. PAR is quite helpful in introducing reflective learning process within users, between them and amongst the CFUGs and stakeholders. However, there needs a competent and committed facilitator to properly drive the whole process, drag key leaders in the process and attract the attention of authorities and support agencies.

**Horseshoe crab by catch, trade and traditional medicine threatens Indian Horseshoe crab populations**

*Siddhartha Pati*

Horseshoe crab trade and uses in traditional medicine in India has been increased, motivating conservation initiatives and enforcement of legal protection. To assess the current trade and bycatch levels in Odisha we carried out an interview survey of people in 2018, mostly fishermen and fishmongers. Several thousand horseshoe

crabs die each year as a consequence of the high mortality rates typical of these fishing gears. In addition, most fishermen from Balasore coast and some fishermen from other regions declared that they kill horseshoe crab for traditional medicine. Regulations and enforcement appear to be ineffective. The overall mortality probably represents an unsustainable toll on the horseshoe crabs populations, and the perception of fishermen is that horseshoe crabs numbers are declining. Mitigating the identified threats is thus urgent. In particular, intentional killing should be tackled through its cultural drivers, and measures to reduce bycatch mortality need to be tested and implemented.

**Abundance and Distribution of the Four Horned Antelope in Gir Protected Area**

*Dhawal Mehta*

The four horned antelope (*Tetracerus quadricornis*) is endemic to India. Very few studies have addressed the biology and ecology of this species. The current study was carried out in the Gir Protected Area to assess the abundance and understand the factors governing the distribution of the species. An additional aim of the project was to generate awareness among stakeholders for conservation of the species in the landscape. The abundance estimation was carried out using Distance sampling through data collected on vehicle transects. Presence only models were analyzed in a GIS platform to understand the factors that governed the distribution of the species in the study area. The density estimate of the species in the Gir Protected Area was found to be 0.17±0.06 (SE). The distribution of the four horned antelope was assessed using Maxent. Vegetation, Elevation and proximity to water chiefly contributed to the distribution of the species in the landscape. Awareness among locals and the forest staff was generated throughout the duration of the project.

**Status and Conservation Initiative of Phayre's Langur in Northeast Bangladesh**

*Tanvir Ahmed*

Phayre's Langur (*Trachypithecus phayrei*) is a globally endangered primate, distributing to Bangladesh, China, India, Lao PDR, Myanmar, Thailand and Viet Nam. The species is on a serious decline and believed to have undergone a decline of more than 50% over the last three generations. There is no precise estimation of the population abundance available in Bangladesh. Since March 2018, we have been surveying the population status, threats affecting their survival and collecting local people's perception data in 5 northeastern forests of Bangladesh. Until now, we have recorded 22 groups of Phayre's Langur totaling 231 individuals in Satchari National Park, Lawachara National Park and Rema-Kalenga Wildlife Sanctuary. Mean group size was 10.66 ± 5.73 ranging from 4 to 26 individuals/group. 46% of the

population were adult and 54% were non-adult. Adults composed of 39% male and 61% female and their ratio was 1:1.56. Habitat destruction and fragmentation by agricultural practice, monoculture plantation and unregulated bamboo extractions, road-railway and electrocution were found affecting the Langur population for long. Trading attempt of a non-adult individual was reported. Hunting and Human-wildlife conflicts were poorly known but disturbances by tourists were high in winter. The socio-economic conditions of local people were found a barrier to reduce dependency on forests for their livelihood. However, people were enthusiastic in participating consultation meetings, awareness campaigns and receiving conservation materials for the Langur. So, we primarily recommend stopping agricultural practice into the protected forest areas and providing alternate livelihood strategies for sustainability of current conservation initiatives.

**Patterns of human-tiger interaction at the human-wildlife interface areas of Western and Eastern Ghats of Tamil Nadu**

*Gayathri Venkatramanan*

Habitat loss and fragmentation has led to wide-ranging carnivores such as tigers to disperse into the human-wildlife interface areas resulting in human-tiger conflict. Economic losses by tigers due to livestock depredation invariably results in people developing negative perceptions on tigers and retaliatory killing. It is vital to investigate the patterns of livestock depredation by tigers and develop effective measures to mitigate conflict. I conducted semi-structured questionnaire surveys of local communities within 5x5 km2 grids covering Protected Area (PA), non-PAs and its 5 km buffer areas from September to November 2018 in Mudumalai Tiger Reserve (TR), Nilgiris Forest Division (FD), Gudalur FD and Sathyamangalam TR regarding the instances of livestock depredation by tigers. Tiger was found to depredate mostly on cows (51%) followed by goats (34%) and buffaloes (15%). Temporal attacks of tigers were inclined towards daytime (73%) as the livestock which are herded into the forest form easy prey. Few attacks (5%) were reported at sunset and 22% at all times. Compensation scheme was applied by 30% of respondents with livestock depredation, of which only 35% were compensated by the Forest Department, as compensations are not provided when livestock are grazed within the PA. Ninety one percent of the respondents expressed negative attitudes and nine percentages expressed positive attitudes towards wildlife. Understanding the patterns of human-tiger conflict and the perceptions of local communities will help in formulating management plans and mitigation measures to reduce conflicts.

**Doodling the Cat (Sequel II): Using youth as a strong community connection to sensitise people on safely sharing space with leopards to reduce negative interactions and create greater understanding of human-leopard interactions.**

*Mrunal Ghosalkar*

Major part of western Maharashtra is an irrigated agricultural landscape which supports large carnivores such as leopards living alongside high densities of humans having agriculture and livestock rearing are main livelihoods. Livestock depredation by leopards is commonly recorded here with very few instances of loss of human life. There is definitely a fear of the leopards in the landscape as people had not shared the space with this feline since generations. Increased fear also results in undue pressure being put on the managers of the area to take knee jerk actions such as setting up traps even if leopard has been only seen. The aim of this project was to transform this fear into a greater understanding of leopards through imparting knowledge from both scientific and traditional origins on leopard behavior and the precautions people need to take to reduce the negative interactions. This work initiated in Niphad (Nashik, Maharashtra) in August 2017 and we started working in Sinner (neighboring taluka of Niphad) this year 2018 in which included conducting workshops for the Forest Department, Schools, Colleges and Media on (i) leopard behavior (ii) precautionary measures related to the safety of humans and their livestock (iii) creating children leopard ambassadors who can spread awareness in their own community. Our belief and experience is that a greater understanding leads to a reduced fear and a more rational way of dealing with the issue of shared spaces between large wildlife and people. Our work also provides a platform for the different important stakeholders to have dialogue with each other to increase the knowledge in community.

**Burrowing to oblivion: integrating field surveys and community knowledge to assess the threats facing the Indian pangolin and its distribution in India's northern Eastern Ghats**

Vikram Aditya

Pangolins have been declared by CITES as the world's most trafficked mammals. The Indian pangolin is an endangered mammal previously distributed across the subcontinent. No information exists on its current occurrence in the northern Eastern Ghats and how hunting and illegal trade is affecting it. We aim to assess the impacts of hunting on the Indian pangolin and to study its presence and distribution in the northern Eastern Ghats landscape of Andhra Pradesh, India. We use primary field data from camera traps combined with secondary data on presence elicited

from local community interviews to estimate presence of the Indian pangolin in the region, using an occupancy modeling framework. We surveyed over 400 km2 in the northern Eastern Ghats, focusing on RFs around Papikonda NP through ~80 camera trap locations for identifying potential pangolin presence and habitats. We conducted semi-structured, open-ended interviews with 30 respondents from villages in the landscape to document pangolin presence and impacts of hunting. Results are still emerging. However, interviews revealed that pangolins were primarily hunted for meat, and for their scales used as rings and amulets. Occupancy models based on interviews indicated that over 75% of surveyed grids could be potentially occupied by them. 18 species of mammals including first records of the honey badger *Mellivora capensis* were captured from the camera traps. This project highlights the threats facing the Indian pangolin from hunting and illegal trade in the Eastern Ghats, and the importance of working with local forest dwelling communities for their conservation.

**Population Status, Threats, and Conservation of Bengal Slow Loris (Nycticebus bengalensis) in Northeast Bangladesh**

*Hassan Al-Razi*

The Bengal slow loris *Nycticebus bengalensis* is the only nocturnal primate in Bangladesh. This species is categorized as Vulnerable on the global IUCN Red List but in Bangladesh it is Endangered. Very little data is available about this species in Bangladesh except distribution. From June 2017 to August 2018 we conducted a survey in five protected areas of North-east Bangladesh by using recce transects to estimate encounter rates of Bengal slow loris. A team of 2-5 persons conducted night survey (18.00–03.00) by using head lamp with red filters. We walked very slowly in the forest (1-1.5 km per hour) and covered total 107 km over 53 nights survey. We encountered Bengal slow loris a total of 68 times in four protected areas. We did not encounter any slow loris in Juri Reserved forest. Encounter rate was highest in Satchari National Park (1.78/km) and lowest in Rajkhandhi Reserve Forest (0.13/km). Different types of threats were recorded from four protected areas. Habitat destruction and hunting and light pollution is the main threat of slow loris. Beside these threats road kills and electrocutions are direct cause of mortality of Bengal slow loris in these forest patches of Bangladesh. This study presents the information on population and threats of slow loris in Bangladesh for the first time. Precautionary approach is needed to conserve this cryptic and least studied nocturnal primate species in their natural habitat.

**Mitigating the risk of electrocution mortality to threatened vultures in the Terai region of Uttarakhand: some preliminary results**

*Khima Nand*

The declination of vulture population in the Indian sub-continent during the last three decades is a well-known fact. The veterinary drugs like diclofenac and other NSAIDs were considered among the major reason behind this population crash. However, the recent population surveys in Uttarakhand state have revealed that the risk of electrocution mortality is among the major threats to the existing vulture population especially in the Terai region of the state. We recorded mortality of more than two hundred threatened raptors due to electrocution in various carcass dumping sites of the state. To mitigate the electrocution mortality risks, we identified safe sites for carcass dumping and with involving key stakeholders we shifted the unsafe sites to a safer location. A total of five unsafe sites in Dehradun and two in Haridwar districts were shifted to safer locations and were continuously monitored. The preliminary results showed that the overall mortality was reduced up to 85-90 percent of the last years and only 7 *Gyps himalayensis* (49 in the year 2017) and 4 *Aquila nipalensis* (21 in the year 2017) were found dead due to electrocution in the unsafe dumping sites of Dehradun district. The preliminary results showed positive impacts of the conservation actions taken in the region, however, to ensure the long term survival of vulture populations, similar conservation initiatives are required to be undertaken throughout the state.

**Foraging ecology of Great slaty woodpecker (Mulleripicus pulverulentus)**

*Sarabjeet Kaur*

A study of foraging of the Great Slaty Woodpecker (*Mulleripicus pulverulentus*) was conducted in Pawalgarh Conservation Reserve in the western Himalayas in Uttarakhand during the post-breeding season of 2018. Six groups of the Great slaty woodpecker were encountered in Sal-Mix forest each having four to six individuals inside the conservation reserve. In addition, a female was encountered outside the reserve boundary. The foraging was primarily observed on live trees of *Shorea robusta* (Sal) followed by an encounter each of the species feeding on the termites on the trees of *Tectona grandis* (Teak) and *Anogeissus latifolia* (Bakuli). The foraging on Sal was primarily in tree crown whereas it was observed on the main trunk in Teak and Bakuli. The foraging maneuver frequently adopted by individuals was pecking, probing and gleaning prey from live trees. Mean measurement at foraging trees was: DBH (Sal) = 66 in, DBH (Teak) = 46 in and DBH (Bakuli) = 55 in. I found little intersexual variation both in foraging behaviour or habitat. Conspecific, however,

showed variation in both foraging behaviour and habitat. The focal species co-occurred with others but differed in substrate manipulation. Seven species of conspecific belonging to four different genera were encountered foraging with the Great slaty woodpecker at the same time. Great slaty woodpecker although largest is rare in occurrence in the reserve and so it becomes very crucial to understand their foraging behaviour which will help us to adopt proper conservation strategies to maintain their integral role in the ecosystem.

**The influence of landscape composition on butterfly populations**

*Ravi Madhav Jambhekar*

A central question in ecology involves understanding the processes underlying patterns in population abundance and the distribution of species at small and large spatial scales. The distribution of individuals of a species across a landscape may be influenced by both local factors, such as resource abundance; and by landscape-level factors, such as the size of habitat patches, connectivity between patches and the permeability of the matrix surrounding habitat patches, all of which influence the colonisation and extinction of local populations and the movement of individuals between populations. How these local and landscape-level factors affect the distribution of a species may vary widely between species, because the response of species to these ecological conditions may depend on species-specific traits, such as body size, behaviour and other functional traits. I investigated the ecological processes at local and landscape levels influencing population densities by taking a behavioural ecological approach and using butterflies as a model system. I also examined how functional traits affect the relationships between ecological factors and species distribution in a landscape. I then examined how landscape-level factors, specifically patch size, connectivity and matrix permeability, affect butterfly populations. I tested whether the apparent response of a species to landscape-level factors was affected by species-specific traits, specifically whether it was a habitat generalist or specialist and how permeable the matrix was to it. Finally, I test and describe how diverse functional traits, including morphological, life-history and behavioural traits, affect relationships between landscape composition and population density patterns of butterflies.

**Conserving the soundscape of the land of cloud**

*Vivek Sarkar*

Cicadas are one of the major players of Forest orchestra. Despite having the highest generic diversity in the world Indian cicadas have remained one of the most understudied taxa. India (including Bangladesh) all together has 189 species of

cicadas and only 22 cicadas were reported from Meghalaya. A study has been carried out for nine months (from February 2017 to October 2017) in order to explore the cicada diversity of Meghalaya and during this study more than 60 species of cicadas were recorded. Among these 60+ odd species, 44 are new report for Garo-Khasi-Jaintia Hill complex, eight are new report for India, and tentatively 11 of them are new to science. As many as 59 cicadas were recorded under this project and majority of it has been recorded for the first time. Not only the calls, but also the habitat preference, activity period, emergence timing, their predator community and other natural history observations were recorded for every species encountered. All the calls and the observations will be published and soon after will be uploaded in www.indiancicadas.org website. Most of the Khasi and Garo Cicada names and related folklore have been recorded as well to have an insight of the culture-nature linkages of these tribes.

**Landcover dynamics of Manas National Park : elevation & fire incidents control the Woodland-Grassland transitions**

*Subham Banerjee*

Manas National Park (MNP) is located at the Eastern Terai (foothills of Himalaya) region of India. The tall grassland ecosystem of MNP supports a huge range of vulnerable and endangered grazing animals including the Indian Rhinoceros (*Rhinoceros unicornis*), Swamp Deer (*Rucervus duvaucelii*), Pygmy Hog (*Porcula salvania*), and Hispid Hare (*Caprolagus hispidus*). The Manas Grassland Ecosystem is under threat of conversion (to Tropical Moist Forest) which directly questions the existence of the charismatic grazing animals. So, it is critical to look at the vegetation dynamics of this national park.

With an interval period of 4 years we analyzed the land cover types of 8 different time periods (1988-2016). In our Remote-Sense based study we found that grassland to woodland transition is the major trend in the last 28 years. The grassland coverage decreased to 37.49% (in 2016) from 62.67% (in 1988). Almost at all the transitional periods some part of the grassland converted to Woodland.

We assume that along with anthropological disturbances and fire activity, Hydrology and River action play crucial role in this Grassland-Woodland dynamic. Our study suggests that lower elevation range and low slope regions (ideal for river channel and water logging) are more prone to transition compared to higher elevation and high slope regions.

**Effect of agricultutal intensification on herpetofauna**

Deyatima Ghosh

Farmlands create homogeneous landscapes that pose a threat to the biodiversity sustained by these landscapes. Though ample amount of work exist regarding groups like birds and arthropods, herpetofaunal group are still kept neglected. Agricultural gradient serve as one of the best way to study the effect they have on biodiversity over years by serving as a proxy for timeline data. The work is based on such a gradient in Balasore district Odisha, a low intensification zone in the town Panchalingeswar and a high intensification zone in Remuna. We investigated the diversity of amphibians and reptiles across 13 sites distributed among the categories by resorting to passive sampling, active sampling, transect walk and area constrained search. We encountered a total of 361 amphibians and reptiles belonging to 24 species. 15 species of amphibians we observed belonging to 4 families and 11 species of reptiles belonging to 7 families. The result showed no significant difference among the diversity of herpetofauna along this gradient though the mean abundance showed significant difference. We further investigated how the sites are different from each other and which environmental factors affect the availability of herpetofauna. Intensification gradient, soil temperature and bare ground percentage showed a strong effect on availability and the sites showed overlap among the gradient. The results provide a baseline data of how agricultural intensification might be affecting herpetofauna with time and leaves a scope for more directed study regarding the factors mostly affecting their existence within such man made ecosystems.

**King Cobras of the Kumaon hills, Uttarakhand: Nesting Ecology and Conservation**

*Jignasu Dolia*

The King Cobra is the world's longest venomous snake, and the only one that builds a nest for its eggs. Yet, we know surprisingly little about its ecology, natural history, and distribution, especially from the subtropical forests of northern India, which are also home to this apex predator. Native to South/Southeast Asia, the King Cobra is generally uncommon throughout its range. The main threats to its survival are habitat destruction, poaching (for meat, skin, Chinese medicine etc.) and persecution by humans.

Uttarakhand state in northern India probably encompasses the latitudinal and altitudinal limits of the King Cobra's range. The subtropical Pine and Baanj oak forests in this region seem to provide suitable habitat for the nesting of this unique

species. In the past (2006-2017), we have successfully monitored 16 King Cobra nests in Nainital district alone.

Thus, the main aim of this study was to scientifically monitor and protect King Cobra nests in Nainital. With the help of villagers and a community radio programme, we located two nests in June 2018. Nest microclimate data (i.e. temperature and relative humidity) was collected using i-Button data loggers. One nest contained 25 eggs, all of which hatched successfully in mid-August; the other contained 22 eggs, 19 of which hatched in the 3rd week of August. After collecting detailed morphometric data of the resulting hatchlings, we released them back in the forest. As conservation education was an integral part of this project, we also carried out snake-awareness/sensitization programmes in several village schools and NGOs.

**Old, older and oldest- monitoring hornbill nests in the Anamalai hills**

*Pooja Yashwant Pawar*

Nest trees are critical resources for hornbills. They show strong nest-site fidelity. I assessed nesting status of historically known hornbill nests in the Anamalai Hills. The 120 hornbill nests monitored during the study period included 50 Great Hornbill nests, 66 Malabar Grey Hornbill nests, and 4 nests of Malabar Pied Hornbill. Of the 120 nests, 25 nests were located in plantations. On an average 57% of Great Hornbill and 59% of Malabar Grey Hornbill nests were active. Nests were recorded on 34 different tree species including non-native species like Silver Oak (*Grevillea robusta*), African Tulip (*Spathodea campanulata*) and *Eucalyptus sp*. Four Great Hornbill nests first located in earlier studies during 1991 were found to be still active in 2018, 27 years later, highlighting the importance of critical resources like individual nest trees. The study provides useful crucial information on hornbill populations and status of their resources, which would benefit long-term planning for hornbill conservation strategies in the Anamalai Hills. Considering that hornbills show nest site fidelity, retention of existing nest trees, large trees, figs, native trees including hornbill food plants could assure the persistence of these birds in the present landscape.

**Towards understanding local community perception on native pollinator insects in high altitude settlements of Kedarnath wildlife sanctuary in Uttarakhand Himalaya**

Joyeeta Singh

Pollinator insects are important ecosystem service providers and are on the verge of rapid decline globally. Although much attention has been devoted to them in many countries of the world, India has largely ignored their ecological role for too long. Understanding the perception of local community on native pollinator insects is the

first step towards participatory management and conservation of this important functional group as well as their threatened habitats. High-altitude ecosystems in western-Himalaya of India are fragmented, degraded and threatened with consistently increasing anthropogenic pressure and pollinator insects are much understudied in these fragile ecosystems. The present study has attempted to investigate general perception and awareness of people living in Ransi and Makku villages located in Kedarnath wildlife sanctuary of Uttarakhand Himalaya. Personal interview through semi–structured questionnaire, informal discussion and picture based survey were conducted among 60 respondents to understand their perception on local pollinator insect identity, diversity, abundance, habitats, host plants, related socio-cultural/socio-economic values and practices as well as effects of habitat degradation, climate warming, pesticides etc. Field collected data were compiled and analysed to i) find out the role of age, gender, education, culture and socioeconomic background in influencing the general awareness and perception, ii) identify and prioritize specific target groups for future outreach program. Key findings will be summarized and presented.

**Innovative technological solution to roadkill: A success story**

*Sanjoy Deb*

According to the recent report by Wildlife Protection Society of India (WPSI), during last few decades almost eighty one species of large and small animals have became victims of traffic and train accidents in India, generally termed as 'Roadkill'. Till now, to deal with this problem, plenty of ideas have been suggested and implemented by the experts in many developed countries e.g.; building underpass, installing motion detect camera etc. But those solutions are either very costly or complicated to be implemented in a populous country like India. So our country desperately needs a native low-cost simple technological solution for Roadkill prevention to maintain its valuable biodiversity. Considering the importance of this issue, under present research and development an indigenous low-cost multiple sensors based Roadkill Prevention System (RPS) has successfully designed and field implemented at Bhavanisagar Dam area of Sathyamangalam Tiger Reserve, Tamil Nadu. During its infield operation of last five months, the RPS has successfully detected elephant, dear, pigs etc. and generated subsequent massage warning. With overwhelming support of forest department and local residents, initiatives have been taken to implement few more units at nearby areas. The RPS is the first of its kind elsewhere and having immense potential to be replicated at other wildlife-vehicular traffic-conflict zones, either in same or in modified format.

**Adoption of non-lure crop**

*Subhransu Bhusan Swain*

The applicant Subhransu Bhusan Swain and his team have continued elephant conservation and corridor management activities since 2009. 80 per cent of India's elephant population is in eastern region of India and elephants in Odisha constitute 74% of the total elephant of the eastern region of India. Odisha now with 1976 remaining elephants. Elephants fighting a tough battle to survive in the Telkoi-Pallahara elephant corridor. Elephant attack on crop field severely destroy tribal's livelihood and result in fatal retaliation which is boosting man elephant conflicts and there are causality. The Rufford grantee is constantly working with tribal community, forest administration and local CBOs to chalk out long range strategic plan emphasizing public, private, community partnership approach for conservation of elephants and their habitat. One of the successful approach is adaptation of non lure crop which greatly supporting eco friendly and co-existence of elephant and human beings and there will be less crop raid by elephant and reduced incidences of Man – Elephant conflicts, less damage of property and elephant trespassing to settlement . The indigenous knowledge base facilitates for sustaining eco-system, common resources including forest , wood lots and perennial water resource. Farmers trained on farming of non elephant lure crops i.e Turmeric, Ginger and Chili as a solution of crop depredation by wildlife & foster tolerance for co existence. After completion of this training programme the trained farmers are transferring the gained knowledge to their fellow community members and in process the villagers are realizing the benefit.

**Study on Chiroptera Specifically Focusing on Endemic and Endangered Species Conservation Status and Ecosystem Service in the Mountains of Southern Western Ghats**

*Tijo K Joy*

The Idukki district is the highest forest cover in the state of Kerala. The estimated maximum forest cover in the study area is 3930 sq.km. The anthropogenic land use-change from natural vegetation to any other use typically results in habitat loss, degradation, and fragmentation, deforestation is the reason for loss of a natural habitat, with large numbers of trees being cut down for residential and commercial use in study area. The extent and type of land use directly affects wildlife habitat and thereby impacts local and global biodiversity. Monitoring bats is a high priority given the important role they play in ecosystems and their potential sensitivity to both land-use and global climate change (Jones et al. 2009). The study specifically focusing

on endemic and endangered bat species and other bat species conservation, local land-use intensity and landscape features affect the predator– prey interaction of bats and insects. The effect of local land use as a proxy for site accessibility on bats and insects and their biological interaction measured in bat's feeding activity. Acoustic monitoring is a well-established method for monitoring bat activity patterns and changes in habitat use and activity of bats across habitats (Hayes 1997:2000: Broders 2003: Gehrt and Chelsvig 2003: 2004: Gorresen et al. 2008: Hayes et al. 2009: Parsons and Szewczak 2009) and other bat species conservation, species identification and the importance of conserving bats roosts and caves. In addition to this, we will conduct awareness programmes.

**A tale of how spiny-tailed lizards and people co-exist**

*Caleb Daniel Gnanaolivu*

In different desert scrublands of Rajasthan, exotic invasive plants, climate change events and anthropogenic activities have altered a large proportion of the landscape. Such ecological changes have wide-ranging effects on vegetation composition, soil structure, floral abundance, habitat connectivity, and even community assemblages and trophic interactions. These processes are pernicious and can have adverse consequences for native faunal and floral communities. In this project, we examine the effects of environmental disturbance (i.e. land-use type, habitat structure and resource availability) on a native herbivorous lizard, Hardwick's spiny-tailed lizard (*Saara hardwickii*). Because of the unique herbivorous diet and temporal dormancy of the lizard, we hypothesize that habitats structure and resource availability, as a function of different land-use types, will have different ecological advantages and disadvantages which in a long run will strongly influence the density, distribution, and survivorship of the species. Over the first year of the study (2017-2018),

we have (1) quantified the spatial distribution and density of *S. hardwickii,* to understand the effects of habitat and land-use type on the population of lizards, and (2) started a range of observations and sampling protocols to determine the behavioural activities, dietary choices, and thermoregulatory responses of lizards from select habitat types to understand how variation in resource availability and habitat structure influence lizard strategies.

**Developing Technology for Successful Transplantation of Seagrass in India with Respect to Climate Change**

*Adhavan*

Seagrass is the only flowering plants that usually colonize soft-bottom areas of the oceans from the tropics to the temperate zones. Seagrass provides a range of ecosystem services including a check on water quality, habitat and food for many marine organisms. They also play a vital role in balancing of the ecosystem. In many coastal areas, seagrass beds are threatened by human activities such as construction and dredging, anchoring, habitat conversion, pollution, and climate change. Due to loss of seagrass habitats in India, the population of Dugongs, sea turtle, and other commercially important fishes are drastically affected. Restoration by introducing vegetative plants or seeds of the suitable seagrass into the areas that were previously colonized by seagrasses is the only process to speed up the recovery of seagrass meadows. Developing technology for successful seagrass restoration would be a first attempt in India to conserve seagrass habitat in the Marine Protected Areas of India. Restoration work is also helping to increase the fish diversity as it acts as a hiding place for juvenile fishes and egg. After successful growth of seagrasses in the nursery site, the grown seagrasses can act as a donor for the other recipient sites for restoration. Developing a proper technique for seagrass restoration would be carried out at the nursery site near to the existing seagrass bed. The spawning season and the suitable species for restoration would be studied based on the restoration and donor sites. A grid of soft iron mesh with the support of small cement blocks or boulder stones at four corners will be formed for seagrass restoration process. The seagrass seedlings/rhizome will be protected by thin iron mesh to combat erosion due to water movement.

Further, a study will be carried out to discover suitable anchoring methods for rhizome before transplanting technique can be fully evaluated. The rhizomes of the donor sea grass will be inserted into the sediment approximately 5 cm deep and held with the help of plastic coated steel clips in between the mesh. The plantation of Rhizome will also be carried out in peat pot which will be held in between the iron mesh and cement block grid. Different methods will be carried out to find the suitable technique. Fishermen community will be engaged in the seagrass restoration work. In addition to that, awareness programs on the importance of seagrass will be organized for school and college students and fishermen community as a part of Nature Education Camps.

**A case for indigenous community-centric buffer zone management**

*Shankar Datt*

Although, conservation word is getting more popular, however, in reality, the situation of biodiversity conservation on the ground is poor! People's active participation in conservation is declining. The traditional knowledge, community-based institutions, and volunteer activities are being replaced with alien concepts; short-lived institutions and paid work. I believe conservation of biodiversity is not possible without an active participation of the local communities. I could transform my thoughts into action through Rufford foundation's small grants first in 2015-16 and second in 2017-18. We did Participatory village's biodiversity conservation Planning and found the situation of Tor Putitora an endangered fish species was really poor, uncontrolled and illegal fishing activities (i.e. blasting and electric current) takes place in the Ranganga River. We made necessary conservation efforts including social fencing, seed ranching, and awareness rally to protect the fish. A technical expert suggested that to get significant conservation result at least 90 KM of the river should protect. We have executed the programme in 25 KM of the river. Now we want to scale up the programme in the next 25 Km. Local University and state fishery department have also given their consent for technical and financial cooperation in this program.

**Fostering Grass-roots Conservation in India - A Rufford Initiative**
**The Rufford India Conference, Goa 2018**

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