



CENTRAL INDIAN LANDSCAPE SYMPOSIUM (CILS5)

February 15-18, 2023
Infinity Resorts, Kanha Tiger Reserve

JUGALBANDI

Exploring the Duality and Dance of
Peoples' Livelihoods and Ecological Integrity

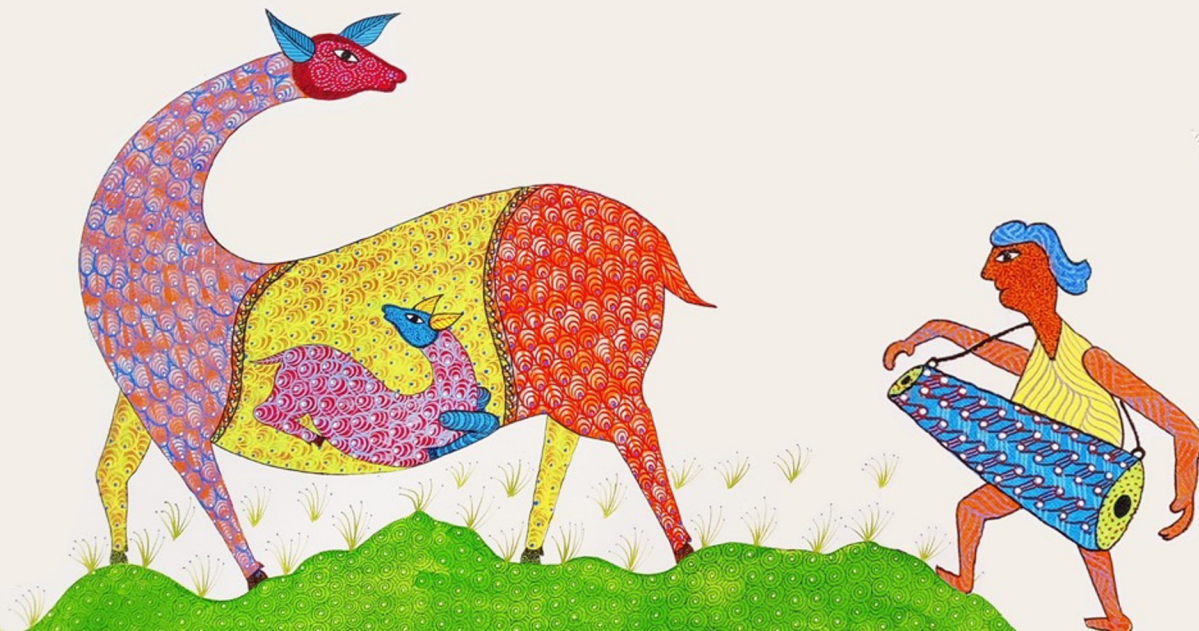


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WELCOME LETTER

Dear Symposium Participants,

Welcome to the Central India Landscape Symposium!

This gathering is the fifth in the biennial Central India Landscape Symposia that began at Kanha in 2014. Then, as now, the aim was to provide a forum for researchers, managers and those working in NGOs to think together about the future of the unique and iconic Central Indian landscape. Our shared goal is a healthy and productive future for all life – people, wildlife, plants, and animals – in this majestic landscape. Working together towards this goal, our collective efforts can contribute to positive outcomes for all life.

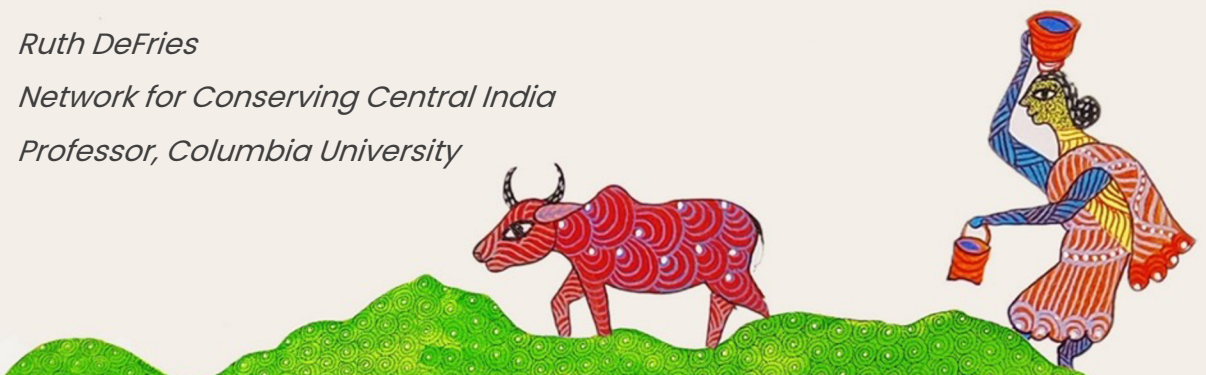
Our community has grown since 2014 and changes in the landscape have proceeded at a rapid pace. The Network for Conserving Central India has expanded its membership, provided small grants to many people working in the landscape, and developed collaborations to advance evidence-based management. This symposium is a continuation of the journey of which you all are part.

I hope you will enjoy the coming days with fruitful discussions, collaborations, and friendships, forged by our shared aspirations for the long-term health and well-being of both wildlife and people living in this incredible landscape. Truly a Jugalbandi that reverberates across central India.

Ruth DeFries

Network for Conserving Central India

Professor, Columbia University



ACKNOWLEDGMENTS

We are grateful to the many people who made CILS5 possible.

Funding for the symposium is provided by the DeFries Bajpai Foundation, whose mission is to support scientists working towards sustainable solutions, particularly in India. The source of funds for the DeFries Bajpai Foundation is a no-strings-attached award from the MacArthur Foundation to Ruth DeFries.

Logistical support was provided by the Corbett Foundation.

Our CILS5 planning committees are an invaluable group of friends and colleagues shaping each priority and theme.

Umed Patta created the beautiful and evocative Jugalbandi artwork for CILS5.

Ayushi Jain provided the graphic design expertise as our CILS5 design intern and Saurabh Sharma provided graphic design guidance.

We thank NCCI member volunteers who helped us coordinate travel and provided additional logistical support during CILS5. Thank you - Bhavna Menon, Nandini Mehrotra, Peeyush Sekhsaria, Krishna Anujan, Shikhar Srivastava, Tara Rajendran, Yashwardhan Dalmia, Mandar Pingle, Savita Chib, Kanika Aggarwal, Prajakta Hushangabdkar.

Green Hub (central India) fellows provided AV support and also interned at CILS5 to make creative short films. A big thank you to them.

We thank all of you CILS5 participants and NCCI members.

Amrita Neelakantan, Mansi Monga, Satvik Parashar, and Pakhi Das worked tirelessly to coordinate CILS5.





IMPORTANT CONTACTS

General questions conservingcentralindia@gmail.com

General logistics Mansi Monga at (+91) 8377093535

Travel bookings Kaushal Shah at (+91) 9892330247

Symposium venue Infinity Resorts, Village Baherakhar,
Near Baihar, Dist. Balaghat
Kanha National Park,
Madhya Pradesh 481111
[Google Maps Location](#)



CILS5 PROGRAM



WEDNESDAY, FEBRUARY 15

10:00 – 5:00 PM

Arrival & Registration at Infinity Resorts

7:00 – 9:00 PM

Dinner - Welcome Gala at Infinity Resorts

THURSDAY, FEBRUARY 16

THEME FOR DAY 1

Conservation, connectivity and coexistence

9:00- 10:00 AM

Opening Session

Session chairs:

[Amrita Neelakantan](#) (Network for Conserving Central India)

[Mansi Monga](#) (Network for Conserving Central India)

Welcome:

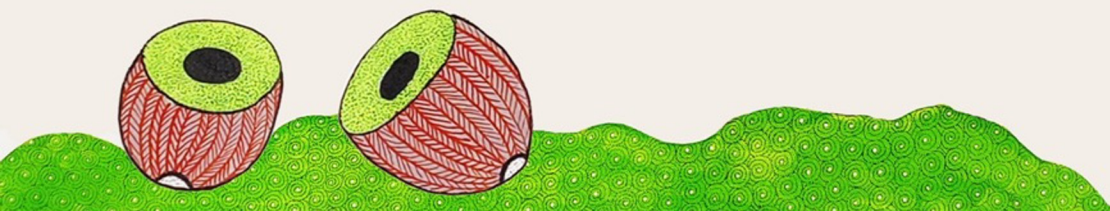
[Ruth DeFries](#) (Columbia University)

[Kedar Gore](#) (The Corbett Foundation)

A window into the Mukki side of Kanha:

[PashooPakshee](#) (co-op)

[Umed Patta](#) (Artist)





THURSDAY, FEBRUARY 16

THEME FOR DAY 1

Conservation, connectivity and coexistence

10:00 – 11:30 AM

Keynote Address and Discussion

Session chair:

[Prerna Bindra](#) (Cambridge University)

The evolution of tiger conservation through the decades

[Dr M.K. Ranjitsinh](#)

11:30- 12:00 PM

Tea Break & Group Photo

12:00 – 1:00 PM

Jugalbandi for coexistence

Session chair:

[Sandeep Sharma](#) (German Centre for Integrative Biodiversity Research)

Panellists:

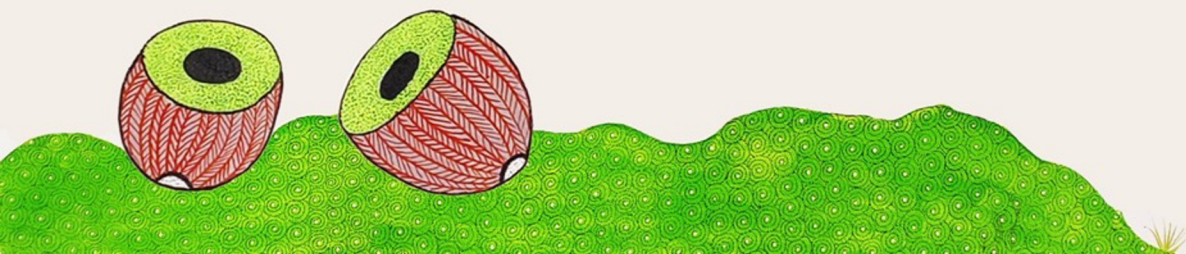
[Kishor Rithe](#) (Satpuda Foundation)

[Shri Sunil Kumar Singh](#) (Field Director, Kanha)

[Meetu Gupta](#) (Conservation Core Society)

[Sudhir Agarwal](#) (Chief Wildlife Warden, Chhattisgarh)

[Dikesh Choudhary](#) (The Corbett Foundation)





THURSDAY, FEBRUARY 16

THEME FOR DAY 1

Conservation, connectivity and coexistence

1:00 – 2:00 PM

Lunch

2:00 – 3:40 PM

Research to action for landscape connectivity

Session chair:

[Mandar Pingle](#) (Satpuda Foundation)

NCCI's Connectivity Synthesis

[Jay Schoen](#) (Columbia University) &

[Amrita Neelakantan](#) (Network for Conserving Central India)

[Aunindo Ghosh](#) (Biodiversity Collaborative),

[Aditi Sajwan](#) (Biodiversity Collaborative) &

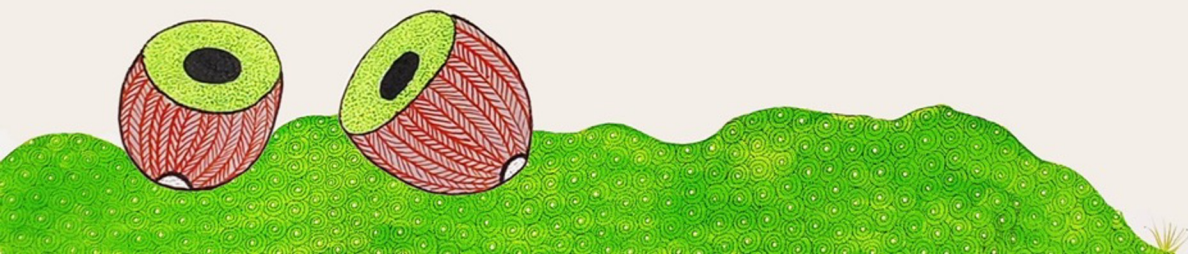
[Sudarshan Shaw](#) (Studio Kyaari)

Journey of Satpuda Landscape Tiger Partnership (SLTP) over the last 19 years

[Yashvardhan Dalmia](#) (Satpuda Landscape Tiger Partnership)

Introduction to Coalition for Wildlife Corridors

[Prachi Thatte](#) (WWF India)





THURSDAY, FEBRUARY 16

THEME FOR DAY 1

Conservation, connectivity and coexistence

3:40 – 5:00 PM

(Tea – Break)

Café: Conservation Tools for Coexistence

Session chair:

[Pakhi Das](#) (Network for Conserving Central India)

Win-win situation for wildlife and people

[Prajakta Hushangabadkar](#) (Tadoba Andhari Tiger Reserve Conservation)

Project Dhvani

[Pooja Choksi](#) (Columbia University) &

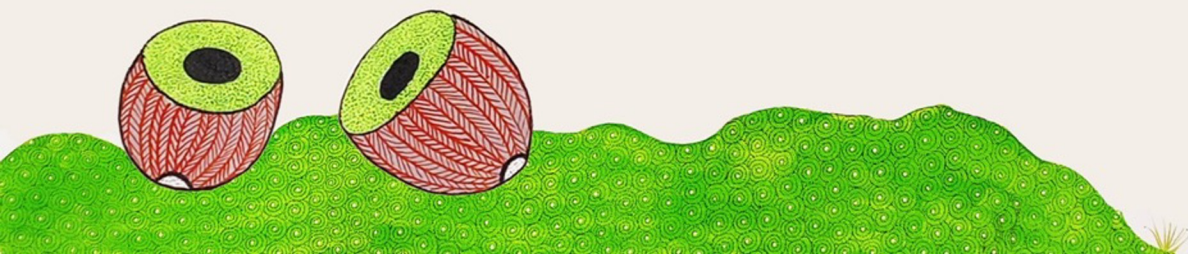
[Sarika Ann Khanwilkar](#) (Columbia University)

Data Collab

[Satvik Parashar](#) (Network for Conserving Central India)

Tech for Wildlife

[Nandini Mehrotra](#) (Technology for Wildlife Foundation)





THURSDAY, FEBRUARY 16

THEME FOR DAY 1

Conservation, connectivity and coexistence

5:00 – 5:30 PM

Tiger Recovery Plan in Achanakmar

[Sudhir Agarwal](#) (Chief Wildlife Warden, Chhattisgarh)

Eco -development committees – resources and institutional support

[Shri S. Jagdeeshan](#) (Field Director Achanakmar Tiger Reserve)

5:30 – 7:00 PM

CILS Haat

7:00 – 8:00 PM

Future Directions for Connectivity and Coexistence

Session chair

[Prachi Thatte](#) (WWF India)

Panellists:

[Upasana Ganguly](#) (Wildlife Trust of India)

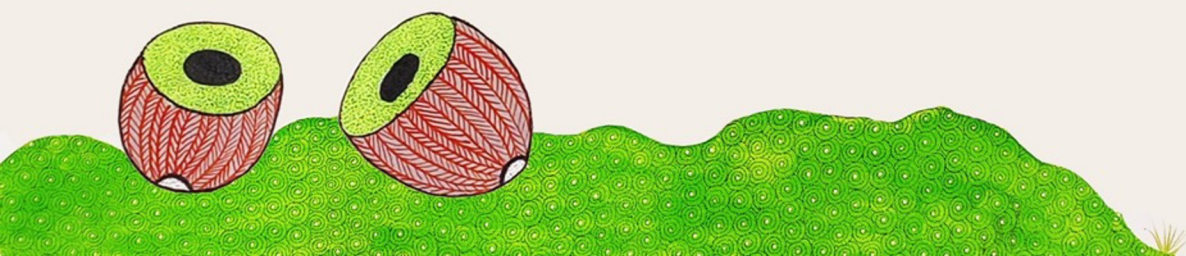
[Kishor Rithe](#) (Satpuda Foundation)

[Gary Tabor](#) (Centre for Large Landscape Conservation)

[Ravi Chellam](#) (Biodiversity Collaborative & Metastring Foundation)

8:00 PM

Dinner





FRIDAY, FEBRUARY 17

THEME FOR DAY 2 : Restoration for healthy habitats and people

[MORNING SELF BOOKED SAFARI]

12:30 – 1:30 PM

Visions for restoration for healthy habitats and people

Session chairs:

[Vidya Venkatesh](#) (Last Wilderness Foundation)

[Amrita Neelakantan](#) (NCCI)

Mukesh Baiga (Earth Focus)

Kishan Puri (Earth Focus)

Prashant Markam (Wildlife Guide, Kanha National Park)

Purushottam Singh Parihar (Landscape Horticulturist)

1:30 – 2:30 PM

Lunch

2:30 – 3:30 PM

Forest restoration and the carbon market

Session chair:

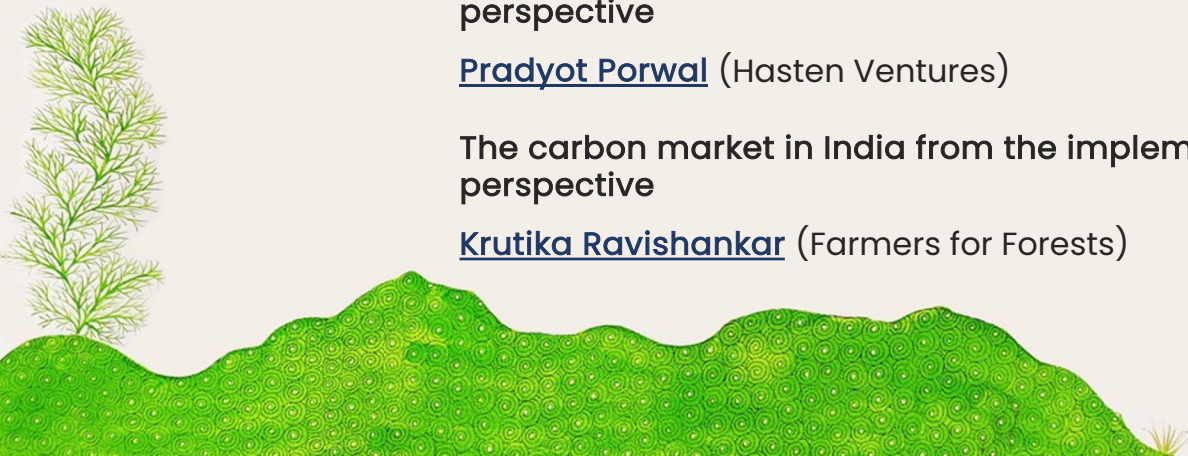
[Mansi Monga](#) (Network for Conserving Central India)

The carbon market in India from the project developer perspective

[Pradyot Porwal](#) (Hasten Ventures)

The carbon market in India from the implementer perspective

[Krutika Ravishankar](#) (Farmers for Forests)





FRIDAY, FEBRUARY 17

THEME FOR DAY 2 : Restoration for healthy habitats and people

3:30 – 5:00 PM

(Tea Break)

Poster Session & Livelihoods Café

Session chair:

[Satvik Parashar](#) (NCCI)

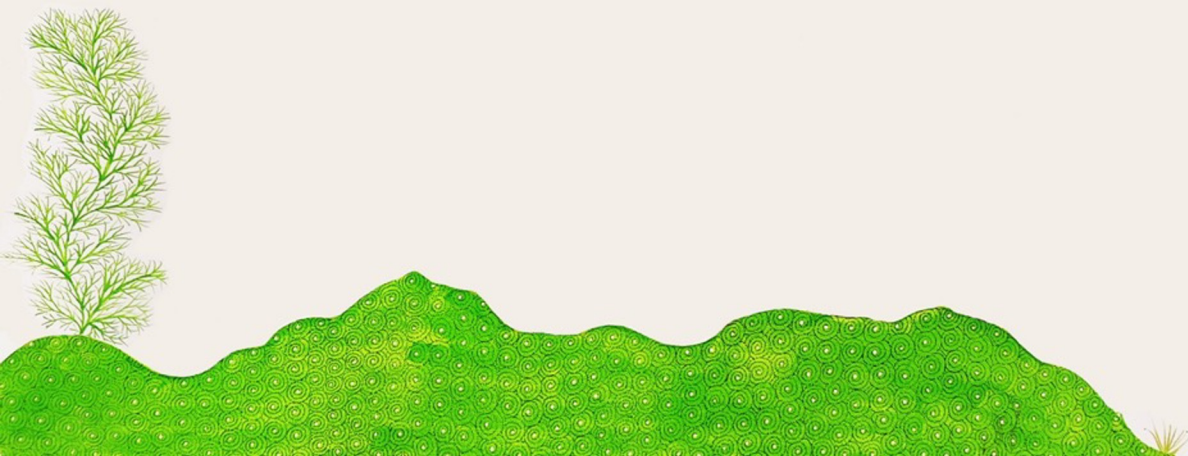
[Vipul Gupta](#) (Earth Focus)

[Shekhar Kolipaka](#) (CHiRP)

[Dhwani Lalai](#) (Foundation for Ecological Security)

[Chandni Navalkha](#) and [Henry Tepper](#) (International Land Conservation Network)

[Dinesh P Yadav](#) (Reliance Foundation)





FRIDAY, FEBRUARY 17

THEME FOR DAY 2 : Restoration for healthy habitats and people

5:00 – 6:00 PM

Framing next steps for restoration

Session chairs:

[Sahana Ghosh](#) (Mongabay - India) &

[Pooja Choksi](#) (Columbia University)

Panelists:

[Kedar Gore](#) (The Corbett Foundation)

[Shalini Dhyani](#) (CSIR-National Environmental Engineering Research Institute)

[Ameen Charles](#) (Community Development Centre, Balaghat)

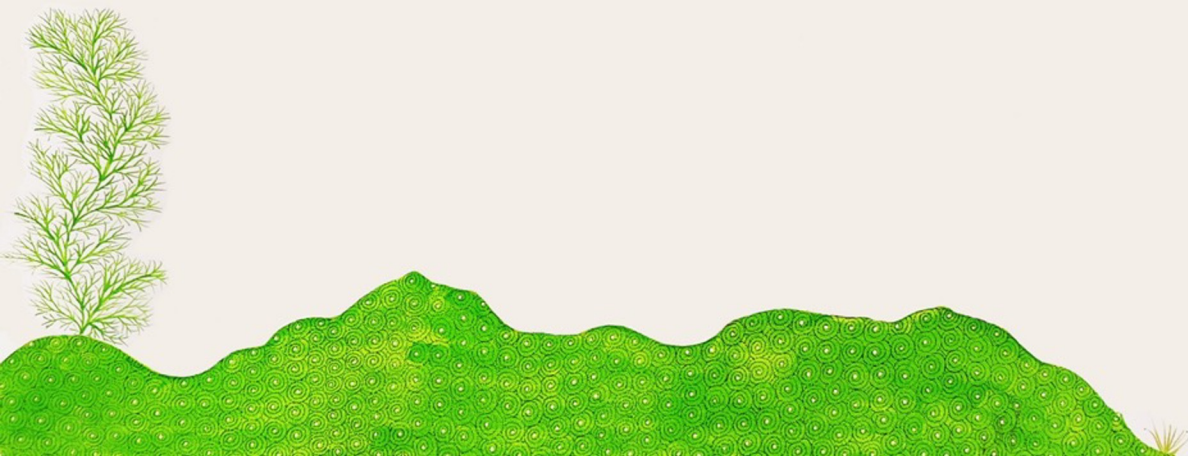
[Soumik Banerjee](#) (Keystone Foundation)

7:30 – 8:00 PM

CILS Haat

8:00 PM

Dinner





SATURDAY, FEBRUARY 18

9:00 – 9:40 AM

Closing Plenaries

Session chair:

[Naveen Pandey](#) (The Corbett Foundation)

A landscape approach for Central India

[Jagdish Krishnaswamy](#) (Indian Institute for Human Settlements)

Insights from two decades of landscape approach practice

[Sejal Worah](#) (WWF-India)

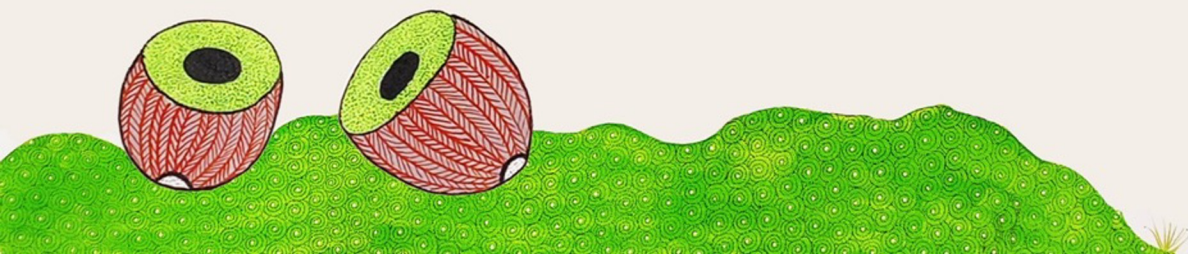
9:40 – 11:00 AM

Discussion of Next Steps

Session chairs

[Ruth DeFries](#) (Columbia University) &

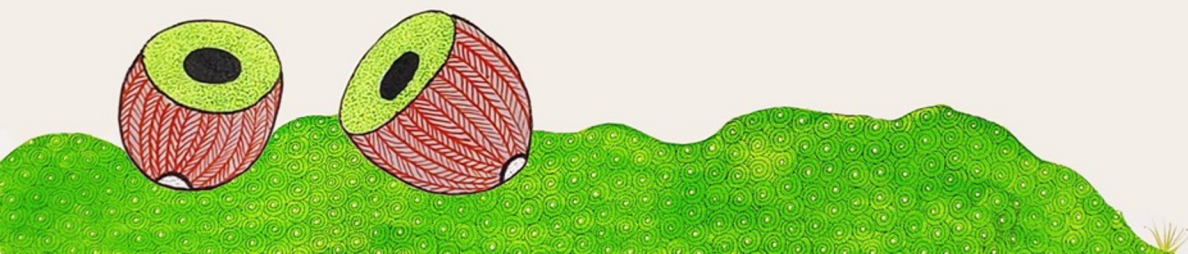
[Amrita Neelakantan](#) (NCCI)





SATURDAY, FEBRUARY 18

- 11:00 – 11:30 AM *Tea Break*
- 11:30 – 11:50 AM **Poster Prizes Presented by**
Sandeep Sharma (German Centre for Integrative
Biodiversity Research)
- 11:50 – 12:50 PM **Greenhub Showcase Hosted by**
Pooja Iyenger (GreenHub)
- 12:50 – 1:10 PM **Vote of Thanks**
Naveen Pandey (The Corbett Foundation)
- 1:10 – 2:20 PM *Lunch and Departures*



LOGISTICAL INFORMATION

How will I get to CILS5?

By now – you should have already booked your travel with our agent Kaushal Shah at (+91) 9892330247

You will arrive at one of three points – Jabalpur, Nagpur or Raipur. At your arrival station / airport there will be assigned volunteers (coordinated in a whatsapp group by the 13th February for each incoming node) who will get you to a shuttle that will run on schedule to bring you to the conference venue.

Nagpur: Yashwardhan Dalmia 9821252963

Jabalpur: Dikesh Chowdhary 9752345523

Raipur: Satvik Parashar 9560562310

How do I get between the resort venues?

You will either be accommodated at the sessions hall venue (Infinity resorts) or at Kanha Treasure Resort.

- Those of you at Infinity Resorts can just walk over to the main hall.

- Those of you at Kanha Treasure Resort will have a conference day shuttle schedule that will bring you to Infinity. These shuttles will not run all day so please be mindful to bring your daypack with you as you might only be headed back to Kanha Treasure Resort after dinner or for dinner.

15th Arrival: At Infinity for registration and then the cabs will take you to Kanha Treasure Resort

16th Morning: 8:30 am leaving Kanha Treasure Resort

16th Evening: Post Dinner between 9:30-10 pm

17th Morning: 8:30 am leaving Kanha Treasure Resort (If you are not going for Safari)

17th Evening: 8 pm

18th Morning: 8:30 am leaving Kanha Treasure Resort

(Please check out from your rooms at Kanha Treasure Resort in the morning before leaving and carry your luggage along with you to Infinity, departures will be from Infinity itself).



LOGISTICAL INFORMATION

How do I book a safari for the morning of Feb 17?

Please [use this link](#). They sell out fast so book right away – but please only for the 17th morning safaris from Mukki gate only – to not miss CILS5 sessions on other days. Safaris to any other park gate from the venue are impossible to get to on time.

Who should I contact if I need to arrange travel?

Kaushal Shah at (+91) 9892330247

How will I know which room I'm assigned for my CILS5 stay?

At the CILS5 Registration desk at Infinity Resorts Reception on arrival day 15th February you will be given your room allotment.

How do I participate in social media about CILS5?

#CILS5 #JUGALBANDI are the hashtags you need

Plus tag our handles –

Twitter: [conserving_ci](#)

Facebook group: <https://facebook.com/groups/348559185245287>

Instagram: https://instagram.com/conserving_ci

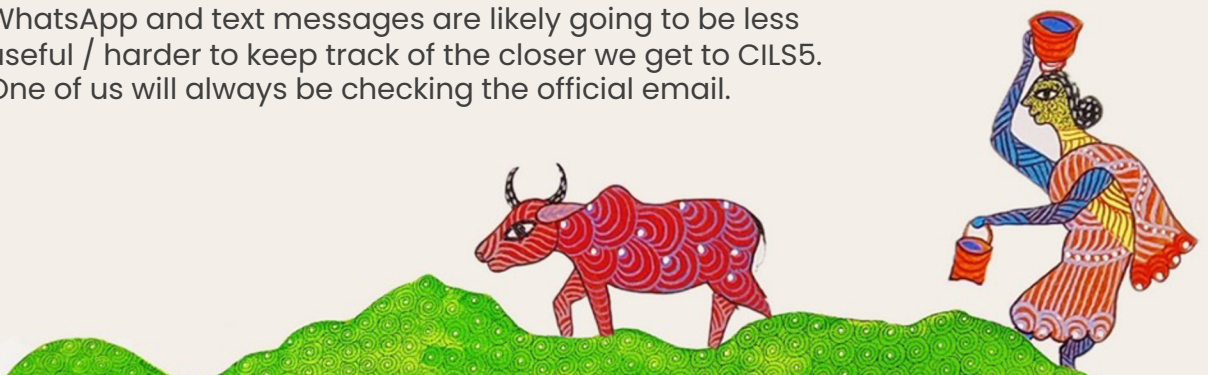
LinkedIn: <https://www.linkedin.com/company/76177608>

YouTube: <https://www.youtube.com/channel/UC9gDYY9uuewwI2RehnUqk7w>

Who should I contact with any other logistical questions?

Please email – conservingcentralindia@gmail.com

WhatsApp and text messages are likely going to be less useful / harder to keep track of the closer we get to CILS5. One of us will always be checking the official email.



JUGALBANDI

Exploring the Duality and Dance of Peoples' Livelihoods and Ecological Integrity



ABOUT THE ARTWORK



I, Umed Singh Patta, am from the Gond Tribe. In this picture, I am working on a Gond painting. My family consists of my mother, wife, two children and two siblings. When I was studying in the 5th grade in my village in 1991, my father passed away. After his passing, I began working as a farmer and as a labourer. While doing so, I studied till the 10th grade. I used to watch the people in my village make gond paintings and that made me want to learn the art of gond painting. I began observing the paintings made by several artists and started practicing sketching on paper at home.

In 2010, I was learning and was given the opportunity to make gond paintings at several locations such as Bhopal, Jabalpur, Chitrakoot, Delhi, Mumbai, Jaipur, Kolkata, Jamshedpur, Tata Nagar, Balaghat, Kanha, Ghaziabad, Chindwara, Odisha, Mandla & Pune. Here I made gond paintings for workshops, fairs, exhibitions and even fabric paintings for diwali. My wife, Geeta Patta, also works as a Gond artist with me. I want to keep the Gond tribal traditions alive through my art. For this, I hope to receive your support.

The painting I have created for CILS5 is based on the theme Jugalbandi. I have tried to keep that thread going across different elements in the painting. I started by painting 2 Barasinghas, one female that is carrying a baby and a male, they are a family. Further from there, I have painted the antlers of the Barasingha like that of a tree. The antlers branch out like the '*Saaja*' tree, which is considered as the home of our god - '*Bada Dev*'. The Bada Dev's musical instrument called '*Baana*' is painted right in the center of the painting - we worship this instrument as well. We believe that he protects and takes care of us. The rest of the painting has different elements from our tribes' everyday lives, livelihoods and traditions, such as men and women doing agricultural work, women's jewelry '*Soota*', tribal huts '*Jhopdi*', bamboo satchel for collecting fish - '*Dhooti*', an axe, a type of sickle '*Dabha*', a shovel, women carrying food and water and finally our dance form - '*Shaila*'. What brings this painting together is the element of the Nagada, which is a musical instrument used for ceremonial purposes of both joy and sorrow.

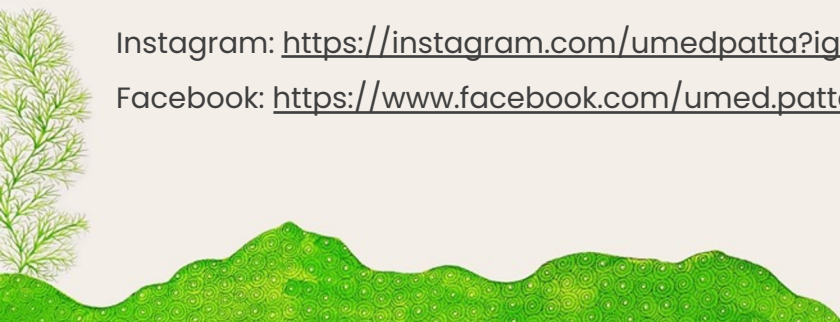
Gond Artist

-Umed Singh Patta

Phone: +91 9617324625, +91 9340059991

Instagram: <https://instagram.com/umedpatta?igshid=YmMyMTA2M2Y=>

Facebook: <https://www.facebook.com/umed.patta.9>



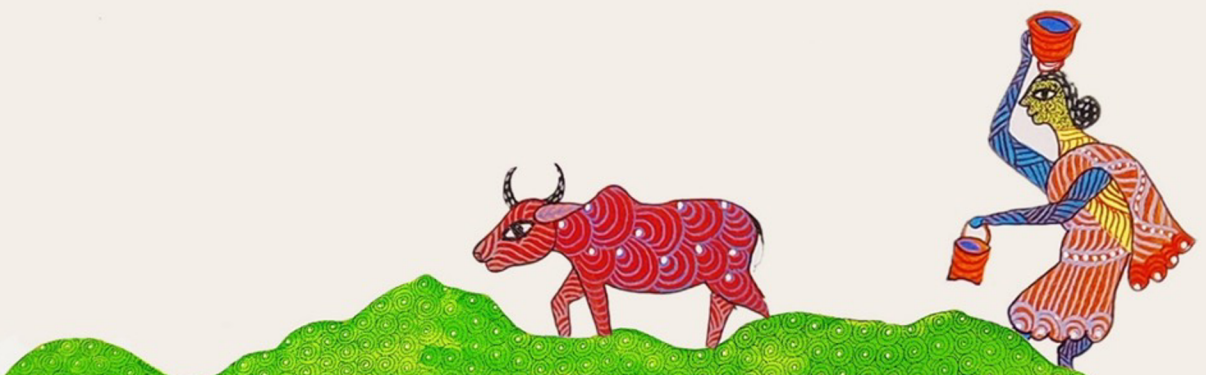
ABOUT THE CENTRAL INDIAN HIGHLANDS

The Central Indian Highlands consists of a continuous landscape in Central India across the states of Madhya Pradesh, Chattisgarh, Maharashtra and Andhra Pradesh where tropical deciduous forests form a major land cover. This landscape includes several protected areas (Kanha, Satpuda, Pench, Melghat, Tadoba and Achanakmar) and forest corridors that are essential for wildlife movement and genetic continuity across the landscape. The Central Indian Highlands are particularly important for tiger (*Panthera tigris*) populations (they support 17% of the country's tiger population), as well as populations of leopard (*Panthera pardus*), sloth bear (*Melursus ursinus*), gaur (*Bos gaurus*), and swamp deer (*Cervus duvacelli*).

The landscape also serves as the headwaters to several rivers, including the River Narmada, which is one of seven major rivers in India, and is essential for meeting the irrigation, industrial and urban needs of the region. The forests in this landscape support local livelihoods: 60% of the income of local people in non-protected areas is based on these forests. Important forest products include fodder for cattle, tendu (*Diospyros melanoxylon*), mahua (*Madhuca indica*), awla (*Phyllanthus emblica*) and other ingredients essential for the herbal medicine industry.

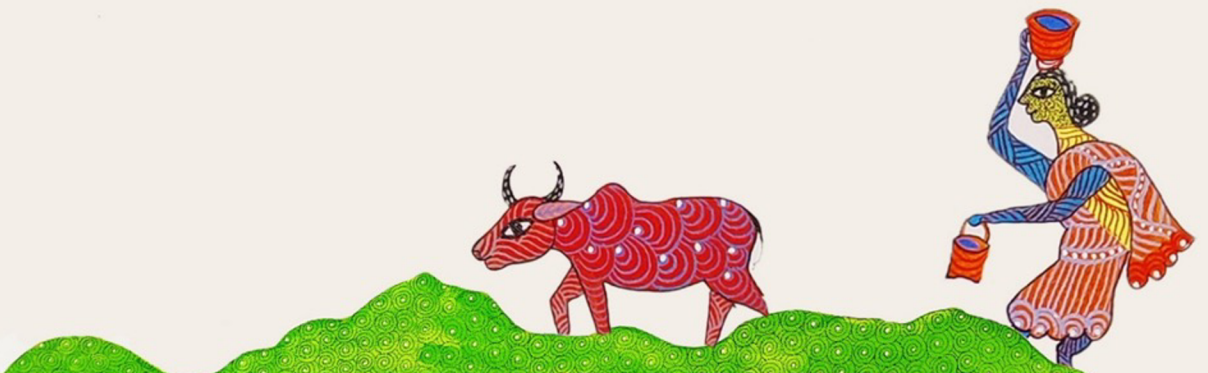
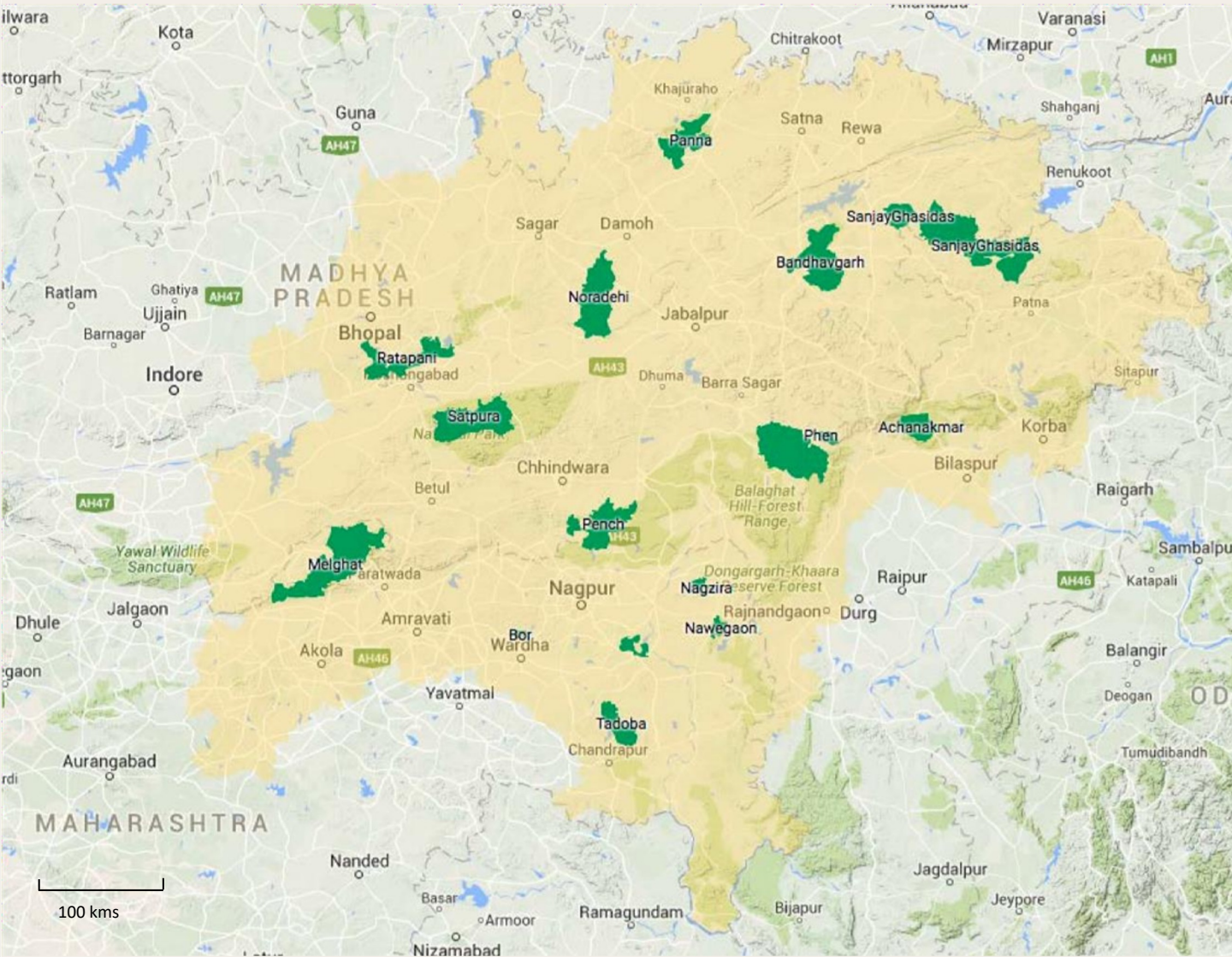
The people of this landscape live and support themselves through a range of activities, including agriculture, forest produce collection, tourism and urban activities. This landscape has been the focus of recent development which includes the introduction of new crops and the development of new roads, rails, mines, tourism and other infrastructure. Simultaneously, studies on larger processes such as climate change suggest that this region will be highly vulnerable to climate change, and higher temperatures and altered precipitation may disrupt the existing environmental and economic system.

Science-based management of the landscape is needed to achieve a balance among multiple objectives in the present and the rapidly changing future, including improving the well-being of local communities; conserving habitat for wildlife; protecting watersheds; tourism; and accommodating development needs for improved infrastructure





THE CENTRAL INDIAN HIGHLANDS



ABOUT THE NETWORK FOR CONSERVING CENTRAL INDIA

The Network for Conserving Central India is a group of researchers, NGOs and managers dedicated to conserving biodiversity, improving livelihoods, and fostering sustainable development in the landscapes of the Central Indian Highlands through the application of science.

Our network was formed as an outcome of the Kanha-Pench Landscape Symposium (KPLS) held in February 2014, out of the desire to establish a more direct method for communicating news and resources relevant to management and conservation in the Central Indian Landscape.

We encourage you to join us so that we continue to stay connected. We are also looking for members who wish to help us expand our reach and innovate new ways to keep in touch, connect as a group and actively contribute to the sustainability of our landscape. Please contact one of the CILS Organizers if you are interested in playing a larger role in the group.

Funding for NCCI is provided by the DeFries Bajpai Foundation.

Dr. Amrita Neelakantan serves as the NCCI coordinator.

Join Us!

Website: conservingcentralindia.org

Email group: conservingcentralindia@gmail.com

Twitter: [conserving_ci](https://twitter.com/conserving_ci)

Facebook group: <https://facebook.com/groups/348559185245287>

Instagram: https://instagram.com/conserving_ci

Linkedin: <https://www.linkedin.com/company/76177608>

YouTube: <https://www.youtube.com/channel/UC9gDYY9uuewwI2RehnUqk7w>





CILS5 PLANNING COMMITTEES

Advisory Committee:

Dr Ruth DeFries, Professor, Columbia University

Mr Kedar Gore, Director, The Corbett Foundation

Dr Naveen Pandey, Deputy Director and Veterinary Advisor (Northeast India), The Corbett Foundation

Prof Uma Ramakrishnan, Professor, National Centre for Biological Sciences

Mr Kishor Rithe, President, Satpuda Foundation

Mr Ramesh Pratap Singh, IFS (Retired)

Dr Sejal Worah, Programme Director, WWF India





CILS5 PLANNING COMMITTEES

Science Committee:

Dr. Meghna Agarwala, Ashoka University

Dr Pooja Choksi, Columbia University

Dr. Trishna Dutta, European Forest Institute

Dr. Parul Gurjar, Barkatullah University, Bhopal

Amit Kaushik, University of Georgia

Dr Sarika Ann Khanwilkar, Columbia University

Dhwani Lalai, Foundation for Ecological Security

Dr. Pinki Mondal, University of Delaware

Dr. Amrita Neelakantan, Network for Conserving Central India

Mandar Pingle, Satpuda Foundation

Dr Sandeep Sharma, Smithsonian Conservation Biology Institute

Dr Jay Michael Schoen, Columbia University

Prof. Tarun Kumar Thakur, Indira Gandhi National Tribal University,

Amarkantak, Madhya Pradesh

Dr Prachi Thatte, WWF India





CILS5 PLANNING COMMITTEES

Organizing Committee:

Chair:

Dr Ruth DeFries, Network for Conserving Central India

Local Partner: The Corbett Foundation

Kedar Gore, Director, The Corbett Foundation

Dr. Naveen Pandey, Deputy Director & Veterinary Advisor, The Corbett Foundation

Priya Warekar, Programme officer, The Corbett Foundation

Asmita Pawar, Account executive, The Corbett Foundation

Dikesh Choudhary, Project officer, The Corbett Foundation

Coordinator, NCCI:

Dr. Amrita Neelakantan, Network for Conserving Central India

CILS5 Coordinator:

Mansi Monga, Network for Conserving Central India





POSTER ABSTRACTS

Authors: Kanika Aggarwal, Upendra Dubey, Harshad Sambamurthy, Tara Rajendran, Arpit Deomurari, Prachi Thatte

Title: Understanding the Wildlife corridor connecting Bandhavgarh tiger reserve with Achanakmar and Kanha tiger reserves

Abstract: Protected areas in isolation may not be sufficient to support viable populations of wide-ranging animals. Hence, it is crucial to protect ecological connectivity between these protected areas through wildlife corridors.

Bandhavgarh tiger reserve hosts a high density tiger population and tigers, like other wide ranging species, need connectivity between Protected Areas for long term survival. The Bandhavgarh- Achanakmar/Kanha corridor lies in the south-eastern part of Madhya Pradesh and forms an important linkage between Bandhavgarh- Achanakmar- Kanha tiger reserves in central India. This corridor spreads in an area of 7779 sq km approximately and is a part of the Satpura- Maikal region of the larger central India landscape which is rich in wildlife as well as minerals. Despite only 50% of the area of this corridor having natural habitat. Recently, two tigresses moved from Bandhavgarh to Achanakmar. Likely traversing through fragmented forest patches, crossing linear infrastructures and even adjacent to some of the largest coal mines in India. This wildlife corridor not only provides ecological connectivity but also hosts residential wildlife populations. However, very little is known about this corridor, we compiled information from literature and met forest department officials along with other people working in the landscape to gather information about the importance of the corridor in maintaining wildlife connectivity across high density Protected Areas. We identified increasing anthropogenic activities such as infrastructure development, mining, encroachments and expansion of village settlements as major threats in the corridor.





POSTER ABSTRACTS

Authors: Anam Ahsan

Title: Mapping fire risk zone describing the threat of fires and the effects of fire behaviors on natural ecosystems of Bhopal Forest circle in Madhya Pradesh.

Abstract: Fires are a natural agent of ecological disturbance with a variety of effects on ecosystems, depending on the type of fire, fire intensity, fire frequency, and fire behavior. A geographic information system (GIS) can be used effectively to obtain different fire points using fire data for demarcating the forest fire risk zone map. The present study focuses on understanding how natural and anthropogenic factors impacted by fires frequency in Bhopal Forest circle. Bhopal and its surrounding four districts in Madhya Pradesh, India, were chosen for this study because they consistently struggle with forest fire issues and since they are surrounded by numerous forests and vital wildlife habitats. For vegetation mapping, a colour composite image from LANDSAT (2022) was used. Slope and vector layers were created using topographic maps. Forest fire risk zones were developed by hotspot analysis by applying arbitrary weights to the classes of all the strata in line with their sensitivity to fire frequency and relationships. From very high to low, six categories of forest fire risk were established. To understand patterns in forest fires over a five-year period, data (MODIS) on fires data from 2018 to 2022 were downloaded. The statistics indicate that a total of 11655 fires points were collected during five years. 2019 had the fewest fire points, while trends anticipate a rise in the fire number in 2020 and 2021 and a decline in 2022. The year 2020 shows the highest night time fires points, while year 2018 shows the lowest night fires points of 483.





POSTER ABSTRACTS

Authors: Priyanka Biswas

Title: Socio-economic determinants of NWFP based livelihoods in Mandla, Madhya Pradesh

Abstract: NWFPs play a crucial role in stabilizing the economy of rural India. Both listed and non-listed NWFPs are harvested by the tribal communities and used as food, medicine, and beverages. They are then sold in local markets as a bankable asset in times of need. As per the 2011 Indian census, Madhya Pradesh and Mandla have approximately 21% and 58% tribal populations, respectively. Gond and Baigas are the major tribes residing in Mandla district who collect and use NWFPs like Mahua (*Madhuca* sp.), Tendu (*Diospyros melanoxylon*), Saal seed (*Shorea robusta*), Chironji (*Buchanania lanzan*), Chakora (*Cassia tora*), Dhawai Phool (*Woodfordia fruticosa*), Harra (*Terminalia chebula*), Baheda (*Terminalia bellirica*) regularly. There are a total of 79 forest villages in the district, distributed in 17 blocks. A participatory rural appraisal (PRA) tool was used to assess the wealth classes in the forest villages of Mandla district. Personal interviews and focus group discussions were conducted in nine blocks to understand the dependency of villagers on NWFPs. Our research attempts to disentangle the socioeconomic factors that contribute to the reliance on NWFP-based livelihoods. The results of this study may help bolster the NWFP-based economic system and can have policy level implications for augmenting the NWFP livelihood support systems. This will ultimately maximize the benefit of the primary stakeholders, i.e., the forest dwellers, who are being exploited due to the unregulated and non-structured value chain of NWFPs.





POSTER ABSTRACTS

Authors: Kaushal Kumar Chauhan, Prachi Thatte, Pranav Chanchani, Sumit Roy, Soumen Dey, Ajinkya Bhatkar, Omkar Patil, Joel Correa

Title: Fine-scale assessments of multi-species spatio-temporal distribution and conservation prioritisation in Satpura-Pench Corridor

Abstract: Satpura-Pench Corridor (SPC) connects Satpura and Pench Tiger Reserves in the central Indian state of Madhya Pradesh where conservation threats from linear infrastructure, extractive industries, commercial agriculture expansion and poaching pressures are present. Despite these pressures, tigers and other large carnivores are still using this corridor and functionality has been established by recent studies. With an aim of long-term monitoring, we carried out wildlife habitat-use surveys in this agro-forested corridor. Using a systematic grid-based design, we conducted camera trapping across SPC in monsoon 2021. We estimated occupancy of primates, rhesus macaque and langur, at 0.10 and 0.36, respectively. Captures of other species were not enough for an occupancy analysis and we are currently working on mesocarnivore occupancy analysis. Activity analysis revealed potential temporal partitioning of space-use between wild species, people and livestock, with most wildlife captures at night (jungle cat and nilgai at night; leopard, chital and wild boar at midnight) whereas wolf and jackal in afternoon and evening, respectively. Data from monsoon surveys, along with information from published literature were used to identify critical areas within the corridor which are stepping stone habitats providing scientific basis for effective wildlife management. During summer 2022, we conducted a sign survey across 440 km² critical area in the southern portion of SPC, where leopard habitat-use was estimated at 0.36 while suggesting positive correlation with prey availability and forest habitat. Our surveys contribute to data on wildlife use of the corridor and establish a baseline for future monitoring of the important agro-forested mosaic within SPC.





POSTER ABSTRACTS

Authors: Kundan Deval, Dr. G.V. Reddy and Prof. P.K. Joshi

Title: Evaluation of semiarid forested wetland as a potential site for climate change mitigation measures for community development applying regional scale forest carbon projects

Abstract: Increased levels of Carbon-di-oxide (CO₂) concentration in the atmosphere in the post-industrial era is an immediate threat to the world. Intergovernmental Panel on Climate Change (IPCC) has recognized land management and forestry as the potential sector for climate change mitigation. The present study evaluated application of the scientific database for policy implementation towards forest conservation with the involvement of the local community to secure their livelihood at Keoladeo National Park (KNP), a forested wetland, situated in semi-arid part of India. This study discuss results from the survey conducted for various stakeholders for carbon stoke management possibilities. The survey has analyzed awareness, the scope of policy implementation, potential sectors and the role of stakeholders in carbon stock management. The main stakeholders identified were local community, forest department and other concerned stakeholders (NGO, scientific community, etc.). The main significant aspects of policy implementation were identified as community participation, sustainable forest management, afforestation/reforestation, forest conservation associated with water resource conservation and incentivizing natural resources conservation. 98% of the local community people agreed for using forest products, and there is awareness about the indirect uses among them. There is good to excellent awareness about environmental issues among the stakeholders. More than 80% of responses are in favor of policy interventions for carbon stock management in this region. Such projects can additionally contribute in biodiversity protection, job creation, public health improvement, pollution prevention and ecological restoration. This study also widens the understanding of ground challenges in the local context in adapting forest carbon projects.





POSTER ABSTRACTS

Authors: Abhijit Dey

Title: Exploring the feasibility of mahua seeds as a viable Adivasi livelihood option

Abstract: Mahua trees (*Madhuca longifolia*) don't need much introduction in the central Indian context - a crucial component of the Indian dry forests, culturally and economically highly revered by the local Adivasi communities. It's a source of two non-timber forest products (NTFPs) - flowers and seeds. Most of the academic attention is centered around flowers. The significance of mahua seeds is largely unknown. The present population pattern of mahua also claims attention as it's been reported that mahua is a slow-growing species. And with a low regeneration rate, it poses a concern. Here, we explored the feasibility of mahua seeds as a viable livelihood option and in connection to that tried to understand the population pattern of mahua trees for sustaining mahua-dependent livelihoods.

We found that the seed harvesting technique is non-invasive. Ripe fruits fall on the ground below the canopy and seeds are handpicked from there. If not collected, seeds face high mortality due to the seed shadow effect. With the presence of a non-tribal market for mahua seed oil and butter, it's possible to make this an effective livelihood. We also found mahua population is highly skewed towards old-grown mature trees with hardly any young juveniles. It also changes with land cover - the number of trees is more outside than inside the forests. The consequences of this pattern on the livelihood possibility are under investigation.

With these findings, we anticipate, it can be the starting point to understanding the socio-ecology of mahua and carving out a meaningful mahua-based Adivasi livelihood.





POSTER ABSTRACTS

Authors: Parul Gurjar, Kuldeep Lakhera, and Vipin Vyas

Title: Study of Physical habitat of central region of fifth longest river of India (River Narmada) based on GIS mapping

Abstract: Physical habitat is the surrounding area encapsulating instream biota; determined by hydrological and terrestrial characteristics. Habitat summarizes ecological niches for aquatic organisms. In today's time, aquatic impairment is a major issue of concern. The water infrastructure developments, water pollution, flow regulation and land use practices possess adverse effect on aquatic ecosystem. For evaluating aquatic health there is a need for quantitative approach to be developed which involve monitoring of habitat alteration.

Physical Habitat Index (PHI) based on visual-based assessment is a successful monitoring tool for ecological condition & health of aquatic ecosystem and is helpful in encapsulating the various factors responsible for impairment of waterways.

Like many other systems in the Indian province, Narmada and its tributaries are under huge stress which leads to water deterioration and impairment and is pertinent to rapid industrialization and urban growth. The purpose of this study is to assess Visual-based Physical Habitat conditions for assessing the aquatic health of the Narmada river watershed. The present study on River Narmada reveals that sites with optimum quality of habitat supports better aquatic life and diversity. GIS based techniques have been used to develop the habitat suitability map of river Narmada. The study is helpful in developing good understanding of Narmada river watershed and will enable resource management to not only assess current level of habitat health but also fore cast ecosystem health under various land uses.





POSTER ABSTRACTS

Authors: Prajakta Hushangabdkar, Priya Jadhav, Shahebaj Shekh, Nandkishor Kale, Dr Jitendra Ramgaokar, and Dr Sandeep Sharma

Title: Local community's perception about wildlife, conflict, and conservation around Tadoba tiger reserve

Abstract: Forest landscapes in central India have changed in the last century, but the wildlife populations including tigers have made a significant recovery in past two decades resulting in escalation of conflict between humans and wildlife. We hypothesized that an increased magnitude of human-wildlife conflict might have changed the perception and attitude of local community living in the landscape. To assess this, we have conducted a focal interview survey in Aug-Nov 2022. The primary source of data collection includes household survey of 264 families in 21 villages around the buffer area of Tadoba-Andhari Tiger Reserve. We asked specific questions to assess local communities' knowledge and perception about four species (tiger, leopard, sloth bear, and wild boar) that are the major cause of human-wildlife conflict. We found out that all respondents have a good knowledge about these species, their habitat and food requirement. All of them (100%) are fearful of these species and think that conflict incidents have increased in the last decade. While assessing for the extent of human-carnivore conflict, it was disclosed that 62% respondents have lost livestock to these species, and 7% respondents had experienced direct encounters with carnivores. Despite this 35% respondents think that these species do not always attack people during these encounters, and 36-46% people believe that these species are useful for maintaining forest. We also assessed that if people have no direct negative experience with these species, why they are scared of the species. Respondents are scared because they hear about these attacks from other people and social media (WhatsApp). Our study results will help in planning for effective mitigation plans and communication strategies for human-wildlife coexistence in this globally important conservation landscape.





POSTER ABSTRACTS

Authors: Priya Jadhav, Dr. Jitendra Ramgaokar, Dr. Geetanjoy Sahu, Babu Yele.

Title: Social benefits of Eco- Tourism: Community Narratives.

Abstract: National parks and sanctuaries in India are considered important not only for conserving forest and wildlife but also for promoting tourism and livelihood of the local people. Hence it has become a necessity to balance conservation goals and livelihood needs.

Tadoba Andhari Tiger Reserve (TATR) in Maharashtra is considered as a very successful tiger reserve in the area of wildlife management as well as in eco-tourism. The study attempts to examine community perception of eco-tourism, a comparison of social-cultural benefits in TATR: Junona village, one which is depended on eco-tourism and Bhamdeli village, which is not. A questionnaire for residents was prepared to identify perception and impacts towards eco-tourism.

The study reveals community depended on eco-tourism, has helped to reduce their excessive dependency on forest resources for the livelihood. Community participation in the eco-tourism program has brought significant changes in their worldview for natural resources. Whereas those who are not benefiting, they feel getting neglected by the department. The non-beneficiaries people still could not support the conservation policy wholeheartedly. For them creation of protected area has done more harm due to the ban on collection of resources, and thus, they do not find any interest in all such activities. While locals have valuable natural resources, they have limited knowledge about how to use them positively for their own benefit. This study was conducted from 12th April 2022. The primary source of data collection include household survey of 35 houses, interview with the villagers and local leaders, and forest department officers.





POSTER ABSTRACTS

Authors: Prameek Kannan, Saloni Salaria, Siddique Khan, Tanuj Mark, Navin Baberwal, Abhishek Bhatnagar, Yash Shethia, Prachi Thatte and Pranav Chanchani

Title: Assessing Carnivore Occurrence and Community Attitudes Towards Wildlife in a Multi-Use Arid Landscape Corridor

Abstract: Small population sizes, low densities, and large area requirements make large carnivores particularly sensitive to habitat degradation and land-use change. In fragmented landscapes, many protected areas cannot accommodate viable wildlife populations in themselves, which brings the surrounding human-dominated matrix that may extend wildlife habitats or serve as corridors into focus. Such areas are typically excluded from the conservation portfolio and are subject to rapid land-use change in many areas. This study investigates the occurrence of tigers, sloth bears, leopards and striped hyenas and assesses community use of natural resources and attitudes towards wildlife in a 3,384 km² portion of semi-arid multiple-use landscape in Western India that also serves as an important wildlife corridor. This area abuts Ranthambore Tiger Reserve, a preeminent protected area in Western India. Sign surveys spanning 1,039.22 km of trails were conducted in 94, 36 km² grids spanning agricultural land, forests and other land use types to collate information on wildlife occurrence and associated environmental and human factors. Analysis using occupancy models revealed that tiger and sloth bear occurrence probabilities (0.093 ± 0.05), and (0.13 ± 0.02) were considerably lower than those for leopards (0.72 ± 0.22) and striped hyenas (0.91 ± 0.08). Lack of sufficient cover and limited food availability renders these multiple-use habitats poorly suited for tigers and sloth bears, while leopards and hyenas are able to adapt better to multi-use areas. Concurrently, 66 villages were surveyed across the study landscape, where data on broad socio-economic attributes of communities and their attitudes towards wildlife were assessed through questionnaire surveys. More respondents expressed negative attitudes than positive attitudes which vary as a function of education levels, occupation and land holding sizes. Ongoing landscape transformation through mining, agricultural expansion, infrastructure development, and negative attitudes towards wildlife conservation among people living in the agricultural matrix threatens the long-term functionality of these corridors. Therefore, immediate measures are needed to develop and implement corridor conservation strategies and plans, with a focus on land use planning and human-wildlife conflict mitigation. In the absence of decisive and timely action, wildlife populations may increasingly get relegated to fragmented patches, jeopardising their persistence.





POSTER ABSTRACTS

Authors: Sarika Khanwilkar

Title: Governance and livelihood approaches to healthier forests in central India

Abstract: Central India's forests are embedded in diverse forest governance and resource use settings which are linked as components of social-ecological systems, presenting an opportunity to identify pathways that provide multiple benefits. First, I developed a measure of forest health, the Bare Ground Index, derived from a very-high resolution land cover map (3-meter resolution) with 83.00% overall accuracy. Forest health and land cover datasets are freely available online. Then, I integrated remote sensing products with data from 4,994 household surveys across 500 villages and surveys to 234 sarpanch in statistical models. At the community scale, I found consistent significant associations across multiple statistical models between villages where there was a local institution involved in forest management and healthy forests between 3 and 8 km of villages. The way people used the forest, like the amount of firewood collection, remained important for forest health more near and far the village. At the household scale, I found that households who own Liquefied Petroleum Gas (LPG) spent 14% - 53% less time collecting firewood than households who did not own LPG. Access to LPG has increased for marginalized social groups since Pradhan Mantri Ujjwala Yojana was launched in 2016. Multiple sustainable development solutions can promote healthy forests and benefit people across central India, including establishing formal community institutions with authority over forest management and providing access to LPG. We must continue to find ways to harmonize environmental and development goals in central India.





POSTER ABSTRACTS

Authors: Krishna Komanduri, Meghna Agarwala, Charuta Kulkarni

Title: Understanding the role of humans in shaping forests of central India using paleoecological proxies

Abstract: Several factors including climate, anthropogenic activities like agro-pastoralism and physical factors such as fire are thought to have played role in shaping the current forest habitats that we see in central India. Understanding the role of these factors in shaping the central Indian forests has critical implications for proposing appropriate management plans. Paleo-ecological proxies such as fossilised pollen can be used in this regard. As part of a larger study, we here present how the tree and wild grass fossil pollen numbers vary across sites with and without human presence. The fossil pollen data was compiled from multiple published literature sources, that spatially span across central India. The human presence data of these areas was compiled from archaeological records. The pollen records included in our analysis date back to 12,700 years, that is the beginning of the Holocene. Our results show that, tree and wild grass pollen numbers vary between areas with and without human presence. Areas with human presence had lower number of tree and wild grass pollen. These results support that theory that human presence might have altered past habitats in central India. Additionally, these results highlight the importance of using paleoecological proxies to better understand forest dynamics.





POSTER ABSTRACTS

Authors: Amit Kumar, Dr. Yogesh Dubey and Dr. Advait Edgaonkar

Title: Testing Island Biogeography Theory Using Fragmented Forest Patches as Islands in the Human-dominated Landscape of Central India

Abstract: With the increasing fragmentation of natural areas and a dramatic reduction of forest cover in several parts of the world, quantifying the impact of such changes on species richness and community dynamics has been a subject of much concern. This study attempts to test the Island Biogeography Theory given by McArthur and Wilson (1967) which explains the effect of two variables i.e. the size of the island and distance from the mainland on the extinction rate and immigration rate on an island. In the present study, fragmented forest patches were identified in an outside-protected area of Bhopal Forest Circle and bird data was collected in multiple seasons with replications. Point counts were used for the multi-species bird survey in selected 21 forest patches. These patches were of different sizes ranging between 10 ha to 500 ha. Data on human disturbance was also collected taking grazing, lopping, cutting of trees, etc. FRAGSTATS program was used to calculate the isolation of the patches and other characteristics of patches such as size, and shape index. PLS path modeling was used to create an ecological model to understand the relationship between species diversity and isolation of patches, size, and shape of patches. The results suggest that terrestrial forest patches act as islands and follow Island Biogeography Theory but instead of two variables i.e., size of the island and distance from the mainland, a third variable which is the "degree of disturbance" plays a vital role in deciding the diversity of the forest patch/island.





POSTER ABSTRACTS

Authors: Pradeep Kumar, Omveer Singh Jadon, Taniya Saharan

Title: An integrated approach to involve different stakeholders in restoration efforts of the region in and around opencast mines of Singrauli region of the Central India

Abstract: Coal has played an important role in the global development since 19th century to power steam engines, heat buildings, generate electricity as a source of energy. However, now a days, climate change, safety, and a variety of other environmental issues are becoming serious concerns. In many cases, such concerns are justified, and much more needs to be done to address them. In the developing country like India, where the coal has share of 56% in primary energy consumption, there is a long way to either reduce dependency on coal or to meet its requirement in a cleaner way without having a serious damage to local flora and fauna of the coalfield area.

Being an energy capital of the country, Singrauli region is home of around 12 mega opencast mines and thermal power plants of installed capacity of more than 20,000 MW. However, at same time it has rich biodiversity in its Sal forests which falls mainly under the Singrauli Forest Division, MP and a small area of Anpara range under Renukoot forest division of UP. The forest is mainly reserve forest and some parts are protected forest. The major forest is northern dry mixed deciduous forest. The forest density is fairly degraded and open in certain areas. In order to conserve the biodiversity of the region while fulfilling the energy demand of the country, a strategic scientific approach is being developed in this region, where the prime focus is on involving all stakeholders in restoration efforts and using technological solution to aid and analyze the impact of these efforts. In this paper, we intend to present the effective integrated restoration techniques for overburden dumps of coal mines and region surrounding these mines by focusing on different ecosystem services and strategically involving locals in restoration and conservation of biodiversity of Singrauli region.





POSTER ABSTRACTS

Authors: Vidushi Pant, Aditya Joshi, Prachi Thatte, Tara Rajendran, Arpit Deomurari

Title: Profiling Wildlife Corridors in India: A case study of Pench–Nagzira Corridor

Abstract: Management of wildlife corridors is one of the most important conservation strategies to ensure landscape-level connectivity. However, documents that provide extensive yet easily comprehensible information at corridor-level are limited in India. Hence, the Coalition for Wildlife Corridors—a network of people and organisations working in the field of connectivity conservation—aims to create dynamic and open-source repositories for corridors across India. Here, we review one of the lesser-studied wildlife corridors—the Pench–Nagzira corridor (PNC), which connects Pench and Nawegaon–Nagzira tiger reserves in central India, a global priority landscape for tiger conservation. We first delineated a crude corridor boundary using genetic data and circuit theory-based modelling approach. We then reviewed scientific literature, government reports, and news articles to collate all available information about PNC, including corridor significance, corridor characteristics (physical characteristics, hydrology, and land-use), stakeholders and communities, major challenges, and current conservation activities. Spanning across an area of 3002 km², PNC forms a critical link between the connected tiger reserves and includes farmlands (54.1%) and forests (41.1%), interspersed with a few villages and mines. Evidence of dispersing as well as resident breeding tiger populations and other wildlife (such as sloth bear, Indian fox, Indian pangolin, and honey badger) have been reported from PNC. However, expansion of linear infrastructure and habitat fragmentation threaten the corridor connectivity. Using GIS analysis and the synthesised data, we identified five critical areas in PNC that need to be prioritised. This profile can help inform stakeholders, facilitate policy interventions, and guide research activities in the corridor area.





POSTER ABSTRACTS

Authors: Tara Rajendran, Prachi Thatte, Amrita Neelakantan, Satvik Parashar, Rutuja Bhatade

Title: Comparing fragmentation and human footprint across multi-use corridors in central India

Abstract: With ~20% of the global tiger population, the central India landscape (CIL) is a stronghold for tiger conservation. Central India contains several protected areas (PA) that are embedded in a mosaic of forest patches, agricultural tracts with human settlements and networks of roads, railways, and canals. Despite an increasing human footprint, several PAs in CIL are functionally connected. Maintaining and enhancing functional connectivity, requires identifying areas critical for functional connectivity and information to assist data driven conservation planning.

We used a multi method approach to delineate 21 corridors based on functional connectivity data. We then characterized these regions using available spatial data along the axes of landscape fragmentation, anthropogenic presence, linear infrastructure, rivers and water stress, livestock density and recent plantation activity.

Most corridors in CIL are multi-use areas with governance and land ownership fragmented across jurisdictions and stakeholders. Land-use composition, rural demography and habitat fragmentation vary across corridors. Our results highlight the incredible complexity of this landscape and confirm that management of such connectivity spaces is likely to remain an intricate and dynamic matter.

Our study provides a foundation to explore connectivity and fragmentation along with patterns of human footprint to manage multi-use corridors to retain connectivity while meeting people's needs. This can be aided by consolidating and expanding this database for long term monitoring. Insights gained from tiger connectivity research in CIL will be informative to big cat conservation in human dominated landscapes as well as research that aims to reconcile biodiversity conservation alongside human needs.





POSTER ABSTRACTS

Authors: Venkat Ramanujam Ramani

Title: Empty forests, soaring aspirations: Adivasi migration and environmental consciousness in a central Indian forest

Abstract: Scholarly dispositions on migration largely draw attention to socio-economic distress as a critical driver, and often depict migration among subaltern social groups as a manifestation of deepening subordination. Meanwhile, recent theoretical forays in the literature argue that migration is driven by aspiration for upward mobility. Nonetheless, existing theoretical frameworks come across as limiting in adequately explaining the material causes of migration as well as its effects on migrants themselves. This study set in the Maikal Hills of Madhya Pradesh, examines migration among the Baiga and Gond Adivasis of the region. Based on two years of ethnographic fieldwork between 2019 and 2021, the study examines Adivasi migration in the light of an ongoing transition in forest- and farming-based livelihoods. The study findings show that migration is increasingly woven into the contemporary portfolio of livelihoods, and reflects a combination of distress and desire. Ecological change in the forest dovetails with an expansion of formal education to contribute to this process. At the same time, a comparison between two different parts of the Maikal Hills suggests a capacity for reflection on the forest among migrants from a region that has been witness to a longstanding people's struggle against state-led timber extraction. These findings are significant because they suggest that migration can contribute to grassroots environmental conservation among Adivasi communities despite the severe economic pressures they face. They add to our understanding of migration as a complex social phenomenon and link it to our comprehension of the formation of contemporary environmental subjectivities.





POSTER ABSTRACTS

Authors: Jay Kumar Ramteke, Anjali Nikam

Title: "Conserving the Conservers"

Abstract: Being a component of biodiversity, humans have a significant impact on the ecosystem. Particularly those Indigenous groups that are reliant on nature and are located nearer to the hills, forests, and other physical landscapes.

It is true that anthropogenic activities have an impact on biodiversity. However, the conservation discourse has a negative effect on a certain group of people as well. Scholars from prestigious universities or major conferences are heavily focused in the fields of climate change and biodiversity conservation. We frequently disregard the worries of native populations that have long lived close to woods. Indigenous people claimed that the conservation of the forest caused them to lose their land and their links to the forest, particularly in the case of Kanha National Park in Central India. The forest they worshipped as their deity is now where visitors go for enjoyment.

The loss of some indigenous flora has contributed to the extinction of ceremonies, practices, and traditional knowledge related to ethnomedicine, which is one way that climate change has impacted the lives of Indigenous people. It is crucial to protect those who have been protecting the forest for centuries. It is important to formulate conservation policies in a way that protects indigenous groups' beliefs and customs.

Our poster will serve as a visual representation of the voices of the indigenous people of Kanha National Park and will attempt to offer some bottom-up approaches to biodiversity protection and sustainable development.





POSTER ABSTRACTS

Authors: Rajat Rastogi, Qamar Qureshi, Aseem Shrivastava, Yadvendradev Jhala

Title: Multiple green invasions in a dry forest decreased native plant biodiversity and led to food shortage for the ungulates!

Abstract: While ecosystems worldwide are confronted with biological invasions by multiple species, our understanding of their consolidated impacts and control remains restricted to a few species. Any management based on these single invasions can be biased, leading to pessimism around invasive species management. Tropical countries like India, with limited resources for invasion management and a plethora of invasive species, are amongst the most vulnerable to multiple invasions.

We investigated the impacts of single and co-occurring invasive plants (*Lantana camara* and *Pogostemon benghalensis*) on native plants, soil nutrients, and herbivory in Kanha Tiger Reserve – a seasonally dry tropical forest of Central India. We systematically recorded plant richness, abundance, regeneration, edaphic characteristics, and mammalian herbivory from 120 plots. Ordination and linear models were used to understand the effects of single and co-occurring invasions.

Results indicate a compositional change in the native plant assemblage, reduced richness and abundance of native plants, increased potassium content in the soil, and increased herbivory on native plants. These effects were more pronounced with co-occurring invasive plants, and larger than other key ecological determinants, indicating towards invasion-centric ecosystem.

Additive impacts of multiple invasions were greater than individual impacts on native vegetation structure, composition, soil nutrients, and herbivory. We infer potential negative feedback, where plant invasions force higher herbivory on already declining native plants thereby exhausting the sustenance of native plants. It can cause a future decline of herbivores, which are an important food resource for charismatic carnivores in these ecosystems. Mitigating the impacts of multiple invasions is thus urgently required.





POSTER ABSTRACTS

Authors: Taniya Saharan, Shalini Dhyani

Title: 4-R approach for transformative changes to sustainable land restoration in the warming world

Abstract: The exponential growth of anthropogenic activities like industrialization, urbanization, and intensive agriculture has resulted into massive land degradation all over the world. Land degradation has contributed to the deterioration of soil quality, loss of biodiversity, and adverse impacts on human well-being. Sustainable land restoration (SLR) is a critical step toward recovering, restoring and reversing of degraded land. Restoration of land also contributes towards the global targets committed under The Bonn Challenge and to achieve the Land Degradation Neutrality under United Nations Convention to Combat Desertification (UNCCD) by 2030. In spite of the diverse restoration approaches implemented to achieve these large global targets, there is still insufficient information and understanding of the larger impacts and benefits of these restorations in improving ecosystem structure and functions. In this poster, we highlight the common challenges faced by restoration managers, practitioners, and other stakeholders in implementation of land restoration projects in the developing countries. Also, we introduce a 4R approach, which serve as an effective approach to gain long-term socio-economic and ecological benefits and to overcome the challenges faced by restoration practitioners in the implementation of these large restoration projects.





POSTER ABSTRACTS

Authors: Peeyush Sekhsaria, Tarun Verma, Reshma Jathar , Trupthi Narayan, Nikunj Jambu, and Pankaj Sekhsaria

Title: Our Tigers Return - the untold stories of conservation

Abstract: I had heard the story of Panna's debacle from many. A chance meeting with friend, Sanjay Thakur who had returned from Panna Tiger Reserve made me aware of the successful return of tigers to Panna. I was struck by the sheer magnificence of the achievement, but virtually nobody seemed to know about it. We asked ourselves, "Why don't we do something about it!" from there emerged the idea of a book for children on the return of tigers to Panna. This was February 2014, the book was released in Hindi and English in October 2015 and it's been over 7 years since, long enough time to know whether the book had any impact, whether the story got told. Many other re-introductions have happened since in the Central Indian Landscape and elsewhere, many stories remain untold. This poster aims to share the learnings from the process of creation and then distribution of the book 'Our Tiger Reserves' and what this holds out for conservation storytelling..





POSTER ABSTRACTS

Authors: Pankaj Sekhsaria

Title: Three decades of media reporting on wildlife and protected areas in India: A database for documenting and analysis

Abstract: The Protected Area Update (PAU) is a bi-monthly newsletter that publishes news and information on wildlife and protected areas since 1996. Based on reportage on related themes in the English media it is a huge repository of over 6000 news items that has the potential to offer multiple insights on issues of conservation on the one hand and of the media on the other.

Supported by the Department of Science and Technology (DST), Government of India and the GISE Hub, IIT Bombay, an online searchable database is currently under development as a collaborative output between CTARA@IIT Bombay, Kalpavriksh and the Foundation for Ecological Security (FES) for the geospatial mapping and representation of this extensive data that will make the information readily available for further research, analysis and visualisation.

Thematically analyzed media content will be a valuable tool because the media is the first interface for the general public on wildlife conservation issues and plays a vital role in shaping public opinion. The prominent themes that the database is proposed to be constructed around include geography, species, land, conflict, displacement of people, developmental projects, and Institutions involved. Use of the database thus far to study geographical entities such as the Northeastern region of the country and the state of Maharashtra provide clues into the possible value of the database besides specific insights into the nature of conservations in these specific regions. Similar state-wide and regional coverage of media reporting can be done for others parts of the country like the Central Indian region which has a rich and diverse network of ecosystems and protected areas.





POSTER ABSTRACTS

Authors: Pratiksha Singh, Vipin Vyas

Title: Assessment of Urban Wetlands Status of Bhopal City using Odonates as Indicator, Madhya Pradesh

Abstract: Water resources require constant conservation efforts due to a variety of issues (e.g., anthropogenic disturbances, sewage, acidification, and pesticide discharges) that degrade aquatic systems throughout and impact their physicochemical parameters and ecosystem features. Odonates are a good biological indicator; as with the change in habitat conditions, they also exhibit changes in their diversity. They are dependent on wetland habitats, for the first stage of their life cycle i.e., the larval stage. The study was carried out to explore the odonate diversity in the wetlands of Bhopal. The study was conducted in 11 urban wetlands of Bhopal from February 2022 to May 2022. Odonates were sampled using line-transect on sunny days, from 9:00 hr to 17:00 hr. A total of 26 species belonging to 2 suborders and 5 families were recorded from all 11 sites. 17 species of Anisoptera (dragonflies) and 9 species of Zygoptera (damselflies) were recorded. The highest numbers of species were recorded from the Family Libellulidae (14 species). According to the study, Bhopal's wetlands are home to a wide variety of odonates.

Keywords: Odonate; bioindicator; wetland; line-transect; diversity.





POSTER ABSTRACTS

Authors: Ankita Singh, Vipin Vyas

Title: Monitoring Landscape patterns in the Harda region of Central India using Land use/ Land cover changes with the application of Remote Sensing & GIS

Abstract: Harda is the central part of the Narmada basin in Central India which is a river of economic and ecological importance and this river faces multiple pressures from different anthropogenic activities. The LU/LC of the river basins is rapidly changing as a result of the high rate of urbanization, industrialization, unplanned infrastructural projects, and vast agricultural. For the purpose of determining vulnerability and managing the natural resources of a river basin effectively, LU/LC changes in a river catchment must be studied. The mapping of LU/LC distribution across a vast area at various spatiotemporal scales using remote sensing technologies is particularly promising. The aim of this work is to use modern geospatial methods like remote sensing and GIS to comprehend the LU/LC variations brought on by urbanization in the Harda region. Using satellite datasets from Landsat MSS, Landsat ETM+, IRS LISS III, and Sentinel-2, we have created time-series Landuse/Landcover maps for the years 1995, 2005, 2015, and 2020 in this work. By using a supervised classification technique, all the satellite images have been- divided into six LU/LC classes: built-up lands, agricultural lands, waterbodies, forests, shrub/scrub, and barren lands. We analyzed the decadal percentage change in our study site and land cover area of the above-given classes. Land conservation, sustainable development, and water resource management will all benefit from the information gained through the detection of changes in land use and land cover.

Keywords: Change detection, Landuse/Landcover, Remote sensing & GIS





POSTER ABSTRACTS

Authors: Manpreet Singh

Title: Influence of socio-economic determinants on the hunting practices of a "denotified tribe" in Central India

Abstract: Hunting has caused unprecedented damage to tropical biodiversity and accelerated the rate of defaunation. The Pardhi tribe, which was once categorized as a "criminal tribe" under the Criminal Tribes Act 1924 and later denotified by the Indian government by repealing the act in 1949, still faces discrimination, aversion, and social stigma. Due to economic hardships, they still practise hunting and other menial jobs to earn their living. To understand how the socio-economic profile of the tribe affects their hunting practices, this study has been undertaken in the five geopolitical zones in Central India. Interviews were conducted in all geopolitical zones using multi-stage convenience sampling, with two districts and two villages in each geopolitical zone. Socio-economic parameters, such as land holding size, domestic livestock owned, and dependency on non-timber forest products (NTFPs), were recorded by asking questions from a pre-designed questionnaire. Our results show that, socio-economic status of the tribe remains poor and their dependency on hunting and NTFP remains high. Furthermore, on average, there was 60% success in the last five hunting expeditions taken by Pardhi community members. With the ever-increasing forest degradation in Central India, hunting may expedite the local extinction risk of many species; however, long-term studies are needed to make any remarks in this regard with conclusive certainty. The results of this study can help forest department officials and policymakers make well-informed and pragmatic conservation management decisions by imperatively weighing the different aspects of the socio-economic status of the tribe.





POSTER ABSTRACTS

Authors: Sujit Sonwani, Tapas Das, Aniruddha Dhamorikar, Soumen Dey

Title: Bee Safe Honey

Abstract: Honeybees are an integral part of socio-ecological landscapes and are crucial for maintaining biodiversity by aiding pollination

Traditionally, the use of honey as an internal and external health agent is much older than the history of medicine itself. The life and livelihood of the forest fringe communities also depends on the forest resources. The challenges faced today are the low market price of harvested resources and unsustainable practices of harvesting. Traditionally, the wild honey is harvested from the 'wild' (or forest) using fire to chase away the bees, which results in complete loss of beehive and poses a threat of forest fire. This also adds traces of soot in the honey due to the use of fire.

WWF-India intervened with a method of honey collection in Kanha-Achanakmar Corridor, to ensure conservation of honeybees and enhance the quality of honey. In 2014, 31 traditional wild honey harvesters were identified, mobilized and trained to harvest wild honey through this practice. The honey collection is in the ration 60:40, where honey is harvested from 60% of the honey chamber and 40% is left for the bees. This induces the bees to rebuild the hive.

The intervention involved capacity building of honey collectors in modifying their method of collection, provide support in institution building by organizing honey collector groups to form MSSKS (Maikal Sahad Sangraha Kalyan Samiti) & ensuring market for the product. This model has benefited both communities and forest ecosystem by enhancing income for honey collectors and ensuring stable bee population.

Key words: Wild honey, Kanha-Achanakmar Corridor, WWF-India, NTFP, Sustainable Honey collection





POSTER ABSTRACTS

Authors: DP SRIVASTAVA, Dr BS Adhikari & Dr Shekhar Kolipaka

Title: Prospects of Tiger Conservation in Urban Landscape of Bhopal

Abstract: In India, wild tiger numbers have gone from 1411 (SE range 1,165 to 1,675) in 2006 to 2967 (SE range 2,603 to 3,346) in 2018 (Status of Tigers in India, 2020). Tigers are known for their large home ranges and great dispersal distances and National Tiger Conservation Authority estimated that approximately 40% of all tigers in India live outside the reserves in unprotected lands. These unprotected lands are mosaics of multiple-use forests and agricultural fields surrounding villages, towns, and cities.

Bhopal, the capital of Madhya Pradesh is unique as it has a breeding tiger population within its municipal limits. In the last twenty years, Bhopal expanded rapidly outwards and today the urban municipal area stretches to approximately 400 sq. km.

As a part of long-term research to understand the potential of urban landscapes for the conservation of large carnivores including Tigers. We have divided the study area into various zones based on their distance from the city center i.e. Urban, Semi-urban, and rural/wild land. We thoroughly survey these zones to understand vegetation, wild prey, livestock, and human presence. This poster presents different aspects of Tiger survival and conservation in the urban landscape of Bhopal. The current land use and domestic plays a significant role in the survival of these tigers in the urban landscape.





POSTER ABSTRACTS

Authors: Abhinav Tyagi, Nidhi Yadav and Uma Ramakrishnan

Title: On the road to losing connectivity: Impact of habitat alteration on two large herbivores in central Indian landscape

Abstract: In current times, habitat fragmentation and loss are the major threats to biodiversity worldwide. Reduction of habitat to smaller patches and increased distance between patches, lead to small isolated populations that pose an increased risk of loss of genetic diversity, inbreeding and genetic load. Maintaining gene-flow among these fragmented habitat patches is critical for long-term species persistence. Several natural and anthropogenic landscape features impede animal movement. Identifying these features is crucial for effective conservation planning. Genetic approaches aid in quantifying connectivity but most studies have focused on a single species, usually, a large carnivore. Despite playing important role in ecosystem functioning and habitat maintenance, herbivores have been largely neglected. Here, we address genetic connectivity of two large herbivores, Gaur (*Bos gaurus*) and Sambar (*Rusa unicolor*) in central India. We collected fecal samples to generate genome-wide SNP data using ddRAD sequencing for 124 Gaur and 99 Sambar individuals. We demonstrate that Gaur population in central India is fragmented and exhibit high genetic differentiation, especially in small populations like Umred Karhandala WLS. Sambar shows low population structure but small population in Bor Tiger Reserve exhibits slight differentiation among other populations. Our results suggest that although forest degradation and roads restrict animal movement, the extent of the impact varied with species' ecology. Our findings reveal that different species exhibit varied responses to various landscape features. We identify small and isolated populations which need conservation intervention. We opine a shift from large and charismatic species focused conservation to a multi-species holistic landscape conservation approach.





POSTER ABSTRACTS

Authors: Mayank Makrand Verma, Satyadeep Nag, Dr. Dharmendra Verma, Dr. Uma Ramakrishnan

Title: Infrastructure impacts and mitigation strategies to allow for wildlife conservation and connectivity; the case study of Ratapani landscape.

Abstract: Our priority is to provide a safe habitat to the increasing population of tigers around Bhopal with minimum human-wildlife conflict. This present effort will be a foundation stone in establishing ecological resilience by restoring the forest areas around Bhopal city. Getting the public cooperation of the people living in the villages around it is necessary to protect Tiger Conservation Prioritization units (TCPUs), in order to get cooperation, the purpose of ecological resilience can be achieved by engaging them in eco-tourism.

Identification of Tiger conservation Prioritise Unit, conflict mitigation sites in TCPU's and their connecting least cost path (LCP) in Ratapani-Kheoni Landscape was necessary prior to strategic planning of tiger conservation near the Capital Bhopal. The extensive tiger sign mark survey, non-invasive tiger DNA collection and NGS analysis, GIS mapping of tiger suitable habitat, tiger occupancy analysis in Presence software v12.17, tiger probability of occurrence derived by MaxEnt modelling and depicted by ArcGIS 10.3, Least cost path derived by Linkage Mapper tool in ArcGIS 10.3 were performed precisely. Infrastructure impacts the connectivity between the TCPU's; therefore, mitigation strategies at identified sites are essential for wildlife conservation and connectivity in the Ratapani landscape.

The total 7210 km² area was mapped on the GIS platform using ArcGIS 10.1 software to find the tiger conservation prioritization areas (TCPUs). TCPU1, TCPU2, TCPU3, TCPU4 and TCPU5 were identified using MaxEnt software within a studied landscape area. The probability of occurrence was predicted at 1409.08 km² in the study area of the landscape. The identified TCPUs area was spatially distributed in five conservation units, namely TCPU_1 (50.99 km²), TCPU_2 (724.20 km²), TCPU_3 (104.43 km²), TCPU_4 (301.48 km²) and TCPU_5 (227.98 km²). The total TCPUs falling area is 1409.08 km² as a recognized high conservation value prioritization area after the GIS mapping and TCPUs were depicted on the geo-referenced map for demarcation of protection treatment. The protection treatment is precious for the co-existence of wildlife in future. TCPUs required complete protection for optimum ecological restoration.





POSTER ABSTRACTS

The land falling under the TCPUs was holding minimal 19 tigers between 2018 and 2019 based on DNA Next-Generation Sequencing. The study finding will be helpful in DSS for the demarcation of critical Tiger habitats based on functional attributes and their connecting linkages. A landscape-level assessment was performed to determine tigers' presence within the urban matrix. Study findings will be helpful in support of the strategic green development of Bhopal capital with special reference to Tiger conservation in the Ratapani-Kheoni landscape.

The Tiger occupancy survey was performed from Dec 2018 to Apr 2019 across the study area to estimate the overall occupancy rate Ψ on PRESENCE software version 13.6 of a total of 5312 (km²), segment distribution was 83 grid cells (size 64km²). The detected tiger sign in 49 of 83 grid cells was confirmed, which yielded a naïve occupancy of 0.5904. the possibilities of a successful eco-tourism which will lead to the achievement of SDGs Goal 15: Life on Land for peace and resilience by creating means of livelihood. The UN Decade on Ecosystem Restoration (2021- 2030), Sustainable Development Goals (SDGs), aims to prevent, halt and reverse the degradation of ecosystems. It will only succeed if all stakeholders work as a team for conservation with sustainable development and required land is available without conflict.

Keywords: Tiger conservation prioritization units, Wildland blocks, Landscape connectivity, DNA, Ratapani-Kheoni landscape, Landscape Management, Co-existence, Zonation, Decision supporting system, Wildlife conservation.

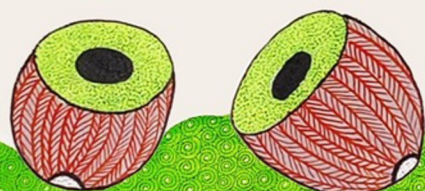
Abbreviations: TCPU (Tiger Conservation Prioritization Units), NGS (Next Generation sequencing), DSS (Decision supporting system), MDGs (Millennium Development Goals), SE (Standard Error), GIS (Geographic Information System) SDGs (Sustainable Development Goals)





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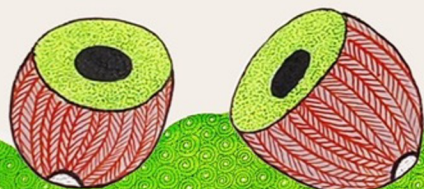
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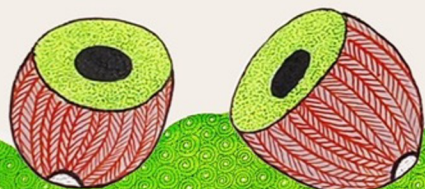
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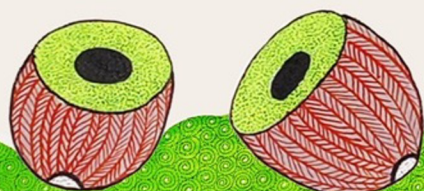
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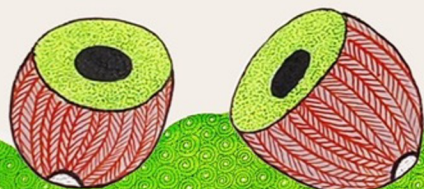
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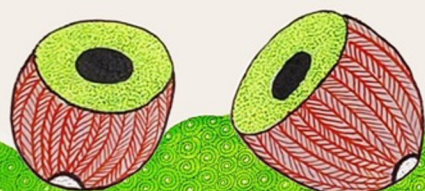
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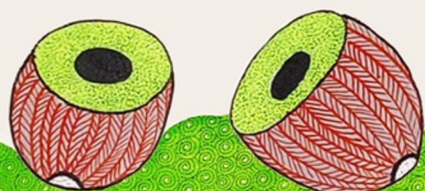
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