

2021-2022
**ANNUAL
REPORT**

SUSTAINING MOUNTAIN ECOSYSTEMS

CEDAR continues to play a pivotal role in strengthening the linkages between research and society through knowledge transfer and evidence based policy advocacy for improved environmental decisions in the Himalayan region.

Picture Courtesy: Team CEDAR

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CENTRE FOR ECOLOGY DEVELOPMENT AND RESEARCH

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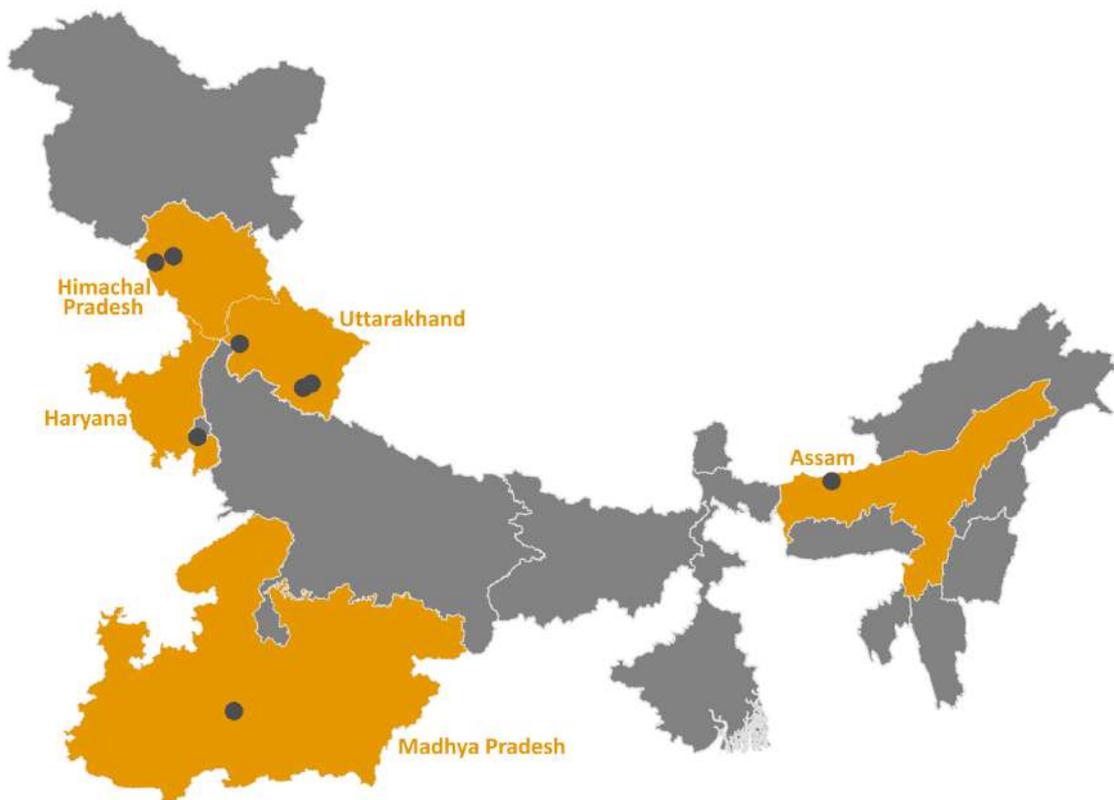
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Where We Work

Number of
States **5**

Number of
Districts **6**



Work Locations in Different States of India

Uttarakhand: **Nainital, Mukteshwar, Dehradun**

Himachal Pradesh: **Kangra, Palampur, Pong**

Haryana: **Gurugram**

Assam: **Manas Tiger Reserve**

Madhya Pradesh: **Ratapani National Park**

Message from THE CHAIR



It is a matter of great satisfaction and happiness that the Centre for Ecology Development and Research (CEDAR) has completed another year of successful and meaningful work documented in this Annual Report for the year 2021-22. As is customary and expected of all such reports, it provides a detailed overview of research and other activities – completed, ongoing and initiated – during the year under review. I may mention that the latter part of the previous year was the time when we all emerged out of the long dark shadow of the Covid 19 pandemic. Though the threat of the virus hasn't fully subsided, we are gradually limping back to some semblance of normalcy thanks largely to the very successful vaccination initiative undertaken by the country. We are now learning to live with the virus. Consequently CEDAR is also gradually emerging out of the darkness of the past two years and resuming its normal role of research, advocacy and policy intervention in the area of environment and development. These are extremely challenging times in a number of ways for organisations like CEDAR. In terms of substantive work we have to squarely face and respond to the challenge of climate change. This has gone much beyond the realm of academic discussion and negotiation in international forums. We are beginning to face its serious impact in our daily lives. While mitigation measures are beyond the scope of individual countries and small organisations like CEDAR and require global consensus and action, adaptation has to happen at the local level. It is here that we can play a useful role through our research, advocacy and policy interventions. Hopefully, we will be able to make a contribution in this regard. However, before we are enabled to play this important role there is another very serious challenge that we have to confront. This emanates from the wider environment in which small independent organisations like CEDAR are functioning today. Instead of support for their work they have to contend with a general atmosphere of suspicion. Consequently funding, so crucial for their very existence, is becoming hard to access. Yet, it goes to their credit that they have not thrown in the towel, but bravely carry on. It is this resilience and strength that we hope will see us through this difficult phase and enable us to play our rightful role in responding to the contemporary challenges.

August, 2022

B. K. Joshi
Chairman

Message from THE EXECUTIVE DIRECTOR



The year 2021-22 was a challenging one. The pall of COVID-19 hung heavy over the first part of the year. We were fortunate in that our staff and affiliates remained safe through this period. However, CEDAR did lose friends and well-wishers to this virus, and these gaps will be hard to fill.

Field work was impacted when it was needed most. The difficulties in crossing state borders led to some experiments with 'long distance field work' where phone and video calls, and instructional videos on sample gathering, were used to coordinate field data collection. This did lead to the development of some innovative research methodologies, though we do recognise that

there is no substitute to physical presence in the field.

Funding was impacted and we were fortunate to stay solvent and ensure salaries were always paid and commitments honoured. To those of our funders who were understanding and supportive beyond what can be hoped for – we are very grateful.

The year also saw more than the usual changes in the organisation, the leadership team, and the staff. It was a year which brought out the best in people – and a year which brought out the worst in people. But adversity brings with it learning, and this helped push us to improve and to strengthen systems and processes. Through it we persevered and forged new collaborations and new programmes. Our core focus – enhancing our understanding of Forests and Ecosystem Services was strengthened this year despite field travel restrictions.

The impacts of climate change are being increasingly felt in terms of erratic weather patterns and severe climate events. By establishing long term forest plots, we hope to be able to better understand the impacts of these on forest ecosystems. This year we saw an extreme rainfall event on October 18-19, 2021 which broke one day records in several met-stations. What made this particularly noteworthy was that the rains came well after the monsoons had retreated. A few months later came the snowfall of February 3-4, 2022. Brought on by a Western disturbance, this was among the heaviest snowfalls in living memory and caused considerable tree damage in two of our long-term plots in the Mukteshwar area. Through these tree falls and branch breakages, we are able to gather data to better understand the role of snow in forest dynamics.

Our work on Urbanisation and water expanded with two independent studies on air pollution in the urban centres of Dehradun and Gurugram. Our focus on working with communities was deepened through a project on stakeholder consultations for drawing up wetland plans. In keeping with the theme of the times, two collaborative projects, looked at the impact of COVID-19 on forests were also initiated. But this was also a year of reorganisation, introspection and working towards developing new strengths and proficiencies, while sharpening old skills. I would thank all our well wishers and friends and our board that has stood us through this period – and I look forward to better times ahead.

August, 2022

Rajesh Thadani
Executive Director



About Us

Vision

Mission

Governing Board

Research Advisory Board

Team

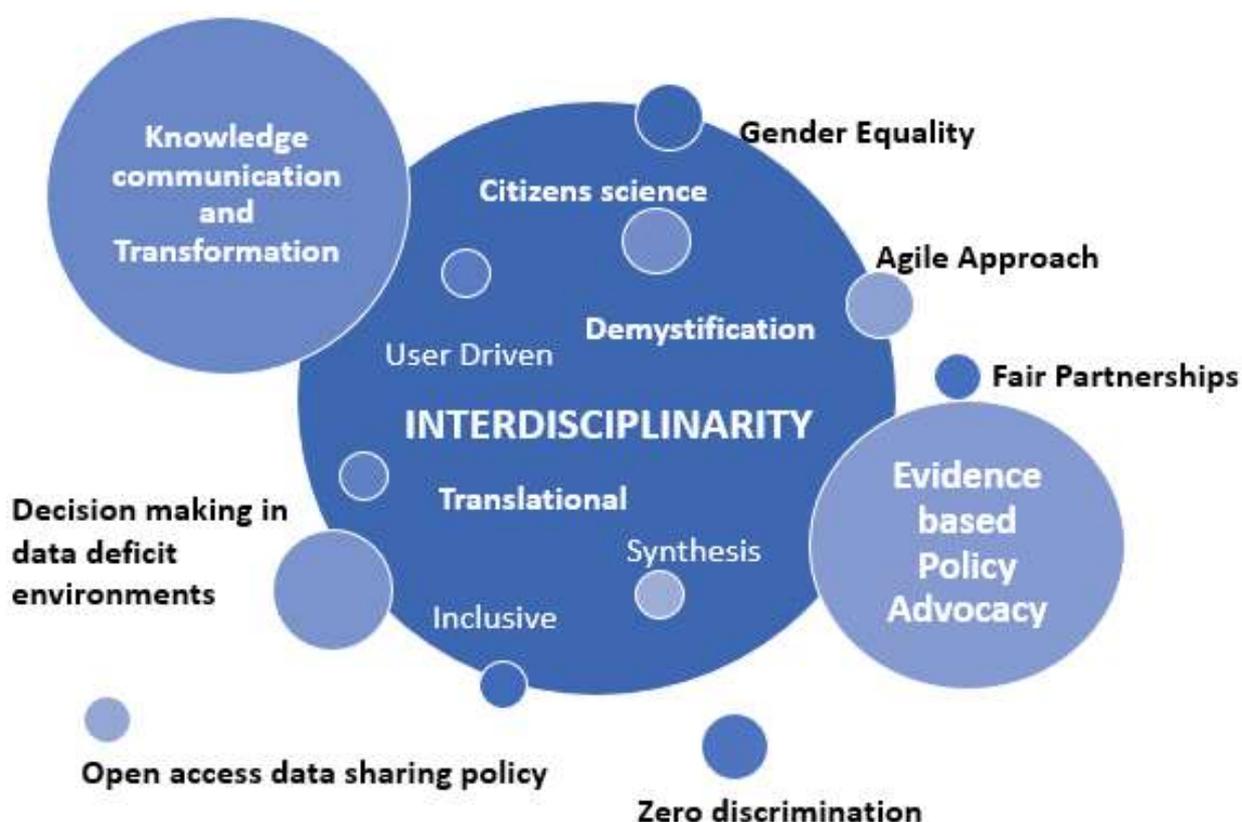
CEDAR is a not-for-profit organization registered in 2006 under the Societies Act of 1860. The registered office is located in Delhi, while the chief operations office is based in Dehradun. CEDAR was established when a group of academics and development practitioners came together to bridge the gap between applied research and field based interventions or, to put it differently, ‘balance theory and practice’. We are committed to inform environmental and development issues, reach out to stakeholders and policymakers, and create novel pathways for sustainable management of natural resources in Himalaya.

Vision

CEDAR envisions itself as the bridge between research and practice to facilitate socially just and equitable natural resource management in the Himalaya.

Mission

Our mission is to foster awareness and understanding of the Himalayan ecosystem through trans-disciplinary knowledge generation and dissemination.

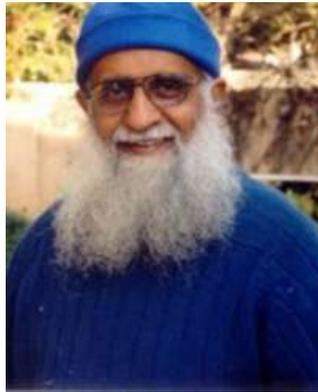


Skills and values of CEDAR

Governing Board



Prof. B. K. Joshi (Chairman)
Ex Vice Chancellor, Kumaun
University Nainital, Director,
Doon Library, Dehradun



Dr. Ravi Chopra (Member)
Founder, People's Science
Institute, (PSI) Dehradun



Dr. Rajesh Thadani,
Vice Chairman (upto May,
2021) Executive Director (from
May, 2021)



Mr. S.T.S. Lepcha (Member)
IFS, Former Managing Director
Forest Corporation, Dehradun



Dr. Ghazala Shahabuddin
(Member), Wildlife Ecologist
(Till May, 2021)



Dr. Vishal Singh
(Secretary Ex-Officio) Executive
Director, CEDAR, Dehradun
(Till May, 2021)

Research Advisory Board



Prof. K. Sivaramakrishnan
School of Forestry & Environmental
Studies, Yale University



Prof. Bhaskar Vira
Dept. of Geography, Cambridge
University, United Kingdom



Prof. J.S. Singh
Professor Emeritus, Dept. of
Botany, BHU



Dr. Meg Lowman
Director of Global Initiatives
California, Academy of Sciences



Dr. Himanshu Kulkarni
Director, ACWADAM
Pune



Dr. Ann M. Fraser
Prof. & Chair of Biology,
Kalamazoo College, USA



Dr. Rajendra Dobhal
Dir. General, Uttarakhand State Council
for Science & Technology, Dehradun



Dr. Rajeev Pandey
Head & Scientist, ICFRE
Dehradun

Team

Research Team

Dr. Rajesh Thadani
Senior Fellow, Forest Ecologist

Dr. Ghazala Shahabuddin *
Senior Fellow, Wildlife Ecologist

Dr. Vishal Singh
Senior Fellow, Translational Ecologist

Mr. Chetan Agarwal
Senior Fellow, Policy Analyst

Dr. Vijay Ramprasad
Senior Fellow

Dr. Pia Sethi
Senior Fellow, Ecologist

Dr. Anvita Pandey
Fellow, Forest Ecologist

Mr. Manish Kumar**
Fellow

Dr. Nidhi Singh
Senior Research Associate

Ms. Manya Singh****
Research Associate

Mr. Laraib Ahmad***
Research Associate, GIS Lead

Dr. Seema Yadav
Research Associate

Ms. Sweksha Gupta****
Junior Research Fellow

Ms. Swati Singh
Junior Project Fellow

*Till May, 2021

**Till June, 2021

***Till July, 2021

****Till September, 2021

Team

A black rectangular graphic with the word "Finance" written vertically in white, bold, sans-serif font.

Finance

Mr. Anil Tyagi
Finance Officer

Mr. Dharmendra Singh
Assistant Accountant

A black rectangular graphic with the word "Field" written vertically in white, bold, sans-serif font.

Field

Mr. Narendra Singh Raikwal
Sr. Field Assistant

Mr. Bhaskar Singh
Field Assistant



Thematic Areas

Climate Change Adaptation
Forest and Humans
Urbanisation and Water
Wildlife, People and Land Use Change

Current Research Themes

Climate Change Adaptation

Conducting research to understand the impacts of climate change in the Himalaya and strengthening the capacities of communities through collaborations with grassroots organizations.

Forest & Humans

We are actively researching the topics of human disturbance, the impact of climate change and more sustainable management practices in Himalayan forests.

Urbanisation & water

We have been systematically researching urban water management, demographic patterns, and urban development in small and medium towns of Western and Central Himalaya.

Wildlife, People & Land-Use Change

Studying spatial patterns in biodiversity, their long-term responses to anthropogenic activities, land use and climate change, and the underlying ecological drivers.

Completed Projects



- Scoping and Screening of Best practices for Forest Ecosystem Services Management in Uttarakhand and Himachal Pradesh
- Promotion of nature-linked ecotourism as a rural livelihood in Uttarakhand: A proposal for development of supporting training materials
- Implementing nature-linked tourism livelihoods: Evaluation of potential for forest conservation in the Western Himalaya



Scoping and Screening of Best Practices for Forest Ecosystem Services Management in Uttarakhand and Himachal Pradesh

Donor/Funding Agency – Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Field Site – Uttarakhand and Himachal Pradesh
Duration - July, 2021 - September, 2021
Project Investigator – Dr. Anvita Pandey

Himalayas and their forest ecosystems are the backbone of Northern India, the services these forests provide extend much farther and wider. In the present time these services and their sustained flow have been affected by various natural and anthropogenic factors. In such scenario, it becomes essential to better understand, manage and protect these services and identify and document best forest practices, where not only are these forest ecosystems being conserved, but the communities living nearby continue to benefit from these services.

GIZ, a research funding and implementing organisation initiated a massive programme to strengthen the management of Forest Ecosystem Services (FES) with emphasis on water availability in Western Himalaya. As part of this initiative, Centre for Ecology Development and Research (CEDAR) was assigned to conduct scoping and screening study of best practices on Forest Ecosystem Services (FES) from Western Himalaya.

The study mainly focused on the scoping, screening and documentation of best forest management practices with respect to water availability, livelihood generation and gender

equity across the two states of the Western Himalaya region – Himachal Pradesh and Uttarakhand.

Findings of the Study

1. Identification of best forest management practices

The process involved extensive secondary literature review to understand the Forest Ecosystem Services (FES) with respect to water management. Based on which, an internal exercise of defining the criteria for scoping, screening and attributes of best practices were identified (Fig 1). In the process of primary data collection, expert consultation meeting was done to understand the implementations done on ground by different agencies.

2. Selected best practices

Based on insights from the experts, the scoping exercise was undertaken and 18 studies were screened for FES (Annexure - III) and out of these , 3 were screened and documented for best practices with respect to water management. Sites visits were made and the with the help of



Fig. 1: Process followed for Identification of Best Practices (Illustrated by - K. S. Asha)

expert inputs from government, non-government departments, and subject experts, a detailed recommendation was made. The sites of selected three best practices are Narendra Nagar, Salkuli Naula (from Uttarakhand) and Thanakasoga (from Himachal Pradesh). Summary of the three practices selected are given in the table 1 .

Table 1: Summary of finalized best Practices

Site	Implementing Organisation	Target	Interventions	Impacts
Narendra Nagar, (Uttarakhand)	State Forest Department, Uttarakhand	Spring, streams and rivers	Hydrogeological approach, Treatment of recharge areas (Mechanical and vegetative measures), Social inclusion, awareness	Improved drinking water quality, increase in spring discharge, reduction in sediment load of the river, reduction in women drudgery
Thanakasoga (Himachal Pradesh)	People's Science Institute, Dehradun	Springs	Hydrogeological approach, Treatment of recharge areas (Mechanical and vegetative measures), capacity building, introduction of Systematic Wheat Intensification (SWI), fodder plantations, protection of recharge area	Equitable water sharing, enhanced spring discharge, improved water quality, increase in agricultural productivity, improved green fodder availability, improved social relations between villagers
Salkuli Naula (Uttarakhand)	Central Himalayan Rural Action Group, Nainital	Springs	Socio- hydrogeological approach, Capacity building, training of para-hydrogeologists, mechanical and vegetative measures, community contribution encouraged	Increased women leadership, improved spring discharge, capacity of local population built. Higher community ownership

Based on the case studies, secondary literature and deliberations with experts we

sum up the study with statements followed by distillation of recommendations.

Statements

1. Forest Departments of Uttarakhand and Himachal Pradesh have put efforts through past and ongoing programs towards Forest Ecosystem Services (FES) in general and for water in particular.
2. State Forest Department and Civil Societies have actively played a role in addressing the problems of water crises, especially drying up of springs through springshed or hydrogeological approaches.
3. Springshed approach is a targeted approach for spring sustainability. However, the border benefits of watershed approach should not be undermined.
4. In many instances, a successful practice applied at one site are transferred to other sites (one-size-fits-all approach), even though there are considerable differences in geology, climate and hydrologic settings.
5. Case studies reflect that social inclusion, awareness and capacity building are strong pillars of success stories.
6. In the context of water, the role of forests in regulating and provisioning is well established from scientific evidences across the world, however the role in enhancement of water is inconclusive.
7. Research on 'Forest and water interactions' remains a 'white spot' in both the States and other parts of IHR.
8. Natural geological depressions in the forested areas of Himalaya contribute significantly to subsurface recharge but have received no attention by researchers or policy makers, many such depressions are in a degraded condition.
9. PES and benefit sharing mechanisms show promise in terms of community harmony and suitability of practices.

Recommendations

1. Ground water recharge through forested ecosystems require extensive understanding of forest hydrology, geohydrology and restoration experts, an expert member committee to be formed by involving experts from the above fields and allied disciplines for better decision making especially in 'data deficit' regions such as UK and HP.
2. Research to be given priority by institutionalizing it through Working Plans of State Forest Departments.
3. Better data collection methods and management practices to be applied by SFD's and CSO's for evidence-based policy making.
4. Consolidation of existing information of springs, streams, lakes and wetlands.
5. Documentation of traditional practices.
6. Hydrogeological mapping of important springs to be undertaken and the status of their recharge areas to be evaluated.
7. Springshed is unit of a watershed/paired watersheds or a larger ecosystem. Watershed practices should be continued keeping in view the larger benefits reaped from them.
8. While outlaying the Catchment Area Treatment (CAT) plans, priorities can be assigned based on need assessments.
9. Harnessing the potential of Van Panchayats for FES.
10. Convergence options for optimization of resources should be explored.
11. Trainings and capacity building of practitioners, implementors and village community.
12. Options should be explored for better collaboration between CSOs/communities and Forest Department.
13. Project on Cloud Forests should be initiated and given priority for the role they play in FES.
14. Natural depressions in the forest areas to be identified and given conservation priority.



Promotion of Nature-Linked Ecotourism as a Rural Livelihood in Uttarakhand: A Proposal for Development of Supporting Training Materials

Donor/Funding Agency – The Development Bank of Singapore Ltd. (DBS)
Duration - August, 2020 - December, 2021
Project Investigator – Dr. Ghazala Shahabuddin

Forest-dependent people in the middle Himalayas are facing loss of livelihoods due to declining agricultural productivity resulting in poverty and out-migration. This project aimed to develop training material for an ongoing livelihood programme (in which CEDAR was a partner) in nature-linked ecotourism as a viable rural livelihood for 7-10 villages in middle Himalayas of Uttarakhand State, India. This project was aimed at development, design and publication of training material that is specifically geared towards the local ecological context and needs in both Hindi and English.

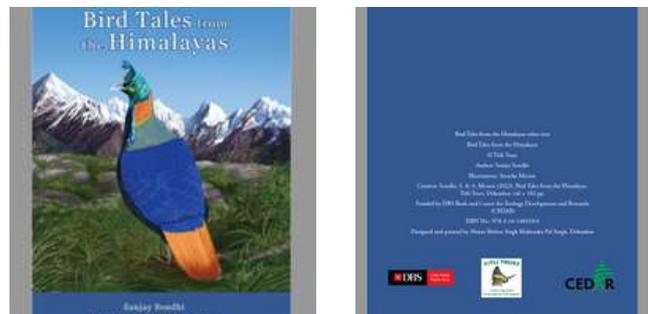
The production of scientifically accurate outreach material has proven to be extremely useful for a range of training and educational activities across Uttarakhand where CEDAR and its collaborators have been working. Through this project CEDAR has significantly supported local non-profits, villages and scientists in training and business activities for ecotourism, and also created awareness of the high biodiversity, large expanse of forests and scenic mountain views, which make Uttarakhand a popular tourist destination. Experienced scientists, writers and artists who have been involved in training activities and creation of training materials since 2012, have also been supported through this project.

Major Outcomes

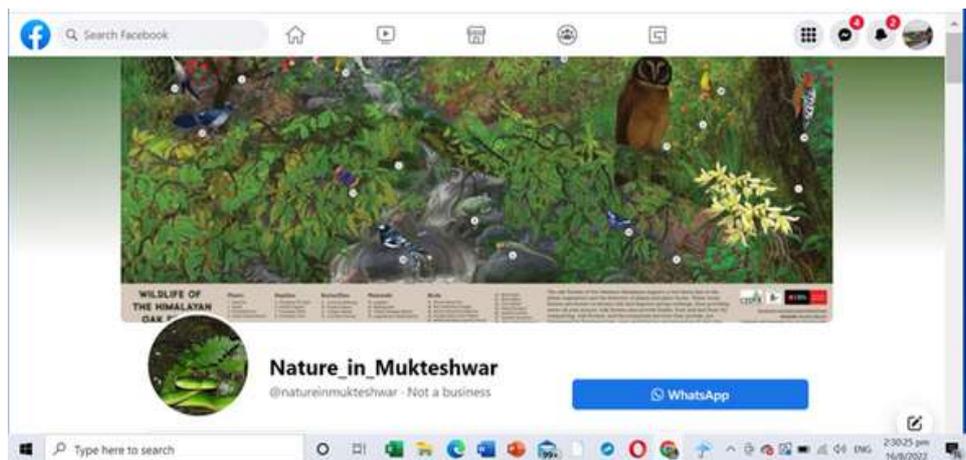
1. An E-flora to identify 50 common tree species and 50 wildflower species of Uttarakhand which will be available as a phone app for Android and iPhone, as well as Windows.
2. An illustrated book on the Bird Tales of Himalayas with 50 bird stories based on local folklore and myths.
3. A website showcasing nature tourism for promotion of birding destination and the associated guides.
4. A Facebook page with regular uploads on natural history, birding and nature events and guide information for an active birding destination.
5. A poster on the wildlife of the Himalayas in both digital and printed format.



Glimpse of website - www.natureinmukteshwar.in



Book - Bird Tales of Himalayas



Picture of Facebook page - Nature_in_Mukteshwar



Implementing Nature-Linked Tourism Livelihoods: Evaluation of Potential for Forest Conservation in the Western Himalaya

Donor/Funding Agency – The Nature Conservancy, USA

Field Site – Kumaon Region (Mukteshwar, Pawalgarh and Munsiri), Uttarakhand

Duration - February-May, 2021

Project Investigator – Dr. Ghazala Shahabuddin

Forest restoration and conservation necessitates developmental approaches that are participatory and least damaging to ecosystems, and that can help regenerate ecosystem services in the fragile Himalayan landscape. One such opportunity for livelihood regeneration is nature-based tourism, given the presence of rich biodiversity and scenic landscapes that are suitable for recreation, as well as the relatively low ecological impact of nature tourism. Activities such as birdwatching, butterfly study and curated nature trails have gained considerably in popularity during the last decade, providing crucial

livelihoods to numerous households. Nature-linked tourism also has the potential to create significant incentives and opportunities for forest conservation, a necessity in the Himalayan region for future adaptation to climate change.

Dr. Ghazala Shahabuddin has been involved in nature-based tourism promotion and training in rural areas since 2012. Through this project, she aimed to undertake evaluation and process documentation of nature-based tourism as a biodiversity conservation strategy, focussed on three project sites in the Kumaon Himalayas where CEDAR has been supporting training programmes for rural guides. The two specific goals of this three-month project were:

1. Documentation of the ongoing programme for promotion of nature tourism as a local livelihood through capacity-building with a view to understanding its strengths, weaknesses and potential for upscaling.

2. Exploring the potential (or pros and cons) for leveraging nature-based livelihoods as a force for long-term forest restoration and conservation by local communities.

Findings of the Study

In this project, significant convergence of nature tourism activities was found with long-term forest conservation goals. There are several ways in which this happens:

1. Creation of tangible monetary incentives for forest conservation among local residents.
2. Intensive documentation of species at the training sites, which is key to conservation planning and outreach.
3. The interactions between experts and village communities, which enables local conservation activities.

However, for such convergence, long-term engagement of trainers, emphasis on ethical guiding practices, and science-based learning, are essential. Further, we find significant potential for upscaling of community-based nature-linked tourism activities- including training, business development and conservation- to many more sites of Uttarakhand, in order to promote forest restoration and protection in the state.

For better effectiveness, training process needs greater resources in order to get better participation from underrepresented communities and women, and allow more intensive forms of training. Expansion of nature tourism as a community-managed business requires better marketing, tourist outreach and synergism with village homestays.

Government facilitation is required by increasing employment opportunities for trained guides in wildlife reserves, providing better access to forest areas, enforcing ethical guiding practices and a fair certification process. The project team found and documented the tangible and intangible links between nature tourism and forest conservation. These links need to be nurtured and facilitated by government, non-profits and funding agencies alike, in the hill state of Uttarakhand, to not just increase and improve forest cover, but also create climate-resilience and social stability amongst local communities, who are hard-hit by global warming.



Ongoing Projects

- Creating climate-resilient communities in mid-hills of Uttarakhand: Interventions towards forest & water
- Planning plantations: Past learning, toward triple wins in carbon, biodiversity and livelihoods
- Hydro-geological assessment and socio-economic implications of depleting water resources in tourist towns of Uttarakhand
- Creating evidence for forest based resilience during COVID-19
- Impacts of the COVID-19 Pandemic on Forest Resource Use by Rural Communities in India
- Establishing a Low-cost sensors network for air quality monitoring in Gurgaon
- Stakeholder Consultations for Integrated Management Planning of Renuka and Pong Ramsar Sites in Himachal Pradesh
- Cities study on exposure and impact of air pollution in the Hindu Kush Himalaya (HKH) region



Village level Water User Committee training in Mukteshwar, Nainital.

Creating Climate-Resilient Communities in Mid-Hills: Interventions Towards Forest, Water & Livelihood Security

Donor/Funding Agency – National Mission on Himalayan Studies (NMHS), Govt. of India
Field Site –Nainital District (Mukteshwar), Uttarakhand
Duration - April, 2019 - September, 2022
Project Investigator – Dr. Vishal Singh

The project aims to address the challenges of water security in the Himalaya by developing and implementing need-based choices to build resilience against climate change for forest-dependent communities in Uttarakhand. CEDAR along with Central Himalayan Rural Action Group (CHIRAG) lead the project.

The collaboration between CEDAR and CHIRAG follows the Springshed Management methodology (Socio-Hydrological research based intervention) and application on three springs and in

tandem build community-level youth leaders. The project seeks a union between conservation and the local economy involving interaction amongst biophysical, social, and economic components. The study focuses on first understanding the ground realities through participatory socio-hydro-ecological research and vulnerability assessments and then explores and implements demand-driven viable solutions in consultation with community leaders, which connect forests and water to provide improved livelihoods, and train a new generation of youth climate leaders.

Key Highlights

Recharge work in the 3 selected springs, i.e. Nathuwakhan Naula, Uchurya Naula (Gajar I), and Gajaar Naula (Gajar II) was successfully completed under which Hydro-geological mapping was done to determine critical water recharge zones of the selected springs (Annexure I).

2. Total 53 household surveys were conducted where 156 men, 133 women and 148 children were surveyed. Out of the total 355 beneficiaries, 32 beneficiaries were SC.

3. Water User Committees were made in all beneficiary villages, and 3 village-level training workshops were provided to address pressure on springs.

4. Democratically formed Water User Committees (WUCs) are the nodal institutions solely responsible for successfully carrying out project implementation along with CHIRAG

staff, managing and mobilizing the community members and strengthening themselves in terms of capacity building.

5. There was very positive outcome noticed in terms of community involvement. The participation of women in the orientation process was very heartening.

6. 200 plantations under Assisted Natural Regeneration were done by the partners with the help of villagers.

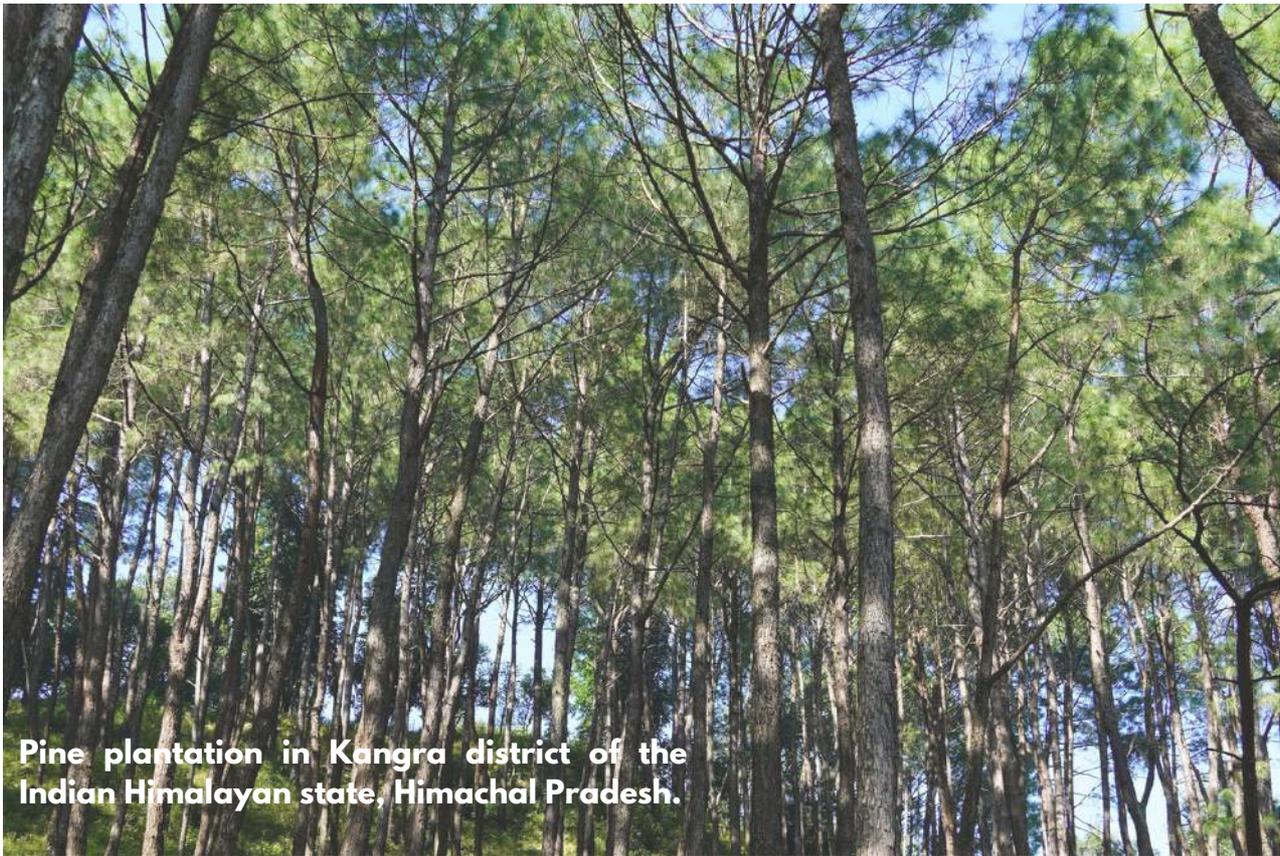
7. Eradication of Eupatorium was completed in the selected villages.

8. 6 Para hydrogeologists were trained for the implementation purpose and long-term data monitoring. Centralized capacity building trainings of 6 Key Resource Persons on spring discharge monitoring, Geo-hydrology, and water quality were successfully conducted.

9. A knowledge dissemination workshop and documentary will be produced by the end of September, 2022.



Water User Committee (WUC) meeting in Gajar village, Mukteshwar, Nainital



Pine plantation in Kangra district of the Indian Himalayan state, Himachal Pradesh.

Planning Plantations: Past Learning, Toward Triple Wins in Carbon, Biodiversity and Livelihoods

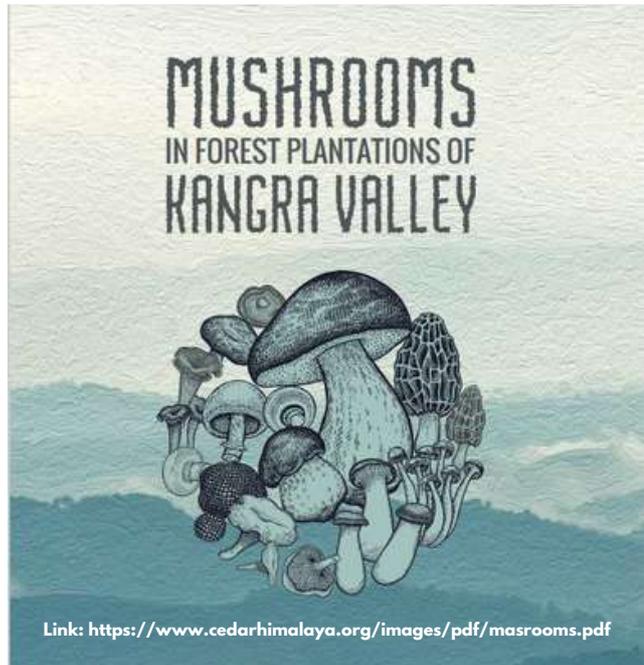
Donor/Funding Agency – Partnerships for Enhanced Engagement in Research (PEER) Cycle 8
Field Site –Kangra District, Himachal Pradesh
Duration - November 2019 - August 2022
Project Investigator – Dr. Rajesh Thadani

The PEER programme (Partnerships for Enhanced Engagement in Research) is managed by the National Academy of Sciences, USA. CEDAR has a PEER grant in collaboration with the Dept. of Forest Resources, University of Minnesota. The objective of this study was to understand the impact of plantations on land cover and livelihoods of forest dependent people in Himachal Pradesh. Under this project, CEDAR measured forest carbon stored in above ground biomass (AGB) after measuring tree diameters in over 40 large plots (1500 meters each) using already existing allometric equations. Smaller plots were set up to assess

mycorrhizal diversity, as evidenced by mushroom sporocarps monitored during the monsoon season. These studies were carried out in plantation areas in Kangra district of Himachal Pradesh. Soil carbon measurements were made for each of these plantations at the CEDAR soil laboratory. The project aims to evaluate when and how afforestation projects achieve the triple win of storing more carbon, protecting biodiversity, and enhancing rural livelihoods, more fully accounting for the potential benefits and costs of plantations in the Himalayas. Envisaged as a one-year project, Covid -19 related interruptions in field work, led to the project going into no cost extensions to complete the field studies.

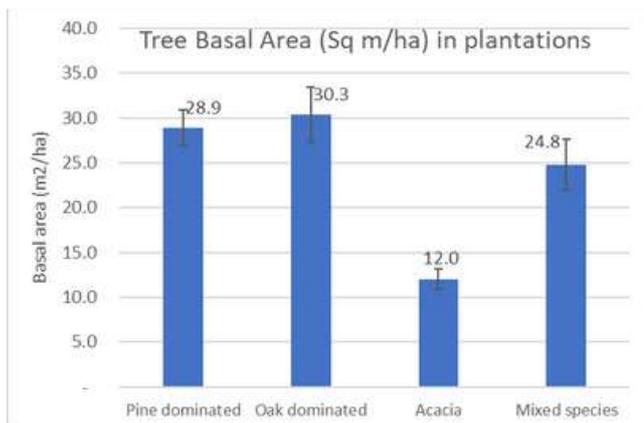
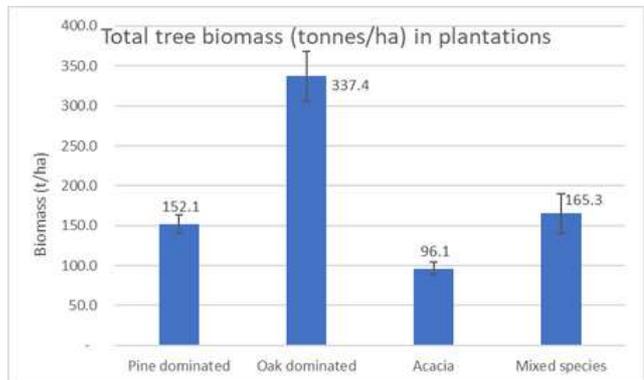
Key Highlights

1. Knowledge product – an identification guide “Mushrooms in Forest Plantations of Kangra valley” was published. With colour pictures, identification and descriptions of key features and ecological features, the guide is aimed at a general audience with a view to increase interest in this important group that forms beneficial associations critical for forest trees.
2. Training of field staff on Mushroom identification and carbon estimation techniques were carried out.
3. Mushroom diversity in different forest plantations was catalogued.
4. Forest biomass and carbon sequestered by plantations was estimated.



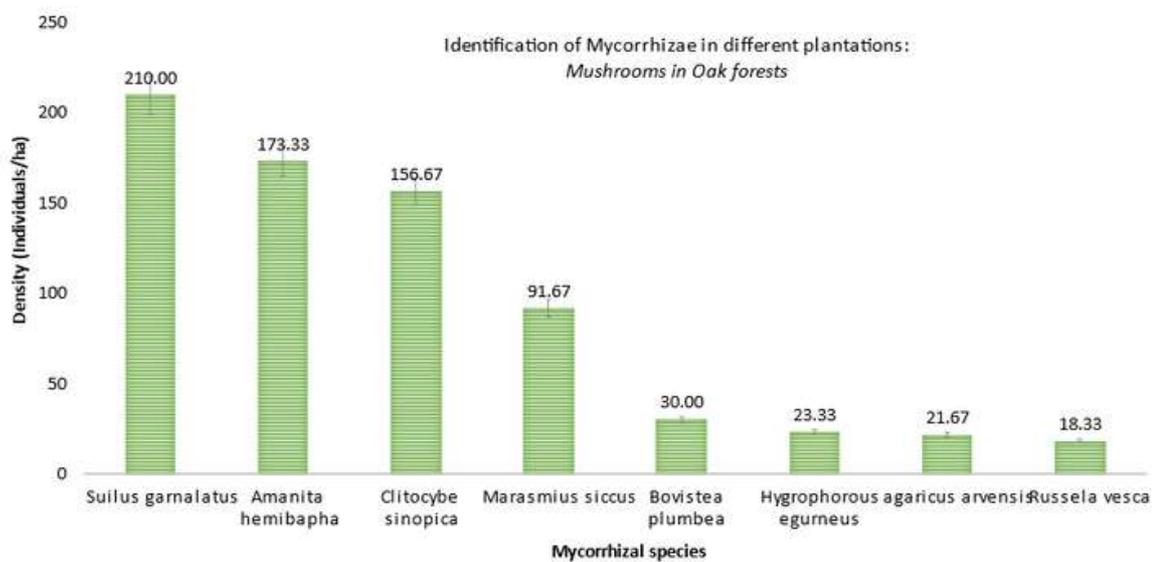
Findings of the Study

While plantations help provide focus and give a reason for forest protection, forests regenerate well naturally. Old plantations, established in the 1980’s and 1990’s were in some cases indistinguishable from natural forests. If protection from human disturbance was adequate, not just the planted seedling and saplings, but all forms of natural regeneration helped bring degraded areas back under good forest cover. This can be seen in the graphs below which show basal areas and biomass in different plantations that are in the same range as natural forests. The majority of plantations also showed good mycorrhizal diversity with a wealth of mushroom fruiting bodies that resemble a natural forest. But this is not to say plantations were wholly successful. Many of those where the community felt excluded had failed for reasons ranging from fires that destroyed regeneration, to entry of grazing animals.

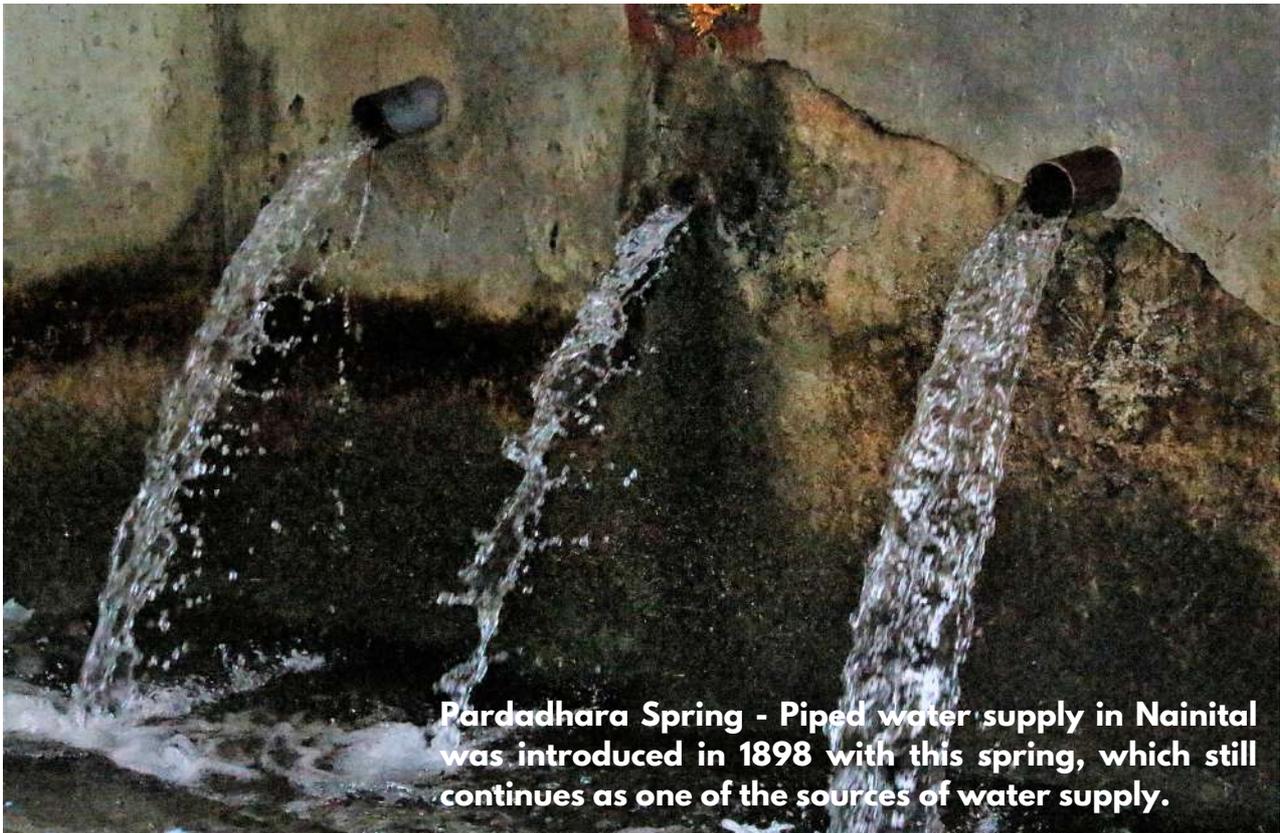


The value of old plantations, especially of Chir Pine (*Pinus roxburghii*) that dominated afforestation efforts in the 1980's and 1990's was questionable. The species is of low importance to local communities and the ban on green felling locks up timber value preventing benefits from accruing to local communities. The findings and learnings from our studies,

hampered as they were by field work restrictions, led to an excellent consultative workshop in Himachal initiated at the end of the financial year. Inputs from forest department officials and open deliberations with community representatives and forest ecology experts helped these disparate groups get a shared perspective and bring out some strong policy recommendations.



Different type of identified mycorrhizae found within Forest Department plantations located at altitudes between 750m and 1900m in Kangra District, Himachal Pradesh



Pardadhara Spring - Piped water supply in Nainital was introduced in 1898 with this spring, which still continues as one of the sources of water supply.

Hydro-Geological Assessment and Socio-Economic Implications of Depleting Water Resources in Tourist Towns of Uttarakhand

Donor/Funding Agency – Ministry of Jal Shakti, Department of Water Resources, River Development (RD) and Ganga Rejuvenation (GR)

Field Site – Nainital, Uttarakhand

Duration - January, 2020 - December, 2022

Project Investigator – Dr. Vishal Singh

Project is commissioned to CEDAR in partnership with Indian Institute of Technology, Roorkee (IITR) and Forest Research Institute, Dehradun (FRI) by Ministry of Jal Shakti, Department of Water Resources, RD and GR. The study aims to examine the drivers for the altered regimes of water supply in the lake town Nainital and the mechanism to deal with it along with the objectives, include social, ecological, and technical and policy components for better

water governance and awareness. CEDAR is mainly focusing on devising citizen science initiatives on long term monitoring, collecting data and compiling long term records which will reflect trends and changes, while IIT, Roorkee is assessing the hydrological balance of the lake. The FRI, Dehradun is looking at the water vulnerability of stakeholders within the municipal confines of Nainital.

Key Highlights

1. Water vulnerability assessment

Ward wise water vulnerability-based questionnaire survey was conducted in 150 households across the city (10 from each ward of Nainital town). Data obtained from questionnaire survey was analysed and by using secondary remote sensing data, water vulnerability in different wards of Nainital was also estimated. (Annexure II- Used methodological flow chart for mapping water vulnerability.)

2. GIS analysis

GCP (Ground Coordinate Point) has been collected for different pump house and springs present in different wards. Land Surface Temperature was estimated for Nainital city. The other GIS analysis i.e., distance of ward to road & lake, digitization of lake, ward, slope and aspect of the study area were also recorded.

3. Ecological and social awareness around the lake

Base line data collection of avian diversity of Nainital (area around Naini lake) was done under the ecological and social awareness components of the project with the help of

local people.

4. Water Institutional Framework

Institutions related to water sector along with their roles and responsibilities were framed with the cooperation of Irrigation Department.

5. Engagement meetings

To gather the information, engagement meetings with officials of Government Departments (Jal Sansthan, Irrigation Department, Lake Development Authority etc.) and citizens, local bodies/groups like Citizens of Nainital were conducted. The prominent issues like institutional set up, water supply system, current water scenario of city, degradation of recharge zones, catchment areas of lake etc. were discussed in the meetings.

6. Installation of Rainwater Harvesting system

Base line survey for implementation of RWH (Rain Water Harvesting) system has been done.

7. Water supply system of Nainital

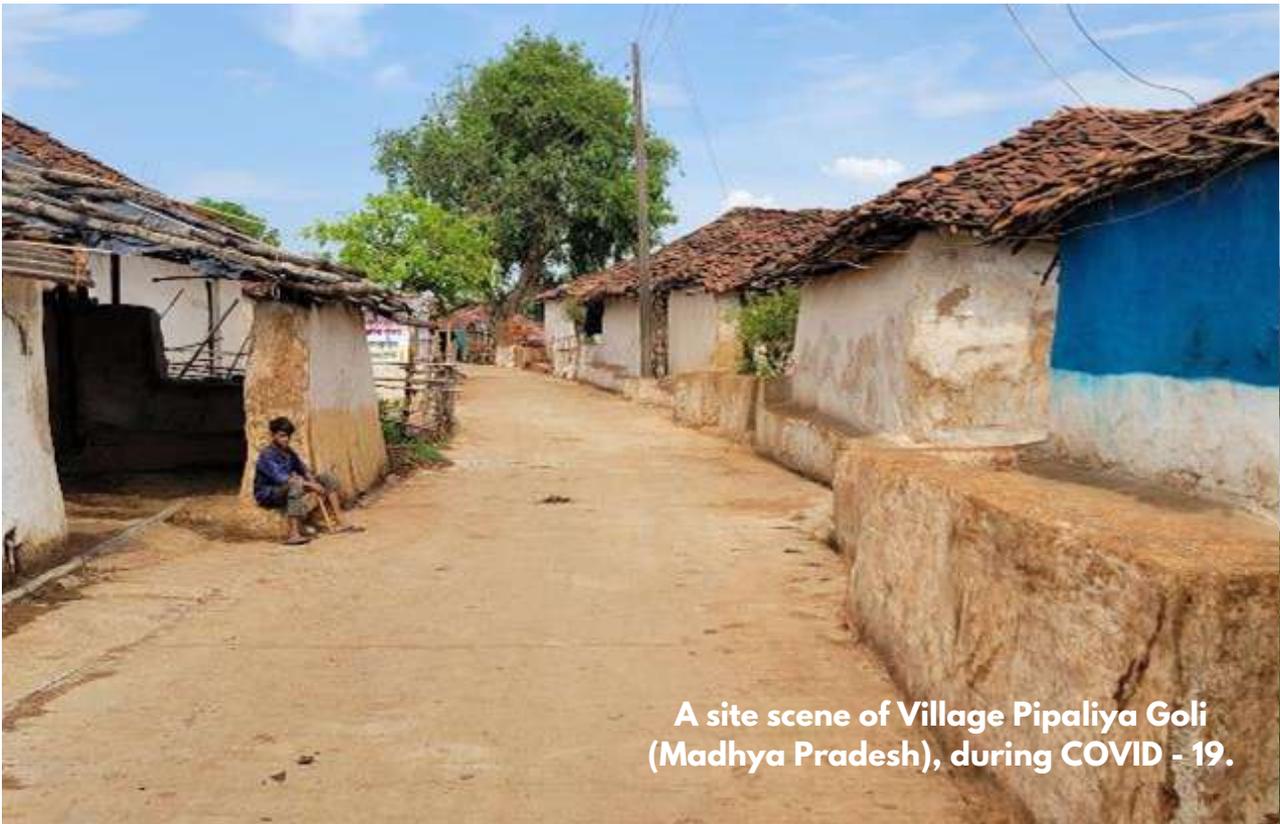
Mapping of water supply system of Nainital was done with the help of Jal Sansthan.



CEDAR team meeting with officials of Irrigation Department, Nainital



CEDAR team visiting construction area in Sukhatal (sub-catchment of Naini Lake), Nainital



A site scene of Village Pipaliya Goli (Madhya Pradesh), during COVID - 19.

Creating Evidence for Forest Based Resilience During COVID-19

(In collaboration with Swedish University of Agricultural Sciences Uppsala, Northern Arizona University, United States of America)

Donor/Funding Agency – FORMAS – Swedish Research Council

Field Site – India (Assam, Himachal Pradesh, and Madhya Pradesh)

Duration - January, 2021 - December, 2022

Project Investigator – Dr. Harry Fischer

**Project Co-Lead - Dr. Alark Saxena (NAU, Forestry Expert/Research Advisor)
Dr. Vishal Singh (CEDAR)**

Forest products play a critical role in household responses to many kinds of livelihood shocks, particularly in rural areas of low-income countries. However, increased forest use-driven by declining off-farm employment and widespread urban to rural migration in the wake of COVID-19-risks degradation, which may threaten longer-term human welfare and environmental objectives. This project studies the role of forests in contributing to livelihood security at a time of unprecedented distress to help build more

secure and sustainable human-environment system. Through a mixture of qualitative enquiry, household surveys, and remote sensing analysis, we assess the role of forests in household coping strategies, study the impacts of changing forest use on forest structure, and identify policies associated with greater socioecological resilience. Our research will contribute critical knowledge to building more sustainable livelihood systems in the face of COVID-19, climate change, and a wide range of shocks, with direct relevance for policy in many countries around the world.

Key Highlights

1. The role of forest as safety net during the time of COVID has been different in the three different states. It appears that the availability of forest resources depended upon the landscape, ecology, the historical use, and the seasonality associated with the landscapes.
2. In Madhya Pradesh it appears that there was no significant increase in the use of forest resources during COVID-19.
3. In Assam the increased use of forest resources was observed. There was an increase in the use of garden vegetables that were available to the households. There was also increase in the use of ferns and other non-timber forest products from the forest.
4. The local public distribution systems-maintained continuity and provided supplied enough that could support the rural communities. However there was struggle in getting household rations due to limited timings of operations.
5. The National Rural Employment Guarantee Scheme did not appear to be working within the forest dependent communities in Madhya Pradesh – the result from other states is under analysis.
6. In Madhya Pradesh, farmers /forest dependent communities were unable to get a fair price for their agriculture and forest produces. They often sold their produce for half the market price. At the same time the rural communities had to buy items of daily use at two to four times the price in the market.
7. In the last phase CEDAR would use evidences collected under this program through awareness, drives, strategic engagement with key stakeholders.



Talking to villagers about the challenges during COVID-19



Our field informant explaining how they use the forest products



Discussion with local field experts



Panchayat Community Centre at Tarkhankar village located in Baroh tehsil of Kangra district in Himachal Pradesh.

Impacts of the COVID-19 Pandemic on Forest Resource Use by Rural Communities in India

(In collaboration with Swedish University of Agricultural Sciences, Texas A & M University ISB, Hyderabad and University of Minnesota, US)

Donor/Funding Agency – FORMAS - The Swedish Research Council

Field Site – Himachal Pradesh

Duration - January, 2021 - December, 2022

Project Investigator – Dr. Harry Fischer

Project Co-Lead - Dr. Vijay Ramprasad

Dr. Vishal Singh

The current COVID-19 pandemic increases the likelihood of food insecurity in many regions worldwide (Dev, 2020; Harvey, 2020; Food Security Information Network (FSIN), 2020). Forest products and other local natural resources play a critical role in household responses to many kinds of livelihood shocks (Pramova et al., 2012; Angelsen et al., 2014; Sunderlin et al., 2005). The present moment offers an unprecedented opportunity to examine relationships among forests, livelihood shocks, and public policy. We propose to build on an existing dataset that documents

forest cover, forest use by forest-fringe communities, and public-policy interventions to improve forest cover to examine the ways in which a major livelihood shock resulting from COVID-19 alters relationships between forests and people.

We will use a combination of remote sensing, household surveys, and systems modeling to build on existing data to answer five questions: 1) How do people change their use of forest products in reaction to livelihood shocks?; 2) How do livelihood shock-driven uses of forests change land cover?; 3) How do public policies aimed at improving forest and other land cover affect the ability of people to sustain their livelihoods from

sustainable forest management in the face of livelihood shocks?; 4) How effective are innovative algorithms at extracting useful forest-use/land-change information from remotely-sensed imagery under challenging

circumstances; and 5) How can a socio-ecological systems model aid in synthesizing information about how the pandemic has altered interactions among people and forest plantations?

Key Highlights

1. Completed the collection of a panel dataset of plantations, communities and households that were sampled as part of a larger project funded by NASA in 2017. This panel data set includes revisits to: 153 plantations, 26 communities (panchayats), and 720 households.
2. Data has been entered in Qualtrics software; cleaning, processing and analysis is underway.
3. Additionally, 200 household level interviews were conducted; data entry of 110 is completed as so far.
4. Completed a qualitative study of participation in plantation-based forest restoration programs.
5. Analysis of remotely sensed information is underway.
6. We trained or re-trained 10 field staff in panel data collection and qualitative data collection.
7. Field visit and team meeting were conducted in Nov 2021.
8. Two engagement meetings (Vijay Ramprasad, Hal Fischer) with Forest Department officials were organised in Himachal Pradesh.
9. Preliminary results were presented in virtual conferences of FOCALI (Forest, Climate, and Livelihood research network) and the bi-annual meeting of IASC (International Association for the Study of the Commons).





Establishing a Low-Cost Sensors Network for Air Quality Monitoring in Gurgaon India

Donor/Funding Agency – Clean Air Fund (CAF)
Field Site – Gurgaon, Haryana, India
Duration - December, 2020 - March 2022
Project Investigator – Mr. Chetan Agarwal

Gurgaon city has poor air quality, along with Delhi and other cities in the Indo-Gangetic plains. This project aims to support the expansion of Gurgaon's low-cost sensor air quality network, to complement the regulatory air quality monitoring stations of the state, and generate more reliable air quality data within Gurgaon; improve the understanding of air pollution hotspots in Gurgaon, both geographically and temporally, and make available air quality information for evidence-based policy decisions that catalyse interventions to reduce air pollution.

The project will contribute to the understanding of functioning of low-cost sensor in Indian conditions. It will involve scoping the most effective low-cost sensors with lower margins of error and evaluating the same by co-locating them with a reference grade monitor. Study will also focus on expanding the low-cost sensor network in Gurgaon according to specified criteria, and facilitating the installing and calibration of the sensors.

This will help assess the efficacy of low-cost sensors to play an informative role in supplement to reference grade monitors and also culminate in a publicly accessible database of air quality of the local authorities.

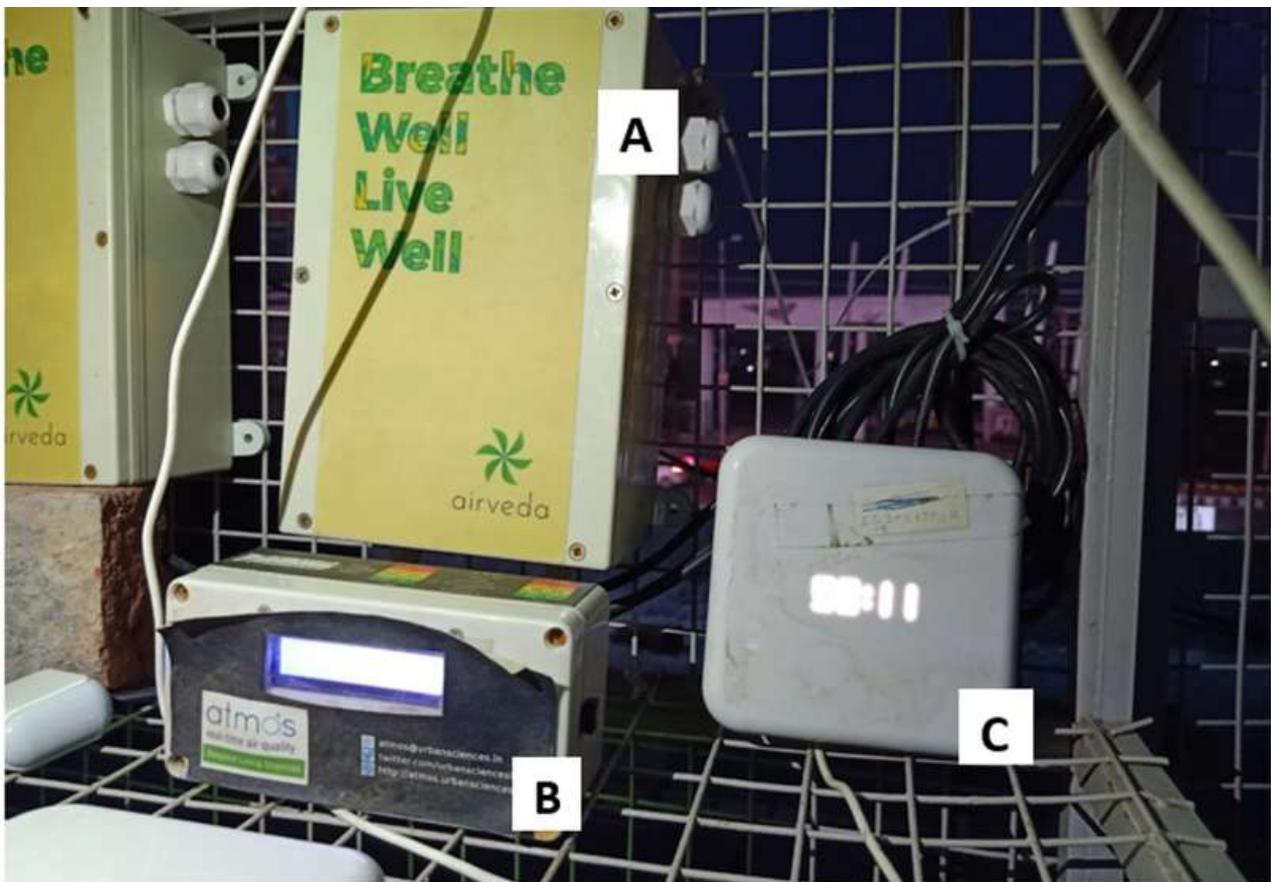
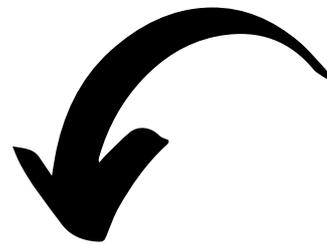
Findings of the Study

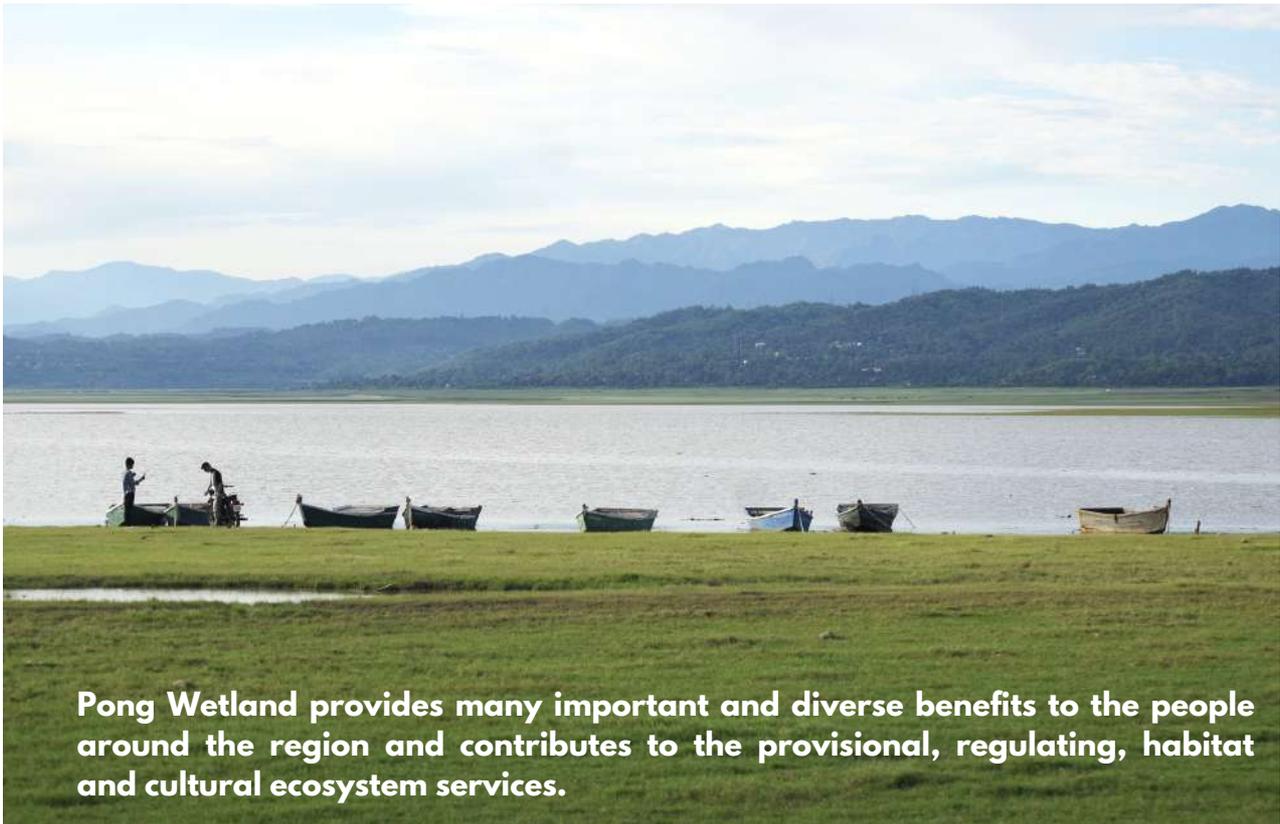
Low cost sensors when compared to the expensive reference air quality monitors had the following traits

1. low-cost sensors perform better in highly polluted conditions, when the variation in data is high.
2. Sensors from a single firm were well correlated, but different brands of low cost sensors showed errors that were relatively constant for a particular brand.
3. Low-cost sensors were more accurate in measuring PM_{2.5} than PM₁₀.
4. Low cost sensors across brands tended to underestimate the Particulate Matter (PM) concentrations in the monsoon and overestimate PM concentrations in the winter.
5. High relative humidity led to drops in accuracy of readings from low cost sensors

Low cost air quality monitoring sensors from three participants of the study installed at Gurugram University, Sector-51

**A- Airveda
B- Atmos
C- Prana Air**





Stakeholder Consultations for Integrated Management Planning of Renuka and Pong Ramsar Sites in Himachal Pradesh

Donor/Funding Agency – Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
Field Site – Pong Dam Lake Wetland, Kangra District, Himachal Pradesh
Duration - 1 January 2022 – 31 September, 2022
Project Investigator – Dr. Vishal Singh

The project aims to conduct stakeholders' consultations to support integrated management planning (IMP) for Renuka and Pong wetlands in Himachal Pradesh based on biodiversity, ecosystem services and climate change risk. The People's Science Institute (PSI) is leading the project and looking Renuka Wetland, while CEDAR is responsible for Pong Dam site in Himachal Pradesh.

The Pong Dam, which is situated in the Shivalik range and built on the river Beas, creates the Maharana Pratap Sagar Reservoir. The entire wetland and reservoir are designated a wildlife sanctuary covering

some 207 sq. km. and notified under the Wildlife Protection Act 1972. Pong Dam was also been declared a Ramsar site in 2002 as it plays host to a variety of migratory birds coming from the Trans Himalayan zone during the winter season when the wetlands in Europe and North and Central Asia are frozen due to onset of winter.

The wetland is vulnerable to several climate induced risk such as floods, increased silt deposits, reduced storage capacity and habitat changes. There are threats to sustainable fish production due to erratic climatic parameters, inconsistent stocking patterns and the presence of large predatory fishes. Human pressure is also

quite heavy around this area. In the monsoon, the area that is not submerged is used as a transit point by the Gujjar community. In the winter, when water levels are low, close to 40 sq km of the area are used for Rabi crops.

The goal of the project is to strengthen the institutional framework and capacities for an ecosystem based integrated management of wetlands of international importance (Ramsar Sites) in India.

Key Highlights

1. Participated in inception meeting with GIZ/project partners virtually to discuss the process and plan of stakeholder consultation and methodology.

2. Reviewed the existing values and threats to Pong wetland.

3. Involved in the preparation of questionnaires, feedback form for different stakeholder groups.



Livestock grazing in the draw down area of Pong Wetland



Study on Exposure and Impact of Air Pollution in the Growing Cities in the Hindu Kush Himalaya (HKH) Region

Donor/Funding Agency – International Centre for Integrated Mountain Development (ICIMOD), Nepal
Field Site – Dehradun, Uttarakhand
Duration - 1 February - 31 December, 2022
Project Investigator – Dr. Vishal Singh

Over the past decades, the Hindu Kush Himalaya (HKH) has been affected by rising emissions of air pollutants from urban, industrial, and rural sources. Poor air quality is a major health and well-being concern in the towns and cities in the HKH region. It has raised concerns about deteriorating air quality and its impacts on human health. There is a need to understand why people continue to expose themselves to high air pollution levels, especially those working in vulnerable occupations such as drivers, street vendors, labourers etc.

To understand the ground realities, International Centre for Integrated Mountain

Development (ICIMOD), a regional intergovernmental learning and knowledge sharing centre, has started working with key national organisations, under the umbrella of Atmospheric Watch Initiative. Apart from measuring air quality, this initiative consists of working on the exposure and impacts of air quality on human life and livelihoods. CEDAR in collaboration with ICIMOD is conducting this study in Dehradun, India. The main objectives of the study are - To assess the impact of air pollution on the vulnerable occupation groups in the form of taxi drivers, street vendors and labourers; To collect adequate quantitative

data and assess the status of adaptation to air pollution from behavioural (social) response

perspective and, to unpack complex issues in relation to exposure and impact of air pollution at the household level.

Key Highlights

1. Finalization of Methodology and the survey questionnaire

Contextualization of the methodology and questionnaire was done with the funder organisation in presence of other involved international organisation Science Connect Ltd., Dhaka, Bangladesh.

2. Preparation of Base document

The base document of air pollution in Dehradun was compiled. (The document is entirely based on literature and includes information related to the level of pollution in the city, monitoring & infrastructure, exposure, affecting factors, impacts and initiatives to control the air pollution.)



Trend of Air Quality Index (AQI) in Dehradun over the last three years in different months

**(2019 – No Lockdown, 2020 – Complete Lockdown, 2021 – Partial Lockdown)
Based on Uttarakhand Pollution Control Board (UKPCB) data**

AQI range chart as per the standards of Government of India

Good (0-50)	Satisfactory (51-100)	Moderate (101-200)	Poor (201-300)	Very Poor (301-400)	Severe (>401)
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Outreach & Achievements



Workshop Achievements

Workshop



Date: 14th July, 2021

The idea of workshop was mooted by CEDAR and jointly organized by the Lake Development Authority (LDA) and CEDAR. Deliberations on “Sukhatal Rejuvenation Plan” was the focus of this workshop. The discussion points included (i) Ecological & Hydrological significance of Sukhatal lake,



(2) implementation strategy of the project and (3) Materials involved in its construction. Dr. Vishal Singh and Dr. Anvita Pandey proposed nature-based solutions and soft landscaping for Sukhatal revival, and strongly recommended to avoid concretization of the lake bed.

Achievements

Dr. Vishal Singh was included in the four members committee formed for the rejuvenation of Sukhatal.

Owing to CEDAR's long term commitment towards conservation of Nainital through evidence based policy advocacy Dr. Vishal Singh, Director Research was included in the four members committee. The other members of the committee include Prof. Ajay Rawat (Environmentalist, Historian), Heritage conservationist Mr. Anupam Shah and Prof. Charu C. Pant (Geologist).

Dr. Anvita Pandey joined the “Better Climate Governance Network” as a Fellow.

An initiative emerged from a research and impact project funded by the UK Economic and Social Research Council on improving the effectiveness of UNFCCC negotiations.

Dr. Pandey shared insights and contributed to the Better Climate Governance Matters! conference in April. The conference was a great success with participants from over 50 countries, including strong representation from Latin America, Africa and Asia.

Publications



Research Papers

Popular press

Dissertations

Perceptive & Opinion Pieces

Research Papers

Chauhan, D., Thiyaharajan, M., Pandey, A., Singh, N., Singh, V., Sen, S. and Pandey, R. 2021. Climate change water vulnerability and adaptation mechanism in a Himalayan City, Nainital, India. Environmental Science and Pollution Research.

Link - <https://doi.org/10.1007/s11356-021-15713-5>

Fleischman, F., Basant, S., Fischer, H., Gupta, D., Lopez, G.G., Kashwan, P., Powers, J.S., Ramprasad, V., Rana, P., Rastogi, A. and Solorzano, C.R. 2021. How politics shapes the outcomes of forest carbon finance. Science Direct, Vol. 51, 7-14.

Popular press

Wild foods as a safety net: food and nutrition security during the covid-19 pandemic

Link- <https://www.siani.se/news-story/wild-foods-as-a-safety-net-food-and-nutrition-se>

Dissertations

Title: Evaluation and Prioritization of Risks in Lesser Himalayan City, Nainital

Name: Mr. Sachin Yadav

Institute: Forest Research Institute (FRI), Dehradun

Title: Identification of Ecosystem Services and Potential Threats of Pong Ramsar Site

Name: Mr. Vedant Hanwat

Institute: Forest Research Institute (FRI), Dehradun

Title: Evaluation of Low Cost Sensors for Air Quality Monitoring

Name: Ms. Nikita Goyal

Institute: The Energy and Resources Institute (TERI), Delhi

Perceptive & Opinion Pieces

Uttarakhand floods: Why abnormal weather is the new normal -Dr. Rajesh Thadani and Dr. Vishal Singh



"Nainital Water Woes: Every Drop of Rain Counts" India Water Portal - Dr. Nidhi Singh.



Spring revival project offers hope amid climate change in the Himalayas - Ms. Manya Singh.





Donors & Partners

Donors

Foreign Grants

**Government of India
(GoI) Grants**

Institutional Donors

Individual Grants

Partners

Technical Partners

**State Government
Department**

**Implementation
Partners**

Donors

Foreign Grants

- The Nature Conservancy (TNC), USA
- National Academy of Sciences, Washington, DC , PEER
- International Centre for Integrated Mountain Development (ICIMOD), Nepal
- Clean Air Fund (CAF)
- Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- The Swedish University of Agricultural Science, Uppsala, Sweden

Government of India (GoI) Grants

- National Mission on Himalayan Studies (NMHS),
- Ministry of Jal Shakti, National Water Mission, Govt. of India

Institutional Donors

- Shree Guru Gobind Singh Tricentenary University, Gurugram
- People's Science Institute (PSI), Dehradun

Individual Grants

- K. J. Bhavnani, HUF

Philanthropy

- The Development Bank of Singapore Ltd. (DBS) Bank
- Pevibai Motiram Shahani Trust, Delhi

Partners

- Himalayan Adaptation, Water and Resilience (HI-AWARE)
- University of Cambridge, Department of Geography, United Kingdom
- Yale Himalayan Initiative (YHI), Yale School of Forestry, USA
- South Asia Institute of Advanced Studies (SIAS), Kathmandu Nepal
- University of New South Wales (UNSW), Australia
- FLAME University, Pune
- Kalamazoo College, Minnesota, USA

Technical Partners

- The Energy Research Institute (TERI), New Delhi
- Tata Institute of Social Sciences (TISS), Mumbai
- Indian Institute of Technology (IIT), Roorkee
- Forest Research Institute (FRI), Dehradun

State Government Department

- Himachal Pradesh Forest Department

Implementation Partners

- Central Himalayan Rural Action Group (CHIRAG), Odakhan, Nainital
- The Mountain Institute (TMI), Sikkim,
- India Megh Payne Abhiyan (MPA), New Delhi
- Himalayan Nature and Adventure Foundation, Siliguri, India

Voluntary Compliance



Governance

Salary

Travel

Statutory Auditor

Our Bankers

Voluntary Compliance

We are in voluntary compliance with the norms of the Credibility Alliance, which has evolved minimum and desirable to promote better governance within the voluntary sector. While, CEDAR is not a member of the alliance, we declare this information voluntarily to promote accountability and transparency.

Governance

None of the Governing board members are related to each other or related to any of the senior salaried staff by blood or by marriage. None of the Governing Board members (including the Chairman) have received any salary, consultancy or other remuneration from CEDAR. Travel costs, as per actual ticket submitted that were budgeted into projects, were however reimbursed.

Annual General Meeting: 15 Annual General Meeting held on 9 of November, 2021

Time: 5 pm

**Venue/Mode: Centre for Ecology Development and Research (CEDAR)
201/1, Vasant Vihar, Dehradun**

Salary

Maximum salary paid was of were Rs. 108900/- per month.

Travel

- Maximum cost of any single rail ticket purchased was less than Rs 2000.
- International Travel: Maximum ticket was NIL

Statutory Auditor

Mr. R. Balasubramanian Partner, S. Ramanand Aiyar & Co.

708, Surya Kiran, Kasturba Gandhi Marg, New Delhi - 110001

Our Bankers

Industrial Credit and Investment Corporation of India (ICICI) Bank,

New Delhi State Bank of India (SBI), Delhi

Indian Overseas Bank (IOB), Dehradun

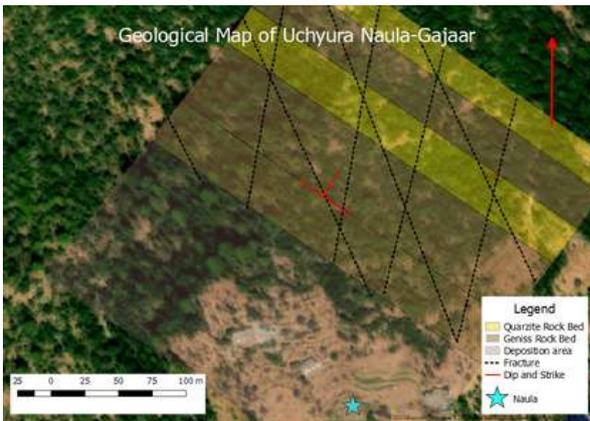
Axis Bank, Dehradun

Annexures

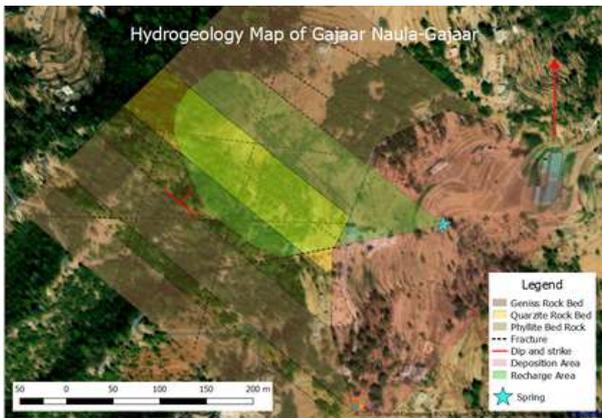


- Annexure I - Geological and recharge activity maps of different villages
- Annexure II - Methodological flow chart used for mapping water vulnerability
- Annexure III- List of scoped case studies

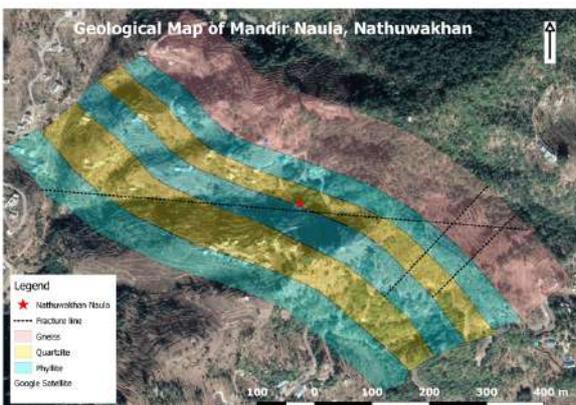
Annexure I - Geological and recharge activity maps of different villages



Uchyura

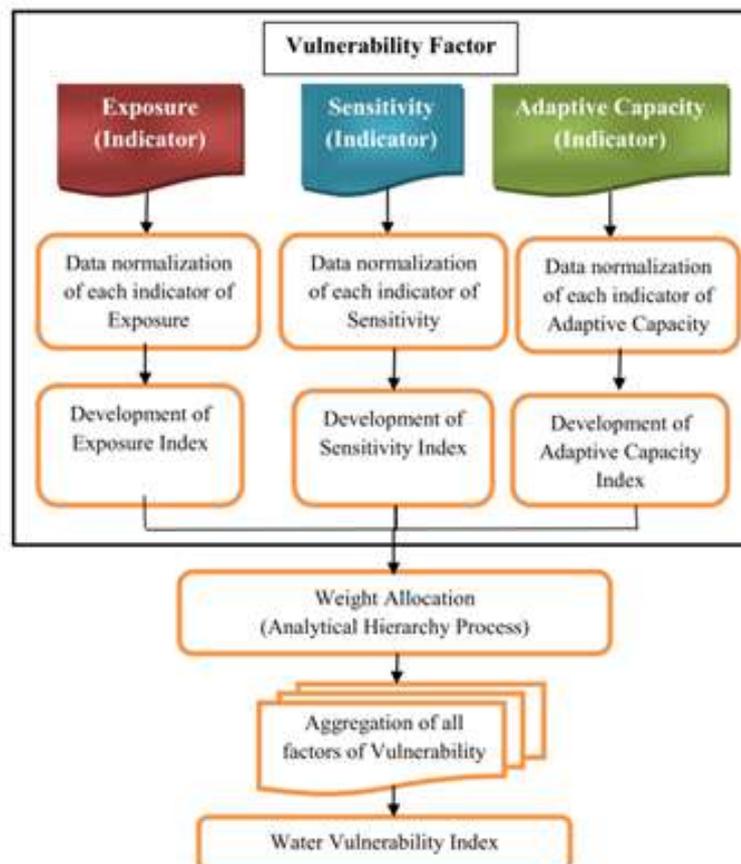


Gajaar



Nathuwakhan

Annexure II - Methodological flow chart used for mapping water vulnerability



Annexure III- List of scoped case studies

S.No.	Case Study and Scale	Implementing Agency/ State	Impact	Measures	Approach/Negotiation/Agreements	Benefactor	Provider
1	Rejuvenation of Naghar Naula (10 ha)	CHIRAG (UK)	Increased spring discharge, Regeneration of oak, capacity building of community	Terrace levelling, terrace bunding, contour trenches, percolation pit, Loose boulder check dam and Plantation	Jal Samiti was formed involving all the three villages. An agreement was made between Jal samiti and Chaped village to provide their land for recharge area implementation.	Downstream village- Naghar and Joshi	Upstream village- Chaped , Joshi Gaon and Kobak
2	Rejuvenation of Mandir Naula (2.75 ha)	CHIRAG (UK)	Increase in water discharge, improved fodder availability	Roof rainwater Harvesting recharge pit, Deep recharge pit, percolation pit, protection wall	NOC was taken from the Forest Department and local community, Jal samiti was formed at the village level and community contributed 20% of the total cost	Downstream Village- Nathuakbao	Upstream village- Nathuakbao
3	Treatment of Kuhan Miroshad (210 ha)	IIED and Wiroopk , International India (HP)	Reduction in silt load in the stream	Construction of brushwood check dams to trap silt	An agreement was made between the Village Development Committees (VDC's) of both the villages to stop grazing, Payments were made for getting saplings, labours and material for check dams as part of the agreement	Downstream village-Kuhan	Upstream village- Oach Kalan
4	Rejuvenation of Suan Catchment (406 ha)	IIED and Wiroopk , International India (HP)	Improved water quality, increased infiltration and fire control	Timely harvesting for fire control, developing fire lines	An agreement was made between the Village Development Committees (VDC's) of upstream and downstream village to harvest for fire control in return for access to grass	Downstream Village- Bodhi , Suan	Upstream Village- Kobak
5	Bobal Spring Recharge Management (20 ha)	IIED and Wiroopk , International India (HP)	Increase in water discharge of spring, Reduced grazing pressure on the forest	Hydrogeological survey of the spring was conducted and negotiation was done with the Village Forest Development Committee, Forest Department, Mabla Mangal Dal and Municipal Corporation to protect and conserve Bobal Catchment area	An agreement was made between Mabla mangal Dal, Forest Department and Municipal Corporation Palampur to stop grazing, collecting leaf litter, and lopping from the forest and in return the MC, Palampur will pay annually to Mabla Mangal Dal for protecting the forest.	Bobal Village	Upstream Bobal Catchment (Forest area)
6	Rejuvenation of Kulgarh Naula (7.92 ha),	CHIRAG (UK)	Increase in spring discharge, improved agriculture and drinking water quality	Construction of sub-surface check dam, loose boulder check dam, contour trenches, protection wall, percolation pit, Khai, drainage of khai and afforestation activities conducted	NOC was acquired from Singoli village for carrying out recharge activities.	Downstream village- Kulgarh	Upstream village- Singoli , Beduji and Kulgarh
7	Rejuvenation of Dhargara Dhara (2.5 ha)	CHIRAG (UK)	Increase in spring discharge, capacity building of Water User Committee (WUC). A proposal was submitted by the WUC to the BDO office for future maintenance	Construction of Contour trenches, percolation pits and loose boulder check dams	NOC was taken from the Forest Department and local community, Jal samiti was formed at the village level and community contributed 20% cost as labour	Downstream village- Baikholi	Upstream Village- Bouri and Baikholi
8	Balkhila Model Forest (16,000 ha)	IUCN, India (UK)	Improved livelihoods, Increased discharge rate, watershed management and biodiversity conservation	Construction of recharge ponds, Kaocha Chal khil , gully plugging, check dam, dhara , Conservation work, pressure pit, Infiltration recharge Pit (IRP) and Afforestation	A roundtable on resilience to water issues in the Balkhila model forest had been created and was used as the Model Forest for multi stakeholder's platform Uttarakhand Youth and Rural Development Centre (UYRDC) and Pan Himalayan Grassroots Development Foundation collaborated with Model Forest partners to implement the programme of activities.	Downstream- 25 communities Gopeshwar - Chamoli towns	Upstream- Balkhila River Basin
9	Spring restoration through sustainable land management in mid-hills of the Indian Himalayas (15 ha)	GB Pant Institute of Himalayan Studies (UK)	Improvement in spring flows, maintaining forest resources and preventing further land degradation	Construction of recharge ponds, trenches, checks dams and monitoring land-use change pattern in the upstream and downstream village community	Nakina village in Gogoo valley, the village Van Panchayat revived their local springs through a protective forest- springshed approach that includes: 1) regulated forest resource extraction, 2) natural assisted regeneration with planting of broadleaved species, 3) maintaining an oak and fodder nursery, 4) protecting the forest perimeter with stone wall and firebreak, and 5) recharge ponds, trenches, and check dams within the mapped Vaishnavi springshed	Downstream village- Nakina	Upstream village- Vaishnav
10	Hydrological process monitoring for springshed management (176 ha),	IIT Roorkee & PSI (UK)	Increase in discharge of springs, water available for irrigation and forest conservation	Hydrogeological survey, instrumentation at the spring, trenches, and land use land cover was analysed for the study	The pilot observatory laid the platform for research addressing complex hydro-geological problems by merging expertise from disciplines like hydrology, geology, environmental sciences and sociology.	Downstream Villages of Haraja and shiv Dhara watershed catchment	Haraja Watershed (Pauri) and Shiv Dhara (Almora)

11	Shimla Watershed (10,000 ha)	State Forest Department (HP)	Increase in spring discharge, increased biodiversity and tourism, forest conservation	Fencing of the entire catchment area, litter removal and lopping banned and converted the entire area into a sanctuary	Conversion of entire catchment area into watershed sanctuary	Downstream of watershed	Shimla Watershed catchment
12	Alpa Catchment (201.60 ha)	GIZ, India (HP)	Increase in spring discharge, forest conservation	Construction of staggered contour trenches, geo-hydrological mapping, socio-economic surveys and economic valuation of water from Alpa watershed	Fencing the area to minimise trespassing, ban on grazing, lopping and grass cutting, artificial/assisted regeneration, soil and water conservation works		
13	Jabarkhet Nature Reserve, Mussoorie (44.52 ha)	Jabarkhet Nature Reserve	Increased Spring discharge, Improved livelihood opportunity and increased biodiversity and ecotourism	Construction of water holes, fencing, developing nature trails. Reduced forest disturbance	The overall approach was to involve local community in conserving the forest area. Capacity building of communities, employment generation, biodiversity conservation	Downstream Kote village	Jabarkhet Forest Nature Reserve
14	Kulgaad- An experiment in sustainable Development	Central Himalayan Environment Association (CHEA) (UK)	Increased Spring discharge and Livelihood	Resorting to the farming-system, integrated programmes of crop production, horticulture, vegetable growing and livestock development with intensive efforts of social forestry and agroforestry approaches. Protection of forests and springs.	10 to 25% of the project cost in the form of labour was contributed by the community. Management through village-level institutions as Gram Sansadha, Prabandh Samiti and Mahila Mangal Dal.	Kulgaad Village	11 villages of Kosi River Catchment
15	Spring-shed participatory model (>900 ha)	Himmothan Society (UK)	Reduced soil erosion and runoff, increase in spring discharge, reduced women drudgery, improved crop productivity	Hydrogeological approach, Loose boulder check dams were constructed for springshed management	Creation of implementation support agencies, and integrated approach between water supply development, sanitation and catchment area protection was taken to improve water resource sustainability	40,000 individuals of 133 villages	Upstream of Chamba, Jaupsar, Budharayya and Chitragadh.



CENTRE FOR ECOLOGY DEVELOPMENT AND RESEARCH

Audited Financial Statement



Balance Sheet & Income and Expenditure Account for the year ended at 31 March, 2022

CENTRE FOR ECOLOGY, DEVELOPMENT AND RESEARCH

BALANCE SHEET
As at March 31, 2022

PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
	Rs.	Rs.
LIABILITIES		
Corpus Fund	2,00,000	2,00,000
Reserve Fund		
As per last Balance Sheet	4,90,438	(3,72,023)
	23,09,059	8,62,461
Add: Transferred from Income and Expenditure Account		
	27,99,497	4,90,438
Current Liabilities		
Projects in Progress (Schedule - 1)	42,70,252	62,11,310
	72,69,749	69,01,748
ASSETS		
Fixed Assets (Schedule - 2)		
Gross Block	9,25,775	11,68,890
Less: Depreciation	2,12,019	2,25,967
Net Block	7,13,756	9,42,923
Current Assets, Loans and Advances		
Current Assets		
Bank Balances		
With Scheduled bank - In saving accounts	62,09,641	57,04,689
Fixed Deposit	-	10,000
Tax Deducted at source	2,32,382	2,06,450
Advance to Others	78,970	2,686
Security Deposit	35,000	35,000
	72,69,749	69,01,748

Significant Accounting Policies and Notes - Schedule 4


Chairman


Executive Director


Senior Fellow

In terms of our report of even date annexed.

For S. Ramanand Aiyar & Co.
Chartered Accountants
Firm Registration No - 000990N


R. Balasubramanian
Partner
Membership No. 080432
Place: New Delhi
Date: 17/09/2022



CENTRE FOR ECOLOGY, DEVELOPMENT AND RESEARCH		
INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED MARCH 31, 2022		
PARTICULARS	CURRENT YEAR	PREVIOUS YEAR
	Rs.	Rs.
INCOME		
<u>Project Funding</u>		
<u>Receipts during the year</u>		
<u>Local Grants</u>		
SERB :- Understanding the impacts of Climate change and Forest Degradation on carbon stock and population dynamics in the Oak zone of the Central Himalayas	6,07,993	-
UNDP :- (United Nations Development Programme) : Status of Plastic waste management in Char Dham Region	-	3,42,000
NHMS :- (National Mission on Himalayan Studies): Creating Climate-resilient Communities in Mid-Hills of Uttarakhand: Interventions Towards Forest & Water	2,52,683	14,78,277
MOWR :- Hydro-geological assessment and socio economic implications of depleting water resources in Tourist Towns of	33,35,892	19,64,167
DBS Bank:- Promotion of Nature-Linked Ecotourism as a Rural Livelihood in Uttarakhand	-	4,88,750
Sustain Plus :- Feasibility Assessment of Biogas value chain in the mid mountainous region of uttarakhand and development of a scale up strategy for biogas solutions	-	10,78,376
MANGAR :- Conservation of mangar bani, surrounding forests and ecosystem services in the gurgaon aravallis	-	1,26,000
GIZ :- IConduct Scoping study and Screening of Best Practices for Forest Ecosystem Services Management at the project sites at UK and HP	10,70,823	-
GIZ :- Integrated Management Planning of Pong Ramsar Site Himachal Pradesh Supported by GIZ, India.	5,07,500	-
<u>Foreign Contribution</u>		
IDRC :- Facilitating conducting research on water security issues in four mid-sized cities in india.	16,39,730	-
TSF :- (The Silent Foundation Ltd): Promotion on Nature-Linked Ecotourism as a rural livelihood in India Himalayas	-	5,24,731
CAF :- Gurgaon Sensors Project	17,77,400	29,21,540
TNC :- Evaluation of potential for Forest Conservation based on Natural-based tourism in Western Himalaya	2,18,600	1,58,400
Kalamazoo :- Apple & Bee Work	-	2,20,619
SUAS :- Impacts of the COVID-19 Pandemic on Forest Resource use by Rural Communities in India	37,95,236	-
SUAS :- Creating evidence for forest based resilience during Covid-19	20,46,837	-
ICIMOD :- Atmosphere, Study on exposure and impact of air pollution in the growing cities in the HKH region.	2,90,169	-
	1,55,42,863	93,02,860
<u>Projects in progress brought forward</u> (brought forward from unutilised funds of last year)	62,11,310	74,93,967



Other Receipts (Schedule 3)		
Donation	6,28,120	10,86,000
Administrative Cost Realised	33,57,167	4,18,463
Facilitation & Support Cost	-	1,02,486
Interest Income	2,34,713	1,47,856
Project Consultancy Received	6,83,000	2,50,000
Interest on income tax refund	5,630	-
FD Interest Received	860	-
	49,09,490	20,04,805
TOTAL INCOME	2,66,63,663	1,88,01,632



EXPENSE		
Expenditure on Projects		
Local Grants		
IGF :- To conduct a action research study on "Gurugram city state of environment: water" with the support of Gurugram metropolitan development authority.	-	80,000
UNDP :- (United Nations Development Programme) : Status of Plastic waste management in Char Dham Region	-	12,55,965
NHMS :- (National Mission on Himalayan Studies): Creating Climate-resilient Communities in Mid-Hills of Uttarakhand: Interventions Towards Forest & Water	11,04,351	10,54,769
MOWR :- Hydro-geological assessment and socio economic implications of depleting water resources in Tourist Towns of Uttarakhand	43,82,334	19,55,945
TNC :- (The Nature Conservancy Centre) : Scoping and Prioritization of Assisted Natural Regeneration (ANR) opportunities in India	4,18,417	33,048
DBS Bank:- Promotion of Nature-Linked Ecotourism as a Rural Livelihood in Uttarakhand	3,07,500	1,81,250
HPFD :- (Himachal Pradesh Forest Department): Conducting socio-economic and livelihood assessment surveys of pastoralists of Himachal Pradesh	-	2,97,000
Sustain Plus :- Feasibility Assessment of Biogas value chain in the mid mountainous region of uttarakhand and development of a scale up strategy for biogas solutions	-	10,54,376
MANGAR :- Conservation of mangar bani, surrounding forests and ecosystem services in the gurgaon aravallis	12,000	1,14,000
SDTT :- (Sir Dorabji Tata Trust): Bridge grant to sustain CEDAR	-	2,26,280
GIZ :- IConduct Scoping study and Screening of Best Practices for Forest Ecosystem Services Management at the project sites at UK and HP	10,70,823	-
GIZ :- Integrated Management Planning of Pong Ramsar Site Himachal Pradesh Supported by GIZ, India.	19,500	-
Foreign Contribution		
PEER :- Planning plantations: past learning, toward triple wins in carbon, biodiversity and livelihoods	7,78,522	22,91,069
TSF :- (The Silent Foundation Ltd): Promotion on Nature-Linked Ecotourism as a rural livelihood in India Himalayas	-	5,24,731
CAF :- Gurgaon Sensors Project	24,75,610	7,64,473
IDRC :- Facilitating and Conducting research on water security issues in four mid-sized cities in India.	12,17,771	-
TNC :- Evaluation of potential for Forest Conservation based on Natural-based tourism in Western Himalaya	2,22,000	1,55,000
Kalamazoo :- Apple & Bee Work	-	2,20,619
SUAS :- Impacts of the COVID-19 Pandemic on Forest Resource use by Rural Communities in India	31,86,875	-
SUAS :- Creating evidence for forest based resilience during Covid-19	17,12,088	-
	1,69,07,791	1,02,08,525



OTHER EXPENSES		
Communication Expenses	24,673	6,922
Community Work Expenses - Covid-19	-	1,17,900
Consultancy and Honorarium	1,94,700	24,000
Fixed Assets Write Off (Schedule - 2)	1,09,839	-
Depreciation (Schedule - 2)	2,12,019	2,25,967
Employee Costs	18,21,233	8,71,369
Office Expenses	1,39,569	9,740
Insurance	20,409	19,142
Audit Fees	29,500	23,600
Printing and Stationery	700	-
Rent	4,66,400	1,47,400
Travel and Conveyance	92,432	59,602
Other Expenses	65,087	13,694
	31,76,561	15,19,336
TOTAL EXPENSE	2,00,84,352	1,17,27,861
Balance		
Balance	65,79,311	70,73,771
Less: Transferred to Project in Progress (As per Schedule - 1)	42,70,252	62,11,310
Surplus transferred to Reserve Fund	23,09,059	8,62,461

Significant Accounting Policies and Notes - Schedule 4

Chairman 

Executive Director 

Senior Fellow 

In terms of our report of even date annexed.

For S. Ramanand Aiyar & Co.
Chartered Accountants
Firm Registration No - 000990N



R. Balasubramanian
Partner
Membership No. 080432
Place: New Delhi
Date 17/09/2022



Acknowledgements

The Governing Board of CEDAR along with its staff is extremely thankful to the donor organizations that supported CEDAR's work during the years. We are particularly thankful to the National Mission on Himalayan Studies (NMHS), Government of India (GoI), the Ministry of Jal Shakti, GoI, the PEER program of USAID under the National Academics of Sciences (NAS), United States, the GIZ, India, The International Centre for Integrated Mountain Development (ICIMOD), Nepal, the Development Bank of Singapore Ltd. (DBS), the Nature Conservancy (TNC), India, the Swedish Research Council and the Clean Air Fund (CAF). We are also thankful to Shree Guru Gobind Singh Tricentenary (SGT) University, Gurgaon and the Sanrachna Foundation, New Delhi for unconditional support and encouragement.

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This acknowledgement will remain incomplete without mentoring the role of many well wishers of CEDAR, our sincere thank to each and every individual who stood with CEDAR during a rather difficult year. not but not the least we are indebt to the communities who kept their faith on CEDAR and contributed towards the cause of Sustainable Mountain Ecosystems.

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