



36th ANNUAL REPORT 2017-18



CHEA

Central Himalayan Environment Association

www.cheaindia.org



36th [ANNUAL REPORT 2017-18]

ACKNOWLEDGEMENT

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We **dedicate** this **Annual Report** to the community members with whom we work; the grant-extending agencies who trusted our endeavours; partner organisations who came forward to collaborate and collectively achieve a sustainable future for the generations to come; life members and Council of CHEA for handholding and mentoring our pathways to up-scale the learning captured from field actions; and finally the staff of CHEA who have served in far-flung areas as 'catalysts of change' to facilitate the rural communities in meeting their developmental aspirations, as well as conserve the fragile ecosystems of the Indian Himalayan Region.

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OUR MISSION

Our mission is to integrate rural livelihoods and sustainable conservation practices to reduce the environmental, economic, and social vulnerabilities of the mountain people. In cooperation with regional and international partners, and working with the communities, we aim to develop and provide integrated and innovative solutions that guide policy change and inspire action to directly benefit the mountain people and their environments. The Himalayas are the principal home of glaciers and the source of water for over 1 billion people living in connected river basins. They are also extremely vulnerable to climate change. Thus, there is a critical need to guide development that incorporates and is compatible with the threat of a changing climate.

CHAIR'S MESSAGE



CHEA in 2018 is a fairly mature and organized set up. When it began its journey, it had only members, largely from Kumaun University and Nainital town to manage it on a voluntary basis. It took several years to make it a functional organization with its own office, working place and full time young workers and researchers. These young persons gradually developed capacities to work with local communities in remote mountain villages. Pushkin Phartiyal, the first executive director, gave a lot of time to managing CHEA along with a small group of youngsters, and contributed significantly to its outreach and reputation as a vibrant organization. CHEA became widely known, not only in Central Himalaya, but also in much of the mountain world. Pushkin made it so effective that the role of councillors and life members became almost secondary in CHEA's day-to-day functioning, for a quite some time. However, councillors, in general encouraged Pushkin and young employees working in CHEA's various projects. A few councillors and life members, in fact, played a central role in running a global project in which village people were trained to measure forest carbon using globally verifiable methods. The project called "Kyoto: Think Global Act Local" made CHEA known at an international level. A globally acknowledge research paper and a book resulted from this international project, it did influence climate change related policies at a certain level.

Councillors played a decisive role also in initiating IMI (Indian Mountain Initiative) under the leadership of Dr. R.S. Tolia, and then in the CHEA's withdrawal from IMI when it began functioning in way with which CHEA was not comfortable.

But CHEA of this century owed primarily to Pushkin and his team for strengthening CHEA's finances, project activities and Himalaya-level presence. Dr. Tolia tried to make councillors and life members involved in CHEA's development, in some ways, but without any meaningful progress.

It is good that now CHEA has an efficient team of young people having capacity to work at grassroots level with local communities. Enabling Van Raji's, the last of tribes to grow cash crops, training poor people to use bamboo-based products to improve their livelihoods, promoting fodder development on ground based on cultivating grasses so that women drudgery is kept within a limit and save forest carbon loss, creating appropriate institutions at village level, and participating actively in transboundary cooperation are some of activities and programmes for which CHEA is now known. Granting agencies began to approach CHEA to implement programmes in Himalayas.

CHEA also began to diversify its activities: organizing workshops to improve research skills of young researchers from different Indian Himalayan states, holding a workshop on learning lessons from Nepal Earthquake for Indian Himalayan region, facilitating the involvement of interns from Cambridge, and trying to take steps for payment to mountain people for forest carbon sequestration and influencing Uttarakhand government with regard to climate change were some of the activities/steps that characterize CHEA's multi-faceted growth.

Then, we lost Pushkin! It was a huge jolt as CHEA had become used to depend on him for its much of functioning, grant generation and financial security. NGOs often tend to become dependent on one person, and sometimes they are even known by that individual. I was right there when Pushkin left us. Residing next to CHEA, I could spend most of my time in CHEA office, and I think it helped in their (CHEA's staff) confidence building. The message that CHEA could generate grants and continue to grow even after such a loss was needed at that time.

This was the time when we submitted a major multi-site and multi-partner project built around a new culture of team research and by getting the project approved, CHEA entered mainstream research. It earned the position of coordinator of a research project which

involved several major research institutes/universities connected with Himalayas. Accepting CHEA as a coordinator of research project in a climate change field (timberline responses to climate change) by research bodies at the National level, was a major qualitative change in the functioning and stature of CHEA.

During much of the recent decades, CHEA's young project workers were main contributors to its growth. Pankaj Tewari, the new executive director is quite successful in raising grants and connecting CHEA to organizations like Department of Science and Technology, India, and various departments of Uttarakhand state. We councillors and members, with a few exceptions remained mostly observers as far as day-to-day working was concerned, and our presence was felt largely through meetings. Many of the life members had almost no touch, some visited CHEA only as guests, or on a special occasion of felicitation. But, perhaps this is the way NGOs function. Most of us are busy along with our own activities, and hardly find time for organizations with which we are associated. Let us accept this reality.

So, the importance of our idea of expanding a few activities of CHEA to Dehradun, can be seen as a positive step in this context. This made several members interested in CHEA. Never before in CHEA's history life members participated in CHEA's issues as intensely and fervently as they did in recent weeks. Several members who had forgotten even CHEA's full name, suddenly became fiercely argumentative and vocal. This issue has made some life members awake from a deep slumber, and engage in never-ending discussions on issues, like basic nature of CHEA, significance of research or useless of research. Why should CHEA do research when there are numerous organizations doing research on Himalayas has been a common argument. But there can be a counter argument: Why to retain an NGO like CHEA, when Himalayas have thousands of other NGOs. Such arguments lead us nowhere. Look at the council election, how fiercely it is being fought; one can easily hear its rumblings even from a distance. But it is good that members now are interested in CHEA, and I hope they would contribute to its progress in future.

Let me conclude, Nainital is very important for CHEA, but it does not mean that inbreeding should be further strengthened. An excessively inbred system stinks, particularly when several members are interrelated. Central Himalayan Environment Association should have at least a pan-Uttarakhand council and its spatial expanse. Doing research may be useless in many situations, but doing the same thing repeatedly without making any progress in learning may make a system putrid.

CHEA's membership based CV is extra-ordinary, not many NGOs in India can come even close to it in that. Its members include some of the renowned scientists, administrators, and photographers of the country. CHEA should treat these as its strength. I am sure, they can rise to the occasion to run CHEA smoothly. Whether they agree to our opinion or not, let me submit most humbly that I tried my best to serve CHEA as its chair person (this is my last year as a chair person). There were many members who helped me, so that I kept going. In Mr. Akshobh Singh and Prof. Khetwal, we have highly trusted custodians of CHEA's democracy. The employees of CHEA must be congratulated on their achievements, they need to be supported so that they are more productive. Recognition of CHEA by DST, MoEFCC, ICIMOD, State Government's departments, and others is a healthy sign. But we cannot afford to be complacent, for the world is changing rapidly, and the future courses required to function successfully in it are now less clear than they used to be earlier. The Homo sapiens itself has become the greatest disturbing agent in the anthropocene. How to keep learning and taking right steps in a changing world is a great challenge!

Best Wishes,
S.P. Singh

A NOTE BY THE SECRETARY



The year 2017-18 was a year of new challenges and solutions for CHEA. It was also a year of consolidation and putting some systems in place. Taking impetus from previous year's work CHEA undertook several new projects under different thematic groups establishing equilibrium between the execution at grass root level for outreaching the local communities directly and also addressing several questions. The main focus was on value chain development and sustainable use of natural resources.

This year, the two flagship programmes were successfully completed viz. NABARD supported project on livelihood improvement of tribal community residing in Pithoragarh district with special focus to primitive tribal community *Van Rajis* and the first phase of ICIMOD's supported transboundary project on Kailash Sacred Landscape Conservation and Development Initiatives.

Multi partner and multi institutional research project on "Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustainance in a Warming Climate" supported by the Ministry of Environment, Forest & Climate Change (MoEFCC), GoI under its National Mission of Himalayan Studies (NMHS) is progressing well and the research as well as livelihood components involved under the project is now benefiting community directly, residing in the pilot sites of Rudraprayag district.

Ecological Implications of Forest Fire Regime on Chir-Pine and Oak Pine mixed forests in Uttarakhand has been studied with support of GBPNIHESD under its Integrated Environment Research Programme (IERP) with encouraging initial findings. The conference on Connecting Science with Practices and Policy for Resilience towards Climate Change Risks in Uttarakhand was successfully organised at Dehradun which was inaugurated by the Hon'ble Chief Minister of Uttarakhand Shri T. S. Rawat. Such events have widened the outreach of CHEA in state and national level.

CHEA is also the partner for the Erasmus+ Capacity Building in the Field of Higher Education project i.e. Capacity Building in Higher Education: Sustainable Natural Resource Use in Arctic and High Mountainous Areas (SUNRAISE), a new dimension to facilitate universities in curriculum development.

Recognition of CHEA by several scientific bodies both at the national and state level is a positive sign. CHEA has to tread forward on a positive note in the coming years and touch new horizons. CHEA has been able to attain these heights due to the continuous encouragement and support of the CHEA council members, life members and its office bearers. I take this opportunity to thank the entire CHEA family for their strong sense of commitment towards the organization and hope that in future too CHEA will continue to be benefitted by their long standing experience.

Ashish Tewari

Hony. Secretary, CHEA



» ORGANIZATION



The Central Himalayan Environment Association, CHEA in short, was founded on October 2, 1981, on a day which has a special significance for India, being the birthday of the Father of the Nation, Mohandas Karamchand Gandhi. The society was registered soon after in May, 1982. Arguably CHEA is one of the earliest Societies founded in the Northern India which had '*Environment and Livelihood of the people of Himalayas*' as its core concern.

Much water has flown in the great Himalayan rivers and the Indian Himalayas have since been a witness to much distress, conflict, degradation, demographic dynamics, political restructuring and impacts of various global revolutions and their regional and local impacts. CHEA has since espoused many mountain causes, engaged itself actively in scores of action-research on human and environmental aspects and livelihood-related projects and continues to be so involved to this day.

Since the *Rio Earth Summit* in 1992 with the inclusion of Chapter 13- 'Managing Fragile Ecosystems : Sustainable Mountain Development' in the UN Conference on Environment and Development (UNCED), the importance of mountain social-ecological systems have been acknowledged for the first time on a global scale. Establishment of CHEA, let it be recalled, predated the Rio Summit by more than a full decade. To ensure solution for increasing pressure on natural resource for rural livelihoods CHEA has developed strategies for strengthening grassroots environmental governance and undertaking need based action research.



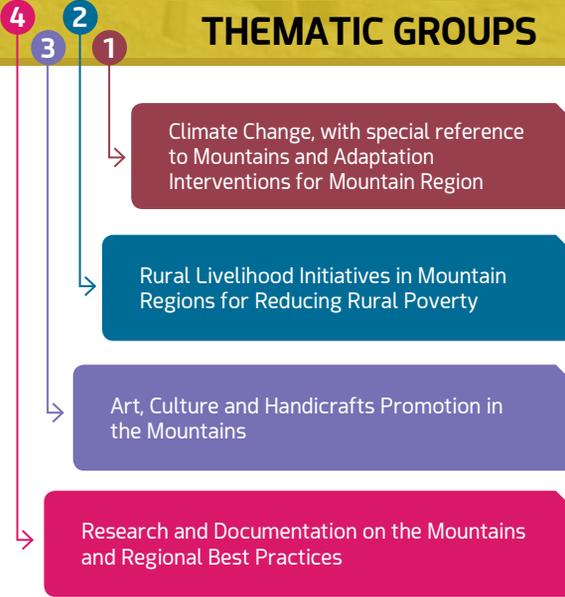
THEMATIC GROUPS

Prominence

- Environment
- Human Resources Development
- Livelihood and sustainable development
- Infrastructure development
- Social development
- Research and Development

Management and membership

CHEA stands with twelve members in the Council along with one hundred and Fourteen Life members and two Institutional members.



» CLIMATE CHANGE

Change with special reference to Mountains and Adaptation Intervention for Mountain Region



The Himalayas are warming at a rate which is two to three times more than the global average rate (Miehe G., et. al., 2007 and Shrestha UB, et. al., 2012). The rate at which warming is increasing is impacting the overall climate of the region and providing both environmental and humanitarian challenges. People living in the Indian Himalayan Region (IHR) are more vulnerable to climate change as it impacts both natural resources and livelihoods.

In recent years the world has changed rapidly, both economically and politically. Last year we had applauded the Paris Agreement which had given us a ray of hope that the whole global community would now come together to fight Climate Change and work for the poorest of the poor. However, in the year 2018 we found ourselves once again in the same situation as before when the USA (the world's second highest global CO₂ emitter) announced withdrawal from the Paris Agreement on account of its "America First" strategy;

however, the fact that the majority of the other countries reiterated support for the Climate accord provided some relief.

World communities are countering the impact of climate change by adopting appropriate technologies and through small innovations for the sustainable use of natural resources available to them. CHEA, through its Thematic Action Group – **Climate Change with special reference to Mountains and Adaptation Intervention for Mountain Region**, endeavours towards climate resilient sustainable management of natural resources in IHR, in general and Uttarakhand, in particular. A number of projects, both action research and livelihood oriented, have been undertaken with the support of various organizations and funding agencies. Under these projects various aspects such as mitigation and adaptation, water conservation and harvesting technologies, demonstration and expansion, promotion of appropriate technologies have been undertaken.

Water Conservation & Harvesting

As water scarcity is a huge challenge and around 90% of agriculture land is rain-fed in Uttarakhand hills, water-harvesting tanks are in high demand. In Pithoragarh district, under the International Centre for Integrated Mountain Development (ICIMOD) supported Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) project, various types of tanks had been installed for collection of water. At present, 210 water harvesting tanks are in use and are maintained by the beneficiaries of the project villages. Tanks are useful in fulfilling the requirement of water during dry stress periods, for both domestic and irrigation purposes. It has been documented that due to water availability, the beneficiary family has water for domestic use for around 6-8 months. The time saved during the year by each of the beneficiary households is approximately 300 hours. The time thus saved is utilized in productive activities i.e. group meetings, vegetable cultivation, bee keeping and skill development in different sectors. Besides, due to availability of water, 2-3 nali (0.04-0.06 ha) area has been irrigated, resulting in vegetable production and income generation.

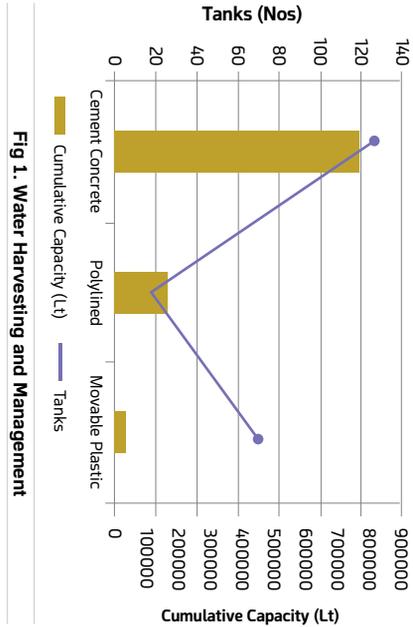


Fig 1. Water Harvesting and Management

At present, 210 water harvesting tanks are in use and are maintained by the beneficiaries of the project villages. Tanks are useful in fulfilling the requirement of water during dry stress periods, for both domestic and irrigation purposes.

Spring shed Management through Contours and Trenches

For spring shed management and to increase the water discharge in down springs, 10 ha area was covered under micro reservoirs and trenches. The geo spatial and technical services were extended by experts and resource persons from CHEA. 13,100 contour trenches that supplement vegetative growth of seedlings, in 12 spring-discharges of 4 villages, were created. An inventory of springs was developed and a continuous measurement of water discharge, water quality testing, the significance of springs in fulfilling the requirement of communities and the nature of springs was carried out. Various equipments were used for monitoring and generating information. Employment for 1,100 man days was also generated from this activity.



Alternative Energy

Parabolic solar cookers have been installed on contribution basis and subsidy from MNRE, GoI, benefitting 10 families in 8 villages. This activity has been introduced for the first time in these villages and the results are mixed, which are vital to further extend this activity on a larger scale. This activity has the potential to reduce dependency on fuel wood by 50%. Data generated from the beneficiaries indicated that the solar cookers are useful and result in saving 1 hour usage of traditional energy resources. The biogas/solar cookers have also contributed in reducing drudgery by providing smokeless energy to the selected families and reducing the need for fuel wood.

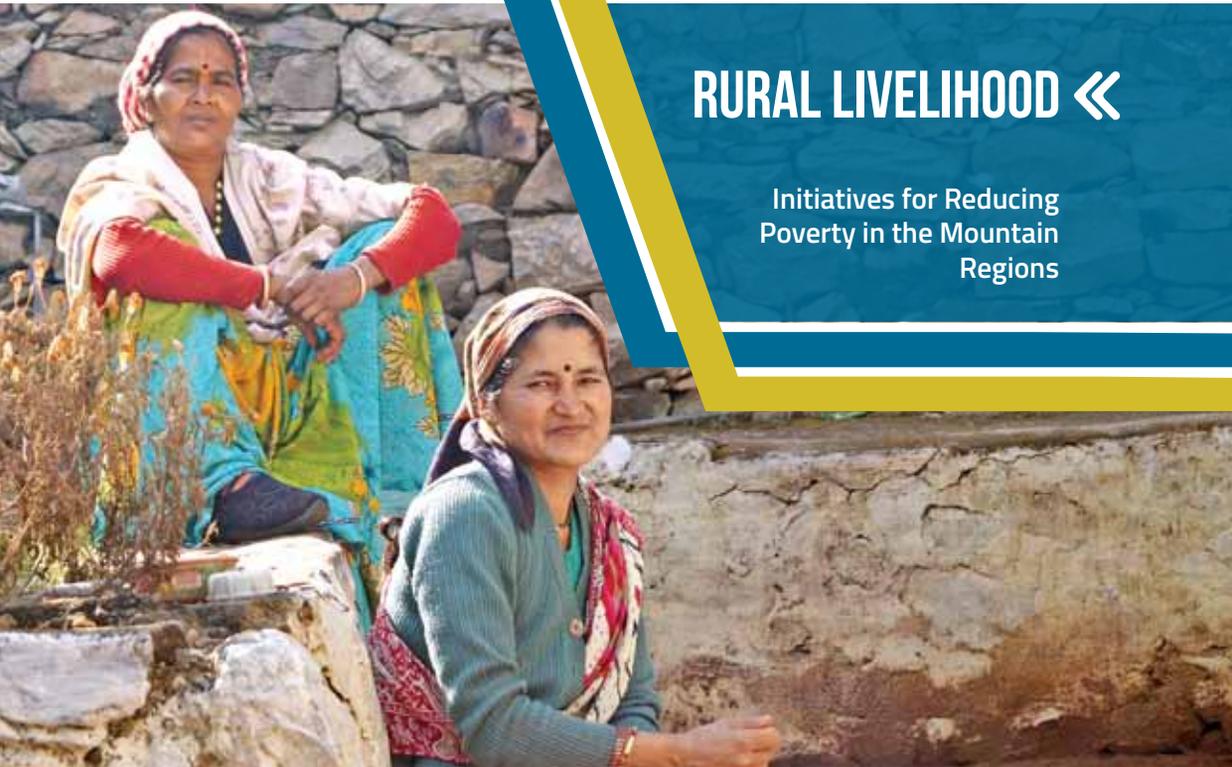
The introduction of prefabricated biogas units in 08 villages on a demonstration basis has been attempted for the first time. Contributions have been made by the beneficiaries and subsidy has been given by PAN Himalayan Grassroots Development Foundation, Ranikhet to

promote 27 prefabricated biogas units. In all, 37 biogas units have directly impacted by reducing drudgery for women, providing clean energy and also decreasing over-dependency on forests. These biogas units are operational throughout the year, with less supply during the winter months. All the units are maintained well, saving 400 hours during the year for each of the beneficiary families. Fuel wood extraction has also come down from around 6 tons to 4 tons in a year.

The results of water harvesting/ management and biogas are being documented as success stories and have been discussed at the state level by policy-makers, to be incorporated as an integral part of rural development schemes. It was also mentioned that Roof Water Harvesting should be promoted under MNREGA programmes at the household level. For reorientation of biogas norms and size, it has been proposed that rather than being used for demonstration purposes, it should be made a mass-level activity.

RURAL LIVELIHOOD ◀◀

Initiatives for Reducing
Poverty in the Mountain
Regions



Uttarakhand is abundantly blessed with the bounties of nature and has potential of becoming a mega centre of biodiversity by conserving and utilizing natural resources sustainably. About 90% of the population in rural areas depends on available resources for fulfilment of their needs. Preservation of the integrity of land and its appropriate use are therefore matters of great concern for all those residing in the area. The hill people are highly concerned about the deteriorating trends in land use and their adverse effects on the livelihood (particularly that of women,) further affected by decreasing production from croplands. Long dry periods, erratic rainfall coupled with the fragile ecosystem provide a dense network of stream system; thus, large cultivated areas are under threat. The situation is further aggravated due to outmigration, extreme rain-fed conditions and human-wildlife conflict which are the challenges in sustaining the population in the mountains.

Thematic Action Group, **Rural Livelihood**

Initiatives in Mountain Regions for Reducing Rural Poverty, provides an opportunity for CHEA to undertake various initiatives to enhance livelihood opportunities of the communities residing in the hills of Uttarakhand. In 2017 two such projects i.e., NABARD supported "Livelihood Improvement of Tribal Community through Promotion of Appropriate Technologies in Rural Hills of Pithoragarh District" and first phase of ICIMOD supported KSLCDI successfully came to an end.

During the implementation of the project, for the first time the CHEA team interacted with the very reclusive, introverted society of Van Rajis, a tribal community which is on the verge of extinction. They are unique in that they add a different colour to the culture and tradition of Uttarakhand.

KSLCDI, is an ambitious project because of its transboundary nature, as it is simultaneously being implemented in China, Nepal and India. In India, CHEA has been entrusted with a very important

component 'Innovative Livelihood Options and Adaptation to Change' which aims at improving livelihoods by implementing innovative on-the-ground activities while simultaneously promoting ecosystem management and efficient use of natural resources, including water and energy. The project is being implemented in close association with relevant partners in specific pilot areas to engage marginal communities in income generation activities that reduce pressure on natural ecosystems.

Notwithstanding its apparent remoteness and inaccessibility, much of the hilly part of Uttarakhand has suffered from human-induced biodiversity loss. Now, with better access to market economies, dependence on natural resources, economic expectations and aspirations of the people have increased in recent years resulting in breakdown of cultural and social traditions.

This Thematic Action Group is vital to fulfil the mandate and objectives of CHEA. Even in the research-oriented project "Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in a Warming Climate" which is funded by the Ministry of Environment, Forestry and Climate Change under its National Mission for Himalayan Studies (NMHS), the livelihood component has been especially incorporated. The livelihood component is useful in the sense that it brings science closer to rural communities residing in the region.

Both for agro-horticulture and animal husbandry, rural people depend heavily on forest biomass. It is established through research that at least seven units of forests are needed to sustain one unit of agriculture in the mountains. 90% of the crop fields are rain-fed with food grain yield sufficient only to fulfil their need for 6 to 7 months in a year.

Basically the farmers are poor and have little money to invest in expensive and high quality inputs. The farmers tend to use farm-produced seeds which are often poor in quality and also decline in production capability over the years.



Agri-Horti-Silvi (Wadi) System - A Case of Tribal Development in Pithoragarh District

In 2011, CHEA introduced WADI (Agri-Horti-Silvi system) in three development blocks i.e., Didihat, Kanalichinna and Dharchula of Pithoragarh district under its NABARD funded project "**Livelihood Improvement of Tribal Community through Promotion of Appropriate Technologies in Rural Hills of Pithoragarh District**". Overall 20 villages having schedule tribe population (i.e., *Van Raji and Rang*) were chosen for project implementation. Out of 20 villages 9 were dominated by Van Rajis. However, in spite of the fact that the main focus was on the schedule tribe community, the Schedule cast communities residing in the villages were also included in order to ensure maximum participation of the villagers.

The main objective of the project is to uplift the Tribal communities by promoting integrated approach of development in a sustainable manner.

WADI is a combination of Horticulture and Forestry where different varieties of fruit in agriculture land and forestry trees in the bunds of that agriculture land are grown simultaneously along with intercropping of the under crops in the initial stage. In rural areas a multilayered cropping system predominates with bigger trees occupying the top layer while the smaller trees and shrubs yielding fruits and other useful

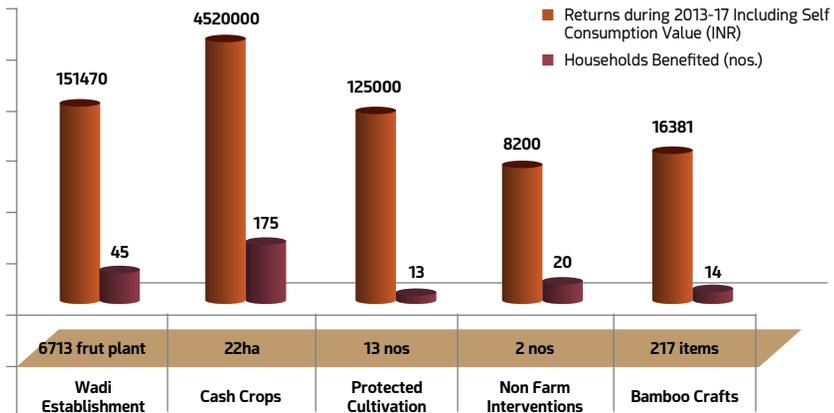


Fig 2. Status of various activities among Van Raji Community

products occupy the middle layer, while shade tolerating vegetables, and spices (garlic, ginger and turmeric) find a place in the ground layer. A large variety of climbing and twining plants yielding vegetables and spices (beans, cucurbits, etc.) are commonly grown in rural hills. This system aims to satisfy the need of fuel, fodder and minor timber from top layer while the middle and ground layers meet the requirements of food, fruits, vegetables, spices, etc. However, the agri-horti-silviculture system has the potential for economic gains if practiced in a technically proven design. An established Wadi is capable of providing adequate income to the family to uplift their living standard, on the one hand, and fulfilling their basic necessities throughout the year, on the other.

Since inception, 200 acres (371 wadis) have been established under the project in private land, benefiting 371 households. In addition 2 wadis were established in community land covering 20 acre area and benefitting 20 households.

In all the holistic approach applied since the last 4 years has definitely made a positive change among the Van Rajis and created resilience towards socio-economic and climate change. Now Value Chains (VCs) are well accepted by Van Rajis and it is turning out to be one of the options contributing towards their livelihood as well as nutritional security.

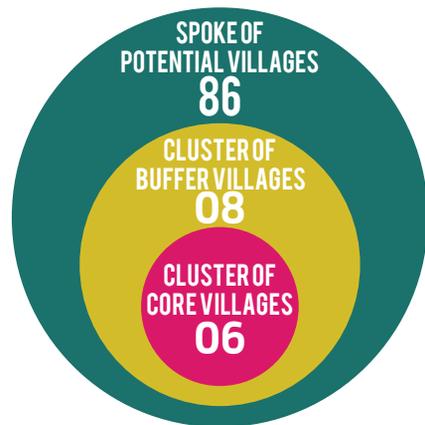


Fig 3. Hub and Spoke Model for Chyura Value Chain

Chyura value chain – Initiative under KSLCDI

Chyura (*Diploknema butyracea*) or Indian Butter tree is found in abundance in Pithoragarh district, Uttarakhand. Its multiple valuable uses make it not only an important resource to protect environmental health, but also qualify it as an alternative livelihood option for the population in the rural areas of the district. Being situated in the foothills of the Himalayas, the landscape consists of mountains, forests and high snowy Himalayan range in the background. The climate and soil conditions favour Chyura propagation and growth (approximately



in 100 villages) in one particular belt of Pithoragarh district. In fact, Chyura requires temperate climate with humidity for optimum growth. Pithoragarh city is the head quarter of the district and this is the nearest town for these villages. The area shares a border with Nepal towards the west and Tibet towards the south. The languages spoken in this area are Hindi and multiple variations of Kumauni.

In 2012 CHEA initiated a KSLCDI project supported by ICIMOD, Nepal and in collaboration with its partners. Chyura value chain has been selected due to its significance in the life of villagers and the potential of livelihood generation in future.

In the landscape, around 100 villages are involved in Chyura based livelihood activities since generations. Based on a preliminary study, 14 villages that were

extracting Chyura ghee (Butter) and honey were studied, and 6 villages i.e. Jamrari, Nishni, Bera, Gogna, Khitoli and Selgwani were selected under KSLCDI project for direct intervention (Fig 3) for piloting the Value Chain in the landscape where Chyura trees grow abundantly and naturally. The intervention has been carried out in these 6 villages through 19 community groups i.e. Self Help Groups (SHGs) and Joint Liability Groups (JLGs) represented by 305 members and a registered cooperative.

Chyura honey

Chyura flowers are optimal forage for honeybees. Flowers are white and contain a sweet, sticky and fragrant substance collected by bees. If the district's full potential is tapped the yearly Chyura honey production could reach around 21,500 to 32,300 kg.

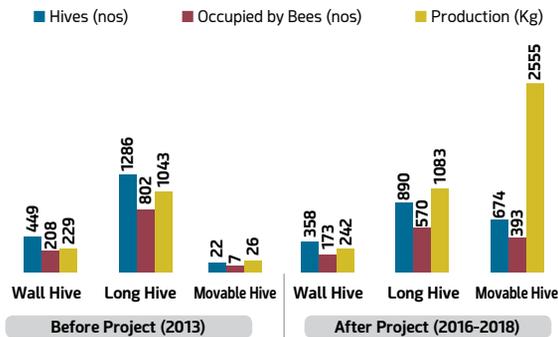


Fig 4. Impact of Project on Bee Keeping

Earlier, the majority of villagers preferred “traditional” methods for beekeeping and honey extraction as the expenses were less and they had a better understanding of their ancestral knowledge. Traditionally the log and wall hives are used by the villagers for beekeeping. Production of honey is not profitable in terms of commercial scale in log and wall hives and the probability of contamination of honey and loss of brood is high.

For strengthening the Chyura honey VC and to have substantial production for commercial gains, efforts were initiated in 2013. Based on need-assessment, people’s perception and willingness, various interventions at different stages of supply chain were introduced in consultation with experts and different stakeholders. The major challenges in developing viable Chyura honey VC were (i) Lack of knowledge about appropriate modern practices; (ii) Lack of communication and understanding among the villagers; (iii) Limited production; (iv) Lack of technical knowledge and documents on contents of honey; and (iv) Lack of motivation to adopt new technologies and inputs. To mitigate the challenges and for achieving success, the activities and inputs were leveraged based on awareness, village consultation, exposure and training. In all 652 movable bee hives were introduced in the pilot villages with ensured cash contribution and commitment of beneficiaries. It is a significant contribution of the project that it has introduced movable hives on a large scale as compared to the status before

project intervention when there were only 22 movable hives.

It is well reflected in Fig 4 that earlier bee keeping was practiced in traditional hives. However, after project intervention movable hives have been adopted and are becoming popular. Further, when the production from these hives was collected it revealed a significant difference. In all, production of honey has increased threefold among 145 beekeeper families while around 160 families are progressing towards substantial success and are optimistic about reaping benefits in the coming years.

The movables hives have also made it convenient to divide colonies and harvesting of honey without disturbing the colonies. Introduction of wax sheets to ensure honey production from movable hives has been promoted and partially accepted by the beekeepers. Additional inputs were introduced for the first time in pilot areas. Under that bee tools and kits were distributed to 252 beekeepers and 30 manual honey extractors to various bee keeping groups. To facilitate bee keepers and Chyura cluster farmers, 2 centres for training, collection and value addition (one at Kanth Gaon and second at Ancholi) were initiated in the project area. The centre at Kanth Gaon is basically for demonstrating the apiary and different phases of supply chain whereas the centre at Ancholi is used for effective value addition and supply of packed products. In addition, 5 model apiary sites have been established for demonstration and also to facilitate the beekeepers at the village level.

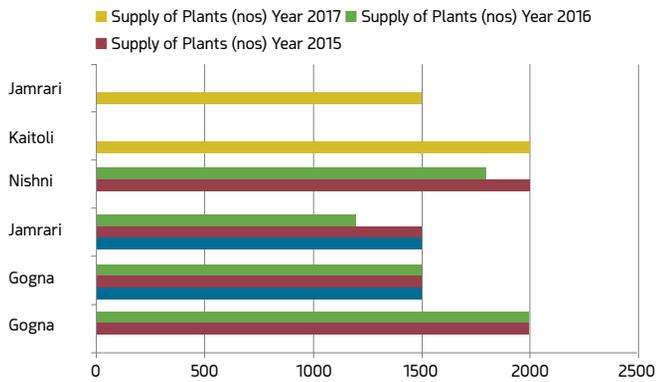


Fig 5. Backyard Nurseries for Chyura Seedlings

During the project period, a total of 3160 kgs of honey had been sold. For the first time in the project 510 kgs (out of 3160 kgs that was sold) was procured by the cooperative and further supplied to different markets, fairs and exhibitions under Kailash brand. 94 beekeepers from 14 JLGs marketed their honey through the cooperative. Since the inception of the project, this good quality honey was packed and sold with a total turnover of INR 3,06,000. 26 well-equipped master beekeepers and rural resource persons are providing support to villagers and helping other beekeepers of the area.

Chyura Nursery: The sustainability of Chyura VCs depends on availability of resources i.e. vegetation of Chyura specifically the Chyura tree, saplings and seedlings in the region. Efforts have been made to strengthen the Van Panchayats (VPs) and mechanism of conservation. In

4 VPs the area is protected from felling of trees. Regular meetings are being organized to conserve the germinated seedlings and plantation through active participation of communities. Continuing the plantation and gap filling, both in VPs and private land, was a key feature and for the purpose backyard nurseries were established; 4 nurseries are well established and sustained with assured supply of quality seedlings. A total of 20,000 seedlings were produced and supplied till 2017. This had resulted in quality supply of planting material and creation of additional income to the beneficiaries.

Since the inception of the project, plantation of 20,000 seedlings was carried out in 6 VPs; it should also be mentioned that this was almost negligible before the project intervention. Survival of 65 % seedlings has been observed in VPs and 85 % in private land.

Chyura By-Products

The use of Chyura Ghee as a major ingredient in soap has given a new dimension to its value as it has properties of body butter, as well. It can be used for manufacturing handmade cosmetic items. Encouraged by the results, soap was identified as one of the by products to be developed for commercial gains.

For this purpose, various training programmes were organized during the project period, a numbers of institutes were visited, and various equipment and raw material were procured. After the success of the trial, this soap was first introduced for sale in an Exhibition in 2015. Since 2015, a total of 2760 bars of soap were manufactured with 16 variants. It has been estimated that sale of 6000 bars of soap with turnover of around INR 2,25,000 will be made annually, adding net benefit of INR 75,000 due to value addition of Chyura Ghee. Moreover, Chyura lamps (Diye) were introduced during Diwali in Pithoragarh and Almora. This trial was well accepted and 7,500 lamps were sold, with a total sale value of INR 30,000 and net profit of INR 7,500.

The government and the district administration have been convinced to generate licenses to provide authorization to produce soap and also to facilitate the entry of private entrepreneurs for sustaining the VC. Efforts are being made to initiate a process for the declaration of Geographical Indicator (GI) jointly with state government and scientific institutions.





Off-Season Vegetable (OSV) Cultivation

The pleasant agro climatic condition of the hills of Uttarakhand has potential for the production of quality vegetables during the season when production in the plains is negligible. The returns of the off season vegetables crops are very high as compared to traditional crops. The land holdings in hilly regions are small and fragmented in comparison to the plains. Therefore, vegetable cultivation under polyhouses increases the productivity and quality of vegetables which have positive impact on the income of the rural people.

Van Rajis and other communities residing in the Pancheshwar valley and other high altitude areas are encouraged to take up off-season vegetable cultivation as one of their income generation activities, with the support of ICIMOD funded KSLCDI project, NMHS project on "Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in a Warming Climate" and NABARD. Under the activity, low cost polyhouses have been promoted in project villages and quality seeds and technical assistance have been provided.

Under the NMHS project, in Makku and Sari villages of Rudraprayag district, approximately 5.5 ha area has been covered under high value crops for enhancing the income of 170 families.



Vegetables worth INR 15,12,500, resulting in income of INR 4,50,000, were produced by beneficiaries, both in polyhouses and open farms.

A total of 390 households benefited from a series of training programmes and inputs in different practices of cultivation. 38 ha area has been covered under high value vegetable and spice cultivation. A total of 55 JLGs are involved in the production and trading of vegetables under different projects.

Kidney Bean Value Chain

Pro poor value chains introduced as a pilot among Van Rajis have turned out to be successful and sustainable VC. 169 households have harvested Kidney Bean along with Black Soyabeans and Urd. The area covered under Kidney Bean and allied pulses was 8.5 ha with 7 ha under Kidney Bean. For maintaining the quality and packaging standard of the product, Supa (winnowing trays) and packing material were provided. Annual calendar on Kidney Bean cultivation was developed during the project period and has been distributed to villagers. Three resource persons were trained and they are now facilitating the post harvest interventions to create awareness among the



Van Rajis. It has been observed that women are more actively involved in the cultivation as well as in the sale of pulses in the local markets.

The average annual production (2014 to 2017) of pulses was 1550 kgs of which 870 kgs were available for selling. This included 800 kgs of Kidney Bean. Of this 500 kgs, worth INR 75,000 were supplied after packaging under Kailash brand. Based on these results, now the focus is on increasing the per unit area productivity by 50-60% from 2018 and to extend the VC in vertical landscapes in the second phase.

Mushroom Cultivation

Mushroom cultivation has been promoted in Makku and Sari villages in Rudraprayag district and village Jajrurali in Pithoragarh district as a pilot project. Makku and Sari are on the the yatra route and have a high tourist inflow during April to September. Mushroom cultivation provides an extra income generation option to the villagers and adds more items to the menu of the restaurants in Chopta, Ukhimath and nearby places. Satisfactory production and positive response from villagers was received during the pilot demonstrations of mushroom (*Pleurotus spp.*). A total of 160 kgs of mushrooms worth INR 90,000 were sold in the nearby markets generating a direct income of INR 40,000 during two consecutive seasons.

Natural & Cultural Heritage Tourism Development in Kailash Sacred Landscape : (Gangolihat Natural & Cultural Heritage Tourism Complex, Pithoragarh)

All the communities that reside in the state of Uttarakhand, right from Johar, Darma, Vyas valleys to the central parts of the state as also Tarai and Bhabhar areas, have their own unique history and culture. A variety of languages, traditional songs, folklores, beautiful traditional dresses and monuments display an amazing blend of natural and cultural heritage in the state.

The sacred groves are important reserves of floral and faunal diversity along with additional groups of microorganisms that have been conserved by local communities. These groves are often associated with ponds, streams or springs, which meet the water requirements of the local people. The vegetation cover also helps in recharging the water level. The vegetation cover of the sacred groves prevents soil erosion as well as conserves fauna.

Sacred groves are sometimes small forests that local communities conserve primarily because of their religious importance. These groves are considered to be a rich and dynamic source of ecological, holistic treatments for human ailments. They are also social pools or servers for restoring

some of the rare plant species and they also act as centres for the conservation of cultural and religious traditions.

These target landscapes offer a variety of opportunities for tourism development such as nature based tourism, culture based tourism and heritage tourism. Cultural & Natural Heritage tourism has been identified as the most suitable segment in order to generate livelihood for the local community.

Considering this, a lot of promotional activities have been initiated in the project area to make the community aware about developing eco tourism as a source of livelihood, as well as the conservation of the natural and cultural heritage through eco friendly tourism activities, during the initial stage. Certificates were also provided to the participants after rock-climbing and catering/housekeeping courses. A lot of natural and cultural heritage trails and sights have been selected for various activities such as camping, hiking, bird watching and rock climbing and development of home stays.

A team of experts from CHEA and ICIMOD visited the area and marked several places and trails such as the old museum in Bhuvneshwar village, a heritage walk near Hat Kalika temple, a beautiful nature trail near Bhuvneshwar village and two villages of the healer community and several tourism packages for the development of natural and cultural heritage tourism in the area.

Promotion of Agribusiness

In 2017, with the support of Watershed Management Directorate, Dehradun, CHEA initiated technical support for value addition and marketing of agriculture products in 105 villages of Dhauladevi development block in Almora district. CHEA has been entrusted as Agribusiness Support Organization (ABSO) under Uttarakhand Decentralized Watershed Development Project (GRAMYA II) in Almora division.

Since 2017, 81 FIGs has been formed represented by 1110 individuals with 35% women. These FIGs are operational and actively involved in various activities with special focus on agro based interventions for enhancing the productivity and quality, and its aggregation for collective marketing. In addition, the FNGO are involved in strengthening of 23 Vulnerable Groups (118 members) and 9 Collection Groups (93 members) that are facilitating specifically in value addition and nonfarm activities. A cooperative is being registered under Self Reliant Cooperative Act, 2003 as an umbrella institute to support the village level institutions. The groups are linked with banks and have made a saving of INR 2,10,000 by FIGs and INR 49,000 by the cooperatives, from various sources.

For promoting climate resilient crops and to take advantage of traditional farming in the area, a programme for seed production of millets and grains has been initiated and at present around 25,000 kgs of certified

For promoting climate resilient crops and to take advantage of traditional farming in the area, a programme for seed production of millets and grains has been initiated and at present around 25,000 kgs of certified seeds of Finger millet, Barnyard millet, Amaranthus, Horse gram, Paddy, Wheat, Mustard and Lentil have been produced during Kharif and Rabi season by 879 farmers.





seeds of Finger millet, Barnyard millet, Amaranthus, Horse gram, Paddy, Wheat, Mustard and Lentil have been produced during Kharif and Rabi season by 879 farmers. The cooperative is facilitating the whole process although it still needs to be strengthened for sustaining the innovative concept of certified seed production. Rain-fed production of spices has been demonstrated in 77.5 ha area with approximate production of 350 tons. In addition, in irrigated areas, off season vegetable (OSV) cultivation is being demonstrated for capturing the markets in major townships. The scope for bamboo based articles has been explored along with floriculture in pilgrimage sites for the FIGs. Continuous efforts are being made to create infrastructural facilities, value addition of raw material, organic certification and to endorse the marketing of products under Gramyashree brand in coming year.

Initial results are encouraging and indicate a bright prospect for the FIGs and cooperatives to create a sustainable marketing system. However, continuous support from technical agencies, buyers and government agencies is required for producers so as to strengthen their capacities for handholding and to have assured markets in future.

Institutional Building

The formation of village level institutions is not the answer for sustainable planning towards technical innovation and value

chain development as their capacities are almost negligible for decision making, project execution and forward linkages. The success of the interventions can be achieved by attempting an attitudinal change among communities towards their livelihood and by ensuring the transfer of appropriate technologies that are linked with drudgery reduction and enhanced income.

To mobilize community and their strengthening it is imperative to organize village consultation by the project staff and personnel from line departments/ institutes/marketing agencies. This had proved to be a vital source for sensitizing local opinion for sustainable development. These consultations were supported by flexi posters, audio-visual aids and lectures with examples.

For conducting training programmes, the Training Need Assessment (TNA) followed a demand-driven approach and assessed its feasibility in the context of proposed activities. Capacity building and training programmes have turned key source in the development of the skills and knowledge of communities for better options of livelihood. Besides, organization of exposure visits to different areas/institutes that have set an example by extracting maximum output through project intervention were encouraged.

The institutions at the village level are now functional and willing to contribute in establishing efficient backward and forward linkages.

ART, CULTURE AND HANDICRAFTS

Promotion in the Mountains



Bamboo Handicrafts of Kumaun

The project entitled **"Improving livelihood of bamboo dependent communities in the mountains through promotion of bamboo plantations and appropriate techniques"** has been supported by Integrated Livelihood Support Programme (ILSP) of Uttarakhand Gramya Vikas Samiti (UGVS), Dehradun. The primary goal of the project is to improve the livelihood of vulnerable groups particularly for bamboo artisans in a sustainable manner through appropriate livelihood opportunities and strengthening of local institutions that relate to livelihood development. The project has been implemented in 7 villages i.e. Katarmal, Khunt, Dhamas, Basar, Kurchoon, Kujiyari, and Jyoli of Hawalbagh development block in Almora district. A total of 248 households are directly linked with various project interventions.

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a pool of bamboo resource in future, for strengthening bamboo crafting and reducing the dependency on natural forests for raw material. All families have planted bamboo seedlings ranging from 10 to 40, depending on the availability of land and their willingness to be involved in craft making.

To supplement Van Raji's efforts, various training and skill upgradation workshops were organised under KSLCDI project. Training and regular facilitation has resulted in 8 Van Rajis, including 5 women, getting motivated to undertake bamboo crafting.

These 8 members are acquiring skills for refined crafting and around 35 members are supporting them in raw material collection and converting raw material into appropriate size for crafting.

The crafting of utility items has resulted in income generation to the Van Raji communities through selling of Dokas, baskets and different utility items specially in the local markets. For the first time, an income of INR 96,000 has been generated by 20 households and they are keen to develop their skills further to have a livelihood option in future.

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Nettle and Hemp – A Natural Fibre Yarn

The districts of Uttarakhand fall in distinct climate zones, welding together to give the region a rich and diverse landscape that nurtures pockets of ecosystem offering a wide range of natural resources, especially Natural Plant Fibre. About 95 fibre yielding plant species have been identified across Uttarakhand. Himalayan Nettle, locally known as Bicchu Buti or Daas Kandali, is one of these fibre-yielding plants. Each part of the plant has been traditionally utilised for multifarious applications such as medicine, food, cosmetics, fibre, etc.

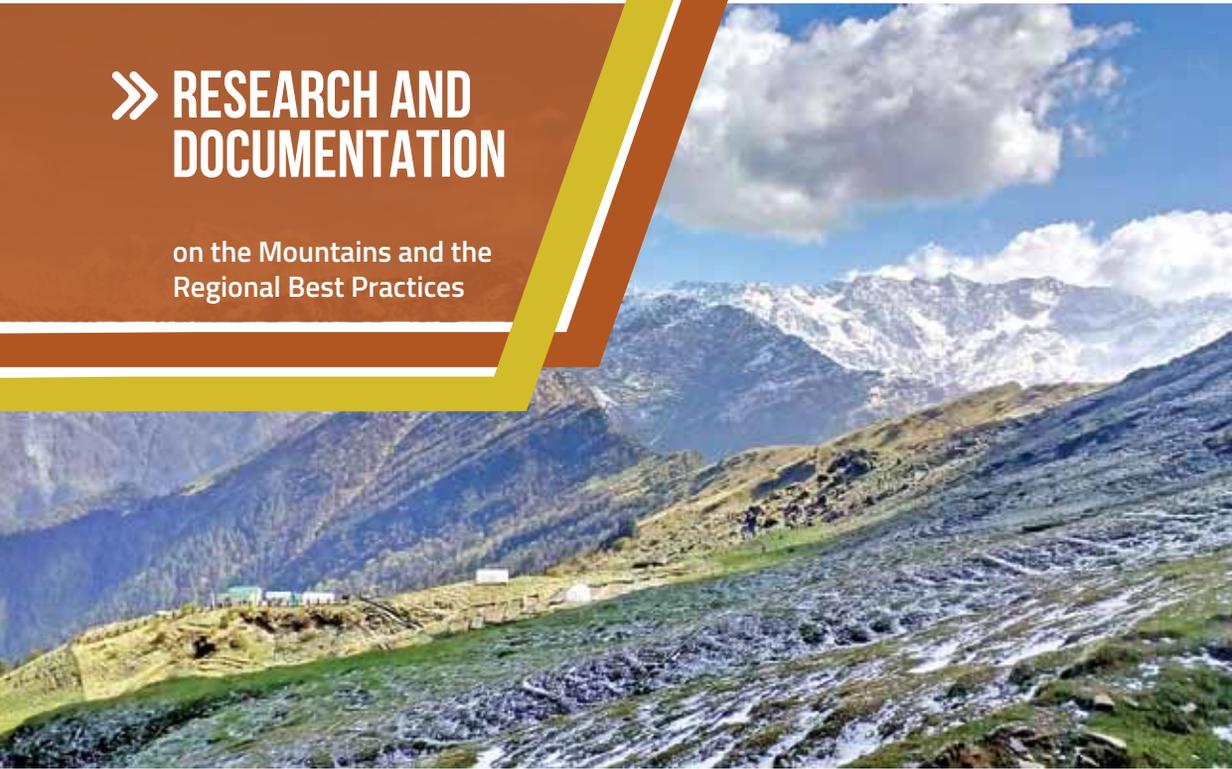
In 2016 CHEA initiated a pilot project "Community Enterprise Development in Natural Fibre Yarn" in Munsyari Development Block of Pithoragarh district with support of Uttarakhand Forest Development Corporation (UFDC) and in collaboration of Chitku design (Design Consultant) and Him Kutir (Women's Group). The project focused on Himalayan Nettle and Hemp as it is abundantly available across this geographical region. During the project period indigenous plant fibre material was harnessed and blended with animal fibres. Various groups were selected for harvesting and collection of resources. The skill of local artisans was upgraded keeping in mind marketing trends and the demand of natural fibres by the textile industry. In addition various tools and processing techniques were also introduced for sustaining the interventions.



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» RESEARCH AND DOCUMENTATION

on the Mountains and the Regional Best Practices



Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in a Warming Climate

In 2016 CHEA initiated a new multi partner and multi institutional project “Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in a Warming Climate” funded by Ministry of Environment, Forest & Climate Change (MoEFCC), GoI under its National Mission of Himalayan Studies (NMHS). The project has 10 experts as principal investigators from six organisations i.e. G.B Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD), University of Kashmir, Kumaun University, Wildlife Institute of India (WII), Birbal Sahni Institute of Paleobotany (BSIP), and Central Himalayan Environment Association (CHEA).

The main objectives of the project are (i) to characterize and map timberline zone in the Indian Himalayan Region (IHR) using

satellite and ground based observations including smart phone applications, (ii) to determine the temperature lapse rate and pattern of precipitation along altitudinal gradients in different precipitation regimes across the IHR, (iii) to study plant diversity, community structure, tree diameter changes and natural recruitment patterns along the three principal sites in the IHR, (iv) to understand tree phenological responses, nutrient conservation strategies and tree-water relations in response to warming climate, (v) to study the relationship between tree ring growth and past climatic changes in different climate regimes across IHR, (vi) to understand the impact of depletion of snow-melt water on growth of tree seedlings, grasslands species composition and selected functional processes, and (vii) to promote participatory action research (Citizen Science) on innovative intervention to improve livelihoods, women participation in conservation and management of timberline resources.

The second year was the year of intensive data collection involving 21 research scholars and 10 Pls. The field visits were synchronized to strengthen the collaboration. A book entitled "Manuals of Field Methods" for timberline studies, which involved "a team research approach", was published. The data collected was shared through poster presentations of each component and several presentations were made at different platforms to share the findings. A special issue of Tropical Ecology is being devoted to the studies conducted under this project and 14 research papers will be communicated to Tropical Ecology research journal.

In most of the components the targets have not only been achieved, but exceeded. One of the major limitations of this project is that the field work time was very short, even though the project team tried to prolong it by trying to collect samples in early spring and autumn in difficult situations.

The project contains 6 components i.e., (i) Timberline Mapping, (ii) Temperature Lapse Rate (TLR) and Precipitation Gradient, (iii) Vegetation and species diversity along elevational gradient, (iv) Phenology, (v) Tree Water Relations, and (vi) Livelihood Intervention.

For the first time in Uttarakhand State, regional timberline was mapped by applying remote sensing techniques, Temperature Lapse Rate (TLR) estimate from the Indian Himalayan Region based on observed data along an elevation transect. The timberline takes a zigzag course between 2600 and 4366 m elevation. The total length of timberline is about 2750.47 km in the entire state of Uttarakhand, which is several times longer than the width of the state. The mean annual TLR in CT transect is found less steep (-0.530C/100m) than the commonly used global value (-0.650C/100m). It varied considerably from one season to the other and between the aspects.

The species richness data was measured continuously in 100 m elevation bands in three different regions i.e., Kashmir, Uttarakhand and Sikkim for measuring

vegetation and species diversity along elevational gradient.

In the reporting period, all the studied species were measured for water potential, osmotic adjustment and leaf conductance at moist Tungnath site in Uttarakhand and dry Chitkul site in Himachal Pradesh.

Trees within the altitudinal transect of ~2780-3364 m amsl at Tungnath site were dated and calculated for Age and Diameter at breast height (DBH), and correlation models were developed between Age-DBH, DBH-Altitude and Age-Altitude for analyzing the age stand structure and tree line dynamics of the Himalayan fir.

Snowfall was measured and its pattern analysed. The study was being carried out at Tungnath region, which is in the upper catchment of river Alaknanda in Chamoli District, Uttarakhand. The elevation ranged from 2900 m to 3680 m amsl (subalpine to alpine).



The project contains 6 components i.e., (i) Timberline Mapping, (ii) Temperature Lapse Rate (TLR) and Precipitation Gradient, (iii) Vegetation and species diversity along elevational gradient, (iv) Phenology, (v) Tree Water Relations, and (vi) Livelihood Intervention.

To involve the locals in scientific study, training on Carbon Sequestration Measurement was conducted. Besides livelihood interventions were also carried out in the villages closer to Tungnath at Makku and Sari. After investigating socio-ecological background of the study area various interventions with regard to livelihood were executed i.e., off-season vegetable, mushroom cultivation and bamboo based interventions. Tourism, which is a major activity in the area, was also taken up for promotion with focus on nature and responsible tourism.

Ecological Implications of Forest Fire Regime on Chir-Pine and Oak Pine mixed forests in Uttarakhand

Fire has been closely associated with mankind since the beginning of civilization. Discovery of fire and its uses have directly or indirectly permitted man to live and survive in the temperate zone. Forests, which are a major natural resource, play a crucial role in maintaining environmental balance. A forest fire may be defined as an unclosed and freely spreading fire that consumes the natural fuels. The main adverse impact of uncontrollable forest fires include damage to growing stock of forests, loss of biodiversity, increase in soil erosion, scorching of soil and reduction in its permeability and water retaining capacity, volatilization of nutrients like Nitrogen.

Forests are vulnerable to climate impacts, including increased fires, drought, invasive species and more. Efforts to foster forest adaptation are important to both ecosystem values (such as wildlife habitat, watersheds and streams, clean air and water, and soils) and human values (such as property, life safety, and wood products). Plants have a distinct disadvantage, compared to animals, in the face of fires. To survive a fire, a plant must be able to insulate itself from the heat of the flames. Bark thickness is the most important factor determining fire resistance of trees. Ponderosa pine,



longleaf pine, slash pine, loblolly pine and giant sequoia are examples of trees with thick bark that acts as insulation from forest fires. Small woody plants and shrubs normally have thin bark. These plants use the soil as an insulating layer to protect themselves. Some plants protect their buds as an adaptive strategy to survive from fire. Retention of seeds by plants and stimulation of seed dispersal by fire are other examples of fire-adaptive strategies.

Forest fire is one of the major reasons for the loss of biodiversity and degradation of environment. Global warming is increasing its intensity at an alarming rate. Thus one needs to understand the complex biophysical parameters which are responsible for this disaster.

The project sites for research purpose are located in Nainital district of the Kumaun Himalayas, between 1000-1800 m elevations. The sites were thoroughly



surveyed and selected in three different forest types *Pinus roxburghii-Quercus leucotrichophora* (Pine-oak); *Pinus roxburghii* (Pure-pine) and *Shorea robusta-Pinus roxburghii* (Sal-pine) forests on the basis of the fire history of the sites. Mostly the south and south west aspects experienced the fire situation in the identified sites while the northern slopes were less affected by the fire during summer.

Detailed study and field visits have been conducted to document and analyze the adaptive traits of major tree species in different studied forest types. Research is in midstream as the project has just completed a year, so it is too early to arrive at a conclusion, but even based on the analysis of some adaptive traits such as bark thickness, self-pruning, etc. from field data generated sets it is revealed that *P. roxburghii*, and *S. robusta* have adaptational features against fire.

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Bio Resource Assessment and Value Chain Analysis of ABS Potential Species/Products in Selected Districts of Kumaun Region

Bio-resources constitute an important source of livelihood for millions of people from forest fringe communities across the world. The economic value of most of these forest resources are often not captured by the market. The potential of these resources has been underestimated since ages due to lack of awareness among the stakeholders and appropriate knowledge about management and usage of bio-resources. This had resulted in improper management of bio resources and their rapid depletion.

Considering Access Benefit Sharing (ABS) as an important issue, the Government of India and The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) jointly launched a project dedicated to conservation and sustainable use of bio-resources in India under the Indo German Biodiversity Programme. The main aim of the study entrusted to CHEA by the GIZ is to explore potential bio resources,

availability, existing mechanism of supply chain inclusive of value addition and scope for ABS. Accordingly, assessment of bio-resources having potential of ABS and value chain has been studied in three districts of Kumaun region i.e., Almora, Pithoragarh and Udham Singh Nagar.

The study begins with the collection of secondary information and literature review. Secondary information was collected from all available sources i.e., government, non government agencies, industries, individuals involved in bio resource supply chain, farmers, collectors, etc. Primary data was collected following top to down approach viz. Industrial survey, Identification of stakeholders, Identification of sites/pilot villages and Participatory Rural Appraisal (PRA).

The study revealed that the level of awareness and information regarding extraction of bio resources from forests is almost lacking and the guidelines for ABS are still not well known to the common people. Traditional farming methods are the main source of livelihood for villagers. Bio resources are not a primary livelihood option for a majority of the villages and villagers, except in Munsyari where bio

resources are ranked high in livelihood generation.

On the basis of certain criteria developed for identification of potential bio resources in the three districts, overall 28 bio resources were finally selected. The SWOT analysis indicates that there is excellent Indigenous Traditional Knowledge (ITK) of bio resources and its uses among the villagers, attraction of consumers towards ayurvedic and herbal products, enormous demand with high cost in market, favourable climatic condition for cultivation and diverse bio resources available in the region, even though several challenges in different stages of supply chain occur that hamper the scope for commercialization of bio resources. The poor marketing infrastructure, uncertain market price and lack of effective policies further demoralize villagers to adopt bio resources as livelihood options. It is concluded from the study that there is a need to ensure people's participation, their capacity building and ownership for promoting and popularizing the bio-resources in the region. Introducing appropriate technologies along with inputs and marketing support in different stages of supply chain is a prerequisite. This would lead towards sustainable development in the context of promoting ABS mechanism and conservation of bio-resources.

Traditional farming methods are the main source of livelihood for villagers. Bio resources are not a primary livelihood option for a majority of the villages and villagers, except in Munsyari where bio resources are ranked high in livelihood generation.

Conference on Connecting Science with Practices and Policy for Resilience towards Climate Change Risks in Uttarakhand

A one day seminar was organised on "Connecting Science with Practices and Policy for Resilience towards Climate Change Risks in the Indian Himalayan Region" on 27th June at Vigyan Dham, Dehradun with support of Indian Himalayas Climate Adaptation Programme (IHCAP). The objectives of the conference were (i) to initiate dialogue on science-policy-society connect for developing an integrated framework on climate change induced hazards risk reduction, (ii) to develop interface between universities and institutions for emerging needs on climate change adaptation strategies for society, and (iii) to draw attention of policy makers to take necessary steps for mainstreaming climate change factors in governance. The participants in the conference included scientists/experts from different institutions, universities, civil societies, ngos, top officials from forest department, media consultant, officials from different departments, public representatives, environmentalists and researchers.



Honourable Chief Minister of Uttarakhand, Shri Trivendra Singh Rawat inaugurated the conference as chief guest while the Member of Legislative Assembly of Uttarakhand from Rudraprayag Sri Vinod Kandari and Karanprayag Shri S.S. Negi were the special guests of the Program. The key presentation was made by Prof. S. P. Singh, Chair CHEA, titled "Emerging Issues from Climate Change Risks for Uttarakhand and its Adaptation Specific to Policy Issues". Prof. Singh emphasized on facts related to climate change risks for Uttarakhand Himalayas such as drying up of water resources, decrease in water level of water bodies and lakes, temperature rise in glacier, seed germination, species movement, etc. He also brought into focus knowledge about the gap between science and societies and the need of authentic data for further planning and policy issues that could lead towards sustainability in the Himalayas.

During the conference two technical sessions were conducted. The first technical session "Climate Change Risks, and Adaptation" was chaired by Prof. V.K. Jain, Vice Chancellor, Doon University and the second technical session "Responding to Climate Change: Policy and Practice" was chaired by Mr. Indu Pande, Former

Chief Secretary Uttarakhand. After the completion of the technical sessions interactive panel discussion on "Developing a Science-Policy - Practice Interface for resilience towards climate change risks" was also conducted. The session was jointly chaired by Dr. Rajendra Dobhal, DG, UCOST and Prof. Sanjay Jasola, Vice Chancellor, Graphic Era Hill University, Dehradun.

Community Led Total Sanitation (CLTS)

Efforts were made in Van Raji villages for making them Open Defecation Free (ODF), following the concept of Community Led Total Sanitation (CLTS) and flagship programme of Clean India Mission. The event was organized in landscape where the Van Rajis from all villages participated and shared their experiences that lead towards ODF process. In all 64 Van Rajis were present in the programme. For their excellent contribution in making the village ODF, 3 leading groups from Jamtari, Aultari and Gainagaon villages were honoured. Block Development Officer (BDO) and Block Pramukh, Dharchula, were the guests during this programme. Gram Pradhan of respective villages and members of various groups were also present in the event.

2017 Environment Awareness Campaign

Swachata Se Swasthya

Programme on "Swachata Se Swasthya" was organized at Bhartiya Shaheed Sainik Vidyalaya (BSSV), Nainital to disseminate awareness regarding relationship between Clean Environment and Health. The importance of Yoga and Dhyana was discussed with the students and some basic yoga kriyas were demonstrated. The programme was organized jointly by the CHEA's Honorary Joint Secretary Prof. (Smt) Ganga Bisht and the Principal and management team of the school. Experts from CHEA also delivered presentations





Capacity Building in Higher Education: Sustainable Natural Resource Use in Arctic and High Mountainous Areas (SUNRAISE)

In February 2018, CHEA initiated Erasmus+ Capacity Building in the Field of Higher Education project with the objective to revise and upgrade higher education programs (Under Graduation,

Post Graduation and Doctorate) to make them end-user-oriented & policy-relevant, and enhance opportunities for life long learning (LLL) education. The project aims to promote sustainable management of Arctic and high mountainous ecosystems in Bhutan, India and Russia through enhanced tertiary education linked to labour markets and wider stakeholder circles.

The project has 11 partners represented by 9 Universities and 2 NGOs from Europe and Asia. In India CHEA is one of the partners along with Jawaharlal Nehru University, Delhi and Kumaun University, Nainital. The major activities entrusted to CHEA is to work in close association with Universities for developing the new curriculum with focus on hot topics those have direct connection with the communities in the mountains. Capacity development and sustainability is also the integral part of the project along with dissemination of learning and outcomes.

about cleanliness and importance of discipline. Oath on cleanliness was also taken by the student as well as teachers and management at the end of the programme. It was decided to keep the college premises clean and to further promote composting in the premises.

Awareness workshops were also organized in various project sites of CHEA in Almora, Pithoragarh and Rudraprayag districts. The purpose was to disseminate best practices to utilize the degradable waste for manure production and also to reduce wastage of water and energy resulting in contributing towards the betterment of our society and nature.



Project 2017-18

Project	Funder/Partner	State/District	Development Block
Bio Resource Assessment and Value Chain Analysis of ABS Potential Species/Products in Selected Districts of Kumaun Region	The Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)	Almora, Pithoragarh and Udham Singh Nagar	-
Community Enterprise Development in Natural Fiber Yarn	Uttarakhand Forest Development Corporation (UFDC), Dehradun	Pithoragarh	Munsyari
Community Led Total Sanitation	ICIMOD, Nepal	Pithoragarh	Dharchula, Didihat and Kanalichinna
Fire Adaptation Features of Important Tree Species of Himalayas and Strengthening Community Participation in Preventing Forest Fire	GB Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD), Kosi-Katarmal, Almora under its Integrated Eco-development Research Programme (IERP)	Uttarakhand	-
Improving Livelihood of Bamboo Dependent Communities in the Mountains through Promotion of Bamboo Plantation and Appropriate Techniques	Integrated Livelihood Support Programme (ILSP) – Small Grant	Almora	Hawalbagh
Kailash Sacred Landscape Conservation and Development Initiative	International Centre for Integrated Mountain Development (ICIMOD)	Pithoragarh	Bin, Dharchula, Didihat, Gangolihaat, Kanalichinna

Project 2017-18

Project	Funder/Partner	State/District	Development Block
Livelihood Improvement & Drudgery Reduction through Appropriate Livestock Technologies and Biomass Enhancement in Kumaun Himalayas	Department of Science and Technology (Seed Division), Ministry of Science & Technology, Gol	Almora	Lamgarah
		Nainital	Dhari
Livelihood Improvement of Tribal Community through Promotion of Appropriate Technologies in Rural Hills of Pithoragarh District – Under Tribal Development Funds	Tribal Development Fund - NABARD	Pithoragarh	Didihat, Kanalichina, Dharchula
SUNRAISE - Sustainable Natural Resource Use in Arctic and High Mountainous Areas.	University of Bremen, Germany and Erasmus+ programme of the European Union	Indian Himalayan Region	-
Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in a Warming Climate	GBPNIHESD under National Mission for Himalayan Studies (MoEFFCC)	Pan Himalaya	-
Uttarakhand Decentralizes Watershed Development Project (GRAMYA – II)	Watershed Management Directorate, Dehradun	Almora	Dhauladevi

Note: The aforesaid list of projects during 2017-18 is in alphabetical order and does not represent any preference.

Financial Summary 2017-18

INDEPENDENT AUDITOR'S REPORT

To The Members of Central Himalayan Environment Association

We have audited the accompanying financial statements of Central Himalayan Environment Association which comprise the Balance Sheet as at March 31, 2018, and the Income and Expenditure Account, Receipt and Payment account for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation of these financial statements. This responsibility includes the design, implementation and maintenance of internal control relevant to the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with the Standards on Auditing issued by the Institute of Chartered Accountants of India. Those Standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error.

In making those risk assessments, the auditor considers internal control relevant to the Company's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of the accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion and to the best of our information and according to the explanations given to us, the accounts, read together with the Statement on Accounting Policies and Notes to Accounts attached thereto give a true and fair view in conformity with the accounting principles generally accepted in India:

- a. in the case of Balance Sheet, of the state of affairs of the entity as at the end of its financial year; and
- b. in the case of the Income and Expenditure Account, the surplus for its financial year.
- c. In the case of receipt and payment account for the receipts and payment reflected therein.

Other matters

Rs 1,24,10,757.44 has been reflected as being spent on account of grant mentioned at serial number 2.11 of schedule 04 to balance sheet. Of this amount, we have audited the expenditure amounting to Rs 40,13,763.77 which has been spent by CHEA and PMU. Since Rs 83,96,994 has been spent by partner units, the underlying documents of which are not in possession of auditee, we have not audited this portion of expenditure. The amount not audited by us has however been audited by either independent auditors or internal auditors of the respective partner units which are government institutions.

Our opinion is not qualified with respect to matters stated here

For Manish Khanna & Co.

Chartered Accountants

Firm Registration Number : 008584C

Manish Khanna

FCA, DISA(ICAI), LL.B

Partner

Membership Nos 077858

Dated: 28 August, 2018

Place: Nainital

Central Himalayan Environment Association Balance Sheet as on 31st March 2018

Liabilities	Current Year (RS)	Previous Year (RS)
Corpus Fund	1,36,00,268	1,33,60,268
Reserve Fund	2,15,91,348	1,97,00,265
Capital Reserves (assets funded by donor agencies)	45,77,933	44,66,778
Unspent grants	1,60,31,634	1,39,80,924
Sundry Creditors	6,01,731	13,53,300
Accumulated Depreciation	95,41,594	95,41,594
Total	6,59,44,507	6,24,03,128
Assets		
Fixed Assets - Acquired from own funds	95,41,664	95,41,664
Fixed Assets - Acquired from funds of donor agencies	45,78,064	44,66,887
(Note : Assets are stated at cost. Please refer significant accounting policy on accounting of fixed assets)		
Current Assets, Loans and Advances		
Grant Receivable	333800	498241
Deposits with banks	3,48,09,628	3,66,77,882
Interest receivable	35,93,060	22,74,637
Advances including income tax recoverable	1,30,28,292	89,43,818
Security Deposit (endorsed in favour of Government Authorities)	60,000	0
Total	6,59,44,507	6,24,03,128

Signed on Behalf of CHEA
Chairman:
Secretary:
Executive Director:
Account Officer

Central Himalayan Environment Association (CHEA)

Receipts and Payments Accounts for the year ended as on 31st March 2018

Receipts	
Opening balance in bank	1,05,29,023.55
Income	Received
Interest	15,49,275.00
Implementation charges for executing grant	5,68,192.00
Other income	1,150.00
Total	21,18,617.00
Project Funding	
Foreign Contribution Grants	25,74,511.08
Government Grants	2,11,69,062.00
Other Non foreign Contribution & Non government Grants	8,72,753.00
Total	2,46,16,326.08
Grand Total	3,72,63,966.63
Payments	
Expenses met from Specific Reserves	10,11,413.97
Investment in short term fixed deposit with banks	22,94,546.00
Advances made	39,53,920.05
Security Paid	60,000.00
Income tax deducted at source	1,30,554.00
Total	74,50,434.02
Project Funding	
Foreign Contribution Grants	32,95,369.00
Government Grants	1,92,28,456.42
Other Non foreign Contribution & Non government Grants	6,28,918.00
Expenditure	2,94,565.00
Total	2,34,47,308.42
Closing balance	
Cash in bank	63,66,224.19
Grand Total	3,72,63,966.63

Signed on Behalf of CHEA

Chairman:

Secretary:

Executive Director:

Account Officer

Central Himalayan Environment Association, Nainital

SCHEDULE NO. 4: Annexure to Balance sheet - Unspent Grant -in -aid for the year ended 31st March 2018

S#	Name of grant	Opening Balance 01.04.2017	Amount received during current year	Amount spent during current year	Closing Balance 31.3.2018
1	Relief of the poor through Income generation projects (including water conservation)				
1.1	Tribal Development Fund Programme funded by NABARD	13,01,883.12	-	13,01,883.12	-
2	Preservation of environment (including watershed and Forest)				-
2.1	Induced new fire regimes on Chir pine and adjacent Oak-pine mix forest of Uttarakhand Himalayan funded by IERP, GBPNIHESD	(83,800.00)	83,800.00	-	-
2.2	Fire adaptation features of important tress species of Himalayans and strengthening community participation in preventing forest fire funded by IERP, GBPNIHESD	-	4,49,728.00	3,47,207.00	1,02,521.00
2.3	Expending the Natural Resource Base for Easy Access to Water and Green Fodder: Supplementing Marginal Community for livelihood Promotion funded by Aquamall	(2,43,835.00)	2,43,835.00	-	-
2.4	"Improving livelihood of bamboo dependent communities in the mountains through promotion of bamboo plantation and appropriate techniques" by UGVs-ILSP	(1,70,606.00)	8,00,400.00	5,72,109.00	57,685.00
2.5	Community Enterprise Development in Natural Fiber Yarn (Nettle and Hemp) at Munsyari, district Pithoragarh by UFDC	2,30,071.00	7,50,000.00	9,80,071.00	-
2.6	Description of Area for Oak Acorn Sowing from Value Network Venture Advisory services LLP (VNV)	-	78,918.00	78,918.00	-
2.7	Workshop on Connecting Science with Practices and Policy for Resilience towards Climate Changer Risk in IHR by IHCAP		5,50,000.00	5,50,000.00	-

S#	Name of grant	Opening Balance 01.04.2017	Amount received during current year	Amount spent during current year	Closing Balance 31.3.2018
2.8	Consultancy contract for carrying out Bio resource assignment and value chain analysis of ABS potential species / product funded by GIZ	-	4,76,500.00	4,76,500.00	-
2.9	Sustainable Natural Resource use in Arctic and high Mountainous area by SUNRAISE	-	3,44,642.70	3,90,739.00	(46,096.30)
2.10.	Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) funded by ICIMOD	7,09,907.65	19,97,203.38	23,39,610.00	3,67,501.03
2.11	Timberline and Altitudinal Gradient Ecology of Himalayas, and Human Use Sustenance in Warming Climate by GBPNIHESD	1,04,94,006.86	1,63,06,475.00	1,24,10,757.44	1,43,89,724.42
2.12	Uttarakhand Decentralized Watershed Development Project by Almora Division	12,45,055.00	17,29,622.00	29,53,362.16	21,314.84
2.13	Livelihood improvement and drudgery reduction through appropriate livestock technologies and biomass enhancement in Kumoun Himalayas by DST	-	11,39,002.00	17.70	11,38,984.30
Total		1,34,82,682.63	2,49,50,126.08	2,24,01,174.42	1,60,31,634.29

Abbreviations & Notes

- a NABARD is National Bank for Agricultural & Rural Development) Dehradun
- b GBPNIHESD means G.B. Pant National Institute of. Himalayan Environment & Sustainable Development, Kosi Katarmal, Almora
- c Aquamall water solutions ltd. Lal Tappar Industrial Area, Dehradun
- d UGVS-ILSP Means Uttarakhand Gramin Vikas Samiti- Integrated Livelihood Support Project, Uttarakhand
- e UFDC means Uttarakhand Forest Development Corporation, Kumoun Division, Aranya Vikas Bhawan, 73, Nehru Road, Dehra Dun -248001, UK
- f VNV means Value Network Venture 41/1, Reyyan Towers, Church Street, Off M.G. Road, Bangalore - 560001, Karnataka, India
- g IHCAP means Indian Himalayas Climate Adaptation Programme, Swiss Cooperation Office India, Embassy of Switzerland, Nyaya Marg, Chankyapuri, New Delhi-110021
- h GIZ Office, New Delhi, B 5/1 Safdarjung Enclave , New, Delhi- 110029
- i SUNRAISE, Universität Bremen Bibliothekstr-128359 Bremen
- j ICIMOD is International Centre for Integrated Mountain Development, Nepal
- k GRAMYA-II, UDWDP, Karbla, Almora

CHEA'S PARTICIPATION IN TRAINING/SEMINAR/WORKSHOP/ MEETING

- National Seminar on "Plants and Environment". Organized by Department of Botany, Kumaun University, Nainital, March, 2017.
- Environment Sciences Sessions at "105th Indian Science Congress (ISC)". Under theme Reaching the Unreached through Science and Technology. Organized by ISC in collaboration with Manipur University. 16-20th March 2018 Imphal, Manipur.
- Review Meeting on "Planning and Agribusiness Development with World Bank Consultants Team". Organized by UDWDP- Phase II, Dehradun. 8th May 2017, Conference Hall, WMD, Dehradun.
- National Synthesis on "Rolling-Up the Curve of Learning: Kailash Experience Phase I: Based on the collation and completion of lessons learnt linked from local to national synthesis in each participating countries to regional scale learning". Organized by KSLCDI India and ICIMOD, Nepal. 1st June to 3rd June 2017, WII, Dehradun
- Stakeholder Consultative Workshop on "Restoration Opportunities Assessment for Uttarakhand". Organized by IUCN, India and GBPNIHESD, Almora. 29th June 2017 ICFRE, Dehradun.
- Workshop on "Linking Science with Policy and Practice Learning from KSLCDI, India : Policy Dialogue with HODs of Departments and Chief Secretary, Uttarakhand". Organized by SBB & WII, Dehradun and ICIMOD, Nepal. 22-24 August 2017 Dehradun.
- Workshop on "Mobilizing Proposals under National Adaptation Fund for Climate Change (NAFCC) and Green Climate Fund (GCF)". Organized by NABARD, Dehradun. November, 2017.
- Conference on "Rejuvenation of Naini Lake, Strengthening state Strategies for climate actions" Organized by CEDAR, Dehradun. November, 2017, Governor House, Dehradun.
- Workshop on "Regional Synthesis and Project Planning Document (Draft) for the Year 2018 KSLCDI". Organized by ICIMOD in collaboration with DFID-UK Aid and GIZ. 3-4th November, 2017 ICIMOD, Nepal.
- Workshop on "Water for Welfare: An Uttarakhand Initiative" with theme Contribute to Save Water Reserves of Uttarakhand. Organized by AHEC, IIT, Roorkee and Kumaun University, Nainital. 14th December 2017 Conference Hall, The Hermitage, Kumaun University, Nainital.
- Kick Off Meeting "Capacity Building in Higher Education: Sustainable Natural Resource Use in Arctic and High Mountainous Areas (SUNRAISE)". Organized by Bremen University, Germany. 14-16 February 2018 Bremen, Germany.

PUBLICATIONS

COUNCIL
MEMBERS
(2017-18)

CHEA has undertaken a wide range of publication to capture field lessons, findings of various action researches and training manuals for capacity building of the rural communities.

- 01** Books/ Booklets - 38 The first publication "Environment Regeneration in Himalayas – Concepts and Strategies – was made in 1985, edited by Prof. J. S. Singh, eminent ecologists, followed by series of publication on contemporary issues)
- 02** Training manual - 31 (covering various topics of Appropriate Technologies in Horticulture, Water Conservation and Harvesting, Animal Husbandry, Fodder Development, Irrigation Technologies, Pre and Post Harvesting, Beekeeping etc.)
- 03** CHEA Bulletin Vol. - 1 to 11
- 04** Research Papers – 37 published in various peer reviewed journals and accepted in national and international workshops/ seminars
- 05** Event and workshop reports -14
- 06** Case Studies on Climate Change Adaptation, rural livelihoods, art handicraft and culture -15

The aforesaid publications are available on request and details of most of them are available on www.cheaindia.org/publication.php

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Retired Engineer, Hotel Lake View, Tallital, Nainital

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(CHEA's council representative).

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Dr. Gopal Rawat

Dean of Academics, Wildlife Institute of
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FNA, Deputy Director General,
International Centre for Integrated
Mountain Development (ICIMOD), Nepal.

Prof. R.S. Tripathi

FNA, Emeritus Scientist, National
Botanical Research Institute (NBRI),
Lucknow.

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FNA, Chair
CHEA, Nainital.

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- Anil Kanwal
- Arjun Singh Dhama
- Deepa Upadhyaya
- Deepak Lal
- Devendra Singh
- Dhiraj Joshi
- Dharendra Joshi
- Ganesh Lal
- Ghanshyam Pande
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- Ram Singh
- Ripu Daman Singh
- Satish Joshi
- Surendra Bhandari
- Surabhi Gumber
- Vinita Verma
- Yogesh Nagarkoti

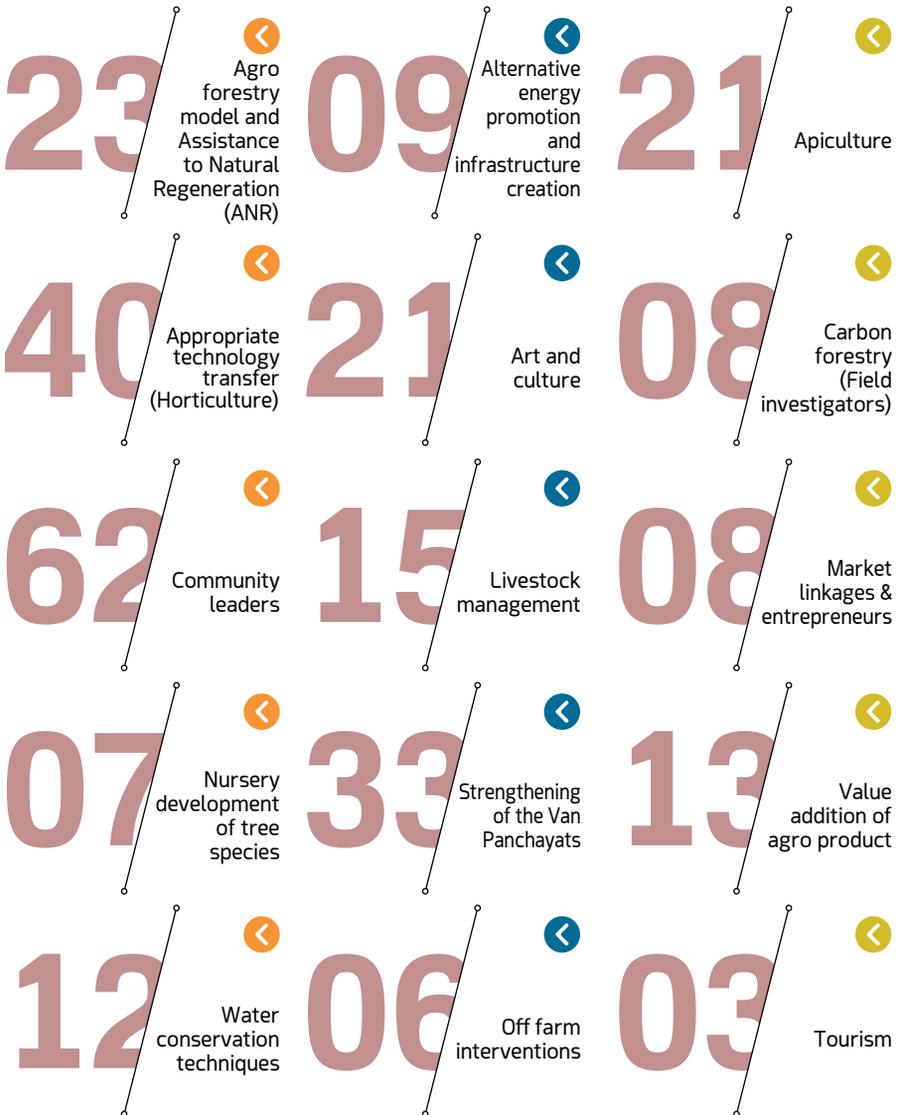
114 Life Members of CHEA, representing academia, university, social work and institutions, contributes through extending their voluntary services to CHEA's programme and interventions on regular basis and forms the core competency of the organisation.

Volunteers/Interns

Volunteers/interns from following institutes:

Bharati Vidyapeeth Deemed University, New Law College, Pune, Maharashtra
Trumbull High School, USA, The Christ University, Bangalore

RURAL RESOURCE PERSONS



DISCLOSURE

OUR LEGAL STATUS ACCREDITATION AND MOU

GOVERNANCE

- All the members of the Council are unrelated to each other by blood and marriage.
- The Executive Director is not related to any member of the Council by blood and marriage.
- Elections to the Council are held as per the rules of the Society and in accordance to the constitution and memorandum of association of the organisation. After three terms each members go for a "cooling off" period.
- No members of the Council received any remuneration during the year.
- The Council met more than thrice in the last year with the requisite quorum.
- Minutes of the meeting were documented, read out and approved in the subsequent meeting and were also circulated in advance.
- The Governing Body of Organization approved the Annual Report and the audited statement of accounts.

Our Statutory Auditor
Manish Khanna
FCA, DISA(ICA)

- Central Himalayan Environment Association (CHEA) is a Society registered under the Indian Societies Registration Act of 1860. Registration No. 222/1982-83., dated 2nd October, 1982.
- Central Himalayan Environment Association (CHEA) is authorized to receive foreign contributions as per the Foreign Contribution Regulation Act 1976.
- CHEA is registered under Sections 12A and 80G of the Income Tax Act, 1961, and is a not for profit entity.
- CHEA is accredited as Scientific and Industrial Research Organisation (SIRO), by Department of Scientific and Industrial Research, Government of India.
- CHEA has Memorandum of Understanding with Department of Forestry and Environment Science, Kumaun University, Nainital for collaborated action research.
- CHEA has Memorandum of Understanding with G.B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD), MoEFCC, GoI, Kosi-Katarmal, Almora for Lab-to-Land approach.
- CHEA is Founder Member of Himalayan River Alliance (HIRA), a South Asian Alliance for working on livelihood and environmental issues of Ganga and Brahmaputra River Basin.
- CHEA is Member of Mountain Partnership, Food and Agriculture Organization (FAO) of the United Nations.
- CHEA is Member of Global Alliance for Climate-Smart Agriculture (Facilitation unit based at FAO).

CHAIR OF CHEA



Late Shri A. D. Moddie

(1982-1988)
Formerly ICS &
Founder Member of ICIMOD



Late Shri D.P. Joshi

(1988-2006)
Formerly PCCF,
UP



Prof. A.K. Pant

(2006-2009)
Formerly Director,
Birla Institute of Applied
Sciences



Late Dr. R.S. Tolia

(2009-2013)
Formerly Chief Secretary
& Chief Information
Commissioner, Uttarakhand



Late Prof. T.S. Papola

(2013-2015)
Formerly Chairman,
14th Finance Commission,
Uttarakhand



Prof. S.P. Singh

(2015-continue)
Formerly VC, HNB Garhwal
University, Srinagar

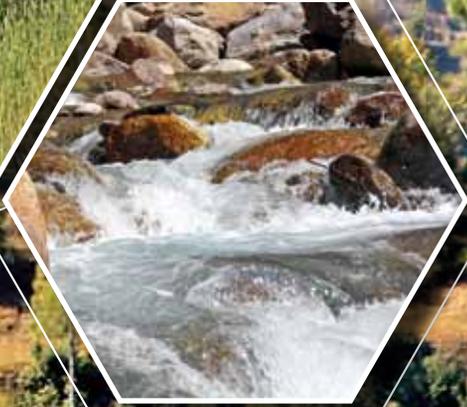
The Himalaya is the principal home of glaciers and the source of water for over one billion people living in connected river basins.

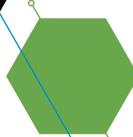
They are also extremely vulnerable to climate change. Thus, there is a critical need to guide development that incorporates and is compatible with the threat of a changing climate.





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Central Himalayan Environment Association

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