CENTRE of EXCELLENCE on FOREST BASED LIVELIHOOD IN UTTARAKHAND

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Uttarakhand State Council for Science & Technology (UCOST)

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INTRODUCTION

Forests help to protect the environment by reducing soil erosion, maintaining ecological balance, regulating water cycle, keeping atmosphere free of air pollutants and moderating temperature. Many minor forest products provide large livelihood opportunities in the state which include Medicinal plants, Bamboo, Wild edibles such as Fungi, Berries, Nuts and Flowers; Fuel wood, Fibres, Seeds, Honey, Leaves, Resins, Gums etc. Numbers of medicinal plants known for therapeutic efficacy are becoming extinct due to unscientific collection, over exploitation and biotic interferences. There is need to conserve and utilize these species in a scientific manner. Therefore "Centre of Excellence (CoE) on Forest Based Livelihood in Uttarakhand" is established by National CAMPA Advisory Council and Ministry of Environment, Forests & Climate Change (MoEF& CC) with Uttarakhand State Council for Science and Technology (UCOST).

CoE will delve on issues related to forest based products and dependence of forest fringe dwellers on these resource. Forest dwellers lives in harmony with nature and surroundings from which they derive their sustenance. Forest provide their daily livelihood requirements of Food, Fodder, Fuel wood etc. Forest products play important role in economy of state. Tejpat possessing several medicinal properties has become the first botanical plant from Uttarakhand to receive the Geographical Indications (GI) tag. Keerajadi, a caterpillar fungus due to its high medicinal value, have greatly enhanced the economic status of the collectors of Pithoragarh, Chamoli and Bageshwar districts. Jhula, a lichen is a source of livelihood due to its use in perfumery and dye making. Some multipurpose species like Bhimal and Khadik are a part of rural culture in hilly region and indispensable for carrying out day today activities.

Local traditions can also be helpful for sustainable utilization of forest based products so CoE will also study cultural dependence and socioeconomic status of forest fringe villages. There is a need for finding ways to manage forests sustainability in face of current pressures and to augment raw material production. One of the principal cause of forestry not being in mainstream of economic activity is lack of reliable / authentic data base. CoE will also collect all available data on forest based livelihood and related issues and will become a clearing house for the same.

MANDATE

Uttarakhand forest have been an essential part of the state development and nearly 80% people are directly or indirectly dependent on forests either for their sustenance or subsistence. Forests create microclimate for cultivation of several crops of the hill and also provide various forest based products like fodder, fuel wood and fruits etc. CoE thrives to generate datasets on forest based livelihood and income generating opportunities.

OBJECTIVES

- To collect all the available data on forest based produce with focus on non-timber products like medicinal plants and bamboo and to create a clearing house for the same.
- To interact with people through Focused Group Discussion (FGD) and to estimate their dependence on forests for their livelihood.
- To do value and supply chain analysis for different forest products.
- To create a resource directory of various government and non-government organisations, private institutes and experts working in the area of forest livelihood.
- To conduct socio-economic analysis and estimate cultural dependence of the forest fringe villages on forestry

VISION

To become a resource and knowledge centre on forest based livelihood and contribute towards sustainable livelihood opportunities in the state.

ACTIVITIES OF CENTRE OF EXCELLENCE

COLLECTION OF SECONDARY DATA

- Relevant information on forest based livelihood and related issues in Uttarakhand were collected from Forest Working Plans, published papers, reports, forest records and National Forest Library cum Information Centre (NFLIC), FRI, Dehradun.
- The CoE team collected information from Uttarakhand Forest Department and Uttarakhand Forest Development Corporation (UAFDC) about the quantity of medicinal plants collected from the forest and sold in the UAFDC mandis through auction during last few years.
- Information on Keedajadi (*Cordyceps sinensis*) collection and market price from three districts of Uttarakhand viz. Chamoli, Pithoragarh and Bageshwar was kindly shared by Dr. V. P. Bhatt, Herbal Research and Development Institute (HRDI), Gopeshwar. The data were assessed for its contribution to the income of collectors in different villages.
- Village boundary data and forest layer of Uttarakhand in shp. format were acquired from Survey of India and Uttarakhand Forest Department respectively, which were prerequisites for selecting forest fringe villages for household survey and focussed group discussion in order to assess forest based livelihood.
- Demographic data of Uttarakhand were collected from the Directorate of Census.
- Vector layer of Protected Forest Areas in shp. format was collected from Dr. Gopal Singh Rawat, Dean, Wildlife Institute of India.
- Team also collected relevant data on livelihood of villages in Uttarakhand from Himalayan Action Research Centre (HARC), Directorate of Census Office, Forest Department, Forest Research Institute (FRI) and Centre for Aromatic Plants (CAP), Dehradun.

VISITS TO EXPERTS

- CoE team visited ICFRE to meet Dr. G. S. Goraya, IFS and Deputy Director General, ICFRE on 5th September, 2016 to discuss about activities of CoE. Team also collected information on various medicinal plants of Uttarakhand.

- CoE team visited Shri Rajesh Kumar, ISS and Senior Deputy Director, Forest Survey of India to discuss the strategies for selection of forest fringe villages and to discuss the criteria for classification of households during survey as affluent, non- affluent and other.

IN- HOUSE MEETINGS OF CoE

Five in house meetings were held at CoE during September – February, 2017. Among them one meeting was held with Director General UCOST, Dr. Rajendra Dobhal to discuss the work done by team and to chalk out future activities of CoE. One meeting was held

with Dr. Ram Prasad, mentor of CoE (Former Director General, MPCOST and Director IIFM, Madhya Pradesh) to discuss about strategies of surveys to be conducted and annual report to be prepared by team. Two meetings were held with internal Advisory Committee of CoE to discuss the activities and short and long term goals of team. One meeting was held with Prof. S. P. S. Kushwaha, Scientist-F and Former Dean, Academics, IIRS Dehradun to discuss about sample village selection using Geographic Information System (GIS) tools and statistical approach to be followed in schedule of enquiry prepared for Focussed Group Discussion and household surveys.

RESOURCE DIRECTORY

Detailed contact information of various government and non-government organisations (NGO), private institutes and experts working in the area of forest livelihood in Uttarakhand were compiled to form resource directory and it is uploaded on the webpage of CoE *(http://ucost.in/document/COE/COE-Resource-Directry.pdf)*. This page is updated regularly.

VISITS UNDERTAKEN BY COE TEAM

Pilot survey was conducted to test the schedules of enquiry and FGD format in three villages viz. Sainthi and Saitoli of Ghat Block and Sunil Gaon of Joshimath Block in Chamoli District in December 2016. Household survey was carried out by selecting 12 families in the ratio 2:5:5 (affluent: less affluent: others) from each village. This was according to the criteria set by National Sample Survey Organization as quoted by Forest Survey of India (2008). The team collected necessary feedback from villagers through Focused Group Discussion (FGDs). Preliminary information related to the extent of dependence of locals for employment and income on forest and other occupations was gathered.

Focused Group Discussion at Saitoli and Sainthi village (Ghaat Block), Chamoli

Ringal artisan at Dhak village and Ringal based products at Tangdi village (Chamoli district)

Team also visited a local ringal artisan shop at village Tangdi (Chamoli district) and collected information related to ringal based products and their marketing in Uttarakhand.

CoE team visited fruit processing unit of Himalayan Action Research Centre at Kaleshwar, Karanprayag in Chamoli district. CoE team interacted with women of Self Help Group (SHG) working at the unit.

Food processing unit of HARC centre at Kaleshwar and Mixed Forest visit at Village Kotmalla

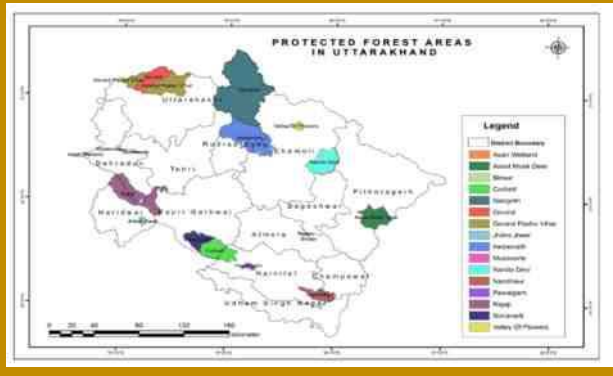
CoE team visited the mandi of Uttarakhand Forest Development Corporation (UAFDC) at Bibiwala (Rishikesh) on 22nd December 2016. Team interacted with the collectors and their representatives locally called middlemen and traders who had participated in the auction of the collected forest produce at this mandi.

DISSEMINATION OF RESEARCH WORK

- Brochure of Centre of Excellence (CoE) was prepared and distributed among various stake holders. It contains detail information of CoE, its objectives and area of focus.
- Information on various activities of CoE during March- August, 2016 was compiled to prepare news- bulletin and it is distributed among various stake holders.
- Webpage of CoE was developed under Council's official website *http://www.ucost.in/works/coe-moef.html.*
- Two posters were prepared for 19th Commonwealth Forestry Conference 2017
- Three abstracts were presented in 11th Uttarakhand State Science & Technology Congress (USSTC), 2017 held at Uttarakhand State Council for Science & Technology (UCOST) Dehradun.

ATLAS OF UTTARAKHAND SHOWING PROTECTED FOREST AREAS OF STATE

Atlas showing boundary of protected forest areas of Uttarakhand was prepared by CoE in association with Spatial Data Infrastructure (SDI) facility of UCOST. Vector layer of Protected Areas in shp. format was collected from Dr. Gopal Singh Rawat, Dean, Wildlife Institute of India to form this atlas. This atlas shows protected and reserved forest areas of the state. Uttarakhand has six National Parks and six Wildlife Sanctuaries which covers 13.8 percent of the total area of the state. The various Parks and Sanctuaries are locating at different altitudes varying from 800 mts to the high altitude Protected Areas at 5400 mts. Apart from these there are two Conservation Reserves– The Asan Barrage and Jhilmil Tal conservation Reserves, two World Heritage sites of the Nanda Devi Biosphere reserve and Valley of Flowers National Park.



GREEN AMBASSADOR OF UTTARAKHAND: SHRI JAGAT SINGH JUNGLEE

Shri Jagat Singh Junglee, the Green Ambassador of Uttarakhand is developer of Mix Forest Model. His journey with the movement started in 1974 when he was serving BSF and once when he returned to his village during holidays he realized the plight of the women of his village who used to go early in the morning to far away forests for collecting fodder and fuel wood, only to return late in the evening. Many of them used to get injured while climbing the forest. He thought to himself of providing a source of these necessities to them near to their village. With this idea he started working on a barren patch of land of 1.5 hectare inherited from his forefathers. Family and villagers supported him in shaping his dream. In 1993 his name got published for the first time in a local newspaper after he was awarded the certificate with title "Junglee" in a function at a High School near his village where he was invited as a speaker to deliver a speech on environment and the forest which he was developing. He has received many prestigious awards like Indira Priyadarshini Vriksha Mitra Award, Uttarakhand Gaurav award and Aryabhatt Award. He was also given Silver Award by Godfrey Philips India in 2007 and was honoured as Green Ambassador of Uttarakhand in 2012. His mixed forest model is a classic example on building up of micro-climate where in both plant species of winter and summer climate can co-exist and survive by adopting simple technologies like Stone, Pit and Wood technology. His forest serves not only a source of fodder and fuel wood for the villagers but also presents a classic example of forest farming by generating livelihood opportunities through plantation of various herbs, medicinal plants, ringal, rambaans, evergreen grasses, ginger, turmeric, tea etc. Some of the high altitude medicinal plants like thuner, salampanja, salammishri and kutki can also be found in this forest due to engineered microclimatic conditions. His forest thus serves as herbal species collection centre for students of different Universities from various parts of the country. During the rampant forest fire incidents in Uttarakhand last year, this forest could survive due to mixed plantation and presence of species like *Pinus patula* (American Pine) which helps in maintaining moisture and whose leaves do not catch fire. His idea of mixed forest need to be replicated in other parts of the State and Country. Our vast forest resources should be managed with the help of local youths which may be trained appropriately which will further check the ever-growing unemployment rate.

Table: *Medicinal plant species of Uttarakhand completely banned for collection from Forest*

S/No	Trade/ Local Name	स्थानीय नाम	Botanical Name
1.	Hattajari/Salam panja	हत्थाजड़ी / सालमपंजा	*Dactylorhiza hatagirea*
2.	Riddhi	रिद्धि	*Habenaria intermedia*
3.	Vriddhi	वृद्धि	*Habenaria edgeworthii*
4.	Kakoli	काकोली	*Fritillaria roylei*
5.	Chhirkakoli	छिरकाकोली	*Lilium polyphyllum*
6.	Jivak	जीवक	*Malaxis muscifera*
7.	Rishibhak	ऋषभक	*Melaxis cylindrostachya*
8.	Salam Mishri	सालममिश्री	*Eulophia dabai*
9.	Jatamansi	जटामांसी	*Nardostachys jatamansi*
10.	Karvi	कड़वी	*Gentiana kurroo*
11.	Satuva	सतुवा	*Paris polyphylla*
12.	Chirayita	चिरायता	*Swertia chirayita*
13.	Kingora	किनगोड़	*Berberis spp.*
14.	Atis	अतीस	*Aconitum heterophyllum*
15.	Mithabish	मिठाविष	*Aconitum balfourii*
16.	Kutki	कुटकी	*Picrorhiza kurrooa*
17.	Genthi	गेंठी	*Dioscorea deltoidea*
18.	Salparni	सालपर्णी	*Desmodium gangeticum*
19.	Prishnaparni	पृष्ठपर्णी	*Uraria picta*
20.	Bach	बच	*Acorus calamus*
21.	Giloy	गिलोय	*Tinospora cordifolia*
22.	Maida / Maha Maida	मैदा / महामैदा	*Polygonatum spp.*
23.	Dolu Archa	डोलूआर्चा	*Rheum spp.*
24.	Sarpgandha	सर्पगन्धा	*Rauvolfia serpentina*
25.	Kalihari	कलिहारी	*Gloriosa superba*
26.	Timru	टिमरू	*Zanthoxylum armatum*
27.	Van pyaj	वनप्याज	*Urginea indica*
28.	Sankhapushpi	शंखपुष्पी	*Canscora decussate*
29.	Manjith	मंजीष्ठ	*Rubia cordifolia*
30.	Balchari	बालछड़ी	*Arnebia benthami*
31.	Thuner/ Talispatra	थुनेर / तालिशपत्र	*Taxus baccata*
32.	Dhup	धूप	*Jurinea dolomiaea*
33.	Tagar	तगर	*Valleriana wallichii*
34.	Choru	चोरू	*Angelica glauca*
35.	Van Kakdi	वनककड़ी	*Podophyllum hexandrum*

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CHIRPINE LEAVES

A PROBLEM TURNED INTO OPPORTUNITY

Chirpine (*Pinus roxburghii*) trees shed a huge lot of leaf biomass, locally called as pirul that is under utilized and is often a cause of forest fires each year. The estimated volume of this litter is approximately 2 million tons per annum. Uttarakhand Forest Department invited proposals from the commercial firms in 2009 to purchase pine needles from the local people at a minimum rate of ₹ 1 per Kg with a token amount as royalty and few firms came forward for making fire briquettes out of the collected needles, and utilizing the dry needles for generating power. This exercise was helpful in generating local employment opportunities and controlling incidents of forest fires (Planning Commission, 2011) initially but did not bear much prospects as not many firms are approaching to buy pirul presently. In 2010, Uttarakhand forest authorities came up with a long-time pirul plan to find a permanent solution to forest fires. The plan envisages utilisation of this pine needles, a major cause of the spread of forest fires. It also calls upon generating power from pirul. Forest authorities have been soliciting support of major industries to ensure utilization of collected pine needles. Since then efforts have been made to make briquettes from pine needle due to its high calorific value i.e. 4000 KCal/Kg to be used as fuel by the rural communities. Moreover, use of pirul in generating electricity is also being explored. 13 Kg of dried pirul can generate 9 KWH or 9 units of electricity.

Villagers already use a large sum of pirul along with other leaves, which they collect before monsoon and winter to be used as bedding for their livestock. This bedding gets messed up with the excreta of the livestock and gets replaced regularly. The leaves and excreta together make a good manure and are used up in the fields. Further, use of pine needles in constructing check dams to control the flow of water and soil erosion in hills is also being practiced. For making check dams, pine needles are packed inside a net made of jute ropes. The net is subsequently shaped into a cylindrical form like that of a bedroll. This roll is put up at strategic points and serves as an effective means to break the flow of small water bodies in forest areas. By 2013, 36 pirul check dams had been constructed in the Van Panchayat's of Chausali, Barshmi and Shail in Almora district (Civil and Soyam Forest Division, Almora, 2013). G. B. Pant National Institute of Himalayan Environment and Sustainable Development, Almora, as part of its training initiative has been encouraging villagers to prepare briquettes from pirul. A recent decision by state authorities to ensure that briquettes be used in government offices during winters has come as a big encouragement. There is still a long way to go for ensuring hundred percent utilization of pirul.

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