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**Utilisation of Pine needles (*Pinus roxburghii*) to reduce the forest fire in
Nowshera Forest Division, J& K**



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ABSTRACT

In Jammu & Kashmir, subtropical Pine forest accounts for 16.40% of the total forest cover and are predominately distributed over the Shivalik range of Himalayas. During the Summer, shedding of dry needles forms a thick mat on ground which not only affects the growth of regeneration but due to slow rate of decomposition, it acts as combustible material during peak summer season. Pine needles have considerable amount of resin content which enhance fast combustion of

dry litter during summer making the forests vulnerable to fire. In order to utilize these chir needles and to reduce the forest fire, its sustainable management with new interventions in utilisation of these chir needles were explored in the Nowshera Forest Division, District Rajouri, J&K.

KEY WORDS

Jammu & Kashmir, Forest fire, Chir needles, Nowshera Forest Division, Control burning, livelihood options

RESEARCH PAPER

Introduction

In India, Chir Pine covers an area of 8,69,000 ha from Jammu and Kashmir, Haryana, Himanchal Pradesh, Uttar Pradesh, Uttarakhand, parts of Sikkim, West Bengal and Arunachal Pradesh inhabiting areas at 450 to 2300m altitude. In Jammu and Kashmir the area under Chir Pine Forest is 158,813 ha and occur at an altitude of 500-1500m all along Himalayas and extend from Basohli in East to Poonch in west and goes up to Chenab Valley. It occurs in Bhadarwah, Doda, Ramban, Reasi, Udampur, Samba, Kathua, Poonch, Rajouri, Nowshera, Billawar and in Jammu Forest Division.

Chir Pine trees due to their resin rich needle leaves and twigs are highly inflammable and prone to Forest fire. As per study conducted in Himachal Pradesh, 1.2 tonnes of Pine needle are shed per year per ha. In J & K, subtropical Pine forest accounts for 16.40% of the total forest cover estimated. During the Summer, shedding of dry needles which add to the vulnerability of the forest floor to fire during summer. Fire incidence cause damage to vegetation cover; loss of natural regeneration; loss of wildlife habitat; change in micro-climate; loss of biodiversity; invasion of weeds which adversely effect on the local livelihood, besides release of Carbon dioxide, responsible for global warming.

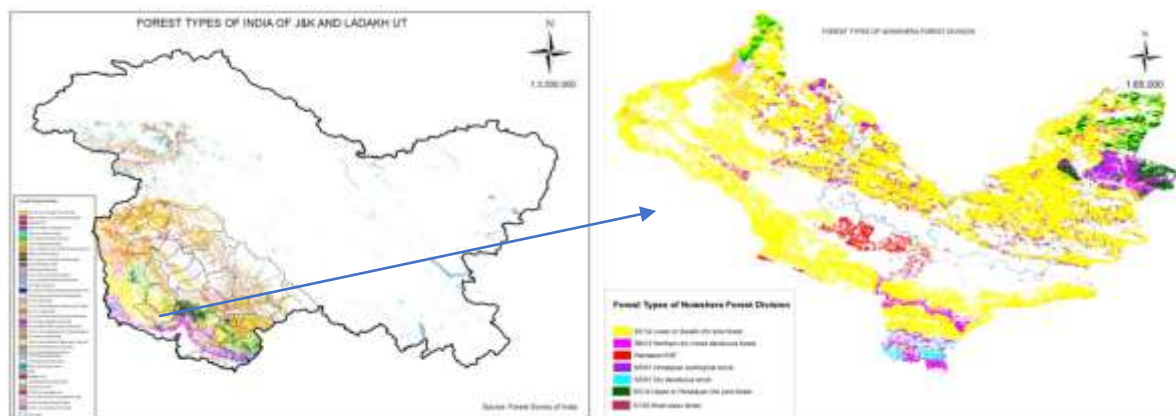
As per the traditional forest management, Control burning of the chir pine needle is carried out just prior to summer months. However, Control Burning leads to emission of CO₂, SO, NO and particulate matter (black carbon and soot) causing the environmental pollution and may leads to loss of visibility and trouble to asthma patients and eye irritation. The huge Pine needle biomass (organic resource) instead of control burning need to be utilized on sustainable basis. Various handicrafts, packing materials and home decor items, bio briquettes, Pine needle Check dam can be made out of these chir pine needles. That will generate employment and income for the local people and involve their effective participation in Forest fire prevention and control. This however requires training and technical support to local communities.

Categorisation of Forest Divisions on Forest Fire Vulnerability

Jammu Region		Kashmir Region	
Forest Fire Vulnerability	Name of Forest Division	Forest Fire Vulnerability	Name of Forest Division
High	Nowshera, Jammu, Reasi	High	Kehmil
Moderate	Kathua, Udampur, Sambha, Ramnagar, Billawar, Rajouri, Poonch, Kisthwar, Marwah	Moderate	Bandipur
Low	Basholi, Ramban, Doda, Bhaderwah, Batote, Mahore	Low	Anantnag, Sind, Kamraj, Urban, LidderAwantipora, Shopian, Langate, Tangmarg, Kulgam, Pir Panjal

Nowshera Forest Division is widespread in around 65000 ha area and about 9565 of very dense and dense Chir forest is prone to the forest fire. The local people residing in and around the forest, depends upon the forest for their daily activities like fuelwood, grazing of their cattle etc. Particularly the communities like Gujjar, bakkarwal largely depends upon forest for grass and grazing of their cattle's. It is worth saying that Nowshera Forest Division has high pressure of grazing. For the green lush grass, the nearby communities put on fire to

the dry chir needles in their nearby forest. Burning of dry chirneedle develops into the forest fire causing emission of gaseous, damage to the trees as well as the biodiversity including the wildlife. To overcome with these above pressures and problems, in year 2021-22 following innovative activities were carried out in Nowshera Forest Division which not only created the livelihood opportunities to the forest fringe communities but also reduces the forest fire incidence in the chir forest. This paper deals with the innovative steps taken by the Nowshera Forest Division in alternative use of Chir pine needles to reduce the forest fire incidences.



Estimation of approx. Quantity of Chir needles.

Approx quantity of pine needle available in the proposed pilot project area is worked out through sampling in selective location and other data compiled from various scientific publications:

S.No	Particulars	units	Remarks
1	Project area	9565ha	V. dense and dense Forest
A	Project area (very dense forest)	449.8	
B	Project area (dense forest)	9115.64	
2	Average pine needle yield	1.2 kg/ha/yr	As per the study conducted in HP in 2006
3	Pine needle availability over the project area (multiplying units in SI No 1 and 2)	11478 tonnes/yr	
4	Wastage due to local consumption, terrain and other factor calculated at 30% of the gross avilability	3443 tonnes/yr	As per calculation followed in various studies
5	Net Pine needle availability over the project area	8035 tons/yr	

Utilising the chir Pine needles

A. Chir Needle to handicrafts

Nowshera Forest Division had initiated the step of training local women's to make various handicraft items out of the Chir Pine needles like Roti box, Tray with wooden base, Tray without wooden base, Dining Mats, Ladies Purse etc. These Bio-product are apart from other handicraft items because of their distinctly eco-friendly and organic nature and no chemical is involved in the entire process.



PROCESSING OF CHIR PINE NEEDLES

Chir needles are collected from forest floor and tied in bundles. After bundling of collected Chir pine needles, thoroughly washed in washing powder so that dirt or any unwanted material get washed away. These bundles are then put in boiling water, with neem leaves and glycerine drops in it. The neem leaves protect the Chir pine needles from fungus and glycerine gives shine to these Chir pine needles. The bundles are kept in water for overnight, after which they are shade dried and ready to braid.



WOMEN SHGS PLAY AN IMPORTANT ROLE

From rural areas, women's are especially showing interest and coming forward to learn the skill of Handicraft making and are playing important role in dispersing the idea of livelihood generation from chir pine needles among the villagers. Some women's are now trained enough to impart these Handicraft making training skill to the other villagers and emerging as the Master trainers. Women can play a vital role in this sustainable use of these Chir Pine needles into beautiful handicrafts. There is a substantial demand for organic and eco-friendly products from handmade craft loving customers, Government & Private organizations. There is a huge potential to Chir pine needle handicraft products as an alternate to Synthetic/Chinese products in the gifting segment, home decor segment products etc. Self help Groups are smart enough to customize designs based on the specific requirements.

INITIATIVE OF Nowshera Forest Division

i) Organizing Awareness camp in different location of Nowshera Forest Division

The foremost thing in the Pilot Project was to motivate the local/ villagers to come forward in learning the skill of handicraft making and to make them aware that on one hand the project will generate the livelihood option in the village on the other hand it will reduced the forest fire incidence in the Nowshera Forest Division.

i) **Training Organised:**

Till Date 11 Trainings are already organized in the Nowshera Forest Division and 15 self help Groups are made and registered in NRLM (National Rural Livelihood Mission). Till now 480 women have been trained in Handicraft making and among them 50 women's emerged as Master training, imparting this skill to the others.

S.No	District	Forest Division	No. Of SHGs	No. of Trainings conducted	No. of Person Trained	Duration of training
1	Rajouri	Nowshera Forest Division	15	11	480	1 week



ii) **Display of Handicrafts**

These Chir needle handicraft products are gaining popularity in a span of short period. These products are displayed in local level markets, exhibitions, Katra, Shiv khori area of J&K. The sale price of these products are from Rs 300 to Rs. 700.

B. Chir needles to Bio briquettes

Another initiative of Bio briquettes making from chir needles started in Nowshera Forest Division. IIT Roorkee has designed a manual, ecofriendly and green machine which is introduced in Nowshera Forest Division for making the chir needle briquettes. It requires no binding material and is hand driven especially designed for womens. 100 grams of crushed pine needles makes 80g of briquettes and the whole process takes 80sec. These briquettes can be used for cooking and heating purpose and can be easily sell out at the rate of Rs12-15/kg. Even aromatic briquettes were tried with these machines using Eucalyptus leaves, Vitex negundo etc. and their selling cost is around 80-100/Kg.



1. Sensitization of the Communities

Department has reached out to communities to sensitize them about the pilot project and to seek their participation as potential micro-entrepreneurs especially targeting the local young population, women and SC/ST communities.



2. Training and Capacity Building

Building capacities of locals through training sessions, structured, awareness programs, and outreach while introducing bio-briquetting machine and its functioning to villagers.



3. Collection of Chir Pine Needles and its storage.

Collection of Chir Pine needles was done from the areas sensitive to the forest fire in the Nowshera Forest Division by the locals to utilize the same for the production of biobriquette machine.



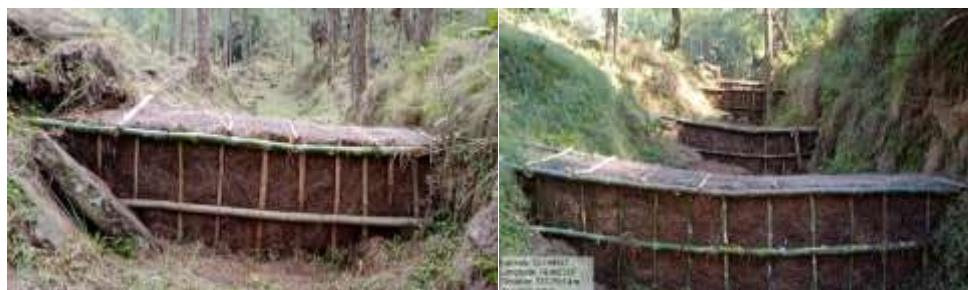
Making of Biobriquettes through SHGs.

S.no	Forest Division	No of SHGs	No. of Person Trained	Duration of training
1	Nowshera Forest Division	05	20	One week

	<u>PROPERTIES OF PINE BRIQUETTES</u>	
<u>1</u>	Calorific Value	4000 kcal/kg
<u>2</u>	Moisture Content	< 5%
<u>3</u>	Ash Content	< 5%
<u>4</u>	Sulphur Emission	NIL
<u>5</u>	Sale Rate	10-15Rs/kg

3. Prepration of Chir needle check dams under Soil and Moisture conservation works

The chir needle check dams were prepared in the Nowshera Forest Division under Soil and Moisture conservation works. In these check dams, chicken mesh is used which is shaped into rectangular shape. The upper portion of chicken mesh has a provision of opening so that refilling could be done after 2 years depending upon the reduction in pine needles. The width is fixed to 3ft while the length of the check dam can vary depending upon the length of the Nala.



Other possibility of utilising Chir Pine needles:

Chir needle to fibre :

FRI has developed an easy, eco-friendly technique to extract fibres from pine needles. Uttarakhand and Himachal Pradesh have already explored this technique to create livelihood opportunities and to reduce the forest fire incidences. The fibre obtained is aesthetic with cream-yellow colour, having a length up to 20 cm with reasonable bundle strength and good water absorption ability. It can be used for numerous purposes as per requirement. The isolated fibre can be spun into handloom cloth, and products like jackets, coats, purses, wall curtains, lampshades, mats, and ropes can be made. The rope net can be used in the mountains to bind large rocks and prevent them from falling. The same technology can be explored in J&K to utilise the chir pine needles in sustainable manner.

Green tea from Green Chir Needles:

Green tea can be made out green chir needles which has a tinge of pine in the aroma and rich in antioxidant properties. Local may be encouraged and trained for the collection, processing, packaging and marketing of Green tea from Green Chir Needles. The online market may be explored for the sale of this product or the sale could be within UT and to other states also.

Conclusion :

Fires caused by pine needles in northwest Himalayas are a major cause of concern for the government of India. The idea of using these pine needles as renewable source of energy generation, handicrafts and other alternative utilisation though theoretically and practically

viable is still not implemented. The process of converting harmful forest bio residue into a useful resource for handicraft and energy has great potential to not only provide sustainable livelihood opportunity to the communities but also to get qualified under the Reduced emission through Deforestation and Degradation(REDD +) by facilitating carbon credits to UT. This experiment of bio briquetting through a manually driven machine, handicraft making and chir pine needle check dam has immense potential to address the issue of economic gain to villagers, forest fire control, forest improvement, climate change and many tangible and intangible benefits. Further other alternatives may be explored to utilise this chir pine needle in a sustainable manner.

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