

PINE NEEDLES TO BIO-BRIQUETTES

Creation of Livelihood Opportunities



Jammu and Kashmir Forest Department
Government of Jammu and Kashmir
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INTRODUCTION

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.

PILOT PROJECT

A Pilot project "Pine needle to Bio-briquettes" is formulated to prevent & mitigate the forest fire and to create livelihood opportunities in Nowshera Forest Division. Keeping in view the recurrent nature of fire incidents during peak summers, the Pilot project was conceived. The key stakeholder are the local villagers in the form of Self Help Groups. As a management, Forest department carry out control burning of Chir Pine needles for prevention of forest fires which leads to Carbon dioxide emissions and add to global warming. Hence, the forest department has initiated utilization of Chir Pine needles for making of Bio-briquettes with active involvement of Self-Help Groups. Forest department, in collaboration with IIT Roorkee is establishing five "Bio briquetting machines" in Nowshera Forest Division to be utilized by women SHGs for production of fuel briquettes which have high demand in market. Technology dissemination is being carried in the area through conduct of awareness & training programs on use of briquetting machine and its functioning to the villagers.

OBJECTIVE OF PILOT PROJECT

The main objective of the pilot project is to utilize the forest bio-residue available as fallen chirpine needles for providing means of livelihood to the local peoples through the use of low cost technology. Following are the objectives of the pilot project:

- Prevention & mitigation of forest fires.
- Providing means of livelihood creation by utilizing the chir pine needles for making bio-briquettes.
- Developing Value Chains including market access, facilitation.
- To involve Women SHGs in creation of livelihoods on sustainable basis.

AVAILABILITY OF RAW MATERIAL

Out of 31,395 ha of Chir forest, 9,565ha is very dense and dense chir forest in Nowshera Forest Division. For the purpose of collection of chirpine needles, very dense and dense forest will be considered as they are more vulnerable to forest fires due to the availability of chir pine needles in large quantities. There is sufficient raw material available on sustainable basis.

AREA OF OPERATION

The Pilot project is being initiated with establishment of five Bio-briquetting in Nowshera Forest Division in the following locations (villages):

1. Kangri
2. Salheri
3. Brevi
4. Nowshera
5. Lamberi

BIO-BRIQUETTE MACHINE DESIGNED BY IIT ROORKEE



GENERAL LAYOUT OF MACHINE

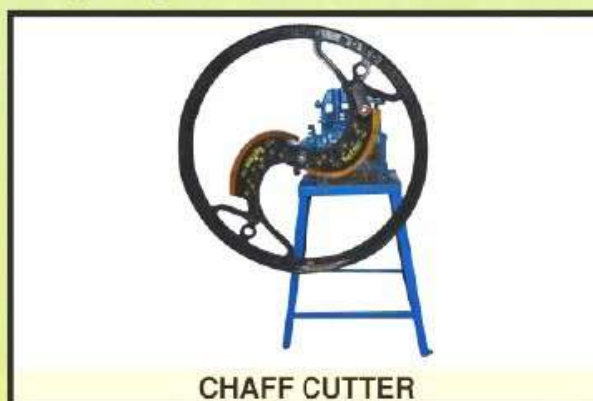
- | | | |
|---------------------------|-------------------|-----------------------|
| a) Hopper | b) Metallic plate | c) Cavity/chamber |
| d) Movable block with die | e) Piston | f) Ejector |
| g) Lever1/arm1 | h) Lever2/arm2 | i) Hydraulic cylinder |
| j) Pressure Knob | k) Metallic Base | l) Oil knob |
| m) Pedal | | |

PRE-PROCESSING OF PINE NEEDLES

1. Make sure that the pine needles are dry. If not, make them dry through normal sun drying for at least one day.
2. Use concrete floor or some plastic sheet for spreading pine needles. This will prevent the moisture coming from the ground.
3. Mix them well after every one hour of sun drying so that the entire lot gets enough exposure to the sunlight.
4. It is advisable to remove the foreign particles like wood, stone, plastic etc at this stage only.
5. Store the dried pine needles in a bag or spread them in a sheet, nicely covered so as to prevent the exposure from moisture or rain.
6. Remember Pine needles are highly inflammable, therefore have to be protected from fire by covering them with fire proof material.
7. Sufficient care be taken to prevent any kind of fire near the place of storage where chirpine needles are stored.

CRUSHING OF PINE NEEDLES IN HAND OPERATED CHAFF CUTTER

1. Pine needles are chopped in hand operated chaff cutter before placing them in the briquetting machine.

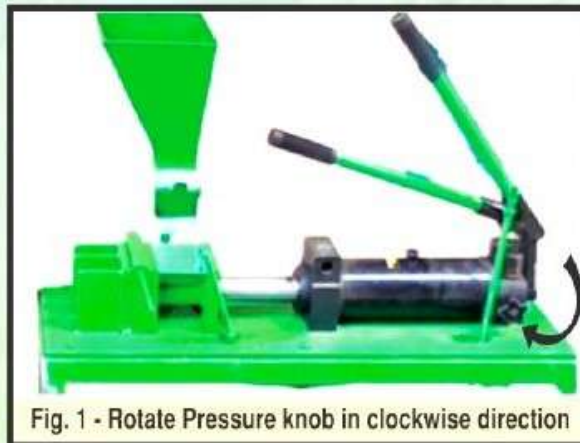


CHAFF CUTTER

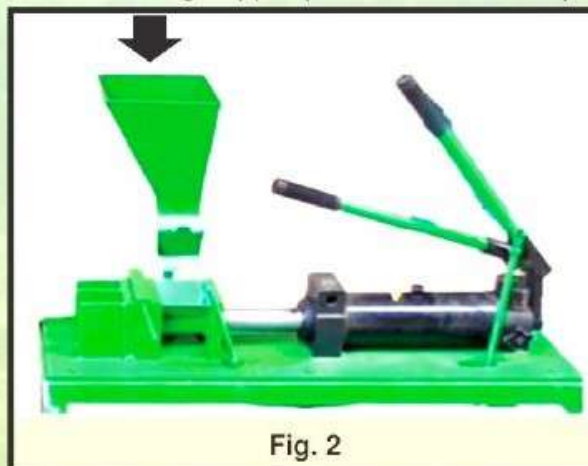
2. To collect the fine particles coming out of the crusher, place the plastic sheet below the outlet provided in the machine.

OPERATION OF BRIQUETTING MACHINE

1. Before starting to work on the machine, make sure to wear the gloves and mask as dry particles may pinch and one may inhale pine dust while breathing.
2. Make sure that the pressure knob (j) is tight.



3. Feed the machine using hopper provided in the setup as shown in the Fig. 2



4. It must be noted that larger particle size may block the exit passage in the hopper and therefore size of the particle must be small. (a) Do not use big pine needles b) Use only crushed pine needles.



5. Start with arm1 to provide initial push that can be applied by moving the lever in up and down direction. Once the pressure is reached to its maximum level, it is advisable to switch to the arm2 and pedal in order to provide final pressure. Stop when the maximum pressure is reached

i.e. piston ceases to move further.

6. Release the pressure by rotating the pressure knob(j) provided on the side of hydraulic cylinder & piston will come back to its initial position. Rotate Pressure knob in the mentioned direction.



Fig. 4 - Rotate Pressure knob in the mentioned direction

7. Move the metallic block containing the die by 90° in upward direction.
8. Use ejector lever(f) for taking briquette out of the die. Make sure that the briquette is ejected, only then feed the machine with new material.

PACKAGING OF BRIQUETTES

1. For supplying briquettes in the market it is advisable to stack 4-5 briquettes properly tied together with the help of a thread as shown in the figure given below.
2. The stacked briquettes must be placed one above another in a carton. Packing briquettes in this fashion avoids crumbling of briquettes during transportation.
3. Briquettes produced from the machine can be utilized in house hold cooking and heating.



PROGRESS MADE TILL NOW

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

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 bio-briquette.



4. Storage of Chir Pine Needles



ANALYSIS OF PILOT PROJECT

1. Strength

- (i) Socio-economic value creation through forest bio residue.
- (ii) Community based management of ecosystem.
- (iii) Source of livelihood generation for the locals.
- (iv) Reduction in the Forest Fires incidence and improvement of forest.
- (v) Alternative fuel for cooking and heating.

2. Opportunities

- (i) Creating a supply chain model to upscale the use of technology amongst the local peoples.
- (ii) Creating options of entrepreneurial efforts for local youth.
- (iii) To support international and national commitment towards climate change mitigation.

3. Safeguards

- (i) Over cleaning of chir pine needles be avoided from forest floor.
- (ii) Needles being forest produce require supervision of field staff.
- (iii) Village Panchayat of the area to play an important role.
- (iv) Machine operation needs careful handling to avoid frequent

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