UNNAT BHARAT ABHIYAN

(A Movement for Progressive India)

Quarterly Progress Report

(Uttarakhand & West Uttar Pradesh Region)

October – December 2022

of

Regional Coordinating Institute (RCI)

Indian Institute of Technology Roorkee

Organic Farming

Water Management

Renewable Energy

Artisans, Industries & Livelihood

Basic Amenities

Convergence

Regional Coordinating Institute (RCI)

Unnat Bharat Abhiyan 2.0

Indian Institute of Technology Roorkee

Roorkee-247 667 (Uttarakhand)

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Regional Coordinating Institute (RCI)
Quarterly Progress Report

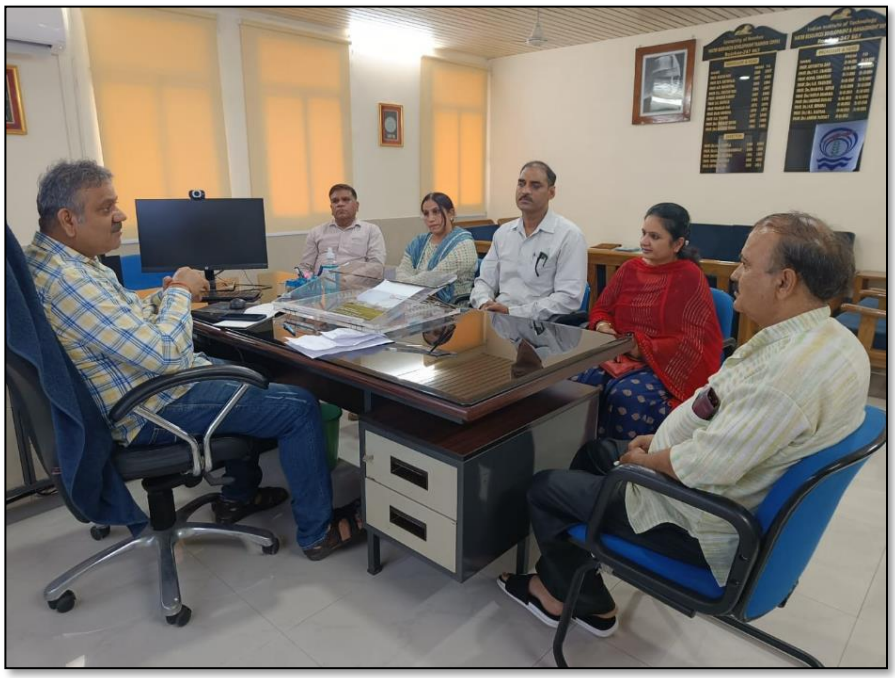
This Quarterly Progress Report provides the details of activities carried out by the Regional Coordinating Institute, Unnat Bharat Abhiyan, Indian Institute of Technology Roorkee, from October 01, 2022 to December 31, 2022. The RCI, UBA, IIT Roorkee organized the following activities:

Sl. No.	Date	Meetings/Webinars /Workshops
1.	14-07-2022	Initiative - Donations of Computers & Chairs
2.	30-07-2022	Tech4Seva Event at Regional Level

"Initiative - Donations of Computers & Chairs

(Regional Coordinating Institute, IIT Roorkee)

The Regional Coordinating Institute, Unnat Bharat Abhiyan, IIT Roorkee has taken an initiative for donating of Computer Systems (12 Nos.) & Chairs (31 Nos.) in the adopted villages i.e. Beladi – Salhapur & Meerpur. Prof. Ashish Pandey, Regional Coordinator, UBA Pandey assured the principals who came from the adopted village that he would do everything possible for the development of the village.



Unnat Bharat Abhiyan

(A Movement for Progressive India)

Report

on

"Tech4Seva Event at Regional Level"

for the coordinators of Uttarakhand - West Uttar Pradesh Region & NGO's

Date: July 30th, 2022

Organic Farming

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Report on "Tech4Seva at Regional Level"

Regional Coordinating Institute, Unnat Bharat Abhiyan IIT Roorkee Organized **"Tech4Seva *at Regional Level*"** event on July 30, 2022, at the Department of Water Resources Development and Management, IIT Roorkee.

UBA Participating Institutions (PIs) coordinators from Uttarakhand, West Uttar Pradesh, IIT Roorkee faculty members, students, NGOs, Gram Pradhan's of the adopted villages attended this program. The list of participants is enclosed as annexure –I. The event schedule is enclosed as annexure – II.

Themes of the Event: The focal theme of the event was technology outreach as an enabler for inclusive, sustainable, and affordable healthcare. Sustainable agriculture systems, water resource management, rural energy systems, artisans, industries and livelihood, and basic amenities (infrastructure, education, healthcare) were the sub-themes of the event.

Prof. Ashish Pandey, Coordinator, Unnat Bharat Abhiyan, Regional Coordinating Institute, IIT Roorkee apprised that the students from 45 participating institutions of Uttarakhand and 40 of Western Uttar Pradesh, working voluntarily under the Unnat Bharat Abhiyan program, are providing their services in about 425 adopted villages. He said that under the UBA program, continuous efforts are being made to make life easier and improve the living standard of villagers through technology intervention. He added that from the Tech4Sewa event, the three best devices/techniques would be selected in this event and shared with the UBA, NCI IIT Delhi, which would later be included in a compendium of 75 technologies chosen from all over the country. The three best entries would be selected by the panel of experts headed by Prof. M. L. Kansal, Prof. Kritika Kothari, and Prof. Bhanu Prakash Vellanki.

Prof. M. Parida, Deputy Director, IIT Roorkee, addressed the inaugural session of the program. He said that the students working voluntarily under the UBA program tried to understand the problems of villagers. They have developed simple devices which address the issues directly related to the villagers and farmers. He said that IIT Roorkee is celebrating 175 years of its existence. This is a matter of

pleasure and pride that IIT Roorkee is successfully connected with farm ers and people of rural backgrounds through Unnat Bharat Abhiyan and Gramin Krishi Mausam Seva (GKMS) programs.

Prof. Akshay Dvivedi, Dean SRIC, IIT Roorkee, apprised that IIT Roorkee has initiated a 'COMAL' (Common Man to Laboratory) scheme under which any common man (innovator) is welcome to approach Design Innovation Center at IIT Roorkee with his/her innovative ideas/design. This is another way to connect common people with IITs-like institutions.

Demonstration of Technologies

1. **Prof. Vinay Sharma, Dept. of Management Studies, IIT Roorkee**
   - Low-cost Energy Through Forest Bio-Residue
2. **Prof. R. P. Saini, RUTAG, IIT Roorkee**
   - Aloe-Vera Processing Machine for Natural Cosmetic Multi Products
   - Mechanized Roller for Namda (Felt) Making
   - Efficient Pomegranate Seed Extraction Machine
   - Development of Air-Cooled Based Vegetable Vending Cart
   - Variable Speed Motorized Bageshwari Wool Charkha (Version-2)
3. **Dr. Swapan Suman, MIET, Meerut**
   - Hands-free Water Tap Mechanism
   - Automatic Plant Irrigation System
4. **Dr. Brijesh Prasad, Graphic Era University, Dehradun**
   - Waste Water Treatment Using Biomass Residue
5. **Mr. Alap Mahar, DR. APJ Abdul Kalam Institute of Technology, Tanakpur**
   - Automatic Chaff Cuter Machine
   - Mechanical Floor Cleaner• Agricultural Multipurpose Machine
6. **Dr. Manuj Agarwal, MIT Moradabad**
   - Krishi Saarthi (Investigating Soil - Arduino Nano, NPK sensor)
   - Krishi Saarthi (Fasal Suraksha)
7. **Mr. Navneet Kumar**

- Demonstration of Drone Technology

❖ Technology - Low-cost Energy Through Forest Bio-Residue

By (Prof. Vinay Sharma, DoMS, IIT Roorkee)

Basic Information of Technology		
	Items	**Answers**
1.	**Title of the technology**	**(Portable Manual Briquetting Machine for Converting Forest Bio Residue to Low Cost Energy Briquettes)**
2.	About technology (in short) (upto 50 words)	The Briquetting Machine is portable, manual, easy to use, low cost, low maintenance having high efficiency in terms of generating around 2000 PSI of pressure to compress forest bio residue in to briquettes without any requirement of mixing, drying or pyrolysis
3.	Contact Details of Technology Developer (Name, affiliation, email id, mobile no.)	IIT Roorkee—PIs Dr. Vinay Sharma and Dr. Rajat Agrawal Professors, Department of Management Studies and Joint Professors at Department of Design at IIT Roorkee with technical advice of Dr. Kapil Joshi IFS. Emails and Mobile:vinay.sharma@ms.iitr.ac.in 9839022610, rajat@ms.iitr.ac.in 9719004491.
4.	What is the scientific approach to choose the particular technology?	Forest Bio Residue is light weight and is available in large quantities, cannot be collected and brought down the hills for a particular usage. It possesses high calorific value. If can be compressed at the place of availability and may be used for energy generation would express large complimentary value. A system is required which does not requires any mixing, pyrolysis and easy for production while enabling usage
5.	After what duration the first output can be seen?	The first output is ready and commercially viable as of now very well adopted by 2 villages in Uttarakhand and the Forest Division of Nowshera in Jammu and Kashmir
6.	What kind of resources required (raw material, energy, water, others)?	Just the Forest Bio Residue especially PINE NEEDLES
7.	What is the area foot print of the Process/Technology?	Whole of the North Western Himalayas
8.	What kind of Climatic and Geographical location is required?	Himalayan Areas

9.	Gestation period of the project?	The project requires larger expansion and the establishment of a fully functional commercial model
10.	Minimum Economic Unit Size?	20 villages with 25 machines each
11.	Indicative Investment for the Technology	9-10 Crore Rupees
12.	Skill required for operations/ maintenance	Basic operational efficiency and very basic maintenance skills
Salient Feature of Process/Technology Information		
13.	How everything from top to bottom (Supply Chain) to be made in the village itself (Circular and local)?	Pine Needles are shed by Pine Trees in millions of tons every year. There are hundreds of villages where pine needles are available in abundance. These needles must be collected and chopped along with briquettes being made. During shedding season of March – June ALL THREE ACTIVITIES of collection, chopping and briquetting must be done while REST of the NINE Months only Briquetting out of stored chopped needles can be done. This will provide cooking, heating with low carbon emissions at the house hold levels, Livelihood ALL YEAR through by sales proceeds from the Restaurants, Resorts and other commercial buyers. Larger out put may cumulatively be sold for industrial usage as well.
14.	Employment generation Potential	One machine is good enough for providing a sustained livelihood to one household or 5 individuals, hence a village may be provided with a livelihood for 125 people and 20 villages may have a livelihood for 2500 people, all the year round.
15.	How many Training Days or months required for the technology to be learned properly?	From production to marketing requires the training during one cycle of 4-5 months
16.	If it can be implemented at Family level or external manpower is required?	It is better if it is implemented at the family levels
Additional Information		
17.	How many Manpower required?	3-4 people per machine
18.	Cost of Technology (Please provide breakup if possible)	One machine installation with cutter and a mobile phone with marketing and information application is around 1,30,000 Rupees wherein Machine is around 90,000 Rupees and the rest are peripherals along with other associated costs

19.	What type of Certification required for the product?	No certifications required as such
20.	Risk involved?	No risk involved as such. The major precaution must be taken for the storage of the pine needles and the briquettes as these are highly inflammable
21.	Research Publications/ Newspaper publication/ Patent(authored by the technology developer)	1. Sengar, A., Sharma, V., Agrawal, R., Dwivedi, A., Dwivedi, P., Dwivedi, Joshi, K., Dixit, G., Sharma, P.K., & Barthwal, M. (2020). Prioritization of barriers to energy generation using pine needles to mitigate climate change: Evidence from India. Journal of Cleaner Production, 275, 123840. **Impact Factor – 9.297** 2. Dwivedi, A., Dwivedi, P., Joshi, K., Sharma, V., Sengar, A., Agrawal, R., Sharma, P.K., Dixit, & Barthwal, M. (2022). Local leader's impact on adoption of renewable energy generation technology by rural communities in the Himalayan region. Journal of Cleaner Production, 352, 131479. **Impact Factor – 9.297** 3. Joshi, K., Sharma, V., & Mittal, S. (2015). Social entrepreneurship through forest bio residue briquetting: An approach to mitigate forest fires in pine areas of Western Himalaya, India. *Renewable and Sustainable Energy Reviews*, 51, 1338-1344. **Impact Factor – 11.239** There are several news coverages on this a recent one is:
22.	Any other Information	Photos/videos https://www.nmhs.org.in/pdf/success_story/18-01-2021_Dr.%20Vinay%20Sharma/Success_story.pdf
		https://youtu.be/-izGxlxyZHw

❖ **Technology -** Following Technology were demonstrated during the exhibition.

- Variable Speed Solar Based Bageshwari Wool Charkha.
- Pomegranate Seed Extraction Machine.
- Aloe-Vera Processing Machine for Natural Cosmetic Products.
- Mechanized Roller for Felt Making.
- Air Cooled based Tricycle Vegetable Vending Cart.

By Prof. R. P. Saini, RuTAG, IIT Roorkee,
Shri. Vijay Saini & Shri. Imtiyaz Ali (Project Associate)

Variable Speed Solar Based Bageshwari Wool Charkha -

Foot operated traditional charkha is used for spinning of the wool in Uttarakhand, Kashmir and Himachal Pradesh. The traditional charka has drawbacks of non-uniform filling of bobbin; non-uniform thickness thread of yarn, low productivity. It requires strenuous efforts and physical work to run the charka. In order to overcome these issues, a modified Bageshwari Wool Charkha is developed by upgrading the traditional charkha as shown in Figure. The advanced Bageshwari Wool Charkha comprises of solar panel (75 W), electric motor (110W), battery (12 V) with 4 volt rechargeable battery operated through foot pedal. Further, a knob control is provided to adjust the course and fine spinning of wool. This system has advantages of a USB socket, battery backup, lightweight structure and its components that can be easily be assembled and disassemble. The main components of the automated Bageshwari Charkha are listed below. The components are also shown in figure**.**

Components of the Bageshwari Wool Charkha

S. No.	Component	Specification
1	Battery:	12 Volt 35 amps
2	Generator	4 volt (Operated through peddle fitted)
3	D.C. voltmeter	6 to 100 Volt
4	Motor	220 V 50Hz 110 watt , R.P.M. 7500
5	Switch and Socket	220 volt Inverter output
6	Knob control	Coarse and Fine control
7	Worm Gear box (gear ratio)	1:48
8	Solar Panel	75 watt
9	Fly wheel	Dia-17", Thickness-18 MM
10	Tool box	14.5" ×11.5"×6"

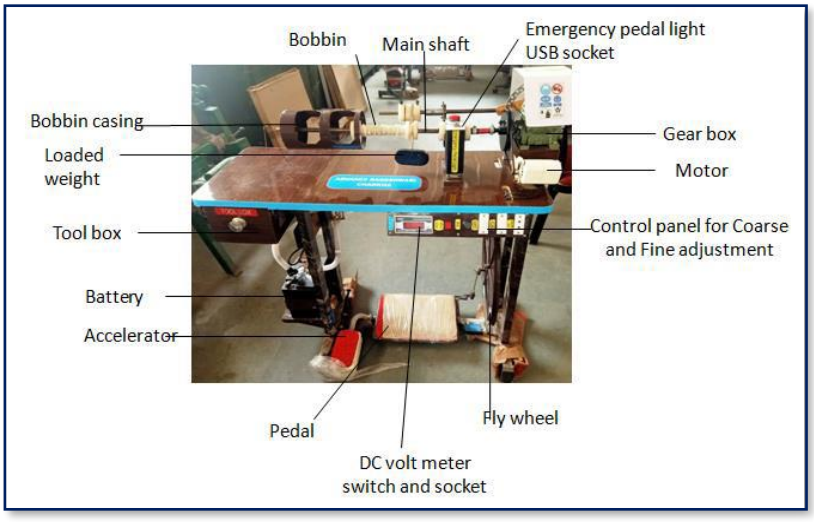


Fig : Photograph of Modified Bageshwari Wool

Pomegranate Seed Extraction Machine -

Photograph of Pomegrante aril extraction machine

India being the largest producer of pomegranate is a host to various cultivated as well as wild varieties. Pomegranate is high in demand due to its rich nutrients, dietary fibers, foliates and vitamins. Wild pomegranate grows in vast tracts of mid altitude in Himachal Pradesh, Uttarakhand and Jammu and Kashmir states of India. It is highly valued for its nutritious arils and peel which is source of additional income to farming communities. Local farmers harvest wild pomegranate, extract arils and peels, and sun dry them for sale. In absence of efficient aril extraction technology the farmers undertake strenuous and time consuming labour. Yet, they are unable to process entire harvested pomegranate during its short shelf life coinciding with September rains. As a result, much of the harvested fruits rot and remain unutilized. In order to improve local extraction processing and to overcome the difficulties, RuTAG, IIT Roorkee has designed an electrically operated light weight pomegranate aril extraction machine. It can completely extract arils of 50-60 kg pomegranate in one hour as compared to maximum of 10 kg extraction in an hour using local technology in Himachal Pradesh. Use of this designed machine, could help in rapid aril extraction to prevent rotting of fruits which cannot be processed in time because of unavailability of efficient machines to the local people. A photograph of Pomegranate aril extraction machine is shown in Figure.2.

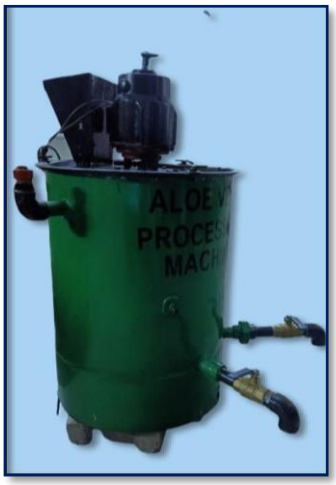
Technical Specifications of Pomegranate seeds Extraction machine

S. No.	Accessories	Dimension
1.	Shape	Cylinder-2 nos. (Base frame & Inner cylinder- Fruits Placing)
2	Size	2 feet
3	Motor	½ HP
4	Pulley	2" & 12"

Aloe-Vera Processing Machine for Natural Cosmetic Products -

Aloe-Vera, Wild apricot oil and Artemisia along with other natural ingredients which are found in states of Uttarakhand and Himachal Pradesh are used for preparing natural cosmetic products. In the pharmaceutical industry Aloe-Vera, has been used for the manufacture of products such as ointments and preparing cosmetic products like creams etc. The production process of Aloe Vera juice involves blending, grinding and heating of the entire leaf of the Aloe Vera plant to produce a liquid followed by various steps of filtrations and analyzed for its quality. The extracted juice is then mixed with other substance to produce a pharmaceutical, cosmetic or food product. However low-cost single unit at small scale which combines all operations is not readily available locally to the people. To Provide additional livelihood for the locals and upgrading skills through developing appropriate techniques to make various natural cosmetic products from Aloe Vera pulp and other useful plants, a low-cost machine is developed which can facilitate all operations of grinding blending& heating of Aloe Vera pulp &other products while controlling all critical parameters during the process in a single unit. This will provide sustainable source of income to the farmers/people of the area.

Final Product cosmetic moisturizing cream



Aloe Vera Processing Machine

Components of Aloe-Vera Machine

Sr. No.	Item	Specification
1.	Motor ¼ HP	2800 RPM

2.	Heating Element	2000W
3.	Grinding Blade	-
4.	Cylinder Diameter	305mm
5.	Manual handle	-

Mechanized Roller for Felt Making -

Photograph of Mechanized rolling devices

Non-woven woolen ornamental felt making is a prominent handicraft cottage industry in many states of India and it is a popular livelihood activity in the states of Jammu and Kashmir , Uttarakhand and Rajasthan. Felt has wide ranging usages for floors spreads, cushion covers, sofa covers, yoga and meditation mats, bags and fancy decoration item, and heat and sound insulation material. Felting wool needs much less time in making as compared to that of handloom fabric. Therefore, it is highly useful in processing waste and discarded wool for making fabric of various thicknesses.

Due to harsh and labor-intensive traditional felting processes, the craft of making handmade felt has remained a part of men's profession, and over the years a large percentage of artisans have left the trade of making felt. With this new technology, revival of felt making can take place. Instead of beating and rolling mass of wool with feet, the felt makers can make felt by pushing rollers without exercising strenuous foot and leg work. It reduces physical strain. Women can easily operate the felt rolling machine.

Technical specifications of felting rollers

S. No.	Specification	Roller-1	Roller-2	Roller-3
1	Roller Size	2.5 feet	4.0 feet	5.0 feet
2	Material	Mild steel	Mild Steel	Mild Steel with rubber wheel
3	Size of Felt	2 ×6 feet to 2 ×8 feet	3 ×6 feet to 3 ×8 feet	4 ×6 feet to 4 ×8 feet

Air Cooled based Tricycle Vegetable Vending Cart -

Air Cooled based Tricycle Vegetable Vending Cart.

Traditionally Vegetable hawkers use an open pushcart to carry fruits and vegetables from wholesale market to residential colonies or rural market to sale them. The vegetables are exposed and sold during daytime when the temperature is high most of the time, which leads to rapid deterioration in the quality of vegetables and fruits. It is estimated that rate of spoilage of vegetables alone increases 2–3 fold with each 10°C rise in temperature. Due to this routine of daily movement for sale, the hawkers are unable to maintain appropriate quality of vegetables for more than two days in summer. Thus, most of the perishable unsold for two days old vegetables are disposed of at throwaway price or discarded as waste incurring heavy loss to vendors.

Perishable vegetables need low temperature and high relative humidity for longer storage, especially during summer months. Among various methods, evaporative cooling is an environmentally friendly air-cooling system where water and air are the working fluids The Design cart include air-cooled evaporation cycle for preservation of food and vegetables. It has cooling unit based on evaporative principle. Cool air rich in humidity circulates the storage area to cool and keep required humidity for long storage time. A battery is integrated for powering a DC pump for spraying water over pads and powering a DC fan for circulation of moist and cool air. The battery will be charged at the residence of vendor each night and it can be used throughout the day without any onboard charging. A small water tank of 10-15 liters' capacity is attached for watering the pads. Based on the data collected during the fielding testing, it is found that Air-cooled Based Vending Cart is efficient for preserving the fruits and vegetable for 2-3 days.

Technical specifications for the components of the Pull-Cart

Sr. No	Particular	Rating
1.	Fan Motor	12 Volt, 3.03 Amp,36.36 Watt
2.	DC Pump Motor	12 Volt, 0.84 Amp, 10.84 Watt
3.	Led	12 Volt, 1.32 Amp, 15.84 Watt
5.	Fogger	24 Volt, 1Amp, 24 Watt
7.	Battery	12 Volt 65 Ah
8.	Stainless Steel Cabinet	123 cm x 119 cm x 88 cm
9.	Stainless Steel Water Tank	41 cm x 41cm x 17 cm (24-26 litres)
10.	Diameter of the tri-cycle pushcart wheel	28 inches

- **Technologies-**
  - **Hands-free Water Tap Mechanism**
  - **Automatic Plant Irrigation System**

By Dr. Swapan Suman & Dr. Gaurav Kashyap MIET, Meerut

Hands-free Water Tap Mechanism -

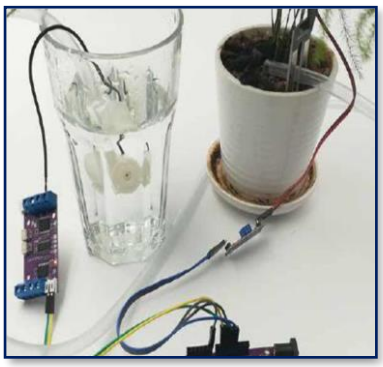
Devansh Sharma and his team under the Guidance of Dr. Gaurav Kashyap and Dr. Swapan Suman present his idea 'Hands Free Water-tap Mecahnism'

1. In the times of Covid-19, washing filthy hands, the user opens the faucet, washes the tap handle thereafter, and then repeats the process. Each and every prevention and precautionary measure is being taken, a foot operated tap for wash basins proposed.
2. The majorities of users do not or are unable to turn off the water, so it continues to flow to the sink without being used when cleaning many pots or utensils consecutively in the kitchen. This prevents the user from taking use of the water running during the times he changes between them.
3. Most important advantage of this mechanism that this mechanism can be brought to the work make without damage to the old pipeline and its cost will be ready in less than Rs. 500-1000 only.

Due to the lack of water resources and extreme use of potable water, a mechanical system is proposed to prevent infection and decrease water consumption in washing of hands and faces, utensils, ablution and similar operations. This study presents a suitable cost mechanical ways with easy implementation to save water and prevent infection. The proposed methods depends on controlling the water flow valve using legs controlled pedals instead of hands because hands are already busy while

washing. This mechanical system is intended to save the cost of power and components and for safety thus, electrical or electronic control is not used. The system design is developed in a way that eases its practical application on the already installed water valves without need to replace these valves entirely. The system is characterized by its simplicity, easy installation and maintenance besides its low effective cost.Currently, there are some available commercial feet or knee operated tap valve systems. They are expensive and need to change and reinstall water piping systems. This design can be implemented on existing systems without changing the tap and/or the connections that are often inside the walls.

Automatic Plant Irrigation System -



Prakhar and his team under the Guidance of Dr. Swapan Suman present his idea 'Automatic Plant Irrigation System' in the event.

The logic of this system is very simple. In this system, the moisture sensor senses the moisture level of the soil and when the sensor senses a low moisture level it automatically switches the water pump with the help of a microcontroller and irrigates the plant. After supplying sufficient water, the soil get retains the moisture hence automatically stopping the pump.

- **Technology: Wastewater treatment using biomass residue**
  By Dr. Brijesh Prasad, Graphic Era Deemed to be University Dehradun

Dr. Brijesh Prasad and his team, from the Department of Mechanical Engineering, Graphic Era Deemed to be University Dehradun have developed a unique method for water treatment, especially focusing on the paper, textile, and leather industries. These heavy industries use various types of industrial dyes as coloring agents and the waste effluent, at last, is then released into the water bodies. This causes an imbalance in aquatic life and creates difficult conditions for the aquatic ecosystem.
Taking it as a factor of motivation a team led by Dr. Prasad started working on it and found a solution by making use of the waste biomass, which can reduce the released effluent effect in water bodies to some extent. The waste biomass has been converted into activated carbon using the pyrolysis technique, which is then used for dye

adsorption. The abundance and availability of biomass make it a cost-effective and attractive product. At present methylene blue and malachite green dye have been taken under consideration.

Experimental results have shown an almost 95% removal rate of the dye from the effluent solution using the developed activated carbon. The work has been patented and waiting to be granted. Presently the technology is in R&D phase and is soon to be completed with the help of Green Ashesh Technology Limited, Hongkong. After granting the patent, the technology will be tested for the pilot project and then will go for commercialization.

- **Technologies –**
  - **Automatic Chaff Cutter Machine**
  - **Mechanical Floor Cleaner**
  - **Agricultural Multipurpose Machine**

    By Mr. Alap Mahar, Dr. APJ Abdul Kalam Institute of Technology, Tanakpur

Automatic Chaff Cutter Machine -

Team Members: Vishwakarma Ashish, Vikram Nagarkoti, Gaurav Sharma, Tushar Goswami, Dhananjay Sharma & Mentor: Mr. Alap Mahar, Dr. Rahul Kshetri, Mr. Nitish Phulera.

Introduction: A chaff cutter is a mechanical device for cutting straw or hay into very small pieces before being mixed together with other forage and fed to horses and cattle. This aids the animal's digestion and prevents animals from rejecting any part of their food. Chaff cutters have evolved from the basic machines into commercial standard machines that can be driven at various speeds and can achieved various lengths of cuts of chaff with respect to animal preference type. New chaff cutter machines include portable tractor driven chaff cutter - where chaff cutter can be in the field and load trolleys. This device is designed and developed using technological advancements our hand operated chaff cutter and or manual chaff cutter is highly précised machine and are smooth to operate. Impeccably designed, these chaff cutters are useful for chopping up hay and oat-straw to feed livestock and prepare fine raw material for food processing industries. The technical specification of this chaff cutter is tabulated below.

Target Groups: Farmers

Detailed Budget and Technical Grief:

- Spur Gear (6)
- Motor (1 HP)
- Bearing (4)
- Shaft (2)
- Wooden Cover
- Stand
- Total Cost: Rs. 17000/-

Expected Outcome:

- Simplicity
- Constant Speed Drive
- Reliability
- Cost-Effectiveness
- Efficiency

Working Model

Mechanical Floor Cleaner -

Team Members: Kartik Verma, Vishwakarma Ashish, Nishant Chaudhary, Deepak Pant. Mentor: Alap Mahar, Dr. Rahul Kshetri, Mr. Nitish Phulera.

Introduction: A floor cleaner is very much useful in cleaning floors in hospitals, houses, auditoriums, shops, computer centers, etc. it is very simple in construction and easy to operate. Anybody can operate this machine easily. It consists of a moisture cotton brush, the brush cleans the floor and is dried with aid of a small blower. Hence it is very useful in hospitals, houses, etc. The time taken for cleaning is very less and the cost is also very less. The maintenance cost is less. Many types of machines are widely used for this purpose. But they are working under different principles and the cost is also very high. Good well-maintained entrance matting can dramatically reduce the need for cleaning. For public and office buildings, about 80 to 90% of the dirt is tracked in from outside. Installing a total of 15 feet of matting consisting of both indoor and outdoor sections will remove about 80% of this. Thus about two-thirds of the dirt can be removed at the entrance.

Target Groups: Rural Population, Disabled person.

Detailed Budget and Technical grief:

- Metal Frame
- Bearings
- Bevel Gear Mechanism
- Plastic-built Mop
- Tires (2)
- 90% parts are taken from scrap material
- Total Cost for 1st Model: Rs. 2500/-
- Total Cost for 2nd Model: Rs. 2000/-

Expected Outcome:

- Manual effort is reduced.
- Operating time is less.
- Cleaning and Polishing liquid can be done at same time.
- It consumes less cleaning fluid.
- Design is very simple.
- Easy Fabrication.
- Net weight is less.
- Maintenance cost is less.
- Smoother Operation.

Model Design

1st Model

2nd Model

Agricultural Multipurpose Machine - Sprayer Machine -

Team Members: Deepak Pant, Kartik Verma, Nishant Chaudhary, Vishwakarma Ashish, Abhishav Pratap Singh. Mentor: Mr. Alap Mahar, Dr. Rahul Kshetri, Mr. Nitish Phulera

Introduction: Agricultural spraying machine is to overcome the problems faced by traditionally spraying done by farmers who carry knapsack-type sprayers because of its versatility, design, and cost. But it is time-consuming and requires human efforts causing problems like back pain. Hence, in order to overcome these problems, we have designed and developed a new agricultural sprayer that is more efficient than traditional sprayers and requires negligible human efforts. A multi-functional device will come in handy that can be used in different stages of farming as per farmers' requirements. This wheel-operated pesticide spray equipment consumes less time and achieves uniform nozzle pressure. A crank mechanism with a piston pump that is driven by a wheel is also used. The main aim of this project is to develop low cost

mechanically operated sprayer pump. The equipment has been validated by the users and feedback has been taken and improvements have been done.

Target Group: Farmers

Detailed Budget with technical grief

- Spindle Chain Mechanism
- Sprayer Tool
- Ploughing Tool
- Leveler
- Sprayer Tank (20 L capacity)
- Structure Cost: Rs. 8400/-

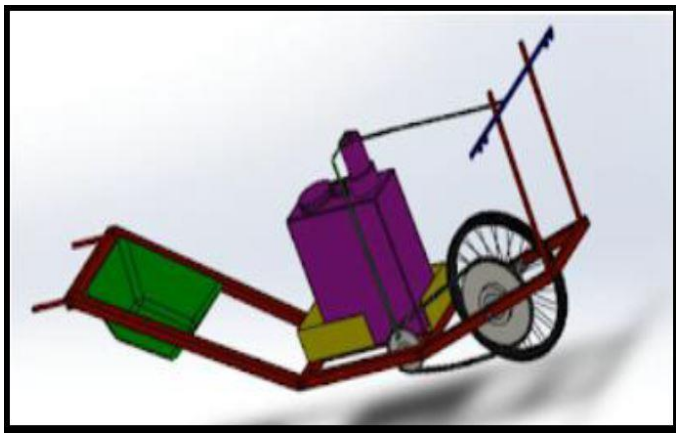
Expected Outcome:

• Human effort in pumping is reduced.
• Fatigue load is reduced.
• Spraying Capacity is increased.
• Cost effective.

Output Cost analysis:

- Insecticides/Pesticides/Fertilizers to be filled in Sprayer tank= Rs. 25000.

Model Design



❖ Technology - Low Propagator House

By Animesh Raj, Saurav Singh, Manoj Kumar, Roshan Jeena, Krishna Kumar Singh, Abhijeet Pal, Sudarshan Anand; Mentor - Dr. Pashupati Nath COER, Roorkee

Introduction: Cultivation of high value vegetables under low cost protected structures has been found to be a viable technology for growing vegetables throughout the year. The crops grown in protected structures in fetch higher prices in the market. Low cost protected technology like plastic low tunnels, walk in tunnels, shade net houses are used for vegetable cultivation for getting high returns. Similarly insect proof net houses can also be used on a large scale for safe vegetable cultivation for minimizing the use of pesticides in vegetable cultivation and for production of virus-free seeding. Therefore to enhance income of the small and marginal farmers, off-season vegetables cultivation under low cost poly houses is found to be very economical and profitable venture. Alongside, this technology ensures availability of every kind of

vegetables throughout the year which ultimately helps in nutritional security of the countrymen. During the winter season, it is extremely difficult to grow tomato capsicum, cucurbits, French bean, amaranth and many other crop varieties in open field conditions, however various types of protected structures have been developed for growing some high-value crops continuously by protecting the excessive cold condition, but the cost of developing the structure is too high i.e. – 50 lakh rupee for 1-acre land. Similarly, this structure will also provide favorable environmental conditions to the plants at a very low cost.

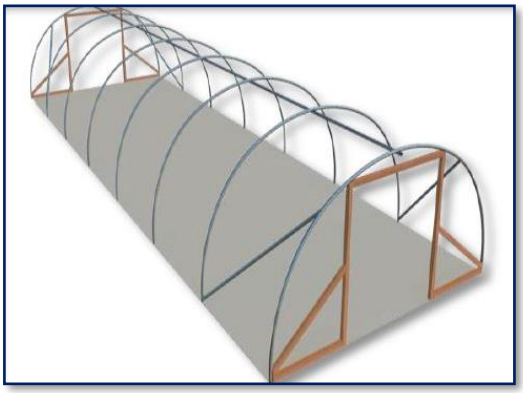
Target Group: Farmers and Rural Population

Detailed budget with technical brief:

- Size of structure (20 m (L) x 5 m (W) x 7’ (H)) = 100 m 2
- Structure Cost: 170700/

Output Cost analysis:

- No. of seedlings 8000 (polybags) + 7000 (portrays) = 15,000 seedlings.
- Seedling @ Rs. 10 = Rs. 150000.



Design: - (20 x 5 x 7) M2

Expected Outcome: It will be used to protect the plants from adverse climatic conditions such as wind, cold, precipitation, excessive radiation, extreme temperature, insects, and diseases. Raising the nursery in the protected structures will be to get higher profit and disease-free seedlings in the offseason. The temperature inside the structure will be 6-10o C higher than outsides during winter.

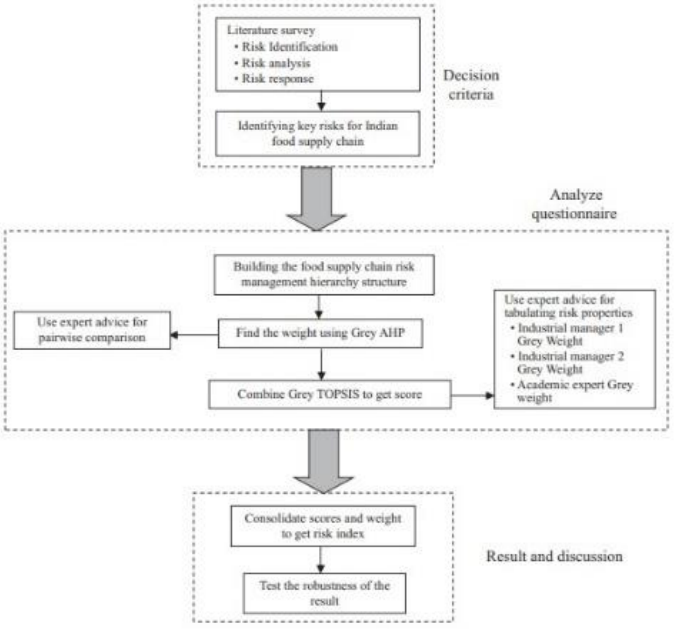
❖ Technlogy - Food Supply Chain

By Mr. Kshitij Jain & Team Members :Tannu ,Shagun Gupta ,Priya Jain, COER, Roorkee

A food supply chain or food system refers to the processes that describe how food from a farm ends up on our tables. The processes include production, processing, distribution, consumption and disposal.

The food we eat reaches us via food supply chains through which food moves systematically in domino like motion from producers to consumers while the money consumers pay for food goes to people who work at various stages along the food supply chain in the reverse direction.

Every step of the supply chain requires human or natural resources. Because a food supply chain is domino-like, when one part of the food supply chain is affected, the whole food supply chain is affected, which is often manifested through changes in price.



Methodology:

The proposed research methodology is divided into two sections.

- **Section 1 :-**

- We propose a risk quantification framework for typical food supply chain.

- **Section 2 :-**

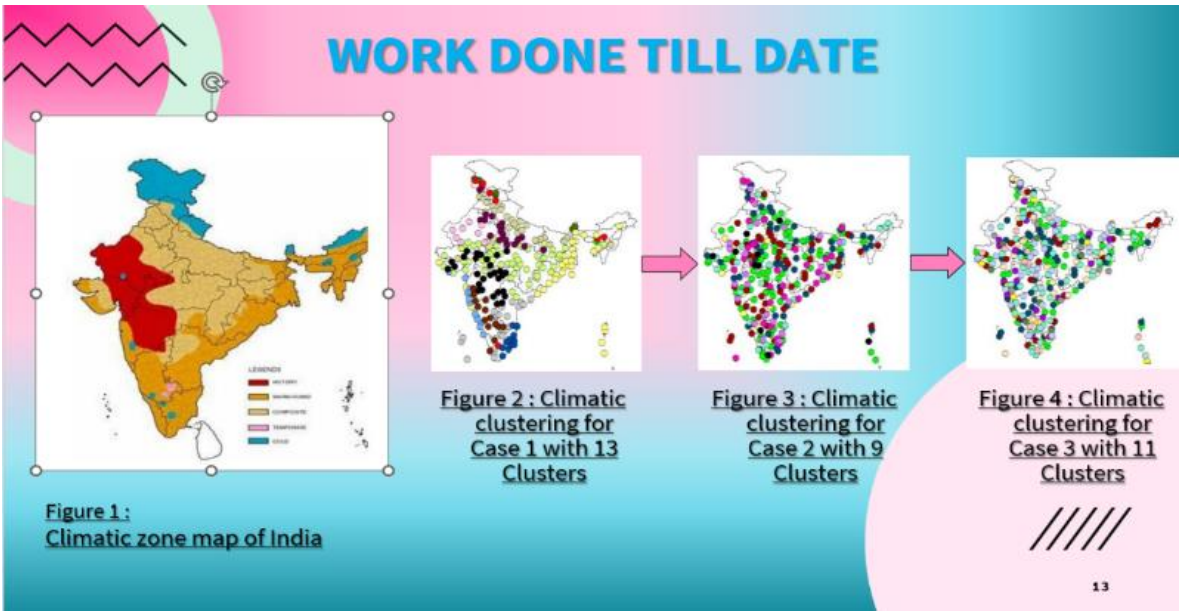
- It reports a detailed application of the proposed methodology for the case of Indian food supply chain.

The various phases involved in the methodology are specified in the flowchart.

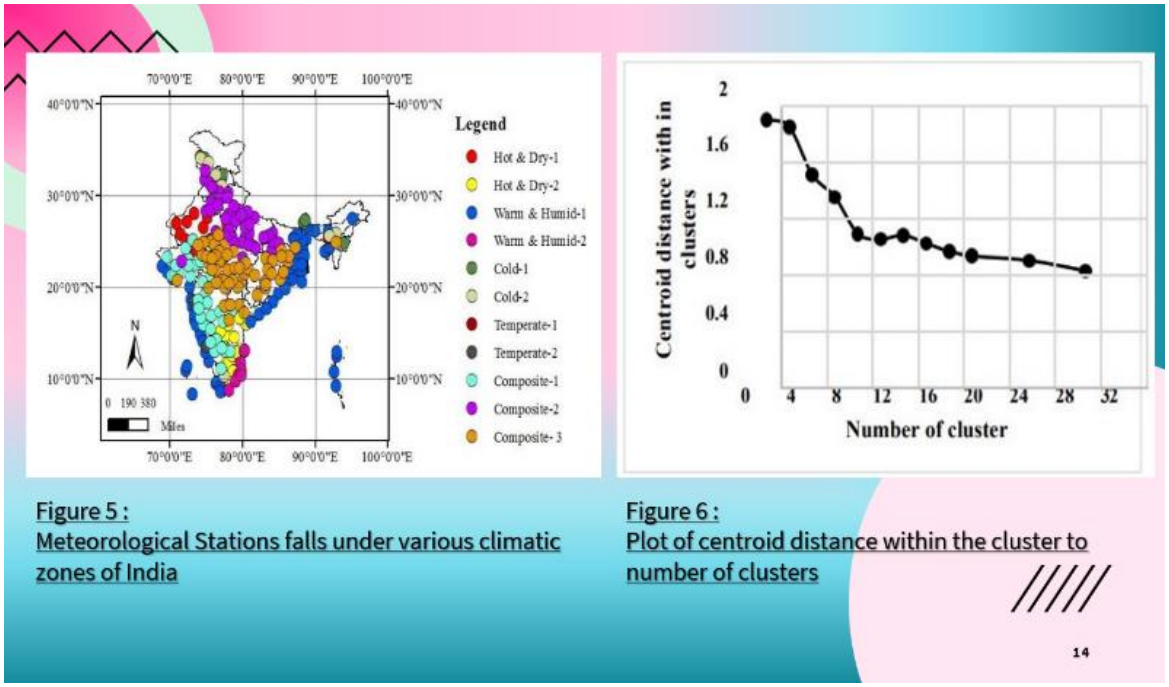
The first phase includes a comprehensive literature survey to identify and classify the relevant risks which may affect the Indian food supply chain.The second phase of the process is to assign weight for the different criteria according to their importance.Grey-AHP is used for assigning the weights based on the inputs from the experts. Calculation of the score for the various risks is done in the third phase, which is analysed using five different measures: categories of risks, the probability of

occurrence, impact on food supply chain performance, an increase in activity duration and growth in activity cost due to the given risk.

Work done till now:



Result:



❖ Technlogy – Fan with self cleaning Machanism of blades

By Rajat Sharma, Graphic Era Deemed to be University, Dehradun

Rajat Sharma showcased the patented product titled “auto cleaning fan” designed by Rajat Sharma, Dr. Sumit Kumar, Dr. Ashulekha Gupta. This product will further ease the life of rural Indians where pedestal fans are quite common and hence this affordable cleaning mechanism costing rupees four hundred eighty rupees is idol for rural India upliftment.

The innovation has following advantage

- Rural people are the majority user of Pedestal fans
- This innovation decreases the worn-out issue of element and motor and thus save the funds of rural people.
- Reduces the bacterial and allergic issues caused due to dust laden air coming from the fan
- Reduces the electricity consumption as dust accumulated blades consume more power

(12) PATENT APPLICATION PUBLICATION
(19) INDIA
(22) Date of filing of Application :09/06/2022

(21) Application No.202211033094 A
(43) Publication Date : 24/06/2022

(54) Title of the invention : FAN WITH SELF CLEANING MECHANISM OF BLADES AND METHOD THEREOF

(51) International classification	:G03G0021000000, F04D0025080000, B08B0001000000, C09D0005160000, B26B0021400000
(86) International Application No Filing Date	:NA :NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number Filing Date	:NA :NA
(62) Divisional to Application Number Filing Date	:NA :NA

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2)Dr. Sumit Kumar
Address of Applicant :Department of Management Studies, Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India ---------- ----------
3)Dr. Ashulekha Gupta
Address of Applicant :Department of Management Studies, Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India ---------- ----------
4)Anjas Asrani
Address of Applicant :Graphic Era (Deemed to be University), Dehradun, Uttarakhand, India ---------- ----------
5)Dr. Sanjay Gupta
Address of Applicant :School of Biosciences, Swami Rama Himalayan University, Dehradun, Uttarakhand, India ---------- ----------

(57) Abstract :
The present invention relates to the fan with self cleaning capacity of blades. Particularly, the invention provides Pedestal and Wall Fans with automatic cleaning of the blades.

Patent copy

❖ **Technlogy -**

- **Water purifier**
- **Waste To Wealth - Vermicompost**

By Prof. Bhanu P. Vellanki, Coordinator, UBA; Mr. Shubham Pal, UBA TEAM, IIT ROORKEE

Water purifier

First of all a preliminary household survey was conducted in the villages, and contaminated water came out to be one of the major problem faced by the villagers. Handpumps and taps were the source of water which contained bad smell and odour. Villagers were also prone to water on diseases like jaundice typhoid stomach pain etc. Therefore water samples from different locations and sources in the village were collected and brought to IIT Roorkee laboratory for testing. The water quality test reports in the laboratory revealed that the amount of total hardness turbidity iron content, coliform bacteria was more than the desired value.

Under the guidance of our faculty coordinator Dr. Bhanu Prakash Vellanki, the team designed the water filter. The filter was designed on the basis of sand filtration process using sand and gravels. The next difficult task was to find a suitable location for the setup of water purifier. After In puranpur village the water purifier was set-up in the government primary school after approving with the principal sir. The team procured the required raw material and further contacted plumber and labour for the setup. Then the gravels and sand were washed properly after sieving and then they were finally layered inside the tank. 6mm and 10mm gravels were used in the filtration tank. The water filter was also provided with backwashing techniques so that the filter can be cleaned as per the requirements. Complete setup of water purifier caused around 12,500 Rs.

One more water purifier plant was set up in Salempur near the plastic shredding plant for the workers present over there.

Waste To Wealth – Vermicompost

The presentation started with how our project aims to establish sustainable vermicomposting beds to promote the use of vermicompost, nutrient-rich manure in agriculture as an alternative to harmful chemical fertilizers like urea which certainly makes crops harmful for consumption and what are the objectives that we aim to achieve through this project. We also explained the bio reactions involved and future scope of development for making the process efficient and plans to collaborate with biotechnology department of the institute to work on the same. Later, we presented our current and previous work done in the villages and talked about our future of expansion of the beds. We also presented the scope of introducing new methodologies like usage of citrus fruits to prevent the compost from common pests, or usage of fruits like watermelons to maintain the moisture content and provide add-ins to the growing season. We also talked how we will be working on the maintenance and sustainability of the project starting from giving training to the farmers to providing them with raw materials and working on providing market for selling their compost. Also, the long- and short-term impact of this project was discussed, some of them which were the low skills job and employment creation through this, scope of crop productivity and less usage of chemical fertilizers and urea, maintenance of ecological balance and efficient usage of cow dung and other organic waste. At last, we talked about how this helps in soil enhancement by improving the aeration of the substrate, and helps in the grinding of the substrate which further saves the cost required from conventional method, and the improvement in the nitrogen, phosphorous and potassium content of the soil. The presentation ended with discussion of future goals and large impact of this project.

List of Participants

Annexure - I

S.No.	Name	Institute Name
1	Mr. Vijayeshwar Dangwal	Shri kedar Janvikas Samiti, Dunder
2	Mr. Bibhas Kumar	NIT, Uttarakhand
3	Dr. Manuj Kr. Agarwal	MIT, Moradabad
4	Mr. Shivansh Chauhan	MIT, Moradabad
5	Mr. Ashish Rana	MIT, Moradabad
6	Mr. Vasu Agarwal	MIT, Moradabad
7	Mr. Rajat Sharma	GEU, Dehradun
8	Mr. Akshay Jaiswal	Ideaforge
9	Mr. Harshit Gautam	RIT, Roorkee
10	Dr. Rakesh Kumar	HESCO, Dehradun
11	Mr. Navneet Kumar	Strategie DDN
12	Mr. Utkrisht Burman	COER, Roorkee
13	Mr. Nishant Choudhary	AKIT, Roorkee
14	Mr. Deepak Pant	AKIT, Roorkee
15	Mr. Vishwakarma Ashish	AKIT, Tanakpur
16	Mr. Pratap Kumar	R.B.D. Mahila Mahaviodyalay, Bijnor
17	Dr. Amar Nath	COER, Roorkee
18	Er-AD Sharma	COER, Roorkee
19	Mr. Animesh Roy	COER, Roorkee
20	Mr. Manoj Kumar	COER, Roorkee
21	Mr. Saurav Singh	COER, Roorkee
22	Dr. Pashupati Nath	COER, Roorkee
23	Dr. Suyash Bhardwaj	Gurukul Kangri Deemed to be university, Haridwar
24	Dr. Sarita Dhaka	S.D. College, Mujaffarnagar
25	Mr. Tushar goswami	Dr. APJAKIT, Tanakpur
26	Ms. Usha	Dr. APJAKIT, Tanakpur
27	Mr. Shubham Dey	Dr. APJAKIT, Tanakpur
28	Ms. Anushka Singh	Dr. APJAKIT, Tanakpur
29	Ms. Esha Rawat	Dr. APJAKIT, Tanakpur
30	Mr. Rahul Kandpal	Dr. APJAKIT, Tanakpur
31	Mr. Dhananjay Sharma	Dr. APJAKIT, Tanakpur
32	Mr. Vikram Nagarkoti	Dr. APJAKIT, Tanakpur
33	Mr. Nitish Phulera	Dr. APJAKIT, Tanakpur
34	Dr. Rahul Kshetri	Dr. APJAKIT, Tanakpur
35	Dr. Madhu Thapliyal	Gov. PG College Raipur
36	Ms. Tannu	COER, Roorkee
37	Ms. Priya	COER, Roorkee
38	Ms. Shagun Gupta	COER, Roorkee
39	Prof. Ashish Thapliyal	Graphic Era, Dehradun
40	Mr. Sachin Kumar	MIET, Meerut
41	Mr. Gaurav Kashyap	MIET, Meerut
42	Mr. Sagar Saini	MIET, Meerut
43	Mr. Devansh Sharma	MIET, Meerut
44	Mr. Manish Sharma	MIET, Meerut
45	Mr. Imtiyaz Ali	Rutag IIT Roorkee

46	Mr Kshitij Jain	COER, Roorkee
47	Mr. Vijay Saini	Rutag IIT Roorkee
48	Pratap Mishra	SIT
49	Mr. Vishal Kashyap	Ideaforge
50	Mr. P.S. Sharma	DIT, Dehradun
51	Mr. Sudarshan Anand	COER, Roorkee
52	Mr. Roshan Jeena	COER, Roorkee
53	Mr. Abhijeet Pal	COER, Roorkee
54	Mr. Krishna Kumar Singh	COER, Roorkee
55	Mr. Ankesh Shekhar	Ideaforge
56	Mr. Pankaj	SEAD, Dehradun
57	Dr. Dheerendra Singh Gangwar	VMSB-UTU, Dehradun
58	Mr. Vibhu Tyagi	COER, Roorkee
59	Dr. Brijesh Prasad	Graphic Era University
60	Mr. Gagandeep	Graphic Era University
61	Mr. Nitin Verma	UBA-RCI-IITR
62	Mr. Abhishek Panwar	
63	Shubham Pal Srishti Mishra Mohit Umraiya Archi Gupta Rohini Srivastava Karan Maniyar Hemant Bidasaria Vaishali Dubey Sejal Shreya Mittal	UBA-IIT Roorkee

Annexure - II

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UNNAT BHARAT ABHIYAN

TECH4Seva at Regional Level

Organized by

Regional Coordinating Institute (RCI), Unnat Bharat Abhiyan (UBA)
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

Date & Time: July 30, 2022; 10:00 AM-5:00 PM
Venue: Lecture Theatre, WRD&M Department

PROGRAM SCHEDULE

Registration - (10:00 -10:45)
Inaugural Session -(11:00-11:30)

Technology Demonstration (11:30-13:30)

1. **Prof. R. P. Saini, RUTAG, IIT Roorkee**
- Aloe-Vera Processing Machine for Natural Cosmetic Multi Products
- Mechanized Roller for Namda (Felt) Making
- Efficient Pomegranate Seed Extraction Machine
- Development of Air-Cooled Based Vegetable Vending Cart
- Variable Speed Motorized Bageshwari Wool Charkha (Version-2)

2. **Prof. Vinay Sharma, Dept. of Management Studies, IIT Roorkee**
- Low-cost Energy Through Forest Bio-Residue

3. **Dr. Swapan Suman, MIET, Meerut**
- Hands-free Water Tap Mechanism
- Automatic Plant Irrigation System

4. **Dr. Brijesh Prasad, Graphic Era University, Dehradun**
- Waste Water Treatment Using Biomass Residue

5. **Mr. Alap Mahar, DR. APJ Abdul Kalam Institute of Technology, Tanakpur**
- Automatic Chaff Cuter Machine
- Mechanical Floor Cleaner
- Agricultural Multipurpose Machine

6. **Dr. Manuj Agarwal, MIT Moradabad**
- Krishi Saarthi (Investigating Soil - Arduino Nano, NPK sensor)
- Krishi Saarthi (Fasal Suraksha)

7. **Mr. Navneet Kumar**
- Demonstration of Drone Technology

Lunch (1:30 – 2:30 PM)

Presentation of Ideas/Technology (2:30-5:00 PM)

2:30 - 2:40 PM	Hands-free Water Tap Mechanism	Dr. Swapan Suman, MIET, Meerut
2:40 - 2:50 PM	Krishi Saarthi (Investigating Soil- Arduino Nano, NPK sensor)	Dr. Manuj Agarwal, MIT Moradabad
2:50 - 3:00 PM	Automatic Plant Irrigation System	Dr. Swapan Suman, MIET, Meerut
3:00 - 3:10 PM	Agricultural drone	Mr. Alap Mahar, DR. APJ Abdul Kalam Institute of Technology, Tanakpur
3:10 - 3:20 PM	Krishi Saarthi (Fasal Suraksha)	Dr. Manuj Agarwal, MIT Moradabad
3:20 - 3:30 PM	Automatic Chaff Cuter Machine	Mr. Alap Mahar, DR. APJ Abdul Kalam Institute of Technology, Tanakpur
3:30 - 3:40 PM	Sustainable Agriculture System	Ms. Tannu, CoER, Roorkee
3:40 - 3:50 PM	Mechanical Floor Cleaner	Mr. Alap Mahar, DR. APJ Abdul Kalam Institute of Technology, Tanakpur
3:50 - 4:00 PM	Agricultural Multipurpose Machine	Mr. Alap Mahar, DR. APJ Abdul Kalam Institute of Technology, Tanakpur
4:00 - 4:10 PM	Low Propagator House	Mr. Animesh Raj (& group), CoER, Roorkee
4:10 - 4:20 PM	Waste to Wealth - Vermicompost	Mr. Shubham Pal, PI - UBA Team Member, IIT Roorkee
4:20 - 4:30 PM	Water Purifier	Mr. Shubham Pal, PI - UBA Team Member, IIT Roorkee
4:30 - 4:40 PM	Fan with self-cleaning mechanism of blades and method thereof	Mr. Rajat Sharma, Graphic Era University, Dehradun
4:40 - 5:00 PM	**Group Discussion**	
Tea		

Glimpses of “Tech4seva” Event

Registration of the Participants for the event

Lamp lighting during inaugural program

Mr. Shubham welcoming Prof. Parida, Dy. Director, IIT Roorkee

Mr. Hemant welcoming Prof. Akshay Dvivedi, Dean SRIC IIT Roorkee

Prof. M. Parida delivering the inaugural address

Prof. Akshay Dvivedi addressing the participants

Prof. Ashish Pandey addressing the participants

Prof. Vivay Sharma demonstrating the technology

Panel of Experts Visiting the Technology Demonstration Desk







Participants making a presentation on technology(s) during the event

Group photograph of the dignitaries & participants during the event

News Clipping

उन्नत भारत अभियान रीजनल कोऑर्डिनेटिंग इन्स्टीट्यूट आईआईटी रुड़की द्वारा आयोजित इवेंट के माध्यम से ग्रामीणों व किसानों के लिए उपयोगी सरल तकनीकी उपकरणों का

रीजनल टेक फॉर सेवा इवेंट में प्रतिभागी संस्थान के छात्रों द्वारा

नई तकनीकी से खेती कर कमाएं अच्छा लाभ

- ऊर्जा उत्पादन तकनीकी पर भी दी जानकारी
- सब्जियों को तरोताजा रखने की विधि भी बताई

टेक फॉर सेवा में तकनीकी का प्रदर्शन

आईआईटी रुड़की की ओर से आयोजित किया गया कार्यक्रम

संवाद न्यूज एजेंसी

रुड़की आईआईटी में उपकरणों का प्रदर्शन करते छात्र। संवाद

सरल तकनीकी उपकरणों को किया विकसित

- आईआईटी में उन्नत भारत अभियान कार्यक्रम के अंतर्गत हुआ आयोजन
- पश्चिमी उत्तर प्रदेश व उत्तराखंड राज्य के संस्थानों किया प्रतिभाग
- अभियान के जरिये ग्रामीणों व किसानों से सीधे जुड़ रहा है संस्थान

इवेंट में ग्रामीणों के आकर्षण का केंद्र बनी वातानुकूलित सब्जी

डॉ. ए.पी.जे. अब्दुल कलाम इंस्टीट्यूट ऑफ टेक्नोलॉजी टनकपुर के छात्रों ने विकसित की मैकेनिकल फ्लोर क्लीनिंग मशीन