rutag iitd news

IIT DELHI

Prof. R. R. Gaur Memorial Issue

Vol. 9, No. 1, January 2021

## *Editor's Desk*

Writing this column this time is so difficult for me as we lost our Best colleague friend and the Mentor of RuTAG IIT Delhi, Prof. R. R. Gaur, on Dec. 6, 2020 even though he was best of his health when we met him last during our monthly review meeting on Nov. 11, 2020. In fact, when we were looking for his article for the Chairman's Column, we came to know that he was not well. But we never thought that we will not get his article, rather an article about him will be written. That's what we are forced to accept! I am sure his memories will always be with us and messages will be our guiding principle. As one of our colleagues who is also associated with a RuTAG project, Prof. S.P. Singh, said that we must learn from his style of living. He was ever active, and took voluntary retirement to fulfil his objectives to contribute to the society, be it Value Education or Rural Technology.

Sharing few facts: 1) We are also providing Multilingual articles in this issue, which are translations of selected articles of July 2020 issue; 2) One round of online internships by NIT Durgapur students ended in Nov., and the 2nd round started with those who wanted to continue further. Several students and faculty of CEMK Kolaghat also joined the effort; 3) RuTAG IITD club members now joining the monthly sessions with NIT and CEMK. I hope all such activities fructify with the blessings of Prof. Gaur!

*Prof. Subir Kumar Saha*

## A Tribute to Prof R. R. Gaur

The RuTAG family mourns the sudden and untimely demise of Prof. Rishi Raj Gaur, our beloved Chairman of Core Group. We pray together for peace for the departed soul and solace to the bereaved family.

Prof. Rishi Raj Gaur had a continuous and energetic association with IIT Delhi for a period exceeding five decades. He joined IIT Delhi in Mechanical Engineering Department in 1967 and opted for voluntary retirement from formal service in 2009. He continued to associate himself with what was closest to his heart ever since: value education in engineering and rural technology and industrialization. NRCVEE and RuTAG were part of his breath until the very end.

During his vast tenure of association, he pioneered several activities at IIT Delhi, along with his closest friend, Prof. P.L. Dhar: boldly telling the faculty fraternity that our research is futile unless we help it reach the people of the country, especially its villages, and emphasizing the complementarity of skills and values. Together, they started and conducted a course named Science and Humanism in early 80s, which was taught every semester until 2007, instilling the thought process amongst students that societal progress starts with inner development of its individuals. Chaired the Yoga club and the Holistic Health Committee, promoting the importance of simple living habits and traditional health care diet and practices. Led the technology mission projects in Internal Combustion Engines, delivering to the industry the latest technological developments in the area that IIT Delhi could offer. Co-founded the National Resource Centre for Value Education in Engineering in 2001 and designed its structure and role in the Institute and nation at large. Was at the forefront of restructuring of the Jamnalal Bajaj Central Research Institute at Wardha into the vibrant Mahatma Gandhi Institute for Rural Industrialization, defining its role, structure and function and showing how it should operate in order to be effective in its role as a nodal centre for rural industrialization. Developed curriculum and resource material for value education programs in several technical universities and the AICTE and was facilitated the training of thousands of technical teachers to conduct courses in value education.

Prof Gaur was associated with RuTAG chapter of IIT Delhi as the Chairman of the core group ever since it started in 2009. Apart from chairing the core group meetings, he was also very particular about taking stock of all the projects under RuTAG once every month. All those of us who have been associated with RuTAG and have attended the monthly and the core group meetings know the level of his involvement in understanding the details of every project, closely monitoring the progress, and giving valuable suggestions and guidance to take the work forward in the desirable direction. He had the insight to ask the appropriate questions irrespective of what the project was about and was always visualizing the practical situation while gauging whether the project was moving in the right direction. As the Honorary Chairman, he also penned down his thoughts for the newsletter starting from the first issue in January 2013.

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His valuable words of wisdom, which reflected his clarity of thought and vision regarding rural development and technology, were an enriching addition to every issue of the newsletter. He was very keen to see RuTAG activities become a part of the mainstream activities at institutes like IITs.

After the Unnat Bharat Abhiyan (UBA) was started, he envisaged RuTAG units in various IITs to develop into the technical resource units of UBA and play an important role in the efforts towards "sustainable indigenous development of rural India, which still remains a long-time expectation".

He also put in special efforts to highlight the importance of a systematic process of Design Engineering involving close interaction with the prospective user as the right approach to the "Creative Problem Solving" for addressing technological issues in rural India, through a two-part article for the newsletter. He even suggested that the RuTAG working groups be oriented towards this approach through workshops so as to enhance the quality of the projects.

Always keen to educate the RuTAG team in the fundamental concepts of sustainable development, in one of his articles, he enumerated various characteristics of appropriate technologies. Realizing that sustainability aspect is only getting a lip service in most arenas of technology development, he repeatedly emphasized the need to keep this aspect central to all technology development and even more so in the development of technology for rural India. In fact, he very strongly felt that development can be sustainable only if it focusses on rural India with special emphasis on decentralized and eco-friendly rural industrialization. In his last message in the newsletter, he suggested "that all the RuTAG centres should join hands" in this endeavor.

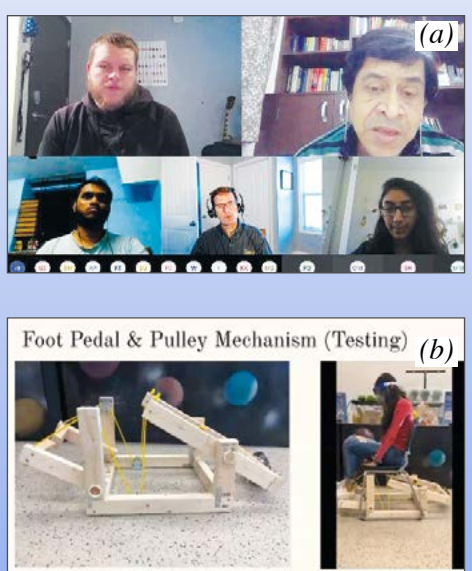
As one reads his writings in RuTAG newsletters conveying his ideas in simple and clear language, one almost feels that he is in front of us talking to all of us in his majestic yet compassionate voice meticulously reviewing every project, sharing his insights, encouraging everyone. On one hand, one feels that this void cannot be filled but on the other, a thought arises that he has already given us adequate direction and ideas to move forward. It is now up to us to work towards his vision with greater zeal.

As an individual, he was a walking University: he would integrate all what he finds good in various schools of technology as well as spirituality and incorporate it in his own life and practice. He was a senior practitioner of the Vipassana Meditation technique; he was a senior member of the Jeevan Vidya family; he attended and internalized several retreats, including those of Tej Gyan Foundation, Divine Light Mission, Sri Ramachandra Mission, etc., and would discuss on amalgamating what he found good in each. The Saturday discussions on teachings of the Buddha were primarily his initiative. His insightful discussions along with Prof P.L. Dhar were an inspiration to several people at IIT Delhi as well as outside. Those who knew him personally would admit that he deeply touched the lives of so many around him particularly those who were in need by going out of his way to help them. He was indeed a source of positive energy and all those who came in contact with him could feel that distinctly.

He leaves behind a void difficult to fill, but a path clearly laid out for us to follow.

*Prof. Sangeeta Kohli, Co-coordinator, RuTAG IIT Delhi*

## RuTAG – EPICS Purdue online interactive sessions




*Figures 1(a) and (b): Interactive session with EPICS*

Continuing our association with EPICS of Purdue Univ. in the USA, RuTAG IITD has extended its ongoing WeLD-R (We Learn through Discussions for RuTAG) sessions to include the students of EPICS. In a plan to host the joint session in every alternate month, the first two sessions were held on Sep 18 and Nov. 20, 2020 on Microsoft Teams. In these sessions, presentations [Figures 1 (a) and (b)] were made from both RuTAG IITD and EPICS groups regarding the projects they are working on. The EPICS India team are currently working on three India-centric projects – i. Mobile Science Labs (In collaboration with IIT Tirupati); ii. Bullock Driven Tractor (RuTAG IITD); and iii. Stone Dust Inhalation (RuTAG IITD). Prof. Saha mentioned that such sessions give exposure to the students of both countries to solve problems faced by the society. In the last session, Prof. William Oakes, who is the director of EPICS, said that this initiative helps in bringing together staff and students who work towards the betterment of the society. He also mentioned that in the upcoming sessions, he would like to include other teams from EPICS Purdue. The next session is planned in Feb.'21.

*Mr. Suraj Bhat, Ph.D. Scholar, RuTAG IIT Delhi*

## PROJECTS AT A GLANCE

*Figure 2: Mound Based Sub Surface Porous Vessel* (SSPV) *with hybridized Compost Patch*

*Figure 3(a): Components of tele-operated face mask*


*Figure 3(b) Left: Mask at closed position; Right: Mask at open position*

*Figure 4(a): Water reservoir*

*Figure 4(b): Powerhouse*

**1. Mound Based Sub-Surface Irrigation, Rajasthan**

**PI -** Dr. Anand Plappally, Department of Mechanical Engineering, IIT Jodhpur

**Collaborating NGO -** *Rupayan Sansthan, Jodhpur, Rajasthan*

Farmers with very small pieces of land or homestead kitchen gardens can enable large horticulture production in small areas making use of enlarged root zone volumes. Inverted frustum shaped mounds with large bases can be equipped with water-filled frustum shaped porous irrigation vessels with surrounding compost patches (Figure 2). These porous clay ceramic vessels are manufactured by local potters in Jodhpur. Here, the water will leach through the soils and enable large volumes to be irrigated in a customized manner. It also serves the purpose of desalting contaminated soils by using water oozing out of the vessels to leach out contaminants from the soil. The efficacy of the present 9L porous vessel is in desalting saline or sodic loamy soils of a size of about 12 cm thick hollow volumetric frustum in 3 hours. On the other hand, for non-fertile soils, oozing water from the porous vessel may wet the surrounding compost patch and help improve fertility and carbon content within the soils. The mounds can be geometrically modified by the farmer such that maximum root zone can be utilized and thus effectively using the water leaching from the porous vessel. Small 1m diameter frustum mounds of 30-45 cm height could be adequate to provide at least 15-18 kg/month of horticulture and tuberous produce. Multiple crops such as vegetables and tubers (such as cassava, sweet potato, and many more) could be grown within the same mound helping homestead farms to produce, keeping in mind nutritional balances for households or of a family. Thus, it also provides one of the cheapest technological solutions to fight malnutrition irrespective of soil fertility issues. Mound based SSPV has been used to perform organic agriculture in the premises of the Arna Jharna Desert Museum in Jodhpur, Rajasthan, and develop vegetable kitchen gardens in hostels under Social Justice and Empowerment Department, Jodhpur Block, Jodhpur, Rajasthan.

**2. Device for Teleoperation of Face Mask**

**PI -** Dr. Vinay Gupta, Professor, IEC College of Engineering and Technology, Greater Noida

**Collaborating NGO -** *None*

In the current COVID-19 situation, the face mask is playing an important role in safeguarding oneself from the COVID-19 virus. However, keeping the mask on the face continuously for hours is difficult. Due to this difficulty, people like to put off their masks whenever they find it safe and put it on again when required. To take off and put on the mask, one has to touch it. Touching, while the mask on the face, is not being considered safe due to the chance of transfer of the virus from hand to mask or vice versa. To overcome this problem, if an arrangement can be made to tele-operate the mask, it may come out to be useful.

There are various types of masks available in the market. They are available in various shapes and sizes. Masks are made of very soft material. Some of the masks, like N-95, are slightly stiff. To tele-operate the mask, some wearable devices may help on which mask can be mounted. As a preliminary work, a device was conceptualized, and a prototype of the same is built as a proof of concept. See self-explanatory Figures 3(a), and (b). However, detailed study and analysis are required to develop the device while keeping aspects such as medical, ergonomics, versatility, cost, etc. To establish an idea for teleoperation of face mask into a completely developed device. The aspects based on the medical requirement, ergonomics, versatility to compatible with various masks, cost, etc., will be considered.

*Figure 4(c): Cold storage unit*

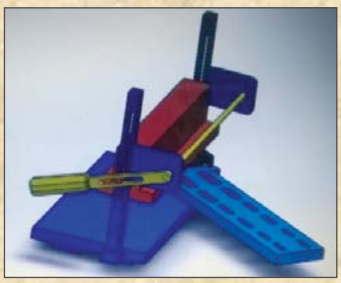


*Figure 5(a): CAD model of manual Bhilawa decortication machine*

*Figure 5(b): CAD model of motorized Bhilawa decortication machine*

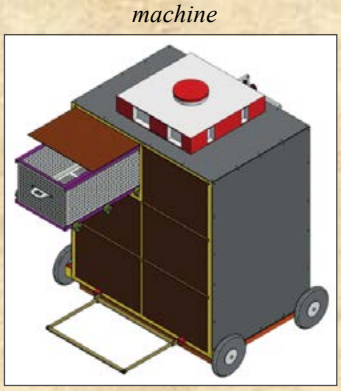


*Figure 6: CAD Model of a Vertical Multilayer Vermicomposting Unit*

### 3. PICO HYDRO BASED COLD STORAGE

**PI –** Prof. R. P. Saini, Department of Hydro and Renewable Energy, IIT Roorkee
**Collaborating NGO -** *None*

In the Himalayan regions, agriculture contributes to the economy significantly. The vegetables and fruits are produced /grown significantly, and a major part of these products (varying from 10 to 50 percent) are wasted in different districts of the states of Himachal and Uttarakhand due to the non-existence of appropriate locally available cold storage facilities. As a result, the farmers are forced to sell their fruits and vegetables to the local market as soon as possible at lower prices, thereby, affecting their livelihood badly. Further, the Himalayan regions and mountain areas of the country are endowed with natural waterfalls, streams, and rivers flowing down the hills. These water resources can provide ample opportunities for electricity production. The integration of micro-hydropower with cold storage is considered economically viable and feasible for such areas.

To provide sustainable solutions for the preservation of crops in hilly areas, a low-cost cold storage powered by Pico-hydro plant was designed and developed by RuTAG, IIT Roorkee to help farmers to create more facilities for long period storage of perishable crops. Pico-hydro consists of a diversion weir, power channel, fore-bay tank, and penstock pipe [Figures 4(a), (b), and (c)]. Water from the fore-bay tank is transferred to the powerhouse through penstock pipe to run hydraulic turbine which coupled with the alternator to generate 5 kW. A controller is used to control the power which is transmitted to the cold store. The power requirement for running the cold store is only 1.5-2.0 kW, while the surplus power from the Pico hydro plant can be distributed to the local area for lighting and other purposes. The cold storage is made of insulating panels and capable of storing about 3000 kg.

### 4. Modification in Bhilawa Seed Decortication process

**PI -** Dr. Vinay Gupta, Professor, Dr. Mukesh Kumar (CO-PI), IEC College of Engineering and Technology, Greater Noida
**Collaborating NGO -** *None*

Semecarpus Anacardium (also known as Bhilawa in Hindi) is a plant whose seeds are mainly used as medicines. It is also known as Bibba in Marathi and Agnimukh in Sanskrit. The two basic actions can be used to open the shell of a seed (nut). One is caused by an impact on the seed against a hard object or applying direct mechanical pressure to crush, cut, or shear through the shell. The stated actions can be performed manually using knives, hammers, simple presses, etc. Also, the action can be used to make a machine. A hand press machine for Bhilawa seed decortication was developed by IIT Bombay.

Two of IEC students Shekahar Chauhan and Sarthak Machkoria visited the Pattan village, Betul, MP with Suraj (Research Scholar, RuTAG, IIT Delhi) to gain the experience of how people decorticate Bhilawa and to know their challenges. To ease the decortication process and increase the production level of Bhilawa, two design ideas are presented. One is manual [requires manpower [Figure 5(a)] to operate], and the other is motorized [it operates with the help of motor and toggle mechanism]. This can also be modified for manual operation. The manual machine uses the manually operated press principal where the person will apply force with the help of a handle. The automatic machine adds up a piston-cylinder arrangement and powered with a motor with the help of a toggle mechanism. Figure 5(b) shows a CAD model of motorized version of the machine for better understanding.

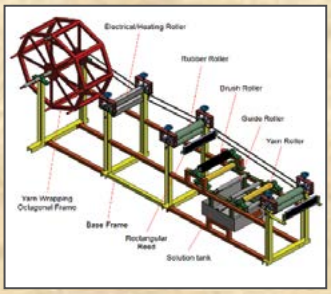



*Figure 7(a): CAD Model of a new Drive Mechanism/ Street sizing machine*

*Figure 7(b): Actual Model of the new Drive Mechanism/ Street sizing machine*



*Figures 8(a) and (b): Vertical Dhenki machine*

**5. Designing of Vertical Multilayer Vermicomposting Unit for Shri Mata Vaishno Devi, Katra, Jammu**

**PI -** Prof. S. K. Saha, Department of Mechanical Engineering, IIT Delhi

**Co-PI** - Prof. Satyawati Sharma, CRDT, IIT Delhi; Prof. Balbir Singh, Dept. of Mech. Engg. SMVDU, Kakryal, Katra, J&K; Dr. Kalpana Arora, SESS, New Delhi.

**Collaborating NGO -** *Centre for Technology and Development (CTD), New Delhi*

Shri Mata Vaishno Devi Shrine is visited on an average every day by about 40 thousand pilgrims, and the numbers are growing every year. As the Shrine is located in a quite steep hilly region, about 15 km walking distance from Katra Town, about 5 to 10% of the pilgrims use local horses and mules for visiting the Shrine. For transporting all the material to the lodges existing near Shrine, a caravan of Mules is used. It is a rough estimate that about 1000 horses and mules are in service in this area.

Mules not only provide the ease of access to pilgrims but also a livelihood activity for the people involved in this service. During the field visit to the Shrine Area in November 2007 for an Environmental, Ecological and Hydrological Basin Study, it was found that the dung of these animals is causing a problem. As the flat land area is limited in the hilly areas and the ecology of the area is also very fragile, maintaining the garbage dump yard sites is limited. A field visit was conducted at the Shrine Board of Shri Mata Vaishno Devi, Katra, Jammu, to understand the problem. Based on the field study, a Vertical Multilayer Vermicomposting Unit is proposed. The CAD model of the Vertical Multilayer Vermicomposting Unit (Figure 6) and assembly drawing (Engineering Drawing) of the composting unit have been completed, and the fabrication work is going on. The actual working model after the fabrication will be tested, and further work will be carried on.

**6. Development of a More Ergonomic and Efficient Street Sizing System for Chirala Handloom Cluster**

**PI -** Prof. Samrat Mukhopadhyay, Dept. of Textile Engineering, IIT Delhi

**Collaborating NGO -** *Rastra Chenetha Jana Samakhya (RCJS), Andhra Pradesh*

The process of sizing is a very crucial step in weaving. Sizing is done to give temporary strength to single count cotton yarn to withstand the rigor of weaving while keeping the characteristics and properties of cotton yarn intact. It directly affects the production rate and the number of breakages and faults in fabric. Street sizing is one of the two most common ways to do it, the other being Hank sizing. The operation mainly consists of coating a long warp sheet from the starch paste by using a handheld spray and heavy brush. It strengthens the yarn so that it can endure the various forces exerted in weaving loom.

A field visit was conducted at Chirala to understand the problem. Based on the field study, a modified version of the street sizing system is proposed. At present, the same is completed, and the fabrication work is going on. A CAD model of the new drive mechanism/ Street sizing machine [Figure 7(a)] has been completed with engineering drawing, and fabrication is under progress. Manufacturing of the following parts of the street sizing machine has been completed, i.e., base structure frame, yarn wrapping octagonal frame, rubber roller, solution tank, guide roller, etc. [Figure 7(b)], and rest parts under process.

**7. Vertical Dhenki**

**PI -** Prof. P. B. S. Bhadoria, Professor, Agricultural and Food Engineering Department, IIT Kharagpur

**Collaborating NGO -** *None*

The machine [Figures 8(a) and (b)] is provided with an iron rod (Pestle) which connects to the pulley. The process is similar to pestle and Motor but is not hand-operated.

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*Figure 9: Rice after pounding by Vertical Dhenki machine*

*Figure 10(a): Schematic of Motor-powered Mini weeder*

*Figure 10(b): Motor-powered Mini weeder at Kenthia*

The length of the pestle is such that it touches the paddy in the motor. Due to the force of the weight upon the rice in the pods, the rice and golden-brown husk separate. Due to the force of the pestle (driven by the motor) acting upon the paddy, the husk and the rice separates. It gives around 74.6% productivity, Coefficient of de-hulling is 0.95, Coefficient of wholeness 0.92, Hulling capacity is 4.5 Kg/hr, hulling efficiency is 91%, and broken rice is 6.5%. In one hour, this machine gives around 4.5 kg of rice (Figure 9). The machine is simple and cost-effective. It removes the drawbacks of hand-pounding and foot-pounding. No technical knowledge is required to drive the machine. The losses are minimum in this machine. It removes the problem of gender sensitivity too. The machine results in high productivity. Several Rice products like Rice Flour can also be made using this machine.

**8. Power Mini Weeder**

**PI -** Prof. P. B. S. Bhadoria, Professor, Agricultural and Food Engineering Department, IIT Kharagpur

**Collaborating NGO -** *None*

Lack of mechanization or automation is one of the significant roadblocks to improving the productivity of agriculture. One of the primary reasons for the lack of agricultural productivity is weeds. The losses caused by weeds exceed the losses caused by any other category of agricultural pests. An important one is that they interfere with food and fiber production in agriculture, wherein they must be controlled in order to prevent lost or diminished crop yields. The simplest and most popular management method is manual weed control, where labourers pull weeds out of the soil using different types of hand tools like khurpi, wheel hoe, hand hoe, etc.

The Power Mini Weeder, which solely intended to be used for weeding operations only. The Power Mini Weeder is generally easy to operate and does not require any type of prior training for safe operation. The Power Mini Weeder is powered by an 1HP induction AC motor. A schematic of the Motor-powered mini weeder is shown in Figure 10(a). The most important part is the power by a motor with a chain-sprocket mechanism used solely for rotating the blades located at the front of the Power Mini Weeder. The Power Mini Weeder usually compromise of 1 HP AC induction motor, frame, support wheels, and blades. The Power Mini Weeder is a self-propelled walk-behind type with which most of the Indian farmers are habituated. The parts and components were strong enough to work with great efficiency.Weeds are unwanted plants. They grow in the fields where they compete with crops for water, soil nutrients, light, and space and thus reduce crop yields. With this equipment [Figure 10(b)], a person can cover up to one bigha per hour, even in hard soils.

## Establishment of a system dynamics model for soil moisture and nutrient management focusing on rice-wheat cropping system in rural India

The research work theme encompasses mainly the need for an integrated modelling approach to understand the dynamic interactions and cause and effect of socio-economic, biophysical, environmental, and political factors of the rice-wheat cropping system (RWCS) in India. The RWCS serves as a cornerstone of India's food security and covers an area of about 10 million hectares in India, mostly in the Indo-Gangetic Plains (IGP). Currently, sustainability and food security in the rice-wheat growing states in the IGP is at risk due to fragmented land, stagnation of crop yield, shortage of labour, soil degradation, the decline in the underground water table, climate change, environmental pollution, and lack of appropriate technology and policy interventions. Though previous researchers have developed many crop simulation models for various crops, a few such models have been utilized for the RWCS. However, those models could not address the sustainability gaps of the RWCS; a modelling approach to consider all the factors of the RWCS becomes a need of the hour. To understand the complex nature of the RWCS, interaction among its various aspects, and its impact on the system's sustainable development, system dynamics modelling has been employed in the present study.

*Dr. Susha Lekshmi S. U., SERB-NPDF, RuTAG IIT Delhi*

## Rural Technology Action Group and Delivery of its Technologies

Office of the Principal Scientific Adviser (PSA) to GOI realized the need for intervention in the Rural sector (Farm and Non-farm Sectors). Therefore, the Rural Technology Action Groups (RuTAG) has been conceived as a mechanism to provide a higher level of Science and Technology (S&T) intervention and support through premier Institutions to the marginalized rural population. These interventions, which are essentially demand-driven, helps in bridging technology gaps, technology up-gradation, technology training, and demonstration or through any other innovative methods with the help of S&T NGOs at grassroots. The objective of the RuTAG is to synergize and catalyse the rural development by intervention, development, and delivery of appropriate technologies.

## RuTAG and Innovative Product Delivery

Today, RuTAG is present in seven IITs situated in Delhi (IIT, Delhi), Uttarakhand (IIT, Roorkee), Tamil Nadu (IIT, Madras), North East (IIT, Guwahati), West Bengal (IIT, Kharagpur), Uttar Pradesh (IIT Kanpur) and Mumbai (IIT, Bombay). Currently, 52 different field-tested demand-driven deployable technologies have been developed by various RuTAG centres at seven IITs. These demand-driven technologies cater various sectors like assistive technologies, rural agriculture, draught animal power, rural energy, rural environment/water, rural handicrafts, and rural textile With an

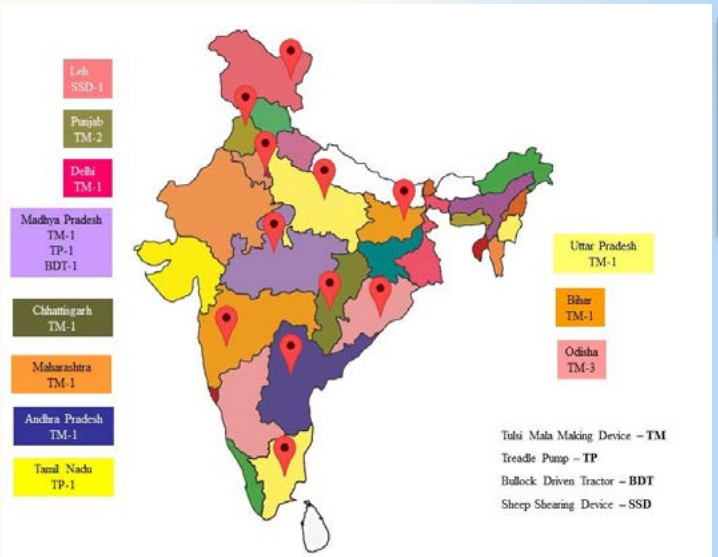


*Figure 11: A map of India showing technologies disseminated by RuTAG IIT Delhi*

*Figure 12(a): BULLOCK DRIVEN TRACTOR (B. D. T.)*

*Figure 12(b): TREADLE PUMP*

*Figure 12(c): SHEEP SHEARING DEVICE*

*Figure 12(d): TULSI MALA DEVICE*

objective to transfer the developed technologies, a facility has been created by RuTAG IIT Delhi in collaboration with Foundation for Innovation and Technology Transfer (FITT) at IIT Delhi under the scheme of "Innovative Product Delivery". Field-tested technologies are being sold directly to the hands of the users on a payment basis through this scheme. A number of technologies disseminated by RuTAG IIT Delhi are shown in Figures 11, 12 (a), (b), (c), and (d).

## Tawa Making Cluster visit at Village Poonchhari, Bharatpur, Rajasthan

RuTAG IIT Delhi team visited Tawa making cluster at Poonchhari village, Bharatpur, Rajasthan, between November 17-21, 2020 to gather data on the Tawa firing process. The field visit was arranged by Lupin Foundation, an NGO in Bharatpur, Rajasthan. In Poonchahari village, around 120 potters from 40 families earn their livelihood by making earthen Tawa [Figure 13(a)]. The team had discussions with the potters to understand the entire process of Tawa making. The visit was mainly oriented to record the temperature profile of the firing process using Type-K thermocouples. Clay, locally called Chikni Mitti, and red stone powder, locally called Bajri, are the materials used for making Tawa. First, clay is poured into a pit containing water and is then allowed to soak. This wet clay is mixed next with red stone powder in a 1:1 ratio.

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The shape of Tawa is molded manually, and then it is allowed to dry under the Sun. Mustard husk (Turi) and dung cakes (Kanda/Uple) are the fuel used for firing. The firing arrangement [Figures 13(b), and (c)] contains eight layers. The first layer just above the ground is mustard husk (Turi) followed by dung cakes, mustard husk, Tawas, dung cakes, mustard husk, broken wares, and ash. The firing process starts by putting some live coal inside a pot, which is placed in the center of the Tawa stack. Hence, the firing initiates from the center. The firing process completes in 2 to 3 days. After the firing, the Tawas are shortlisted on the basis of colour and sound it makes while hitting it with a finger. The Tawas are sold to the wholesaler at Rs. 3 to 5 per piece, and finally, the end-user buys a Tawa at Rs. 10. Mostly, the Tawas are sold in various places of Rajasthan. The visit was successful in providing some important data for the analysis of the current process. The data and samples collected from the field will be analysed to formulate problems associated with Tawa making process, and an affordable solution will be provided to the potters of Poonchari village.

*Mr. Yashwant Prasad, Project Associate, RuTAG IIT Delhi*

*Figure 13(a): Tawa*

*Figure 13(b): Stacking of Tawa*

*Figure 13(c): Firing of Tawas*

## Field Trial of Sheep Hair Shearing Machine Developed by IIT Delhi at CSBF, Hisar, Haryana

RuTAG IIT Delhi team comprising, Mr. Ashish (Jr. Project Assistant tech.), Mr. Davinder Pal Singh (Project Associate), and Mr. Mangal Sharma (Jr. Project Attendant), along with Mr. Bittu Kumar from associated partner company Glimonn Research for manufacturing of Sheep Shearing Device, visited Central Sheep Breeding Farm (CSBF), Hisar, Haryana [Figures 14(a), (b), and (c)] during September 29-30, 2020 for the demonstration of the complete set of sheep shearing device along with ten-teeth comb and three-teeth cutter manufactured by different vendors. These trials were conducted for two days in the presence of the committee assigned by Central Wool Development Board (CWDB), Jodhpur, Rajasthan, for the demonstration of the newly developed shearing machine by IIT Delhi at CSBF Hisar.

Dr. Runtu Gogoi (Assistant Commissioner, CSBF) along with Mr. Ramesh Bundela (Incharge, WTC, Bikaner), and Mr. Kamlakar Shankar Gurao (Technical Officer, CSWRI, ARC, Bikaner) welcomed the RuTAG team at the shearing section where four shearers along with helping staff were present. Rambouillet sheep breed was present for shearing. Mr. Jagdish Chander and Mr. Nathu Ram (Shearers) from CSBF was assigned to use the RuTAG IITD device. The handpiece, along with the motor and flexible shaft, worked very well. The assigned shearers appreciated the overall performance of the IITD device.




*Figures 14: (a)Mr. Jagdish shearing the sheep using IIT Delhi's device; (b) RuTAG team with CSBF officials; (c) Shearing in action*

The combs and cutters of IITD team worked well. The team decided to regrind the blades with CSBF grinder. After grinding, the combs and cutters worked well but some blades were lacking sharpening because of almost depleted emery paper. A need for slight improvement in the tension nut of the handpiece was observed. The shearers wanted to test the IITD handpiece with the imported motor, and vice-versa. Therefore, the IITD team tested the device in various combinations to compare with the imported device. After completion of shearing, the RuTAG team left for Delhi.

On the second day, the RuTAG team began to set up and oiling of the device. CSBF officials bring a flock of 20 sheep for the shearing by IITD device. The team decided to regrind the blades properly. Mr. Jagdish and Mr. Balraj (Shearers) ground the combs and cutters of IITD teams before shearing. Soon after, the shearing started with a full pace [Figures 14 (a) and (c)]. The team tested another handpiece with the improved tension nut. The handpiece worked very well with the enhanced tension nut, but soon it started to heat up from the back end. Hence, the team decided to use the previous handpiece. Handpiece #1 worked endearingly well throughout the day. The combs and cutters also worked very well after the grinding. Till noon, a full flock of 20 sheep were sheared by IITD's device. The CSBF Officials, as well as the shearers and shepherds, witnessed the performance of the device. At the end of the day, the RuTAG team thanked everyone present during shearing. RuTAG team went to meet Dr. A. K. Malhotra (Director, CSBF) to thank them for every arrangement that CSBF has made for making this a successful trial.

*Mr. Ashish Dahiya, Jr. Project Assistant (Tech.), RuTAG IIT Delhi*

## A Multilingual Glance at our Recent Newsletter

*For original articles in English of RuTAG newsletter Vol 8, No. 2, kindly visit the link:*
*http://rutag.iitd.ac.in/rutag/sites/default/files/images/user38/RuTAG%20Newsletter%20July%202020.pdf*

***Tamil***

### கிராமிய தொழில்நுட்ப செயற்குழு (RuTAG) வின் பிராந்தியப் பயிலரங்கு, மதுரா, டிசம்பர் 16, 2019.

கிராமிய தொழில்நுட்ப செயற்குழுவின் (RuTAG) பிராந்தியப் பயிலரங்கு 2019 டிசம்பர் 16ம் நாள் மதுராவில் ஹாத்ராஸ் மனித நல சங்கத்தின் உதவியுடன் நடை பெற்றது. இப்பயிலரங்கில் IIT தில்லியின் பேராசிரியர்கள் கௌர் (தலைவர் RuTAG), சாஹா (ஒருங்கிணைப்பாளர் RuTAG), இரவி, சங்கீதா கோஹலி மற்றும் RuTAG பணியாளர்கள் தேவிந்தர் பால் சிங், யஷ்வந்த் பிரசாத், ராஜ் குமார் குப்தா,மங்கள் சர்மா, சூரஜ் பட், இளநிலை மாணவர்கள் அபிஷேஷ் குமார், சங்கேத் பெனிவால் உட்பட 60 பேர் பங்கேற்றனர். திரு. தேவிந்தர் பால் சிங் பயிலரங்கை நிர்வகித்து, அனைவரையும் வரவேற்றார். பார்க்க: படங்கள் 15 (a), (b), (c).

பேராசிரியர் சாஹாவும் பங்கேற்றோரை வரவேற்றார். அவர் RuTAG பற்றியும், பயிலரங்கின் நோக்கம் பற்றியும் விரிவாக எடுத்துரைத்தார். RuTAG கிராமியத் தொழில்நுட்பத்தை மேம்படுத்துவதில் எவ்வாறு செயல் படுகிறது என்பதை விளக்கி, இப்பயிலரங்கின் நோக்கம் துளசி மாலை மணி தயாரிக்கும் இயந்திரத்தை மக்களிடையே பரப்புவது என்பதையும் தெளிவாக்கினார். பேராசிரியர் ர் அவர்களும் அனைவரையும் வரவேற்று,கிராமிய ஆராய்ச்சியில் IIT போன்ற முக்கிய கல்வி நிலையங்கள் பங்கேற்பதின் இன்றியமையாமையை விளக்கினார். பேராசிரியர் M R இரவி, RuTAG மூலம் உருவாக்கப்பட்ட பல்வகையான சூளைகளைப் பற்றிப் பேசினார்.

*Figure 15(a): Group photo of participants of RuTAG regional workshop held at Mathura*

*Figures 15(b). Mr. Laxman demonstrating the new Tulsi Mala Making Device, (c). New Tulsi Mala Making Device given to Mr. Dharmendra of HSWS*

*Continued to page 10*

In continuation of Page 9

கண்ணாடி வளையல் செய்யும் சூளை, மண் கலங்கள் சுடும் சூளை, பித்தளை உருக்கும் சூளை உட்பட்ட கிராமிய சூளைகளின் உருவாக்கம் மற்றும் செயல்பாடு பற்றி விளக்கினார். பங்கேற்பாளர்களில் பலரும் தத்தம் தொழில்கள் பற்றியும், அதில் அவர்கள் நேர்கொள்ளும் சிக்கல்கள் பற்றியும் விளக்கினர். பயிலரங்கத்தின் நோக்கம் துளசி மாலை மணி தயாரிக்கும் இயந்திரத்தை பங்கேற்பாளர்களுக்கு அறிமுகப்படுத்தி அவர்களுக்கு அந்த இயந்திரத்தைப் பயன் படுத்தும் செயல்முறையில் பயிற்சி அளிப்பது என்பதால், பயிலரங்கின் அடுத்த பகுதி முழுமையாக இதற்காகவே அமைக்கப்பட்டது. இப்பகுதியில், பங்கேற்றோரில் பலர் நேரிடையாக இந்த இயந்திரத்தை இயக்கவும், அதைப் பிரித்து, சரி செய்து, மறுபடி செயல்படுத்தவும் கற்றனர். பரத்பூரின் திருமதி. ஓம்வதி மற்றும் மதுராவின் திரு. இலட்சுமண் உள்ளிட்ட கைவினை விற்பன்னர்கள் பங்கேற்றோருக்குப் பயிற்சி அளித்து, செயல்முறை விளக்கம் அளித்தனர். AC மற்றும் DC மோட்டார்களால் இயக்கப்பட்ட இயந்திரங்கள் கொண்டு பலர் துளசி மணிகள் தயாரிக்கக் கற்றனர். பலரும் புது இயந்திரம் கொண்டு மணிகள் தயாரும் செய்தனர்.
இறுதியில் பயிலரங்கின் நிறைவாக, பேராசிரியர் சாஹா பங்கேற்ற அனைத்துக் கைவினைஞர்களுக்கும், இயந்திரம் தயார் செய்த மரவேலை விற்பன்னர் திரு. தேவேந்திரா அவர்களுக்கும் நன்றி தெரிவித்தார். லுப்பின் நிறுவனத்தைச் சேர்ந்த திரு. புனீத் குமார் அவர்களுக்கும், ஹாத்ரஸ் மனித நல சங்கத்தைச் சேர்ந்த திரு. தர்மேந்திரா அவர்களுக்கும் புது இயந்திரங்கள் வழங்கப்பட்டன. லுப்பின் நிறுவனத்தின் திரு. ஹேமந்த் சர்மா இந்த இயந்திரங்கள் பற்றி கைவினைஞர்களிடையே விழிப்புணர்வு ஏற்படுத்துவதில் உதவி செய்வதாக உறுதியளித்தார். இவ்வாறாக, பயிலரங்கு இனிதே நிறைவேறியது.

*Prof. M. R. Ravi, Co-coordinator, RuTAG IIT Delhi*

## ഇന്ത്യൻ കാർഷിക മേഖലയിലെ പ്രധാന പ്രശ്നങ്ങൾ

***Malayalam***

ലോകത്തിൽ ഏറ്റവും കൂടുതൽ പാൽ, പയറുവർഗ്ഗങ്ങൾ, സുഗന്ധവ്യഞ്ജനങ്ങൾ എന്നിവ ഉൽപ്പാദിപ്പിക്കുന്ന രാജ്യമാണ് എന്നതുപോലെതന്നെ കന്നുകാലി വളർത്തലിലും, അരി, ഗോതമ്പ്, പരുത്തി എന്നിവ കൂടുതൽ പ്രദേശങ്ങളിൽ ഉൽപ്പാദിപ്പിക്കുന്ന കാര്യത്തിലും ഇന്ത്യ ഒന്നാം സ്ഥാനത്താണ്. അരി, ഗോതമ്പ്, പരുത്തി, കരിമ്പ്, പഴം, പച്ചക്കറികൾ, ചായ എന്നിവയോടൊപ്പം മത്സ്യകൃഷി, ആട്, ചെമ്മരിയാട് എന്നിവയുടെ മാംസോത്പാദനത്തിന്റെ കാര്യത്തിൽ ലോകത്തു രണ്ടാം സ്ഥാനവും ഇന്ത്യക്കുണ്ട്. രാജ്യത്തെ നിലവിലെ 195 ദശലക്ഷം ഹെക്ടർ കാർഷിക ഭൂമിയിൽ ഏതാണ്ട് 125 ദശലക്ഷം ഹെക്ടർ മഴയെ ആശ്രയിച്ചുള്ളതും 70 ദശലക്ഷം ഹെക്ടർ ജലസേചനത്തെ ആശ്രയിച്ചുള്ളതുമാണ്. ഇതിനു പുറമെ 65 ദശലക്ഷം വനപ്രദേശവുമുണ്ട്. ഇന്ത്യയിലെ 75 ശതമാനം കുടുംബങ്ങളും ആശ്രയിക്കുന്നത് ഗ്രാമീണ വരുമാനത്തെയാണ്. രാജ്യത്തിൻറെ ഭക്ഷ്യ സുരക്ഷ, ധാന്യ വിളകളായ ഗോതമ്പു, അരി, സോയാബീൻ, എണ്ണക്കുരുക്കൾ തുടങ്ങിയവയുടെ ഉൽപ്പാദനത്തെ ആശ്രയിച്ചാണ് നിലനിൽക്കുന്നത്. അനസ്യൂതമായി വർധിച്ചുവരുന്ന ആവശ്യകതക്ക് അനുസ്യൂതമായാണ് പഴം, പച്ചക്കറികൾ പാൽ എന്നിവയുടെ ഉൽപ്പാദനം ബന്ധപ്പെട്ട് കിടക്കുന്നതു. ഇന്ത്യൻ കാർഷിക മേഖല അഭിമുഖീകരിച്ചുകൊണ്ടിരിക്കുന്ന നിരവധിയായ പ്രശ്നങ്ങൾ താഴെ പറയുന്നു; ഏറെ വേഗത്തിൽ പരിഹരിക്കപ്പെടേണ്ടണ്ടവയാണ് അവ:

1. **ജല ദൗർലഭ്യം:**
   ജല ദൗർലഭ്യവും, നിലവിലെ ജലസേചന സ്രോതസ്സുകളെ പൂർണമായി ഉപയോഗപ്പെടുത്തുന്നതും ആശങ്കാജനകമായ സ്ഥിതിവിശേഷമാണ്.
2. **നിരക്ഷരതയും, അസമത്വവും, സാമ്പത്തിക അഭാവവും:**
   നിരക്ഷരത, കാർഷികരംഗത്തെ പുത്തൻ പ്രവണതകളെക്കുറിച്ചുള്ള അറിവില്ലായ്മ, കർഷകരുടെ മോശം സാമൂഹിക-സാമ്പത്തിക ചുറ്റുപാടുകൾ തുടങ്ങിയവയാണ് കാർഷികോൽപ്പാദനം തുടർച്ചയായി കുറയാനുണ്ടായ അടിസ്ഥാന കാരണം.
3. **ചെറുതും, തുണ്ടം തുണ്ടമായതുമായ കൃഷിയിടങ്ങൾ:**
   വലിയതു എന്ന് തോന്നാമെങ്കിലും 141.2 ദശലക്ഷം ഹെക്ടർ കൃഷിയിടം സാമ്പത്തിക നേട്ടമുണ്ടാക്കാനാകാത്ത തരത്തിൽ ചെറിയ തുണ്ടങ്ങളായി ചിതറിപ്പോകുമ്പോൾ നിരുപയോഗമായി തീരുന്നു. കൂടുതൽ ജനങ്ങൾ തിങ്ങി പാർക്കുന്ന പടിഞ്ഞാറൻ ബംഗാൾ, കേരളം, ഉത്തർപ്രദേശിന്റെ കിഴക്കൻ ഭാഗം എന്നിവിടങ്ങളിലാണ് ഇത് ഏറെ പ്രകടം.

Continued to Page 11

In continuation of Page 10

അവിടങ്ങളിൽ കൃഷിയിടത്തിൽ വിസ്തീർണം ശരാശരി ഒരു ഹെക്ടറിൽ കുറവോ ചിലപ്പോൾ അര ഹെക്ടറിൽ താഴയോ മാത്രമാണ്.

4. **വിത്തുകൾ:**
കൊള്ളവില ഈടാക്കുന്നതുകൊണ്ടു ഗുണമേന്മയുള്ള വിത്തുകൾ ചെറുകിട-നാമമാത്ര കർഷകരെ സംബന്ധിച്ചിടത്തോളം കിട്ടാക്കനിയായിരുന്നു. എന്നാൽ ഇപ്പോൾ ദേശീയ വിത്ത് കോർപറേഷനും, 13 സംസ്ഥാന കർഷക കോർപറേഷനുകളും ഗുണമേന്മയുള്ള വിത്തുകൾ കർഷകർക്ക് വിതരണം ചെയ്യുന്നുണ്ട്.

5. **വളം, രാസവളം, ജീവനാശിനികൾ:**
എല്ലാ വിളകളുടെയും ശരാശരി വിളവ് ലോകത്തിലെ ഏറ്റവും താഴ്ന്ന നിരക്കിൽ ഉള്ളതാണ്. വളവും രാസവളങ്ങളും ഉപയോഗിക്കുക വഴി ഇത് പരിഹരിക്കാവുന്നതാണ്. ചാണകം മികച്ച വളമാണ്, എന്നാൽ ചാണക വരളി വീടുകളിൽ ഇന്ധനമായി ഉപയോഗിക്കുന്നതുകൊണ്ട് അതിന്റെ ലഭ്യത പരിമിതമാണ്. ജനസംഖ്യ വർദ്ധിച്ചതോടെ ഇന്ധന ഉപഭോഗം വർധിക്കുകയും വിറകിന്റെ ലഭ്യത കുറയുകയും ചെയ്തതോടെ പ്രശ്നം കൂടുതൽ സങ്കീർണമായി. വില ക്രമാതീതമായി വർധിച്ചതോടെ രാസവളം പാവപ്പെട്ട കർഷകർക്ക് വാങ്ങാനാകാത്ത അവസ്ഥ ഉണ്ടാക്കിയിട്ടുണ്ട്. എന്നാൽ രാജ്യത്തെ ഗ്രാമീണ മേഖലയിലെ 650 മെട്രിക് ടൺ കമ്പോസ്റ്റും നഗരങ്ങളിലെ 16 മെട്രിക് ടൺ ഇപ്പോഴും പൂർണ്ണമായും ഉപയോഗപ്പെടുത്തുന്നില്ല. ഈ സ്രോതസ്സ് ഉപയോഗപ്പെടുത്തുന്നതിലൂടെ രാജ്യം നേരിടുന്ന മാലിന്യ നിർമ്മാർജ്ജനം സാധിതമാക്കാനും മണ്ണിനെ ഫലഭൂയിഷ്ഠമാക്കാനും സാധിക്കും. ജീവനാശിനികൾ (കീടനാശിനി, കള നാശിനി, പായൽ നാശിനി) കൃത്യമായ അളവിൽ ഉപയോഗിക്കുന്നത് വഴി വിളകളെ കീടങ്ങളിൽനിന്നും രോഗ ബീജങ്ങളിൽനിന്നും പായലുകളിലിന്നും രക്ഷിക്കാനും അതുവഴി വിള വർധിപ്പിക്കാനും കഴിയും.

6. **കാർഷിക മേഖലയിലെ ഫലഭൂയിഷ്ഠമല്ലാത്ത ഭൂമിയും അടിസ്ഥാനസൗകര്യങ്ങളുടെ അഭാവവും**:
വ്യവസായശാലകൾ ഉയർന്ന തോതിൽ പുറംതള്ളുന്ന മാലിന്യങ്ങളും, വിഷ ലോഹാംശങ്ങളും, നദികളിലും കനാലുകളിലുമൊക്കെ അടിഞ്ഞുകൂടുന്നതുവഴി കാർഷിക ഉൽപ്പാദനക്ഷമത കുറയാൻ കാരണമായിട്ടുണ്ട്. ഇതോടൊപ്പം വ്യാപകമായി സംഭവിച്ചുകൊണ്ടിരിക്കുന്ന മണ്ണൊലിപ്പ് ഭൂമിയുടെ ഫലപുഷ്ടി നഷ്ടപ്പെടുത്തുകയും ചെയ്യുന്നു. രാസവളങ്ങളുടെയും കീടനാശികളുടെയും അമിതമായ ഉപയോഗവും മണ്ണിന്റെ ഫലപുഷ്ടിയെ നഷ്ടപ്പെടുത്തുന്നുണ്ട്. കർഷകർ പഴയതരം ഉപകരണങ്ങളും രീതികളും പിന്തുടരുന്നതുകൊണ്ട് വിളയുൽപ്പാദനം കുറയുകയും ചെയ്യുന്നു.

7. **കാർഷിക വിപണനം:**
ഗ്രാമീണ ഇന്ത്യയിൽ കാർഷിക വിപണനം മോശമായി തുടരുകയാണ്. ശരിയായ വിപണന സൗകര്യം ഇല്ലാത്തതിനാൽ കർഷകർക്ക് തങ്ങളുടെ ഉൽപ്പന്നങ്ങൾ വിറ്റഴിക്കാൻ പ്രാദേശിക കച്ചവടക്കാരെയോഅല്ലെങ്കിൽ ഇടനിലക്കാരെയോ ആശ്രയിക്കേണ്ടിവരികയും തുച്ഛമായ വിലക്ക് അവ വിറ്റഴിക്കേണ്ടിവരികയും ചെയ്യുന്നു. വിളവെടുപ്പിനു ശേഷം ഏറെക്കാലം കാത്തിരിക്കാൻ പാവപ്പെട്ട കർഷകർക്ക് സാധ്യമല്ലാത്തതുകൊണ്ടാണ് ഇത് സംഭവിക്കുന്നത്.

8. **സംഭരണ സൗകര്യങ്ങളിലെ അപര്യാപ്തത:**
ഗ്രാമീണ മേഖലയിൽ സംഭരണ സൗകര്യം ഒന്നുകിൽ ഇല്ല അല്ലെങ്കിൽ തീരെ കുറവാണ്. അത്തരം പര്യാവസ്ഥതയിൽ വിളവെടുപ്പ് കഴിഞ്ഞ ഉടൻ കർഷകർ അവരുടെ ഉൽപ്പന്നങ്ങൾ ചെറിയ വിലക്ക് വിറ്റുതീർക്കാൻ നിർബന്ധിതരാകുന്നു. അങ്ങനെ മനം നൊന്ത വിപണനം മൂലം കർഷകനെ യഥാർത്ഥത്തിൽ കിട്ടേണ്ട വരുമാനത്തിൽനിന്നു അകറ്റി നിർത്തപ്പെടുകയും ചെയ്യുന്നു. വിളവെടുപ്പാനന്തര നഷ്ടം ഏകദേശം 9.3 ശതമാനമാണെങ്കിൽ അതിൽ 6.6 ശതമാനം മോശം സംഭരണ സൗകര്യം മൂലം ഉണ്ടാകുന്നതാണ്. ശാസ്ത്രീയ സംഭരണ രീതികൾ, അതുകൊണ്ടുതന്നെ അത്യാവശ്യമാണ്; അത് നഷ്ടം ഇല്ലാതാക്കുകയും കർഷകനും, ഉപഭോക്താവിനും ഒരുപോലെ ഗുണകരമായിത്തീരുകയും ചെയ്യും. പാണ്ടികശാലകളും, സംഭരണ കേന്ദ്രങ്ങളും നടത്തുന്ന പല ഏജൻസികളും ഇന്ന് നിലവിൽ ഉണ്ട്. ഈ ഏജൻസികൾ ബഫ്ഫർ സ്റ്റോക് ശേഖരിച്ചു സൂക്ഷിക്കാനും, ആവശ്യം വേണ്ട ഘട്ടത്തിൽ ഉപയോഗിക്കാനും കർഷകരെ സഹായിക്കും. കർഷകർക്ക്, പ്രത്യേകിച്ചും ചെറുകിട നാമമാത്ര കർഷകർക്കു അവരുടെ കൃഷിയിടത്തിന് സമീപം തന്നെ വിളകൾ സൂക്ഷിക്കാനുള്ള ഒരു കേന്ദ്ര സർക്കാർ പദ്ധതിയും നിലവിലുണ്ട്.

Continued to Page 12

*In continuation of Page 11*

9. **ഗതാഗതത്തിന്റെ അപര്യാപ്തത:**

ആദായകരവും കാര്യക്ഷമവുമായ ഗതാഗത സൗകര്യം ഭൂരിഭാഗം ഗ്രാമങ്ങളിലും ഇല്ല എന്ന് തന്നെ പറയാം. ഈ ഗ്രാമങ്ങൾ പ്രധാന പാതകളുമായോ കച്ചവട കേന്ദ്രങ്ങളുമായോ പൂർണ്ണമായും ബന്ധിപ്പിക്കപ്പെട്ടിട്ടില്ല .

10. **ഉപസംഹാരം:**

ഇന്ത്യയുടെ സമ്പദ്‌വ്യവസ്ഥയുടെ നട്ടെല്ലാണ് കാർഷിക മേഖല. ഇത് ദശലക്ഷങ്ങളായ ഇന്ത്യക്കാർക്ക് തൊഴിൽ നൽകുന്നതോടൊപ്പം വ്യവസായ മേഖലക്ക് അവശ്യം വേണ്ട ഊർജ്ജവും പ്രദാനം ചെയ്യുന്നു. ഇന്ത്യയിലെ വൻതോതിലുള്ള കന്നുകാലികൾക്ക് തീറ്റ നൽകുന്നതോടൊപ്പം വിദേശ നാണ്യം നേടാനുള്ള പ്രധാന ഘടകമായി മറയുകയും ചെയ്യുന്നു. അതുകൊണ്ടു തന്നെ, ഔപചാരികമായ വായ്പ്പകളുടെ സമയബന്ധിതമായ വിവരങ്ങൾ കർഷകരെ പഠിപ്പിക്കേണ്ടതും സർക്കാരിന്റെ നയങ്ങളെയും പരിപാടികളെയും കുറിച്ച് അവരെ ബോധവൽക്കരിക്കേണ്ടതും അത്യന്താപേക്ഷികമാണ്.

*പ്രൊഫ. കേശവ് കാന്ത് (റിട്ടയേർഡ്), റൂറൽ ടെക്നോളജി ആക്ഷൻ ഗ്രൂപ്പ്, ഐഐടി കാൺപൂർ*

## @ रूटाग

***Hindi***

भारत में ग्रामीण क्षेत्रों में रोजमर्रा के जीवन और आजीविका की उत्पादकता में सुधार के लिए प्रौद्योगिकी के लाभों का दोहन करने की उल्लेखनीय क्षमता है। नई व उन्नत प्रौद्योगिकियों के माध्यम से परिश्रम को कम और दक्षता को बढ़ाया जा सकता है।

वर्ष 2003-04 में भारत सरकार के प्रधान वैज्ञानिक सलाहकार (Office of the PSA to GoI) के कार्यालय द्वारा मांग पर आधारित प्रौद्योगिकी की पहचान, विकास और प्रसार के लिए रूरल टेक्नलजी एक्शन ग्रुप (रूटाग) (Rural technology action group) का आरंभ किया गया था।ग्रामीण क्षेत्रों की आवश्यकताओं पर आधारित प्रौद्योगिकी की पहचान विज्ञान और प्रौद्योगिकी (S& T) संस्थानो, NGO' पीएसयू (PSU), सरकारी व अन्य ग़ैर सरकारी संगठन द्वारा की जाती है। रूटैग द्वारा इन प्रौद्योगिकी का उन्नयन(अपग्रेडेशन), फील्ड डिलीवरी और विशिष्ट प्रशिक्षण कार्यक्रम किया जाता है। अब तक 7 आईआईटी (Indian Institute of Technology) में 7 रूटैग केंद्रों की स्थापना की गई है:- आईटी-बंबई, ii)आईआईटी-दिल्ली, iii) आईआईटी-गुवाहाटी, iv) आईआईटी-कानपुर, v) आईआईटी-खड़गपुर, vi) आईआईटी-मद्रास, vii) आईआईटी-रुड़की

इन केंद्रो द्वारा विकसित प्रौद्योगिकियों को लोकप्रिय बनाने के लिए कुछ बहुत ही दिलचस्प प्रदर्शन और उत्प्रेरक परियोजनाएं बनाईं गई हैं। हाल ही में इन प्रौद्योगिकियों के व्यावसायीकरण के लिए फिक्की (FICCI) द्वारा व्यावसायीकरण कार्यक्रम( commercialization प्रोग्रम्म) प्रारंभ किया गया है, जिससे भारत के ग्रामीण क्षेत्रों के साथ बिमस्टेक( BIMSTEC) व अन्य पिछड़े अफ़्रीकन देशों का विकास किया जा सकता है।

*Ms. Gunjan Rohilla, Project Assistant (Admin), RuTAG IIT Delhi*

## A s tudent's perspective

I joined RuTAG in January 2019, and it has been an overwhelming experience since then. I have not only explored ground reality-based problems but also got an opportunity to apply engineering skills that I learned throughout my bachelor's. I feel the best thing about being part of RuTAG projects are the field trips that provide an opportunity to explore some diverse small-scale rural industrial systems that prevail within the country. Also, the projects create a direct impact on the livelihood of a group of people; hence there is always a personal sentiment present while working on a specific problem. Lastly, I feel that being part of RuTAG does not only involve doing projects and solving problems, but it also involves exploring different cultures and people of our incredible India.

Vipul Sattavan, B. Tech Industrial Engineering, 4th Year, IIT Delhi

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| | |
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