

Report on the

**Rural Technology Action Group (RuTAG), IIT Delhi Regional
Workshop**

At

**Society for Rural Industrialization
(Behind Doctor's Colony)
Bariatu, Ranchi, Jharkhand**

on

November 19-20, 2015



By

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Preamble

RuTAG IIT Delhi conducted a regional workshop on November 19-20, 2015 at Society for Rural Industrialization (SRI), behind Doctor's colony, Bariatu, Ranchi, Jharkhand. The program was attended by 34 participants from 12 NGOs, 2 faculty members from Xavier Institute of Social Service Ranchi, 2 Faculty members from Xavier Institute of Polytechnic and Technology Ranchi, 1 Faculty member and 4 students from BIT Mesra, Ranchi.

1. Inauguration Session

As per the attached schedule (Annexure-1), the program started with the welcome address by Prof. S. K. Saha, Coordinator/Principal Investigator of RuTAG, IIT Delhi. (Fig. 1). He briefly explained about the agenda of the workshop and introduced RuTAG IIT Delhi.

Dr. A.K. Basu, Chairman SRI appreciated the effort of the Principal Scientific Advisor to the Govt. of India Dr. R. Chidambaram in establishing RuTAG in various IITs and its contributions to the rural population of India by mentioning the epitome of Ru-TAG as “**Ahankar** i.e. **Ru** and **TAG** is **Tyag** or **Discard**”. Dr. Basu briefly explained about his present and past work with various universities in India and abroad. He welcomed all the participants. (Fig. 2)

Mr. Deepankar Sengupta, Chief Executive Officer of SRI mentioned that the mandate of SRI, Ranchi is to carry out rural development activities through scientific and technological interventions. He told that SRI, Ranchi has been working in the areas such as Technology for Marginal Farmers-Soil and water management, Soil Health, Agriculture, Aquaculture, Technologies for Rural women-Health, Finance Management and Social Organisation, Technology for Rural professionals- Engineering, Energy and processing.

Father Ranjit P. Toppo, Secretary of SRI mentioned that SRI, Ranchi is a national level voluntary organization. He stated that aim of any organization is to go beyond livelihood security in order to introduce a system that ensures sustained growth and improvement in the quality of life of the rural poor. He appreciated the role of RuTAG in rural development and welcomed all participants.

The program continued with a round of introductions of the participants.



Fig. 1 Prof. S.K. Saha, Coordinator of RuTAG IIT Delhi welcoming the participants



Fig. 2 Dr. A. K. Basu, SRI Ranchi, Jharkhand

2. Technical Session 1

With the invitation of Mr. Raj Kumar Gupta (Fig. 3), workshop coordinator, Major Chatterjee, Senior Project Consultant, RuTAG IIT Delhi and Central RuTAG Coordinator from the Office of the PSA (Fig. 4) explained in detail about the objectives and mandate of the RuTAG Programme. He explained different technologies developed at various RuTAG Centres. He highlighted Development of improved gravity based ropeways for the hilly regions of Uttarakhand designed by RuTAG IIT Roorkee, Improved Sanitary Napkins by RuTAG IIT Madras, Coir Spinning Ratt by RuTAG IIT Madras, Pirn winding machine by RuTAG IIT Madras, Foot operated Amber charkha by RuTAG IIT Kharagpur, Muri (puffed rice) making machine by RuTAG IIT Kharagpur, Foldable bridge over irrigation canals by RuTAG IIT Madras, Multi nutrient compressed feed block making machine for yak by RuTAG IIT Guwahati, Fish cage project by RuTAG IIT Bombay, Improved metallurgy of horse shoe by IIT Kanpur, Pedal operated Tassar Silk Reeling machine by RuTAG IIT Kharagpur, Bageshwari charkha by RuTAG IIT Roorkee, Mechanised Dhenki by RuTAG IIT Kharagpur, Motorised Mat Making machine by RuTAG IIT Kharagpur, Manual as well as motorised Sabai grass rope making machine by RuTAG, IIT Kharagpur.



Fig. 3 Mr. Raj Kumar Gupta, workshop coordinator, RuTAG IIT Delhi



Fig. 4 Major S. Chatterjee from RuTAG IIT Delhi and the office of the PSA

In the same session, Prof. S. K. Saha presented several completed and on-going projects of RuTAG IIT Delhi (Fig. 5). He briefly explained Animal Driven Gear Box, Bullock Driven Tractor (old and new), Treadle Pump, Solar Treadle Pump, Dehusking of Minor Millets, Garlic processing Machines like Graders, Bulb breaker, Flaker, Dry Garlic Peel remover, Fruwash Technology developed by Prof. H. M. Chawala, Tulsi Mala making machine, improvisations in Bangles making furnace, tools, seating arrangement, sheep wool shearing machine, low cost Ground Water Level Measuring Device, etc.



Fig. 5 Prof. S. K. Saha, presenting work done by RuTAG IIT Delhi

3. Technical Session 2

Technical Session 2 started in morning on the second day of the workshop. Mr. Raj Kumar Gupta invited Prof. Sangeeta Kohli, Head National Resource Centre for Value Education in Engineering (NRCVEE) and Professor in Department of Mechanical Engineering. Prof. Kohli (Fig. 6) presented her work on technologies relating to furnaces and stoves. She mentioned some critical issues in developing low cost and maintenance free rural products, less expensive fuels, cheap smokeless stoves and livelihood focused rural products. She also presented two case studies. Prof. Kohli stated that institutes and NGOs working on technological development for rural India must understand the criticality of product maintenance in rural areas as the success of a product totally depends on after sales maintenance. Therefore, product must be manufactured or assembled and maintained at village level to give thrust to livelihood generation.



Fig. 6 Prof. Sangeeta Kohli presenting work done by various low cost and maintenance free rural products

In case study-1: Prof. S. Kohli presented on Improvement of Bangles making furnace of Bharatpur, Rajasthan, a RuTAG IIT Delhi project, its various stages and progress. In case study-2: Prof. Kohli presented on Dokra craft furnace and pottery kiln furnace with up and down draft kiln in Chhattisgarh region.

Major S. Chatterjee conducted Problem identification session. Around 18 participants present about their organisational activities and problems. Salient features of technology gaps presented are as follows:

- i. Dr. A. K. Basu (90511366521), Chairman, Society for Rural Industrialization (SRI), behind Doctor's colony, Bariatu, Ranchi, Jharkhand

Intervention required:

1. Pre-heating of the mould- heat utilization from Rat-trap construction.
2. **Running D.G. Sets on Organic Fuels-** Technology is required for using karanj oil as a diesel substitute. When this oil is heated to a critical temp., it can fully replace diesel in a commercially available D.G set. The amount of oil to be preheated is 1 to 2 cc./sec for 3 KW generation and hence suitable temperature control is best attained at the Injector nozzle.
3. Iodization of salt for tribal population of Jharkhand and Himalayan region. Rural poor buys raw non iodized granular salt in bulk quantity which leads to known medical problems. Therefore, technology is required to determine the exact amount of iodine required and technique to iodize the granular salt in batches. Available cheap technology will help rural poor in livelihood generation at village level.
4. Development of low cost technology for Hemoglobin level indicator for village health workers. One can think of using electronic means.
5. E-Decision – making support for village panchayats in India - “Bodhi”- A database at the panchayat level which will incorporate all the information of individuals, natural and other resources, decision making systems, etc. requires software and servers.
6. Technology for making ultraviolet light for purification of water by removing florescent coating of house hold tube lights.

IITD Remarks:

Prof. Basu may be requested to submit brief concept note on each of the above mentioned problems.

- ii. Mr. Sudhir Prasad (9905105515), Chotanagpur Craft Development Society, Hawaii Nagar, Road No.-3, Ranchi.

Intervention Required:

1. Improvement in Dhokra craft furnace.
2. Value addition for better finishing and packaging of Dhokra craft products.
3. Seating arrangement for durrie weaving loom. Nearly 400 people are engaged in durrie weaving in Jharkhand and nearby states. There is also a requirement of a low cost improved loom for durrie weaving.

4. Improvement of Jute based products.
5. Improved machinery for wool and cotton based carpet weaving.
6. Technology to process saal seed.
7. Technology for fruit processing.
8. Irrigation with less water.

IIT D Remarks:

The organization may be requested to submit brief concept notes on the furnace, the looms for durrie and carpet weaving. For the other problems, IITD would find out about technologies already available and then inform the organization accordingly. Prof. Ganeshan, expert on Looms and currently consultant to RuTAG, IIT Madras may be involved.

- iii. Mr. O. P. Sharma (8292029995), Ramkrishna Mission Ashram, Swami Vishuddhananda Road, Morabadi, Ranchi and Krishi Vigyan Kendra (KVK), ICAR unit.

Intervention Required:

1. Due to topography of land 70% land is vacant and technology is required to irrigate land. The KVK has developed Gravity Irrigation System. Multicropping in fallow lands needs to be promoted.
2. Solar based cooker for making bakery items.
3. Technology for rain water conservation as annual rainfall is in excess of 1400 mm.
4. Potato planter- the required distance between rows needs to be adjusted.
5. Requirement of small agricultural hand implements

IITD Remarks:

The KVK may be requested to send concept notes on Potato planter and other hand operated agricultural implements. For the other problems, RuTAG, IITD would examine their suitability under the programme and inform about technologies already available.

- iv. Mr. Manjit Nayak (9479218803), Rural Education and Development Society, Jashpur, Chhattisgarh.

Intervention required:

1. Technology to cultivate land on slopes.
2. Requirement for mechanized Dhenki.
3. Technology for mushroom cultivation.

IITD Remarks:

Mechanized Dhenki can be obtained from RuTAG, IIT Kharagpur. Prof. P.B.S. Bhadoria is the contact person. Vivekananda Institute of Biotechnology, Nimpith, South 24 Parganas, West Bengal can provide technology for mushroom cultivation.

v. Mr. Naresh Kumar Patel (9406056815), Raigarh Sahyog Samiti, Raigar.

Intervention required:

1. Technology for watershed development and management
2. Technology mechanized boring system instead of hand boring.

IITD Remarks:

Standardised technologies are available for watershed management. Similarly, for boring, mechanized systems are commercially available in the market.

vi. Mr. Ravikant Sharma (9407644553), Rural Education and Development Society, Jashpur, Chhattisgarh

Intervention Required:

1. Solar dryer for chilies/ furnace based drying during rainy season.
2. Oil extracting technology

IITD Remarks:

Concept notes may be submitted by the organization regarding both the problems with details of volume to be dried, types of seeds from which oil extraction is required, etc.

vii. Neeraj Rutton Toppo (9406342303), Raigarh Sahyog Samiti, Raigarh

Intervention Required:

1. Cashew nut processing unit
2. Smokeless low cost stove.
3. Small processing unit for paddy, maze
4. Briquettes making machine.
5. Processing unit for cashew apple drink

IITD Remarks:

Paddy processing and briquette making machines are commercially available. IITD would source the types available along with the information of manufacturers and send it to the organization. Similarly, a range of low cost stoves is also available including the one developed at IITD. Details of these stoves would also be sent. Work is presently going on Cashew nut processing at RuTAG, IIT Kharagpur. Once the technology is ready for use, the information shall be shared. Technology for processing of cashew apple is available at RuTAG, IIT Kharagpur. Prof. P.B.S. Bhadoria may be contacted.

viii. Mr. Sunil Kumar (9006436557), Barabar Women Federation, Makhdumpur, Jehanabad, Bihar.

Intervention Required:

1. Technology for making Agarbatti
2. Technology for making cemented ring in one go.
3. Technology for making sanitary napkin.

IITD Remarks:

IITD would carry out a detailed study of Agarbatti manufacturing at various scales of operation including making of bamboo sticks, both square and round, and the consolidated information would be shared with all interested organizations. The technology for twin pit latrines is well documented and standardized. IITD would share the information with the organization. This may solve the problems of cemented rings. For Sanitary Napkins the group may contact Gandhigram Trust. The cost of setting up the unit (Rs 5 to 6 lakhs) will have to be raised by the organization. The training of master trainers at Gandhigram can be borne by RuTAG, IITD.

- ix. Mr. Satinder Kumar Sinha (9009832502), Madya Pradesh Vigyan Sabha, Balod, Chhattisgarh.

Intervention Required:

1. Technology for Potter's wheel
2. Technology to make round sticks for agarbatti.
3. Drip irrigation technology package
4. Technology for packing pickle.

IITD Remarks:

Information on improved potter's wheel may be obtained from RuTAG, IIT Kharagpur. Prof. P.B.S. Bhadoria may be contacted. Mr. J.N. Ray of IDEI may be contacted for drip irrigation technology. More information is needed on pickle packaging. For agarbatti, please refer to the remarks under viii above.

- x. Mr. S. R. Patel (7898987833), Chhattisgarh Agricon Samiti, Raipur, Chhattisgarh

Intervention Required:

1. Companies to buy produce directly from farmers
2. Processing Unit for Kuddo, kuttiki, Ragi and millets
3. Technology for aromatic oil extraction.

IITD Remarks:

Information on machines for processing of minor millets can be obtained from **Mr. S. R. Azad** (Mobile-09425009257; Email: mpvs.bpl@gmail.com, srazad61@gmail.com), Madhya Pradesh Vigyan Sabha (MPVS), Gyan Vigyan Parisar, Sangoni Kalan, Raisen Road, Bhopa. More details are needed for oil extraction from aromatic plants. A concept note may be submitted by the organization.

- xi. Ajeet Kumar (7654238295), Naari Gunjan, Danapur, Patna, Bihar

Intervention Required:

1. Technology for Packaging
2. Technology for Muri making machine
3. Technology for skin shredding of channa dal.

IITD Remarks:

For Muri making machine Prof. P.B.S. Bhadoria of RuTAG IIT Kharagpur can be contacted. It seems skin shedding of channa dal can be done using the above machine also. Technology for packing will be checked with local manufacturers around Delhi.

- xii. George Francis Osta (7781010338), Xavier Institute of Polytechnic and Technology, Namkum, Ranchi.

Intervention Required:

1. Technology for safe ergonomics
2. Solar based table lamps for children.
3. Low cost drinking water filtration system
4. Technology for rain water harvesting
5. Carbon credit project which will pay money to people at panchayat level.

IITD Remarks:

Technologies for low cost water filters, solar table lamps and rain water harvesting systems are available. RuTAG, IITD would share details with the organization.

- xiii. Vinod Kumar Apte (8435300138), Manav Sansadhan Sanskriti Vikas Parishad, Darripara, Ambikapur, Chattisgarh.

Intervention Required:

1. Technology for Tau (Buckwheat) crop threshing
2. Technology for food grain and produce storage.

IITD Remarks:

Concept note is needed for Tau threshing. For storage of food grains, PUSA model of Zero Energy Cool Chamber may be tried. Details can be sent by RuTAG, IITD.

- xiv. Harpreet Singh Ahluwalia (9431350814), Xavier Institute of Social Service, Dr. Camil Path (Purulia Raod), Ranchi

Intervention Required:

1. Can plan an entrepreneurship development program

IITD Remarks

IIT Delhi can organize with this institute at suitable time in future.

4. Concluding Session

After listening to all the above problems, Major S. Chatterjee told the participants that RuTAG IIT Delhi will analyse all the problems. Selection of the problems will be done according to the mandate of RuTAG. Selected NGOs will be either called upon or RuTAG IIT Delhi team will visit for detailed discussion on the problem. Prof. S. K. Saha and Mr. Deepankar Sengupta thanked all the participants.

The representatives of RuTAG IIT Delhi have discussed the presentations made by the NGOs and the comments received during the discussion. The remarks have appeared under “IIT Remarks” after the discussion of every presentation. It is expected that some of them can be considered as the new projects for the next phase of RuTAG IIT Delhi during 2015 – 2018.
