

An International Conference on ‘Rural Technology Development and Delivery: RuTAG and its Synergy with other Initiatives’

An International Conference on ‘Rural Technology Development and Delivery: RuTAG and its Synergy with other Initiatives’ was held during March 9-11, 2018, at Indian Institute of Technology Delhi. This conference was organized by RuTAG IIT Delhi with advisory inputs from all the Principal Investigators (PI) of RuTAG centers at six other IITs (Madras, Bombay, Roorkee, Kharagpur, Kanpur, and Guwahati) and University of Jammu. The conference was financially supported by the Office of the Principal Scientific Advisor (PSA) to the Government of India (GoI).

More than 150 registered delegates participated in this conference from across India, Japan, and the United States of America. Five keynote lectures were delivered by distinguished speakers, and two panel discussions were held pertaining to social enterprises and the future roadmap of RuTAG. Invited panelists comprised of all the PIs of RuTAG centers, faculty working in similar areas, and corporates working for social causes. For technical sessions, 63 full papers were submitted through online process. Out of which 28 papers were selected for oral presentations based on the reviews received. A total of 13 submissions were selected for poster presentations. Products/Technologies from various RuTAG centers were also exhibited. Selected papers will be published by Springer.



Prof. A. Fujiwara delivering his keynote address



Group photo of the conference delegates



Prof. S. K. Saha summarising the conference

Poster presentations and Awards

1. The poster on ‘Dynamic Analysis and Design of a Solar-operated Treadle Pump’ by Airin Dutta, ex-Masters student from IIT Delhi won the First Prize for Best Poster in 3rd International and 18th National Conference on Machines and Mechanisms (iNaCoMM), held at Bhabha Atomic Research Centre, Mumbai during December 13-15, 2017.
2. A poster paper on ‘Design improvement in the Batasha making process’ by students and faculty of IEC, Greater Noida won the best poster award at RTDD 2018 Conference.
3. Certificate of Gratitude presented to RuTAG IIT Delhi by Bosch Engineering, Bengaluru on January 26, 2018.



Best poster award grabbed by Airin Dutta at iNaCoMM 2017



Best poster award grabbed by IEC at RTDD 2018

RuTAG CENTERS

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IIT DELHI

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Editors' Desk

It has been a great pleasure to write this column again. I am glad to see the continuity of this newsletter in its 12th edition in six years. This is a great achievement, where not only the information from IIT Delhi is reported but the news from other IITs are also captured. Such a team work will certainly boost up our networking throughout the country.

In our recent endeavour, we started collaborating with the scientists of CSIR-CEERI Pilani with whom a joint Regional Workshop was conducted in Jaipur on February 23, 2018. Through one of the scientists we could reach out to the Sundarban area to install two Treadle Pumps where villagers are using them to draw water from nearby ponds. What a new application of the pump! From irrigation to convenient water collection from ponds/water bodies. This has eventually led to the collaboration with IEST Shibpur and IIT Kharagpur to make the technology of Treadle Pump and relevant trainings available in the state of West Bengal. Very satisfying collaboration.

In other dimension, RuTAG IIT Delhi is planning to embark on global platform through its international conference held in March 2018 where speakers and delegates from the USA and Japan participated. Besides, the RuTAG IIT Delhi team is providing technical support to manufacturer of Treadle Pumps who export to Africa.

I hope with the above momentum RuTAG at IITs will certainly reach greater heights not only in India but on international scene.

Prof. Subir Kumar Saha



The PSA Dr. R. Chidambaram delivering his keynote address at RTDD 2018

Chairman's Column

‘Researchizing Rural Problems’

The International Conference adds New Dimension to the RuTAG Activity

To begin with, I wish to express my whole-hearted appreciation to the consistent efforts of Prof. S.K. Saha, Coordinator, RuTAG IIT Delhi to integrate the RuTAG activity with the rest of academic activities in the institute involving students, research scholars and faculty members formally and informally and also publicizing at all possible forums. Definitely, it is high time that the institutions and their academic members recognize the urgent need and the professional challenge involved in appropriately understanding the indigenous technical problems, particularly, of the rural masses; evolving appropriate user-friendly solutions to these problems and also, creating proper channels for their dissemination. Further, it is also needful to motivate tangible number of faculty and students from various departments and centres to involve in such an activity rather than viewing it as a (minor) digression by a ‘splinter’ group.

To those who have been involving in the RuTAG and other Rural Technology Development projects, it has become increasingly clear that it is much more challenging and research-worthy to tackle the real life technical problems and find a truly user-friendly solution to them than working on rather ‘academically artifactual’ research, design and development problems. In this respect, the organization of an International Conference on Rural Technology Development and Delivery – particularly deliberating on various achievements and issues pertaining to RuTAG and its Synergy with other such initiatives organized by IIT Delhi with the help of other RuTAG centers in March this year was a highly welcome initiative. This was duly encouraged by the Office of the PSA with their active support and guidance. This conference not only provided the academic rigour but also a wider interactive platform to the theme. It included highly inspiring keynote addresses by Dr. R. Chidambaram and other stalwarts. Through panel discussions, the issues of synergy, dissemination, academic recognition, integration with other R&D activities and further advancement and stabilization were debated. The paper presentation and poster sessions focused on the activities and achievements of various RuTAG groups and others.

The educative value of sharing the process of development of some successful outcomes was quite evident, for example, the presentation on the design improvement of ‘Palki’ for the Vaishnodevi shrine pilgrims by Prof. B. K. Chakravarthy of IIT Bombay provided valuable insights on different steps of the design process such as the needs analysis, the feasibility analysis, the preliminary design, and highly iterative detailed design, etc. You may recall that for some time we have been discussing and shall resume deliberations on these constituents in this column in future issues of the newsletter.

Needless to emphasize that while our premier technical institutions are expected to involve in a major way towards understanding and development of the cutting edge, highly sophisticated technologies, it is also an equally important challenge to nurture the ethos and the capability to provide appropriate user-friendly solutions to the indigenous technical problems concerning the large and rather less-privileged masses in the context of the local tradition and culture.

Finally, I wish to suggest that such conferences and other interactive platforms should become a regular feature at a feasible frequency, and the effort to strengthen, expand and academic integration of the RuTAG activities should continue synergizing with other similar initiatives.

Prof. R. R. Gaur



Figure 1: Dissemination of Fish Cage



Figure 2: Ambadi Fruit



Figure 3: Tool for removal of calyces from Ambadi fruit.



Figure 4: Mechanized roller for felt making



Figure 5: Potters kiln used in Unch, Bharatpur, Rajasthan



Figure 6: CAD model of improved pottery kiln.

1. Dissemination of RuTAG IIT Bombay's 'Floating fish cages for inland waters' at North-East

P.I. – Prof. Siddhartha Ghosh, Department of Civil Engineering, IIT Bombay
Collaborating NGO – Ministry of DONER (MDONER)

Prof. Siddhartha Ghosh from Department of Civil Engineering, IIT Bombay has developed a technology called 'Floating fish cages for inland waters' for livelihood enhancement through aquaculture. The technology has a potential to be used in any inland water body for cultivation of fish and other aquatic organisms. Ministry of DONER has sanctioned funds for the dissemination of 50 fish cages of RuTAG IITB design at various locations in North East. First two of those floating fish cages were installed in the water bodies at Matamualtam Village, Dist. Churachandpur, and Chadong Village, Dist. Kamjong, Manipur (Figure 1). The inauguration of these 'Fish cages' was done by Shri. S. N. Pradhan, Joint Secretary, M/O DONER and Dr. Ketaki Bapat, Scientist 'F', Office of the PSA to GOI on April 23-24, 2018, respectively.

2. A tool for removal of calyces from Ambadi fruit

P.I. – Prof. R. Sandesh, Industrial Design Centre, IIT Bombay
Collaborating NGO – Center of science for villages (CSV), Wardha, Maharashtra

Ambadi is an important crop in Wardha–Nagpur area (Vidarbha region of Maharashtra). Several villages in Wardha region grow Ambadi (Figure 2) as a crop. The villagers make juice of fleshy red calyces (the petal-like parts of a Roselle), which is then used for making syrup. Removal of the calyces from Ambadi fruit is tricky and is done manually. This activity is full of drudgery. Present project proposes to reduce the drudgery and improve productivity. RuTAG IIT Bombay has designed a tool (Figure 3) that can be used for this purpose.

3. Mechanized roller for felt making

P.I. – Prof. R. P. Saini, Alternate Hydro Energy Centre, IIT Roorkee
Collaborating NGO – Jansamarth, Tehri, Uttarakhand

Making felt from woolen fibers is amongst the oldest form of fabrics known to mankind. Decorated felt sheet known as 'Namda' has been a popular floor covering material in cold climatic zones of Asia and Europe. RuTAG at IIT Roorkee in association with NGO Jansamarth has developed 3 mechanised rollers (Figure 4) of different sizes to make felt of different sizes for wet felting which saves a lot of labour and reduces physical strain. Some other advantages are: a limited shrinkage in felt size while rolling; Layered wool remains in place and there is no distortion of imbedded designs; Easy to roll and far less strenuous operations. It is based on hand pushing instead of kicking and pushing by legs. There is substantial reduction in physical labour, and can be operated by unskilled labour, while the traditional rolling requires highly skilled craftsman. Rolling time is reduced while felting in bulk and large sized pieces. The cost of equipment ranges in between Rs. 5,000 to Rs. 20,000 depending on the size of a felt.

4. Design and development of efficient and less polluting Potters Kiln in Unch, Bharatpur

P.I. – Prof. M. R. Ravi, Prof. Sangeeta Kohli, Department of Mechanical Engineering, IIT Delhi
Collaborating Agency – Lupin Foundation, Bharatpur, Rajasthan

Pottery making is a traditional craft in villages. During the preliminary investigation and problem identification it has been found that if the furnace (Figure 5) can be made more efficient such that the cost of firing is reduced by 40-50%, the profit margins would improve, making the craft more viable profession. IIT Delhi had prior experience on up-draught pottery kilns in Kondagaon of Bastar dist., Chhattisgarh. Introduction of an air-gap through the rat-trap type of wall construction and channels in the floor construction saved 40-60% in wood consumption. The furnace in Unch is very similar. Based on the CAD model of improved potters kiln (Figure 6) construction has started at the site.

5. Design improvement in the Batasha making process

P.I. – Dr. Vinay Gupta, Mr. Nurul Hassan Laskar, IEC Greater Noida, U.P.
Collaborating NGO – Lupin Foundation, Bharatpur, Rajasthan and Madhya Pradesh Vigyan Sabha, Bhopal, M. P.

Batasha is a very common known name in the households of Indian families. It is a sweet dish used in offerings to God and as a traditional sweet. It is also used in Indian marriages. The problem of drudgery in the Batasha making process was raised by an NGO during RuTAG IITD's regional workshop. The RuTAG team surveyed the cluster in Karauli and observed the existing process of making Batasha. During RuTAG's core group meeting, Dr. Vinay Kumar, a faculty at IEC, Greater Noida who completed Ph. D. at IIT Delhi and had prior experience of investigating Batasha making process for a village near Dadri, Noida, was requested to investigate the present problem with his team of students and faculty from his institution. In Dadri, the team conducted various visits and identified problems faced by the workers. Based on various concepts, a shortlisted prototype was fabricated. A trial was conducted on December 23, 2017. The observations were noted for further improvements. The modified prototype has been fabricated (Figure 7) and tested (Figure 8). The device was demonstrated at the Open House (I²Tech) of IIT Delhi on April 21, 2018.



Figure 7: Fabrication of improved model of Batasha making process



Figure 8: Testing of improved model of Batasha making process

Delivery of RuTAG-IIT Delhi technologies through FITT, IIT Delhi

RuTAG IIT Delhi has been continuously developing and disseminating technologies for rural areas since January 2009. RuTAG works on a concept of open source designs which are accessible to everyone. Therefore, if anyone who is interested in adopting any of the technologies or to manufacture them by their own, they can contact RuTAG IIT Delhi for the designs of these technologies. As problems occur in dissemination of the technologies, Prof. R. R. Gaur, Prof. S. K. Saha and other PIs of RuTAG IIT Delhi have decided to start a scheme called "Delivery of RuTAG IIT Delhi technologies through FITT-IIT Delhi". FITT-IIT Delhi was established in 1992 which acts as an interface between Institute and industry for an effective technology transfer. It enables NGO and rural people to contact RuTAG IIT Delhi to order some of the selective technologies which are accessible through this scheme. This helps in dissemination of RuTAG technologies especially those which are manufactured in institute for the users or the NGOs.

Events, Exhibitions, and News

1. RuTAG IIT Delhi conducted Regional workshop on February 23, 2018, at CSIR-CEERI (Central Electronics Engineering Research Institute), Incubation-cum-Innovation Hub, Jaipur, Rajasthan.
2. An International Conference on 'Rural Technology Development and Delivery: RuTAG and its synergy with other initiatives' held at IIT Delhi during March 9-11, 2018.
3. RuTAG IIT Delhi demonstrated technologies of all RuTAG Centers at PHD Chamber exhibition at Mahindra College, Patiala on April 11, 2018.
4. RuTAG IIT Delhi demonstrated its technologies at Open House of IIT Delhi on April 21, 2018.



Regional workshop at Jaipur

Visits

1. Mr. Davinder Pal Singh and Suraj Bhat visited Bosch Engineering, Bangalore, Karnataka for a demonstration of RuTAG IIT Delhi technologies (Treadle Pump and Tulsi mala making device) during January 22-26, 2018.
2. Mr. Davinder Pal Singh and Mr. Mangal Sharma visited Sundarban, West Bengal during March 24, 2018 – April 02, 2018 to install two treadle pumps improved by IIT Delhi.
3. Mr. Davinder Pal Singh, Mr. Ashish and Mr. Mangal Sharma visited Bharmour, Himachal Pradesh to test newly developed Comb and Cutter and Handpiece for Sheep Hair Shearing Device during May 17-24, 2018.



Certificate from Bosch