

# CENTRE FOR RURAL DEVELOPMENT & TECHNOLOGY

- at a glance

## STRENGTHENING OUR VILLAGES FOR A NEW INDIA

A SUSTAINABLE DEVELOPMENT PROCESS AND NATIONAL NECESSITY

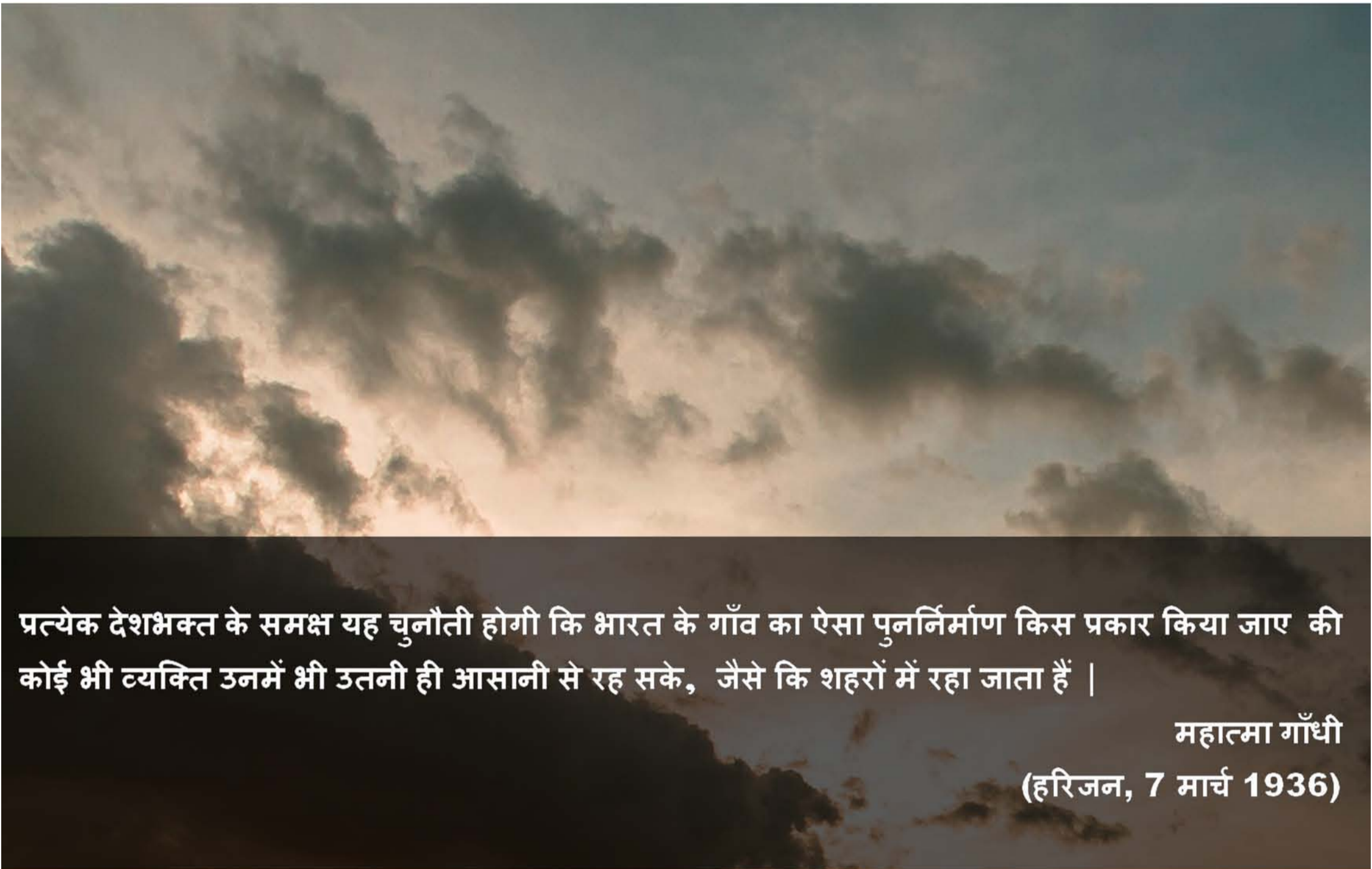


“If we want to build our Nation, we have to start from villages”  
Mahatma Gandhi



# INDIAN INSTITUTE OF TECHNOLOGY DELHI

National Coordinating Institute for Unnat Bharat Abhiyan,  
A Flagship Programme of Ministry of Human Resource Development, Govt of India



प्रत्येक देशभक्त के समक्ष यह चुनौती होगी कि भारत के गाँव का ऐसा पुनर्निर्माण किस प्रकार किया जाए की कोई भी व्यक्ति उनमें भी उतनी ही आसानी से रह सके, जैसे कि शहरों में रहा जाता है ।

महात्मा गाँधी  
(हरिजन, 7 मार्च 1936)



## Message from the Head



Prof. Virendra Kumar Vijay

India was one of the most developed economies in the world till mid of 18th century. India was highly industrialized and urbanized in its own way. There was a continuum of rural – urban settlements in a rational and harmonious way. The remotest, smallest villages were linked to a medium village which served the first level of centralization of functions and activities serving 4-5 villages around in a radius of 2-3 kms. For instance a cobbler could be available at such a medium village and not in every village. Similarly, a potter could be there making and supplying pots to smaller villages around. A flayer could be there to lift dead animals from the surrounding villages and to remove the skin to be supplied to higher up centers for further processing. A blacksmith could be there to repair the agricultural tools, etc.

The next level of centralization could be easily identified at a bigger village serving around 20-25 smaller villages in an area of about 6-7 kms radius. There could be small markets to meet the routine requirements of villages around. One of the major characteristic of such a place is generally a weekly market (haat) bringing the buyers and the suppliers from the area together for local products and requirements.


The next level of centralization or urbanization was the taluka town with regular markets for local and non-local products to meet the requirements of an area of 20-25 kms covering 100 to 200 villages. Taluka level economy can be said to be local economy which can be self-sustaining in terms of local resources as well as providing an interface with the non – local requirements. The next level of centralization / urbanization was probably the district and then the state level reaching out, further to regional and national centers.

This kind of structure of Indian economy was devastated by the European colonizers after 1757, once they got foothold in the politics and administration of Bengal to start with. The East India Company became the revenue collector in Bengal. The balance of trade with England which was highly in favour of India was totally put upside down with the revenues collected by the East India Company. This is where the de-industrialization of India also started. Centers like Dhaka which were world renowned for the textile products were devastated and people forced to migrate to rural areas to protect themselves from the exploitation of the British. The agriculture and local economy of India was strong enough to absorb the impact of all these upheavals.

This de-industrialization continued for more than 80 years. However, the rural areas and the local economy were strong enough to absorb all this and remain strong as compared to the other international economies. It was only after 1820 that the rural areas and the local economy were devastated by the European traders and the Indian economy really broke down. Around 1840 onwards, one finds an exodus of people migrating from rural areas not only to newly coming up urban centers of India but also to many other countries in the world.

Till 1840, no modern industry could take a foothold in India as cheap labour was not available. The first modern industry to come to India was the textile mills which despite all the de-industrialisation and devastation, faced a stiff competition from Indian handlooms and not an inch of the cloth produced in the mills that could be sold in the Indian market. Similar is the story with other industries.

Contd...



The British were developing a few coastal cities like Bombay, Calcutta, Madras etc., for their own import export interests. However, this gave rise to a different concept of urban settings. The rural – urban continuum that existed in India as a natural growth in a very harmonious way got neglected. A few metropolitan cities came up. The investments were largely concentrated in these metropolitan cities and the rest of India was highly neglected. So a new situation developed where we have a few islands of prosperity surrounded by a ocean of poverty and distress. This is when people like Rabindranath Tagore, Mahatma Gandhi and others started talking about a concept of rural development after 1920s. We even started taking pride in saying and referring to India as a country of villages and as an agrarian economy. In reality; India was an industrialised and urbanised nation maintaining a natural harmonious continuum between rural and urban areas. With the distortion brought about by the British in the economy and geographical continuum of rural – urban settings, the need for the concept of rural development and technology for the same became more and more evident. This distinction or disparity of urban and rural should vanish. It's a continuum and is a one whole nation. The centre for rural development and technology that came into existence in 1979 at IIT Delhi had the sole aim of correcting this distortion in national development with inputs of science and technology.

In past three and a half decades, it has made significant contributions in areas like alternate energy technology (biogas, smokeless chulha, etc.), sustainable agriculture, food processing, food preservation and storage, bamboo based sustainable housing, mushroom cultivation, waste management, sanitation, etc. Through this brochure, we share our achievements, contributions and future missions for rural development by implementation of appropriate technologies. We have a strong team of faculty members, researchers and students to strive for holistic development at the grass-root level.

As we complete 75 years of Indian independence in 2022; the centre aims to contribute to new India by technologically fortifying the nation through low cost, last mile, and futuristic technologies. A giant leap in this direction has been taken through the launch of Unnat Bharat Abhiyan in 2014 by Ministry of Human Resource Development (MHRD) that aims to utilize knowledge institutions of the country to help villages, which is being nationally coordinated by CRDT, IIT Delhi. Another key programme envisaged is Scientific Validation and Research on Panchgavya (SVAROP) in 2017 which will help in reinstating the cattle based economy supported by critical scientific research. Apart from these key programmes, this brochure takes you on a virtual tour of appropriate technologies being developed at the centre. There are many expectations from the Centre. As India is making a fast progress to become a developed nation, the key lies in doubling the income of farmers by 2022 for which we have to create allied activities and rural industries to fulfil this aspiration. Livelihood and employment opportunities can be created in rural areas by the intervention of science and technology in which rural development centres like ours play a major role. With the efforts of all in the institute, I strongly believe that we will be able to see our nation in better position in next five years in technology, education, health and employment opportunities and pave a way for reverse migration.

-Jai Hind





# Genesis of the Centre

Prof.(Emeritus) Rajendra Prasad

The concept of rural technology was initiated around 1972 at IIT Delhi in an informal manner. A group of enthusiastic under-graduates, post-graduates and research scholars as well as some faculty members regularly met and discussed issues like how Science & Technology (S&T) could benefit people at large particularly in the rural areas. An informal group was constituted named 'Science for People' which held a number of meetings at Indian National Science Academy (INSA) under the chairmanship of Dr D S Kothari and a number of dignitaries participated like Prof M. S Swaminathan, then Director-General Indian Council for Agriculture Research (ICAR), Dr Y Nayudumma, then Director General Council for Scientific & Industrial Research (CSIR), Dr Ramalingaswami, then Director AIIMS, Prof M. S Sodha, senior Prof, IIT Delhi, Shri Devendra Bhai from Gandhi Samarak Nidhi with some young scientists, public engineers from IIT, JNU, AIIMS and IARI.

In 1974, the theme of Indian National Science Congress (INSC) was 'Science for Rural Development' held at Waltair, Andhra Pradesh and Prof M.S Swaminathan was the general President. The group at IIT Delhi invited dignitaries involved in the movement for 'Science for People' to deliver lectures as well as to hold discussions with more interested faculty members, people in administration, staff and students.

Dr Rajendra Prasad being an active member of the group and spear-headed the movement for creation of Rural Development Centre. The Senate and the Board of Governors, IIT Delhi approved of up-gradation of the informal Rural Technology Cell to a full fledged Rural Development Centre. Thus, the thought of taking S&T to the grass-root level was the main motivation for genesis of this Centre. This idea materialized in 1979 in the form of Centre for Rural Development and Technology which blossomed into a successful model for convergence of research, application and rural development.

## Eminent Personalities associated with CRDT



Daulat Singh Kothari  
Chairman, UGC 1961-73



M.S Swaminathan  
DG, ICAR 1972-79



Yelavarthy Nayudamma  
DG, CSIR 1971



Vulimiri Ramalingaswami  
Director, AIIMS 1969-79



Mahendra Singh Sodha  
Sr. Prof. IIT D, 1964 -92

## VISION

To strengthen rural india by developing and disseminating technologies to address the rural challenges through appropriate technology development, capacity enhancement and last mile connectivity.

## MISSION

To involve higher research base for rural technology development for last mile connectivity. To strengthen rural communities through technological interventions for enabling sustainable livelihood, quality life and healthy environment.

## ROLE

Interaction and learning from field and at policy level. Identify technological, social, livelihood and eco-logical challenges from rural sector requiring S&T inputs. Develop technological solutions blending appropriately the modern S&T with traditional knowledge base. Transfer/Disseminate the technologies through Govt. sponsored schemes involving voluntary organizations / field groups for livelihood generation, poverty alleviation & sustainable development.

## Development Through

## Scientific Research

### Thematic Areas

- Biomass and Environment
- Food and Natural Products Processing
- Green Solution and Sustainable Habitat
- Livelihood and Rural Industrialisation
- Rural Energy Systems
- Panchagavya and its Products

### Publications

- 27 Impact Assessment Reports
- 25 Information Brochures for Rural Technologies
- 204 High Impact Factor Research papers
- 10 Popular Article in Different Languages

### Patents and Start-Ups

- 22 Patents
- 1 Start-Up

Problem Identification

Need Assessment

Scientific Research

Technology Scale UP

Impact Assessment

Technology Scale Out

## Unnat Bharat Abhiyan & SVAROP

### Human Capital of the Centre

Faculty	PhD Scholars Enrolled	PDFs
Core 9	90	13
Joint 4		
Emeritus 2		
Honorary 1		

# ACADEMIC PILLARS



**Prof. Virendra Kumar Vijay**

Biogas, Renewable Energy, Rural Industrialization, Rural Energy Systems Entrepreneurship Development

**Prof. Vijay P. Bhatkar**

(Honorary Professor)  
Computer Science and ICT,  
Rural Development



**Prof. Satya N. Naik**

Biofuels, Oils, fats and Waxes Technology, Extraction of Natural products & Value addition of NTFPs

**Prof. Rajendra Prasad**  
(Professor Emeritus)

Rural Energy Systems, Wood Burning Cookstoves, Entrepreneurship Development



**Prof. Satyawati Sharma**

Biomass Utilization and Mushroom Cultivation Technology

**Prof. Santosh Satya**  
(Professor Emeritus)

Holistic Health,  
Food Safety and Quality



**Prof. Anushree Malik**

Bioremediation, Waste Water Management, Algal Technologies

**Dr. Hariprasad P.**  
Environmental Biology and  
Biotechnology, PGPR



**Prof. Vijayaraghavan M. Chariar**

Ecological Sanitation, Design for Sustainability, Traditional Knowledge Systems

**Dr. Jatindra K. Sahu**  
Food & Process Engineering,  
Agro-food Processing and  
Management Technology.



**Dr. Vivek Kumar**

Paper Technology, Waste Water & Ecofriendly Technology

**Dr. Kavya Dashora**  
Biosensors, Non Chemical Pest  
Management Agricultural  
Technologies, Panchgavya



## JOINT FACULTY



**Prof. P.V.M. Subbarao**

(Deptt. of Mech. Engg.)  
Pico-hydel Power Plants & Bio-fuel systems for rural applications

**Prof. T. R. Sreekrishnan**

(Dept. of Bio chemical Engg. & Biotechnology)  
Waste Engineering & Environmental Biotechnology



**Prof. Kamal K. Pant**

(Dept. of Chem. Engg.)  
Green Technologies for Sustainable Energy & Environment

**Prof. Sunil K. Khare**

(Dept. of Chemistry)  
Microbial Screening & Molecular Biology



# Participation in ACADEMICS

Centre provides open electives for all UG & PG students of the institute. The motivation behind the courses is to provide the students with the exposure to rural technological systems and holistic development.

RDL340	Technology and Community Development	RDL730	Technology Alternatives for Rural Development
RDL700	Biomass Production	RDL740	Technology for Utilization of Wastelands and Weeds
RDL701	Rural Industrial Planning, Policy and Cases	RDL750	Intensive study on Topics of Specific Interest in Biomass Production
RDL705	Rural Resources and Livelihoods	RDL760	Food Quality and Safety
RDL710	Rural India and Planning for Development	RDP750	Biomass Lab
RDL720	Rural industrial Planning and Management	RDD750	Minor Project
RDL722	Rural Energy System	RDL801	Successful Forms of Grass Root Organizations
RDL724	Technologies for Water and Waste Management	RDL803	Informatics and Rural Development
RDL726	Herbal, Medicinal and Aromatic products		
RDL807	Women, Technology and Development		

## POST DOCTORAL FELLOWS



**Dr Rimika Kapoor**

IITD - PDF  
Biogas upgradation, Water scrubbing technology, Bio-methane production from Biogas



**Dr Pooja Ghosh**

DST-Inspire Faculty  
Solid waste management, Bio-energy, Bio-remediation



**Dr Naseer Hussain**

IITD - PDF  
Bioremediation, organic agriculture & waste management.



**Dr Rachana Jain**

DST-SERB PDF  
Value-addition of de-oiled cake



**Dr Ranjita Biswas**

Ramalingaswami Fellow  
Bioenergy and Biorefinery



**Dr Pratibha Yadav**

UGC PDF  
Enzymes



**Dr Ram Chandra**

Energy Bioscience Overseas Fellow  
Bioenergy, Agricultural Engg.



**Dr Monica Verma**

UGC PDF  
Bio-pesticides, fertilizers, formulations



**Dr Kanika Choudhary**

DST- SERB PDF  
Biopesticide & Bioformulations



**Dr Anil Kumar**

UGC PDF  
Designer lipids



**Dr Narendra Kumar Sahoo**

DST- SERB PDF  
Algal biorefinery



**Dr Ruma Karmakar**

DST - SERB PDF  
Microbial diversity and soil contamination



**Dr Sneha Sehwal**

DST-SERB PDF  
Mushroom Technology



# CRDT Leadership

Prof. S. V. Patwardhan	1979 - 1984	Prof. Rajendra Prasad	2000 - 2003
Prof. P. V. Vasudevan	1984 - 1991	Prof. Santosh Satya	2003 - 2006
Prof. P. L. Dhar	1991 - 1993	Prof. P. L. Dhar	2006 - 2009
Prof. Mira Madan	1993 - 1994	Prof. S. N. Naik	2009 - 2012
Prof. Rajendra Prasad	1994 - 1999	Prof. Satyawati Sharma	2012 - 2015
Prof. R. C. Maheshwari	1999 - 2000	Prof. V. K. Vijay	since 2015

## Significant Milestones of CRDT

- **1979** - The Senate and the BOG approved of up-gradation of Rural Development Cell to a Centre. Hence birth of Centre for Rural Development & Technology.
- **1984** - Farukhnagar community development experiences. Launch of National Project on Improved Cookstoves.
- **1994** - Prof. Rajendra Prasad as Head and initiated major interaction with KVIC. Farukhnagar field station reactivated and food processing centre setup.
- **1995** - DST, SIDBI and KVIC sponsored Rural Entrepreneurship Development Programs initiated.
- **1998** - Started a major sponsored project on handicrafts, particularly developing a GIS based system, loom and machineries for carpet industry.
- **2001** - Revamping of JBCRI into MGIRI at Wardha, Maharashtra. Rural Industrialization as thrust area in the Centre.
- **2005** - National Resource Facility on Bamboo Technology.
- **2008** - Rural Technology Action Group (RuTAG), KVIC Interface Program in NRCVEE , New Initiative in Biomass Cookstoves and Biogas Development & Training Centre from MNRE.
- **2014** - Given an idea & concept for involving knowledge institutions in rural development called Unnat Bharat Abhiyan by CRDT and accepted by MHRD as a National Program.
- **2015** - National Coordinating Institute of Unnat Bharat Abhiyan, a programme of MHRD.
- **2017** - Coordinating Scientific Validation and Research on Panchgavya on behalf of Ministry of Science and Technology and Earth Sciences, Government of India

माइक्रो-मॉडल परिसर में प्रयोगशालाएं/सुविधाएं  
Laboratories/Facilities in Micro-Model Complex

- बायोगैस अनुसंधान प्रयोगशाला  
Biogas Research Laboratory
- बायोगैस संवर्धन और बॉटलिंग सुविधा  
Biogas Enrichment & Bottling Facility
- वाहनों में जैव-सीएनजी भराई स्टेशन  
Bio-CNG Filling Station in Vehicles
- चूल्हा परीक्षण प्रयोगशाला  
Cookstove Testing Laboratory
- बायोमास प्रयोगशाला  
Biomass Laboratory
- खाद्य और जैव-प्रक्रिया अभियांत्रिकी प्रयोगशाला  
Food & Bio-Process Engineering Laboratory
- पर्यावरण जैव प्रौद्योगिकी प्रयोगशाला  
Environmental Biotechnology Laboratory

ग्रामोदय परिसर  
GRAMODAYA PARISHAR  
ग्रामीण विकास एवं प्रौद्योगिकी केन्द्र  
Centre for Rural Development & Technology  
भारतीय प्रौद्योगिकी संस्थान दिल्ली  
Indian Institute of Technology Delhi

# GRAMODAYA PARISHAR (MICRO MODEL COMPLEX)

Micro Model Complex renamed as Gramodaya Parishar in IIT Delhi is a seven acre landscape categorically planned for developing laboratories and work area akin to rural setup for students to understand the perspective. The key research themes in the micro model complex being practiced are biogas setup, mushroom cultivation, rapid composting, bamboo as construction material, Moringa and Mulberry research, Panchgavya based technologies and molecular biology. The field crops being researched on are cultivated in the field area for students to perform experiment. The biological waste is being converted into biogas by the floating drum technology as an efficient way of waste management.



- माइक्रो-मॉडल परिसर में प्रयोगशालाएं/सुविधाएं  
Laboratories/Facilities in Micro-Model Complex
- बायोगैस अनुसंधान प्रयोगशाला  
Biogas Research Laboratory
  - बायोगैस संवर्धन और बॉटलिंग सुविधा  
Biogas Enrichment & Bottling Facility
  - वाहनों में जैव-सीएनजी भराई स्टेशन  
Bio-CNG Filling Station in Vehicles
  - चूल्हा परीक्षण प्रयोगशाला  
Cookstove Testing Laboratory
  - बायोमास प्रयोगशाला  
Biomass Laboratory
  - खाद्य और जैव-प्रक्रिया अभियांत्रिकी प्रयोगशाला  
Food & Bio-Process Engineering Laboratory
  - पर्यावरण जैव प्रौद्योगिकी प्रयोगशाला  
Environmental Biotechnology Laboratory
  - अनुप्रयुक्त जीवविज्ञान प्रयोगशाला  
Applied Biology Laboratory
  - सूक्ष्म-पनबिजली परीक्षण सुविधा  
Micro-Hydro Testing Facility
  - बायोमास गैसीफायर परीक्षण सुविधा  
Biomass Gasifier Testing Facility

# SOCIAL CONNECT

for long term community involvement of **CRDT**

- **Gwalpahri, Haryana** : Sahyog IITD (1979 - 1989), a mechanism to connect users with producers directly
- **Farruknagar, Haryana** : Kshetriya Sahyog (1981 - 2000), need identification, finding solutions and implementation
- **UP (40 villages in 10 districts)** : Technology Package for Organic farming (wheat, sugarcane and pulses , Jeevan Vidya Trust) (1985-1995)
- **J&K, Uttarakhand, UP, MP, Rajasthan** : Carpet Looms and Processing machines (2000- 2005)
- **Gujarat, Rajasthan, Punjab, Haryana, Maharashtra, Karnatka** : Biogas Purification & Bottling Technology Package for vehicular use, (Gaushalas/ Entrepreneurs) (2008 – till date)
- **UP, M.P., Bihar, WB** : 5500 Improved Cook stoves (TERI) (2014 - 2016)
- **Sikkim, Bihar and Chhattisgarh** : Safe and Sustainable Housing (Jr & Sr.Engineers at deptt of R.D./ RH , States) (2011 - 2014)
- **Haryana, UP & Rajasthan**: Mushroom Technology, Rapid composting, Biopesticides (since 2011)
- **Orissa & M.P.** : Value added agro forest products (Mahua, Jamun) (2012- 2016)
- **Unnat Bharat Abhiyan** : All India (2014 - till date)
- **SVAROP**: All India (2017 and forward)



A state of art Biogas Enrichment and Bottling Facility for Vehicular application at CRDT



Experimental Algal Bio-Reactor in Applied Microbiology Lab



Experimental demonstration in Mushroom Cultivation Lab



Testing of prototypes in Biomass Cookstove Lab



Experimental Biogas generation from Biomass available in campus

**36**  
NATIONAL AND  
INTERNATIONAL  
PROJECTS

## TECHNOLOGIES TRANSFER & DISSEMINATION

The key technologies developed by the centre are Biogas enrichment and bottling technology for vehicular application, improved cook stoves as Unnat Chulha, indigenous seed based organic farming, rapid composting, biopesticides, mushroom cultivation technologies, bamboo foot scooter, odourless sanitation technologies, Algal Wastewater Treatment & Biofuel Technologies.



Experimenting Oil Expeller & De-huller in Supercritical Fluid Extraction Lab



'Gram Darshan' tour to remote villages in Maharashtra



Inspection of 100 m<sup>3</sup>/h Biogas Plant at Lambra Kangri Multipurpose Cooperative Services Society Ltd., Hoshiyarpur, Punjab



Mushroom Propagation in different places of Haryana



Rural implementation of technology for development of product from Mahua like mahua concentrate, mahua juice etc



# INTERFACE WITH RURAL SOCIETY

Since its establishment, the Centre has made significant contribution to rural development by technology transfers, capacity building and established a channel of communication between rural population and academia. Our faculty members and research teams work in various areas for improving living conditions and generating employments through S&T interventions for rural masses.



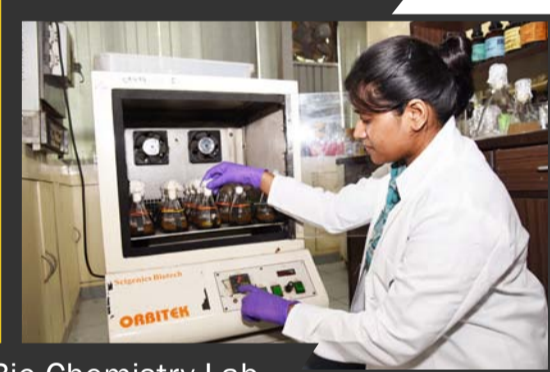
# Technologies/Processes Developed, Transferred & Disseminated

- Bio gas Enrichment and Bottling for vehicular application
- Integrated Technology systems for Artisans and Landless labourers
- Improved cook stoves as Unnat Chullah
- Indigenous Seed based Organic farming
- Minimizing trans-fats in Indian processed food and natural oxidants from edible oils
- Phytoremediation of wastewater in rural areas
- Rapid composting, bio-pesticides, Mushroom cultivation Technologies
- Integrated process for solid and liquid dairy farm waste management
- Herbal product for housefly control
- Panchgavya Processes and Products
- Odourless Sanitation Technologies
- Processing and Value addition of NTFPs

## LAB FACILITIES



Applied Micro-Biology Lab



Bio-Chemistry Lab



Supercritical Extraction Lab



Food and Bioprocess Engg. Lab



Agro-Ecology Lab



Biomass Cookstove Lab



Biogas Enrichment Lab

# MAJOR COLLABORATIVE PROGRAMMES

PROGRAMME	FUNDING AGENCY	CO-ORDINATORS
Technical Back-up Unit for Biomass Cook-stove (1981-95, 2010-11)	Ministry of New and Renewable Energy	Prof Rajendra Prasad, Prof R C Maheshwari
Mahatma Gandhi Institute for Rural Industrialization (2001-08)	Ministry of Micro Small and Medium Enterprises	Prof Rajendra Prasad, Prof V K Vijay, Prof R R Gaur
Biogas Development and Training Centre (2007-cont.)	Ministry of New and Renewable Energy	Prof V K Vijay, Prof P M V Subbarao, Prof Anushree Malik, Prof S Kohli, Prof T R Sreekrishnan
Rural Technology Action Group (2011-14)	Office of the Principal Scientific Advisor, GoI	Prof Rajendra Prasad, Prof S K Saha,, Prof V K Vijay
Super critical fluid extraction of natural anti-oxidant for food preservation from spices and aromatic plants	DST	Prof S. N. Naik
Integrated Technology System for Artisans & Landless Labourers (ITSAL)- 1980-1993	DST	Prof Rajendra Prasad, Prof P S Satsangi
Tools and Machinery for Carpet Industries (1998-04)	Office of Development Commissioner Handicraft	Prof Rajendra Prasad, Prof S K Saha
Valorisation of Food-waste to Biogas (Valor Gas- 2010-14)	European Union	Prof V K Vijay + 13 European partners
Regional Testing & Knowledge Centre for Biomass Cook-stoves (2013-16)	Global Alliance for Clean Cook-stoves, UN Foundation	Prof V K Vijay, Prof Rajendra Prasad
National Network on Integrated Development of Jatropha, Karanja and Non-edible oilseeds (2007-cont.)	Ministry of Agriculture & Farmers Welfare	Prof S N Naik, Prof Satyawati Sharma
From wastewater to bioenergy – A Microalgae Bio-refinery Approach in Indian and Brazilian Scenario (2016-2020)	DBT – India and MCTI-CNPq- Brazil	Prof Anushree Malik, Prof V K Vijay, Prof K K Pant and Brazilian Team
Bio-remediation of Agrochemicals & Heavy metals present in drainage water used for irrigation	NFBSRA, ICAR	Prof Anushree Malik, Prof T R Sreekrishnan, Prof S K Khare, Delhi University and IARI
Supercritical fluid extraction of natural anti-oxidants from spices and aromatic plants of North East region	IIT Guwahati	Prof S N Naik, Prof V V Goud (IIT Guwahati)
Setting up a Knowledge Network on Rural Housing (2013 - 2016)	Ministry of Rural Development, Govt of India	Prof V M Chariar, Asst Prof Jyoti Kumar
Fecal Sludge and Urine Reuse in Agriculture – Opportunities for addressing Phosphorus needs in India (2013-2016)	NSF-USAID	Prof V M Chariar, IIT Delhi with partner Pay Drechsel, IWMI Colombo

# SVAROP

## Scientific Validation and Research on Panchgavya

(A program of Ministry of Science and Technology, Govt of India)

Since the rural economy is largely cattle and agriculture based economy; it is very important to understand the scientific merit of the claims being made by traditional knowledge on the use of panchgavya in food, health, agriculture, utility products etc for better health and environment. CRDT as a National Coordinator has proposed the project for subjecting the Panchgavya claims to critical scientific validation and bringing out the technically correct facts on the use of panchgavya.

### Key Partners

- CSIR/DBT/DST
- ICMR/CCRAS
- ICAR/SAUs
- IITs/NITs
- GAUSHALA
- VATERINARY ORGANISATION
- SELF HELP GROUPS
- ENTREPRENEURS



## Unnat Bharat Abhiyan

The Centre is National Coordinator of Unnat Bharat Abhiyan (UBA) which is inspired by the vision of transformational change in rural development processes by leveraging knowledge institutions to help build the architecture of an Inclusive India.

The Mission of Unnat Bharat Abhiyan is to enable higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth. It also aims to create a virtuous cycle between society and an inclusive academic system by providing knowledge and best practices for emerging professions and to upgrade the capabilities of both the public and the private sectors in responding to the development needs of rural India.

### KEY PARTNERS:

All centrally funded Technical Institutes of MHRD, Institutes of Higher Learning of AICTE and UGC.

### Key Thematic Areas

Scientific Validation of Panchgavya and Its - Products for Agricultural Applications

Scientific Validation of - Panchgavya for Food and Nutrition

Scientific Validation of - Panchgavya for Panchgavya based Utility Product

Scientific Validation of - uniqueness of Indigenous Cows

Scientific Validation of - Panchgavya for Medicine and Health



Inauguration of UBA Cell in 2014 at IIT Delhi by Hon. Union Minister of HRD Smt. Smiriti Z. Irani



National Workshop on Natural Farming under UBA in 2015 at Lucknow attended by Hon. MP Gorakhpur Sh. Adityanath Yogi



National Workshop on UBA in 2016 at IIT Delhi attended by Hon. Union Minister of HRD Sh. Prakash Javadekar



National Training Program of PRA for Participating Institutes under UBA in 2017 held at NIRD&PR, Hyderabad

# MISCELLANEOUS



Centre's faculty interaction with Director IIT Delhi



Director IIT Delhi visit to Gramodaya Parisar



Research Scholar in Gramodaya Parisar Lab complex



Research Scholar at HPLC Lab



Research Scholar at Biochemistry Lab



# List of PhD Scholars at CRDT (till June 2017)

Name	Research Areas
Kumaresh Halder	Scientific validation of Panchagavya based health foods.
Smriti Kala	Development of Micro-emulsion formulation
Anjali Gautam	Study of molecular aspects of Bio-pesticides
Swapna Sahoo	Development of activated carbon from bio mass
Farah Naaz	Development of integrated bio refinery from microalgae (grown on waste water) to produce biofuel precursors and value added products (Bio char/pigments)
Mandira Kapri	Study on functional foods
Sushreesmita Mishra	Development of bio-based multi-layered intelligent films, coatings and sprays for extending shelf-life of perishable fruits and vegetables.
Priyanka	Design of biogas plant for food waste to biogas conversion
Vidhi Bhimjiyani	Supercritical extraction of Nutraceuticals and cosmoceuticals
Garima Singh	Study on Solid Waste Management
Shweta Kalia	Development and optimization of cellulose degrading enzyme and its application in Textile Industries.
Amruta Khairnar	Rural Sanitation from a Circular Economy Perspective
Monu Dinesh Ojha	Study on Biodegradation of Low density Polyethylene
Lalit Anjum	Impact assessment of renewable energy projects for sustainability in rural India
Shreya Tripathi	Scientific Validation and Research on Panchgavya
Asutosh Mohapatra	Encapsulation, characterization and value addition of probiotic bacteria.
Bhushan Dole	Study on Bio-refining of castor
Umesh Chandra	Design and development of Bio-rational System for Legumes Storage for Food Safety
Pratibha	Development of biofertilizers and biopesticides
Himanshu Kumar	Field evaluation and Techno-economical optimization of Biogas Up-gradation Plant
Nitin Kumar	Value Addition of underutilized forest products
Hemant Dadhich	Biogas Production from Mule/Horse dung & its effectiveness for commercialization
P. Duraivadivel	Scientific validation and upgradation of jeevamrutha
Sonal Yadav	Development of microbial formulation for the soil contaminated by explosives and chemical pesticides.
Uma Dwivedi	Production of Fuels & Value added chemicals from waste plastic
Goldy Shah	Improvement in performance of Pressure Swing Adsorption (PSA) for Biogas up-gradation
Shivali	Removal of Hydrogen sulphide from raw biogas using naturally produced sources of carbon
Neha Duhan	Encapsulation, characterization and value addition of Desi ghee Flavour.
Farhat Bano	Assessment of selected emerging micro pollutants in wastewater in Delhi and NCR and their remediation.
Ayusman Swain	Studies on biological activity of phytochemicals from Canna indica and Cyperus sp.
Ambika Bhashist	Current scenario of aflatoxin B1 contamination in cattle feeds and their management
Ashu Jain	Optimization of green synthesis of silver nanoparticles for rural application using locally available plants
Mukesh Jain	Design, Development and Evaluation of Thresher-cum-Dehusker for on-farm Brown Rice Production.
Suneet Anand	Mainstreaming Green Habitat Development through Empowered Choice-making
Vandit Vijay	Development of Energy Sufficiency and Sustainable Model for a Rural Area Using Biomass Resources
Supreet Kaur	Isolation and characterization of bacterial strains and their enzymes with lignolytic potential from Western Ghats of India
Niyati Raj	Development of a Communication Model focussing on Behaviour Change towards Social Welfare Schemes
Neeraj Awasthi	Studies in Kasturi Methi for development of Nutraceuticals
Monika Jangra	Biopesticidal control of Fusarium oxysporum

# List of PhD Scholars at CRDT (till June 2017)

Name	Research Areas
Bhaskar Jha	Biogas Production from De-oiled Rice Bran and Technology Development for High Concentration Hydrogen Sulphide Removal System
Ajay Patel	Utilization of By-Products from Fruit Processing Industries for Functional Food and Nutraceutical Products
Ratnesh Tiwari	Test Protocols and standards for Biomass cookstoves
Pushpendar Kumar	Process optimization and pilot scale testing of algal bio-methanation integrated with wastewater treatment
Sumit Pal	Impact of bio-remediated wastewater on agricultural productivity
Arghya Bhattacharya	Investigations on mechanism, process optimization and feasibility analysis of fungal assisted algal flocculation
Lopa Pattnaik	Valorization of biomass from Indigofera sp.
Deepak Gola	Bio-reactor configurations for treatment of multi-metal containing waste water
Poonam Choudhary	Development of algal biofilm reactor for wastewater treatment integrated with hydrolysis for a sustainable biorefinery
Arzoo	Design and development of small scale grain storage structure for food safety
Mona Anand	A resilience approach to enhance quality of rural housing in India
Shalinee	Studies on <i>Lentinus edodes</i> .
Vinod Kotwal	Developing Holistic Model for Improving the Food quality and Safety aspects of the Street vended Food.
Himanshi	Enhancement of nutraceutical potential of <i>Calocybe indica</i> mushroom.
Amit Ranjan Verma	Basic fundamentals, Lab. and field studies of Biomass cookstoves
Sharad Verma	Pest control by biological means.
Prachi Singh	Bio-rational Approach for Pest Control in Grain Storage System.
Pushp Chawla	Photobioreactor design and development for simultaneous wastewater treatment and CO <sub>2</sub> sequestration.



A group photograph of PhD Scholars enrolled at CRDT at Gramodaya Parisar, IIT Delhi

Alone we are **SMART**

Together we are **BRILLIANT**

# Prospective Faculty/ Post Doctoral Fellow/ Research Scholars

Centre for Rural Development and Technology at IIT Delhi is looking for bright, dedicated and committed people for the cause of rural development. People who are keen and passionate for holistic rural development and interested in developing relevant technologies and knowledge and taking these to villages are welcome.

The centre is always on the lookout for prospective faculty, scientists, post-doctoral fellows, research scholars and project staff enthusiastic for research and development in technologies focused for growth of rural areas.

If you are planning to apply in the centre, please contact the Head of the Centre and schedule a visit. This would offer you an opportunity to meet the faculty, PDF and research scholars of the centre and engage in an informal interaction to learn more about what is happening here.

For more information, you can have a look at our Centre's website.

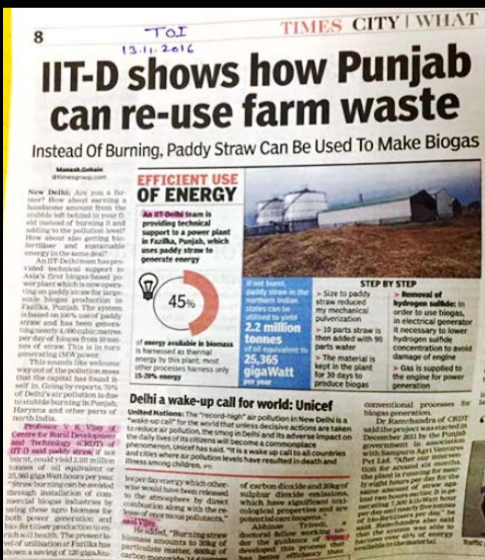
Looking forward for the mission of rural development.

**Prof. Virendra Kumar Vijay**  
(Head of the Centre)  
vkvijay@rdat.iitd.ac.in

## Major Events & News



Visit of U.S. Secy. of State Mr John Kerry to CRDT Lab



Participation of CRDT in India International Science Festival 2016

Newspaper Reports on various Research conducted at CRDT



*The Soul of India lies in its Villages*



CONTACT

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