

# 107<sup>th</sup> INDIAN SCIENCE CONGRESS

Science & Technology: Rural Development

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3-7 January, 2020

University of Agricultural Sciences, Bangalore

ABSTRACTS

Vigyan Sancharak Sammelan - 2020  
**Science Communicators' Meet**

**PROGRAMME**  
**SCIENCE COMMUNICATORS' MEET, Jan 5-6, 2020**

<b>INAUGURAL FUNCTION</b> 5 <sup>th</sup> January, 2020 at 11.30 AM Venue: Kuvempu Sabhangana	
Welcome Address	Dr. Anoop Kumar Jain General Secretary (Scientific Activities) Indian Science Congress Association
Chief Guest	Shri Prahlad Joshi Minister of Parliamentary Affairs, Gol, New Delhi
Introductory Remarks	Dr. S. Rajendra Prasad Vice-Chancellor University of Agricultural Sciences, Bangalore
Guest of Honour	Dr. Akhilesh Gupta Head, NCSTC, Department of Science and Technology, Gol, New Delhi
Presidential Address	Prof. K.S. Rangappa General President Indian Science Congress Association
Vote of Thanks	Dr. S. Ramakrishna General Secretary (Membership Affairs) Indian Science Congress Association
Award Lecture	
12.30 to 1.00 PM	Dr. B. C. Deb Memorial Award for Popularization of Science 2019 – 2020 Dr. Sachin Kumar Singh Lovely Professional University, Phagwara

Jan 5, 2020

Section-I (2.00 – 5.30 PM)

5th January, 2020, Sunday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (2.00 - 3.00 PM)	Invited Speakers	
	1. Prof. Manoj Kumar Patairiya Adviser & Associate Head, NCSTC, Scientist G Department of Science and Technology, Gol, New Delhi	Chairman Dr. K. Muraleedharan Director, CSIR-Central Glass and Ceramic Research Institute 196, Raja SC Mullick Road, Kolkata 700 032
	2. Prof. K. N. Ganeshiah Coordinator, DBT-IBIN Programme, University of Agricultural Sciences Bangalore	Coordinator Prof. R. Uma Shaanker ICAR Emeritus Scientist, University of Agricultural Sciences Bangalore

## Technical Session:

<p>5th January, 2020, Sunday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (3.00 - 4.30 PM)</p>	<p>Technical Session - I (Oral) Oral Presentations (No. OR.01 to OR.09)</p>	<p>Chairman Dr. Jawaid Khan Chief Scientist CSIR-NISCAIR, New Delhi Coordinator Prof. S. Ramesh Department of Genetics and Plant Breeding University of Agricultural Sciences Bangalore</p>
<p>5th January, 2020, Sunday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (4.30 - 5.30 PM)</p>	<p>Technical Session – II (Poster) Poster Presentations (No. PO.01 to PO.10)</p>	<p>Chairman Prof. V.R. Sasidhar Former Professor and Head Department of Crop Physiology University of Agricultural Sciences Bangalore Coordinator Prof. K. Chandrashekara Former Professor and Head Department of Entomology University of Agricultural Sciences Bangalore</p>

Jan 6, 2020

## Section-II (9.30 AM – 1.15 PM)

6 <sup>th</sup> January, 2020, Monday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (9.30 - 10.30 AM)	Invited Speakers	
	1. Dr. T. V. Venkateswaran Scientist-F, Vigyan Prasar National Institute for Science Communication, DST New Delhi	Chairman Dr. A. K. Chauhan Institute of Agricultural Sciences, BHU, Varanasi
	2. Prof. Nagesh Hegde Professor, Indian Institute of Journalism & New Media Science Correspondent, Deccan Herald Prajavani, Bengaluru	Coordinator Dr. M.K. Prasanna Kumar Associate Professor Department of Plant Pathology University of Agricultural Sciences Bangalore

### Technical Session:

6 <sup>th</sup> January, 2020 Monday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (10.30 - 12.00 PM)	Technical Session - III (Oral) Oral Presentations (No. OR.10 to OR.20)	Chairman Prof. Joseph Bhagyaraj, INSA Senior Scientist, Bengaluru  Coordinator Prof. S. Ramesh Department of Genetics and Plant Breeding University of Agricultural Sciences Bangalore
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<p>6th January, 2020 Monday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (12 Noon – 12.30 PM)</p>	<p>Technical Session – IV (Poster) Poster Presentations (No. PO.11 to PO.20)</p>	<p>Chairman Prof. G. P. Brahma Prakash Former Professor and Head Department of Agricultural Microbiology, University of Agricultural Sciences, Bangalore</p> <p>Coordinator Prof. K. Chandrashekara, Former Professor and Head Department of Entomology University of Agricultural Sciences Bangalore</p>
<p>6th January, 2020 Monday Venue: LH-5, College of Agriculture (South Block) UAS, Bangalore (12.30 -01.15 PM)</p>	<p>A Special Brain storming session on science communication: The Way Forward)</p>	<p>Chairman Dr. Narender K. Sehgal Former Head, NCSTC DST, New Delhi</p> <p>Moderator Prof. Manoj Kumar Patairiya Adviser &amp; Associate Head, NCSTC Scientist G Department of Science and Technology, Gol, New Delhi</p>

# Valedictory Programme

6<sup>th</sup> Jan, 2020, 2.00 PM

Welcome Address	Dr. Anoop Kumar Jain General Secretary (Scientific Activities) Indian Science Congress Association
Introductory remarks	Dr. S. Rajendra Prasad Vice-Chancellor University of Agricultural Sciences, Bangalore
Summarization	Prof. R. Uma Shaanker Convener
Chief Guest	Prof. S. M. Shivaprasad Director, Higher Education Academy (Govt. of Karnataka) Dharwad, Karnataka and Professor, JNCASR, Bengaluru
Guest of Honour	Mr. Rajinder Singh Scientist D, NCSTC Department of Science and Technology, New Delhi
Presidential Address	Dr. K.S. Rangappa General President Indian Science Congress Association
Vote of Thanks	Dr. Amit Krishna De Executive Secretary Indian Science Congress Association, Kolkata

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## Dr. B.C. Deb Memorial Award for Popularization of Science 2019 - 2020

Award Lecture:

Challenges associated with oral delivery of formulations used to treat type 2 diabetes and ulcerative colitis and approaches to overcome them

Sachin Kumar Singh

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### Abstract

In case of type 2 diabetes (T2 DM) and ulcerative colitis (UC), the drug has to be administered daily. Hence, currently available drugs are administered through oral route due to the advantages like dose uniformity, ease of administration and non-invasive route. However, the commonly used drugs to treat T2DM include oral sulphonyl ureas, meglitinides, incretin-based medicines, biguanides, thiazolidinediones etc. However, most of them suffer from poor solubility as well as dissolution rate limited oral bioavailability. In order to overcome this various drug delivery systems have been developed in our laboratory to overcome such issues. These approaches include development of nanoparticles, polymorphs/co-crystals, complexes, solid dispersions and vesicular delivery systems. These formulations have shown very effective treatment of diabetes and its complications such as wound healing, neuropathy and diabetic retinopathy on animal models. Similarly, for effective treatment of colorectal diseases such as ulcerative colitis and colon cancer, the release of antiulcer/anticancer drugs is required at the colonic site. None of the formulations have been reported till date in markets that are colon targeted. In our lab we have developed synbiotics based oral colon targeted delivery systems loaded with drugs like 5-fluorouracil, mesalamine and sulfasalazine for their targeting at colonic site. These have shown very good results during the preclinical studies on animal models in significantly reduced dose and ready for clinical studies. Several research papers have been published from the lab related to these approaches. Some patents have also been filed. In the current presentation the prime approaches will be discussed along with their success as well as associated challenges.

Keywords: Nanoparticles; T2DM; Synbiotics; Colon targeted delivery systems

# Invited Lectures

Prof. Manoj Kumar Patairiya

Adviser & Associate Head, NCSTC

Scientist G

Department of Science and Technology, Gol, New Delhi

Prof. (Dr.) Manoj Kumar Patairiya is currently Adviser/ Scientist 'G' in the Department of Science & Technology, Govt. of India. In his prior assignment he has served as the Director of the CSIR-National Institute of Science Communication and Information Resources, New Delhi. Earlier Dr. Patairiya was Additional Director General of Prasar Bharti - the Public Service Broadcaster of India, where he was responsible for setting up a 24x7 Satellite TV Channel DD Kisan including external broadcasts. A well accomplished scientist, science communication researcher and practitioner, Dr. Patairiya specializes in biosciences, mass media and policy. He is decorated with prestigious national and international awards. He has a number of publications and two Indian Patents to his credit. He has edited and co-edited widely acclaimed books "Sharing Science" and "Science Meets Communication". He has been Visiting Professor at National University of South Korea and University of Sao Paulo, Brazil. He also served as the Outstanding Professor of the Academy of Scientific & Innovative Research (Ac-SIR), an institution of national importance established by an Act of Parliament. He is the President of the Society for Information Science and the Founding Fellow of the Academy of Engineering & Technology of the Developing World. Recently he has been elected as the Chair of International AASSA Special Committee on SHARE Communication that is recognition of positioning India at global level in the area of science and technology communication.

## Abstract of talk

### A TV series **"Hopper Race"** on overuse of insecticides in Asia: An appraisal

Most people call it hopper but some scientists call it Brown Plant Hopper (BPH). Clinging to rice stalks down low and out of sight the hoppers stick sharp tubes into them and drink the sun-drenched nutrients in the sap. After a group of hoppers have finished feasting, the rice plants turn brown and the entire field dries out. Because they multiply quickly and there are so many, the farmers call them "pests" and have come to really dislike hoppers. BPH is an insect that causes devastation in paddy crops mostly in Asian countries, also known as Rice Hopper. People used lots of insecticides and hired lots of people to spray. At night, they swarm around the streetlights. They're drawn to light farmers can't even open windows. In the evening they become spirits and fly up out of the paddies. Hopper Race is a TV series produced in collaboration with TV for Environment (TVE) Japan, TVE Asia Pacific, International Rice Research Institute (IRRI), Philippines, with language versions in 8 Asian countries. TVE Japan partnered to adapt and distribute "Hopper Race" documentary in Asian countries. JukaKawaii, Producer, TVE Japan; Monina Escalada, University Professor, Visayas State University, Leyte, Philippines; K.L. Heong, Principal Scientist, International Rice Research Institute, Los Baños, Philippines were amongst the team members. The environmental TV documentary "Hopper Race" has 10 stories, each one about 7-8 minutes long. The first part of the film was launched in November 2012 at the International Rice Plant-hopper Conference with a synopsis of the film and a trailer. The final film was translated and disseminated in the Asia-Pacific region in 2013-14. The film is about rice pest awareness and management, particularly rice plant-hoppers that have been causing extensive crop damages and have become a big problem economically and socially in many Asian countries. The appraisal of the film was carried out by the author, who was also part of the project, and it emerged that the film is a powerful educational tool to promote sustainable agriculture and to increase biodiversity in rice landscapes. The Indian version of the film was well received and appreciated in India especially among farming communities.



Prof. K.N. Ganeshaiah

Coordinator

DBT-IBIN Programme

University of Agricultural Sciences, Bangalore

Prof. Ganeshaiah superannuated from the University of Agricultural Sciences, GKVK, Bangalore as Dean of Post-Graduate Studies. He graduated from the same University with a doctoral degree in Genetics and Plant Breeding. Currently, he serves as Coordinator of a Department of Biotechnology sponsored project on Indian Bioresource Information Network (IBIN) at the School of Ecology and Conservation, University of Agricultural Sciences, Bangalore.

He is an elected Fellow of the Indian Academy of Sciences, Indian National Academy of Sciences and the National Academy of Agricultural Sciences. He was a Fulbright Fellow at the University of Massachusetts, USA and a Honorary Research Fellow of JNCASR, Bangalore. For his distinguished accomplishments, Prof. Ganeshaiah has been honoured with a number of awards and recognitions. For his work on environment and conservation, he was honored with the Parisara Prashasthi, (Karnataka State Environment Award) from the Department of Forest Ecology and Environment, Govt. of Karnataka, India, the British Petroleum Award for 'Resource Substitution', the Ryutaro Hashimoto APFED Award, Gold Prize for promoting ingenious use of a plant invasive, *Lantana camara*, by Asia Pacific Forum for Environment & Development, Japan and the *Radio, Hope and Awareness Media Award* from International Radio Forum – Iran (2010). Prof. Ganeshaiah has been a visiting Professor at the NPST University Ping Tung, Taiwan, Ela Bhat Professor, International Centre for Development, Germany and Institute of Tropical Agriculture, University of Kassel, Germany.

Besides contributing to his primary interests in the fields of evolutionary biology, conservation biology and biodiversity sciences, Prof. Ganeshaiah has also been passionate about reaching out to lay public at large on matters related to science, history, culture and the arts in manner that appeals to people. Over the years he has authored eight novels and over seven short story collections, TV serials and numerous columns to newspapers and magazines in Kannada. His contributions have been richly recognized by literary societies in the state of Karnataka. He was awarded the Karnataka Sahitya Academy Datti Award 2008 for the Kannada novel (*Kanakamusuku*) (2009).

## Abstract of talk

### Breaking the walls and shaking hands: Handing out science to everyone to get all hands to science

Ganeshaiyah K N<sup>\*</sup>, Sagar V, Sachin Rosario, K Chandrashekara and R Uma Shaanker, School of Ecology and Conservation, University of Agricultural Sciences, Bangalore, 560 065

The need for communicating science to the common has arisen because, with time, the practitioners of science have been, both insulating their profession, and isolating themselves, from the common man. Therefore, we argue that an important step in taking science to the common man involves breaking the barriers created by insulation and, bringing back the common man in to the culture of discovery and investigation. In other words, by extending the scientific culture to everyone, we can get all to be with science such that the civil society not only perceives by default the outputs, but also contributes to the growth of science.

However such handing out of the science to all, requires creation of a different medium of communication that can be both followed, and adopted, by the common man. Fortunately, recent developments in information technology have rendered this a near possibility. As a part of the *Indian Bioresource Information Network* (IBIN, DBT, GOI), we have been attempting to develop such tools that can bridge the gap between science and the common man. We present a range of such tools and demonstrate their utility with *Pathanga Suchaka*, an Artificial Intelligence based system to identify butterflies and moths. This helps identifying about 800 butterflies and over 400 moths of India by merely capturing their image in the nature. It also captures the geo-location of the sample thus enabling even the common man to add data to, and to be a part of, the ecological studies.

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Dr. T. V. Venkateswaran

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Dr. T.V.Venkateswaran is Scientist with 'Vigyan Prasar', National Institute for Science Communication, Department of Science and Technology, New Delhi. He is a science communicator, writer, researcher in the area of history of science in early modern and colonial south India, science education and science & media.

He was the founding chief editor of "India Science Wire" an online science and technology news feature service published by the Department of Science and Technology. Currently, he is the editor and publisher of Ariviyal Palagai a new letter in Tamil and Kuthukala a newsletter in Kannada.

In association with Rajya Saba TV (RSTV), he conducts a widely watched television weekly show -Eureka-Conversation with Indian scientists for the past three years. He is popular in Tamil Nadu for his weekly series in PATTAM, a supplement of DINAMALAR and a regular contributor on contemporary developments in S&T in The Tamil-Hindu as well as various journals and magazines on popular science and showcasing scientific activities in Indian labs and research Institutions.

He has published several articles and more than 50 books, popular science as well as analytical work on popular science. He has contributed an article to the compilation "Bridging the Communication Gap in Science and Technology. Lessons from India. Editors: Bagla, P. and Binoy, V. V. One of his recent books is on Stephen Hawking (in Tamil).

## Abstract of talk

### Social media turn and the emerging challenges for science communication

One estimate put the social media users in India at 326.1 million in 2018. While facebook is still the most popular choice among the social media platforms, twitter and other platforms are catching up, in particular among the young population, even in the rural area. Although strictly speaking WhatsApp is a messaging service and not a social media platform, it has emerged in recent years into a new animal almost having crucial characteristics of social media. Urban/rural, gender gap, socio-economic differences in users remain, yet propelled by the low cost of the internet, growth of users across the social divide is seen. If once the news papers were the drivers and agenda setters of mass media, now social media is setting the agenda of traditional mass media- what is trending becomes news. While the initial reception among the scholars was euphoric, social media will herald direct democracy in the domain of communication, bypassing the 'media oligarchy', the dark side is slowly dawning. Social media has become the crucial platform for circulation and consumption of fake news and has emerged a significant challenge for nurturing of the scientific temper and consolidating public health. It cultivates a habit of consumption of only short messages, resulting in loss of nuances in the arguments, a challenge for developing critical thinking. The information overload results on the one hand apathy and other emotional reactions; a threat to public reason. The paper will present a snapshot of the current social media scenario in the country and elucidate the potential challenges for nurturing scientific temper, critical thinking and public reason.

Prof. Nagesh Hegde

Indian Institute of Journalism and New Media  
Opp. BGS International School, Kengeri Hobli  
Bangalore 560 074

Born in a remote village in the Western Ghats of Karnataka, Nagesh Hegde has obtained two Master's Degrees, one from IIT Kharagpur and another from JNU New Delhi. He was a lecturer in Environmental Geology at Nainital before joining Prajavani, a popular daily in Kannada language, Karnataka. As a journalist he specialized in Science, Environment, Agriculture and Health. He is the recipient of all the top awards in journalism, environment, science writing and literature in Karnataka. Many of his writings on science and environment have become text book lessons - ranging from primary schools to Universities. He is the only person honored by all the three academies of the State of Karnataka - Sahitya Academy, Media Academy plus Science and Technology Academy for his writings. His column 'Vijnana Vishesha' is in its 36th year of publication in Prajavani and is the longest running column on science and society. Nagesh Hegde has written some 40 books on science and environment. His column writings on agriculture have been compiled as books in two volumes. Recently he has been nominated for the 'TSR Award', topmost honor for journalism given by the government of Karnataka. As a media person he attended the first world summit on environment held at Rio. He was invited by the United States and Switzerland as their guest. He is the only recipient of the Big Little Book National Award for contribution to children's literature in Kannada. Currently he is a visiting professor at IJNM, a well known journalism institute in Bengaluru. He teaches Developmental Journalism, Environment, Health and Rural Reporting.

Abstract of talk

### Communicating in the age of Climate Crisis

India, with its huge population could be the worst victim of global warming. Almost every individual has to face the brunt of nature's fury whether s/he lives the Himalayas, Tropical forests, and coastal areas, Western Ghats or the Rann of Kutch. Youths and children need to be informed and educated at the basic plan of survival as suggested by scientists and social scientists. It involves all branches of science and technology. The author will present different dimensions of climate information such as carbon footprint and ocean acidification and how to present to the younger generation in a lucid style.

# Abstracts of Oral Presentations

OR-1

## ORAL HEALTH PROMOTION FOR THE INDIGENOUS POPULATION IN INDIA

Pradnya Kakodkar  
Public Health Dentist/Research Consultant  
Deputy Director (Research)  
Dr. D.Y. Patil Vidyapeeth, Pune - India

### ABSTRACT

Oral health affects the quality of life of the people. The two most common oral diseases (dental caries and periodontal disease) are very highly prevalent in India. This paper will discuss the indigenous method and technique of tooth brushing which is cost effective and also feasible based on the "Fit for School" model of WHO. Further, how to integrate oral health preventive program into the national program like Pulse polio for the reduction of oral disease burden in children will be discussed. Community oral health will improve if the indigenous health workers are empowered to become oral health guides.

OR-2

**SCIENCE AND TECHNOLOGY: RURAL DEVELOPMENT**

C.K. Subbaraya

Registrar, Adichunchanagiri University,  
B.G.Nagara-571448**ABSTRACT**

In most of the countries Science & Technology plays a vital role in transforming Social & Economical changes in rural areas. The country has a well-articulated science and technology policy however; much progress has not been witnessed due to the slow social and economic development process.

The efforts in this direction were initiated by Indian Institute of Science (IISc) through its well appreciated program "Application of Science and Technology to Rural Areas" (ASTRA). This model helped the large section of economical deprived people living in rural areas.

It is important to develop technologies to address the needs and requirements of rural population. The basic infrastructures and needs of the rural areas are good education (Schools), safe drinking water, clean surroundings, good transportation service, cultural and social activities. Also in the globalised context, good internet and ICT infrastructure to know the changes happening in and around the world is essential. Farming community, which is the main backbone of our country, for this community access to information through different types of agricultural information systems, monitoring natural resources, education & communication technologies are required to enhance their knowledge. It is also important that well managed networking for interactive knowledge sharing.

Most of the Food and raw materials comes from rural areas hence it is inevitable for involving technologies for improving the agrarian production in terms of adopting the following key aspects for rural development.



- Services like TV, Mobile, Internet, Market Information with an affordable cost
- Support for agricultural & farming Community
- Women empowerment in rural areas
- Establishing Village Knowledge centers
- Use of Solar Power Energy
- Use of renewable energy resources
- Establishing Bio Fuel centers

OR-3

## UTILISING THE POTENTIALS OF SATELLITE DATA FOR IDENTIFYING THE GROUND WATER LOCATION OF THE RURAL AREAS

Agradeep Mohanta, Usha Joshi and G. SandhyaKiran  
Ecophysiology and RS-GIS Lab., Department of Botany, Faculty of Science,  
The Maharaja Sayajirao University of Baroda, Vadodara – 390 002

### ABSTRACT

Satellite data is one of the potential tools for identifying groundwater resources and recharge sites for any area and aids in the preparation and distribution of groundwater prospects zone maps which is the need of the hour for rural areas of the country. Combining the satellite-derived information with location of the water indicator species specifically like *Prosopis spicigera* Linn., *Syzgium cumini* (L.) Skeels, etc. can help in locating the areas with high groundwater in the rural areas. This study summarizes the finding the location of groundwater resources for rural areas with the help of satellite data and groundwater indicating species in the area of Narmada district, Gujarat, India. Extensive fieldwork was carried out to find out the groundwater indicator species which were then localized on the hydro-geological map generated using spatial data. Results clearly indicated that the indicator species were located in the areas with high groundwater level and accuracy was found to be about 85 %. Further, species distribution maps have been generated using a geospatial approach to identify potential areas of high groundwater resources. This study will be helpful to the rural people for finding the locations of new groundwater resources which will be significant in terms of irrigation and household purposes.

OR-4

BIODIVERSITY CONSERVATION FOR LIVELIHOOD  
INSURANCE, ENVIRONMENTAL SECURITY AND RURAL  
DEVELOPMENT: A VISION AND SCIENCE ENABLED MODEL  
ON HISTORIC GANDHAMARDAN HILLS OF ODISHA, INDIA

Abanikanta Bhadra and S.K. Pattanayak

P.G. Department of Environmental Science

Sambalpur University, Jyotivihar-768019, Burla, Sambalpur, Odisha

ABSTRACT

Gandhamardan hills in western Odisha is known for the coexistence of rich biodiversity, economic bauxite reserve, perennial streams and tribal sociocultures. Gandhamardan witnessed Indian bauxite industry's first encounter with people's movement to safeguard natural resources and livelihood of rural inhabitants. With this backdrop and future environmental prospects, the present work has addressed plant species level landscape ecology encompassing drainage basin morphometry, geobotany, pedology and edaphology by means of digital platforms on GIS based software technology. As uppermost canopy, tree species sustainability was prioritized applying population dynamics. Out of 232 plant species modeled, none of the 87 tree species found sustainable. Number of potential species explored for economic, medicinal, ornamental, wildlife sustenance, human food value, thatched house, soil conservation and mineral exploration with mine reclamation purposes are 24, 41, 2, 40, 7, 4, 18 and 8, respectively.

OR-5

## S&T COMMUNICATION AND DRUDGERY REDUCTION AMONG TRIBAL WOMEN IN TAMILNADU

S. Nagarathinam<sup>1</sup> and Kinkini Dasgupta Misra<sup>2</sup>

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### ABSTRACT

Science and Technology Communication on Drudgery reduction equipment in agriculture could help women workers from drudgery and other health related issues. Especially, those living in the tribal areas are not aware of new tools and equipment. This study was conducted by Department of Communication, Madurai Kamaraj University with a collaborative programme of Vigyan Prasar, Govt. of India in three tribal locations of Tamil Nadu, namely Kolli Hills (Namakkal District), Pachamalai (Tiruchirappalli and-Salem Districts) and Pechipaarai (Kanyakumari District) in 2017.

The Science and Technology Communication study was carried in a comprehensive and multi-faceted approach. This approach involved a mix of quantitative and qualitative methods.

Methodology of this study consists of multi methodology. Tribal women from three locations of Kolli Hills, Pachamalai and Pechipaarai were given two day training programme at each location and they had hands on experience with various agriculture drudgery reduction equipment. These three tribal settlements comes under four districts namely Namakkal, Salem, Tiruchirappalli and Kanyakumari in Tamil Nadu state.. During the training programme, S&T information related to drudgery reduction and equipment were given. Practical session with equipment had chance to tribal women to have first-hand drudgery reducing experience. Their pre and post knowledge on the perceptions were administered through a tool of survey questionnaire. For the consistence of understanding an In-Depth Interview were conducted with participant tribal women.

The six types of tools/equipments were selected based on the potential use at the study areas. They were: Paddy Seeder, Improvised Ladder, Fruit Harvester, Finger Guard, ConoWeeder and Twin Wheel Hoe Weeder. Field training to use the ergonomically developed tools/equipments was given to women. A total sample of 66 tribal women, have been engaged in various agricultural activities, participated in the training programmes in three locations with age group of 18-65 years was selected.

In all three places of trainings, S&T information about six drudgery reduction equipment were disseminated by person to person communication and these equipment were provided and tribal women for their use during the programme. During the study, observations were positive for their acceptance, interest, knowledge to operate the equipment and adapt while they work at fields. The Table 2 shows the knowledge gap before and after the training Programme for the drudgery reduction equipments.

The result of the study is obviously understandable that almost all the respondents participated in the study considered it as highly appropriate implement of these tools and equipments in terms of benefits they received and were convinced that it is useful for reducing drudgery.

OR-6

## EPIGENETICS FOR CROP PLANT SUSTAINABILITY AND STRESS ADAPTATION WITH SPECIAL REFERENCE TO NATURAL RUBBER (*Hevea brasiliensis*)

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### ABSTRACT

Epigenetics, known as “above genetics” is the science that describes the mechanisms of heritable changes in gene regulation that does not involve modifications of DNA sequence. Epigenetics is perhaps one of the most popular and quickly evolving fields of modern science to which explain the behavioral modifications of organisms independent of DNA sequence variations. Survival of economically important plant species is necessary for the development of human population on the earth. But the current global climatic conditions due to indiscriminate anthropogenic activities have resulted in loss of natural environment, ecology and genetic diversity of many economically important crop species and their wild relatives. Various studies indicate that phenomena such as plant acclimation and adaptation to stress, plant tolerance to viral infection, hybrid/ heterozygote vigor are excellent candidates for regulation via epigenetic mechanisms. Putative relationship of epigenetic factors with abiotic stress in the tree crop *Heveabra siliensis* a good example for the involvement of epigenetic factors in the stress-responsive mechanism in plants by which they adapt to extreme environmental conditions. In this context, understanding the role of genetic and epigenetic factors involved in the adaptability of economically important plants to various biotic and abiotic stresses is highly imperative to device strategies for the identification and selection of specific stresses tolerant genotypes of important crop species from the available germplasm resources. The role of epigenetic variations in the *Hevea* crop adaptability to the stress was discussed in details with *Heveabra siliensis* in focus with the intention of developing better and hardier crops to withstand hostile environmental conditions in the future.

OR-7

## EXOTIC RUBBER CULTIVATION FOR RURAL ECONOMY OF TRIPURA AND ITS ENVIRONMENTAL CONSEQUENCES WITH SPECIAL REFERENCE TO BIODIVERSITY

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### ABSTRACT

Exotic rubber plantation provided a major means of economic development in the state of Tripura specially for the tribal community since mid-1980s but there were debates regarding sustainable ways of rubber cultivation and a few researchers have also reported the ecological ill effects, threats to biodiversity and change of local climate due to extensive rubber cultivation which has still remained a debatable issue. As there were not enough scientific evidences and very few agencies have reported the facts in this paper an attempt was made to evaluate the ill effects of cultivation of rubber and its threat to local biodiversity. In this paper a study was done with cultivation regime of exotic rubber plantation, its impact on rural economy, soil fertility status, change in floral and faunal diversity and was compared with natural forest which was treated as control. On the basis of observations some mitigational measures were also discussed. From this detailed ecologically oriented study it was very clear that any kind of monoculture plantation practice is not ecologically sustainable and same for exotic rubber plantation which did not support diverse group of soil fauna as compared to the natural forest due to low pH, organic carbon, poor cation exchange capacity and poor rate of decomposition hence the bellow ground vegetation was also sparse and considered as "Green desert". It was also noticed that number of soil faunal community and their diversity especially of detritivore faunal groups was much dense in natural forest as compared to exotic rubber plantation sites but some of the species got well adapted to the habitat of the exotic rubber plantations and showed higher species dominance but diversity index of the faunal community was very low. From this short study it was concluded that: i) monoculture plantation of rubber should be replaced by poly-culture plantation practice ii) balanced fertilizer like compost and vermin

compost could be prepared from the wastes generated in the cultivation site with the aid of local earthworm varieties and may be applied to soils for minimizing the nutritional imbalances in the soil judicious land use practice by cultivating ornamental crops, vegetable crops and floriculture in the bellow ground area can re-establish the microhabitat of the plantation sites which could possibly enrich the biodiversity of the rubber gardens.

OR-8

## ROLE OF ICT IN RURAL DEVELOPMENT

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### ABSTRACT

ICT stands for Information and Communication Technology, which is directly related to use of modern communication devices and instruments to educate the people to enable them to interact with the latest technologies. In India the ICT is still in growing phase in focusing the problems of the rural area. Though, the rapid development in information and communication technologies and easy availability of internet is making a transition of the life of rural people.

ICT is Encouraging Social Transformation by facilitating the flow of information and knowledge, beyond the border of social and economic status. Application of ICT has the potential to improve living standards of people in remote and rural areas by providing important commercial, social and educational benefits.

ICT should be used in such a way that it can improve the quality of life of rural people and can give more opportunities for employment creation. A nation progresses with the progress of the citizens in continuation to that and to educate the local farmers and villagers we have developed some useful apps to demonstrate the use of ICT methods. We are reaching out in villages under unnat bharat abhiyan and also communicating science and educating school going children, women and men of villages about the use of ICT in farming and solving their day to day problems by creative solutions.

OR-9

APPLICATION OF SCIENCE AND TECHNOLOGY IN  
LANDSLIDES OCCURRENCE  
ALONG INDO BURMA ROAD, NH-39, MANIPUR, NE INDIA

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ABSTRACT

A geological investigation of the "Tengnoupal Khunnou Landslide area located along the Indo Burma road (NH-37) has revealed some geotechnical problems related to landslide phenomena. Landslides are mainly occurred in the steep slope transitional zone of Eocene Oligocene flysch sediments of Upper Disang and Lower Barail formations, but significant instabilities were identified within moderate to deep slope Lower Barail Formation as well as Upper Disang Formation. In order to investigate the major contributing factors to landslide occurrence, several physical properties were measured, with the results suggesting that the overall mechanical behaviour of the unit is determined by the clay matrix properties. The clay minerals present found from the XRD analysis are illite, montmorillonite, Kaolinite and chlorite. The percentage of the clay minerals greater than 10% of the matrix fraction and may exert great influence upon the Atterberg limits, swelling, water absorption and shrinkage of the matrix material. Montmorillonite absorbs water between its individual silicate layers with resulting high swelling and low frictional resistance becoming by itself a contributing factor to the failures. The presence of expandable clay minerals within the transitional zone of Upper Disang and Lower Barail, may indicate that the remove of loose soil cover from the moderate to deep slopes area (upper part of the road), during the highway expansion, may be inadequate for preventing future landslides, and a sealing up process in the deep slope area (lower part of the road) may be needed.



OR-10

## ROLE OF HORTICULTURAL AND MEDICINAL PLANTS IN RURAL DEVELOPMENT OF RAJASTHAN

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### ABSTRACT

Rajasthan is an important state in terms of production of horticultural products in form of medicinal, aromatic, fruit and spice producing plants. The state contributes 10 % of total spices and 15% of medicinal and aromatic plants of India. The state is one of the leading producers of coriander, cumin, fennel, fenugreek, ajwain, garlic, psyllium husk and henna. About 65% population of the state is dependent on agriculture and allied activities for their livelihood. Agriculture in Rajasthan is rainfed and the diversity in the climatic conditions of the state creates potentiality of formation of some seasonal fruit cultivation in certain suitable area. The emerging avenue in agricultural system of Rajasthan includes organic farming, seed production, bio technology, food processing, branding, packaging, trading and exports have high potential of growth. Rajasthan government is looking forward in rural agricultural sector to open tremendous opportunities for successful establishment of vibrant and potentially profitable agro processing units. The government is working strongly towards linkage between the farming community, the private sector and financial institutions.

Horticulture in Rajasthan is heralding a new revolution for rural economy of farmers. The State has tremendous potential of rapid increase in fruit production and employment generation. Valuable fruits in Rajasthan include oranges, squash, mandarin, kinnow, guava, pomegranate, bael, ber, aonla, lesora etc. Vegetables include onion, tomato, pea, potato, cucurbits, fruits like watermelon and Muskmelon and export quality-Capsicum, Cabbage, Busses Sprouts, Broccoli, Celery and Parsley. Rajasthan is also very rich in medicinal plants which include Isabgol, Sonamukhi and ashwagandha. Roses from Puskar in Ajmer are used mainly for rose products and gulkand. The contribution of Rajasthan state towards national economy by different and friendly policies and programs related to farmers and rural people are playing a major role in rural development of country.

OR-11

## INTEGRATED AGRICULTURE AND IMPACT OF IMPROVED REARING TECHNOLOGIES ON COCOON PRODUCTION FOR SOCIO-ECONOMIC UPLIFTMENT IN RURAL AREAS

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### ABSTRACT

Agriculture faces significant challenges in responding to the rapidly changing global agri-business environment. Due to the decreased incomes in agriculture in the last few decades, integrated agriculture is frequently recommended as one approach to business survival. Integrated agriculture involves adding income-generating activities at the farm household level, including livestock, local non-farm and off-farm pursuits undertaken by farm people. Sericulture is a farm based commercially attractive activity which falls under cottage industry providing sustainable employment to poor landless and marginal farmers of the country. The growth of sericulture industry in India has been encouraging due to appropriate technologies developed by different institutions of sericulture practicing states. Success of bivoltine silkworm rearing mainly depends on proper chawki rearing method for obtaining assured cocoon crop. After realizing the relevance of evolved technologies regarding rearing of young age silkworms, present study was conceived for upliftment of poor silkworm farmers of this region with an objective to demonstrate and popularize chawki rearing among silkworm rearers in the field for achieving higher quantity of cocoon yield thereby earning more income.

OR-12

**TECHNOLOGY- NEED OF AN HOUR FOR RURAL DEVELOPMENT**

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**ABSTRACT**

The elixir of science and technology still evades rural areas but its current applications can bring about a paradigm shift there, technology that not only caters to their interests and needs but is also cost-effective hence in the reach of the rural poor. Using Internet of things, artificial intelligence and basic sensors, projects are designed that can check the health and economic growth of the people in rural areas. Sensors can sense the soil moisture, pH value of the soil, humidity in air. Weather apps can be used to find weather conditions like percentage rainfall etc of the place and farmers will get to know which crop grown over there will give best output. Not only this, such projects can also sense the pulse rate and if any severe illness like heart trouble take place while working then IOT can inform hospital in the nearest range thus giving proper aid to person. Thus, science and technology has become a great help in pulling these rural people out of their state of oblivion.

OR-13

**STEPPING FORWARD WITH SCIENCE AND TECHNOLOGY:  
AN EFFECTIVE TOOL FOR RURAL DEVELOPMENT**

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**ABSTRACT**

The duo of science and technology paves the way for the development of the country. About 70 percent of our country's population lives in rural areas. The development of rural India reflects the development of entire country. For this prerequisite is an intensive focus on the use of sustainable technologies, in this case science and technology plays an important role for the upliftment of rural India through the advancement in different fields. Science and technology show a significant contribution in the field of agriculture over decades that resulted in the cultivation of genetically modified crops, revolutionary fertilizers, use of water for skyrocketing, the agriculture information system and different information processing tools communicates agriculture related information to the farmers. The health of rural people shows a crucial role in the development of rural India. With the advancement of medical sciences most of the fatal diseases have been cured. Some innovative methods of alternative/renewable energy help to illuminate houses of people residing in rural areas like solar energy, wind energy, energy from biomasses. Many innovative techniques have been developed in the field of construction like the low cost and environment friendly building materials. Science and technology play a great role towards education. The online education system seems boon for the rural children .hence for achieving the goal of rural development science and technology is an effective tool for eliminating poverty, food security, life skilling and educating masses.

OR-14

## AMELIORATING EFFECTS OF MEDICINAL PLANTS EXTRACTS ON DRINKING WATER QUALITY IN RURAL AREAS

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### ABSTRACT

Water is an elixir of life. It is an indispensable resource for the purpose of drinking and agriculture in rural areas. The rural people cannot afford modern devices to get clean drinking water. Hence the present study was undertaken to investigate ameliorating effects of aqueous extracts of some medicinal plants *Moringa oleifera* (Sahjan), *Ocimum sanctum* (Tulsi) and *Azadirachta indica* (neem) on Ganga water as raw sample. Microbial count (CFU/ml) was reduced when the water was treated with plant extracts. Similar trends were observed in case of MPN of coliform bacteria and few chemical parameters. So easily available medicinal plant extracts can be used as an alternative to expensive purification methods of water particularly in rural areas.

OR-15

## NOVEL DRUG TARGETS AND DISEASE MODELS FOR HUMAN RETINAL BLINDNESS

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### ABSTRACT

Neuronal degeneration in human retina causes many sight threatening diseases like retinitis pigmentosa, glaucoma, macular degeneration and diabetic retinopathy. Nevertheless, the mechanism of neuronal degeneration and regeneration is not well understood. Identification of new diagnostic and prognostic molecular markers for retinal degenerative diseases is a major topic of contemporary ophthalmic research. Previously, we showed the presence of PIWI-like proteins in human ocular tissues and vitreous from proliferative diabetic retinopathy patients. Recently, we uncovered 102 piRNAs in retina and RPE by analysing RNA-seq data from Array Express. The identified piRNAs were enriched with three motifs predicted to be involved in rRNA processing and sensory perception. Further, expression of piRNAs were assessed by qRT-PCR in the tissues isolated from donor eyes. Importantly, loss of piRNAs in HIWI2 knockdown RPE cells significantly down regulated specific targets that have been implicated in intracellular transport (SNAREs and Rabs), circadian clock (Timeless) and retinal degeneration (LRPAP1 and RPGRIP). Moreover, oxidative stress in RPE cells elevated the expression of piRNAs indicating a potential role in retinal pathology. Thus, our study provides the clear evidence for expression of piRNAs in retina and RPE. Moreover, we have modeled a bilayer system using primary endothelial and epithelial cells isolated from donor eyesto mimic the human blood retinal barrier to evaluate the role of piRNAs and for screening neuroprotective drugs which could eventually be translated to patient care in various ways.

OR-16

## CLIMATE CHANGE AND VULNERABILITY OF RURAL WOMEN

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### ABSTRACT

Climate change has become a buzzword and critical environmental narrative of the 21<sup>st</sup> century. Deforestation and increased energy consumption driven by an affluent life style is primarily responsible for global climate change. Global climate change has observable effects on the environment and its components. The atmosphere and oceans have warmed, glaciers have shrunk, and the sea level has risen. Extreme and violent weather events are becoming more frequent and agricultural land is becoming less productive. Climate change also distorts natural habitats and is likely to become the dominant driver for the loss of biodiversity and other natural resources by the end of this century. Though, the adverse effects of climate change cannot be compartmentalized within the boundaries of region, religion, caste, creed and gender but different stakeholders in different regions perceive the impacts of climate change differently. It has also been observed that rural women are proportionately more vulnerable to the climate change primarily because of gender inequality, insecure land rights, heavy reliance on agriculture, less access to education and information. Their vulnerability is also confounded by the meagre asset base, social marginalization, lack of mobility and exclusion from the decision-making processes. The proposed presentation will deliberate the differential impacts of climate change on rural women, explain various causes of their vulnerability, outline possible ways to reduce their vulnerability and will also deliberate the contribution of women towards climate change adaptation and mitigation. The proposed presentation will also discuss some action plans to minimize rural women's vulnerability to climate change such as empowering them economically and educationally and involving them in formal climate change mitigation and adaptation policies and programs.

OR-17

## MICROBIAL ENZYMES FOR GENERATION OF 2G-BIOETHANOL AND PREBIOTIC OLIGOSACCHARIDES FROM AGROWASTE

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### ABSTRACT

Efficient utilization of renewable agro-waste for generation of value-added products and base chemicals still remains a far-fetched goal. Microbial depolymerizing enzymes such as cellulases and hemicellulases are catalytic cornerstone of lignocellulose biotechnology. Fungi are bestowed with battery of hydrolases that can degrade complex polymers for generation of fermentable sugars which, in turn, can be fermented to produce bioethanol and other value-added products. Fungal enzymes were used for degrading different low-value agro-wastes such as sugar cane bagasse, rice straw, palm kernel cake and copra meal for generation of bioethanol and prebiotics. The present communication demonstrates use of *Aspergillus tubingensis* NKBP-55 enzymes in valorization of agro-waste for rural development.



OR-18

**EXHALED NITRIC OXIDE IN ETHNICALLY DISTINCT HIGH ALTITUDE NATIVE POPULATIONS: A COMPARATIVE STUDY**Sudipta Ghosh<sup>1</sup> and Tom D. Brutsaert<sup>2</sup><sup>1</sup>Department of Anthropology, North-Eastern Hill University, Shillong, Meghalaya, India<sup>2</sup>Department of Exercise Science, Syracuse University, New York, USA**ABSTRACT**

Previous studies have suggested that high concentration of nitric oxide (NO) in the lungs among high altitude natives may play an adaptive role in offsetting hypoxia. This observation compelled us to examine if such occurrence can be replicated in other high altitude native populations. In other words, we aim to understand whether such adaptive mechanism is a universal phenomenon or population specific criterion. A total number of 670 individuals were recruited from three ethnically and geographically diverse populations in India, Peru and the USA. Three separate sub-groups of Quechua (Peru) participants were recruited. The Indian participants (Tawang Monpa) were an indigenous Tibetan derived high altitude population. Fractions of exhaled NO and other anthropometric-physiological parameters were measured on each participant following standard protocols. All statistical analyses were performed using SPSS version 24.0 and STATA 11.1. Partial pressure of exhaled nitric oxide (PEN<sub>O</sub>) is significantly lower in both high altitude resident groups (TM=  $6.2 \pm 0.5$  nmHg and Q-HAR=  $5.8 \pm 0.5$  nmHg), as compared with the groups measured at sea level (USA=  $14.6 \pm 0.7$  nmHg, Q-BSL=  $18.9 \pm 1.6$  nmHg, and Q-M=  $19.2 \pm 1.7$  nmHg). Interestingly, PEN<sub>O</sub> was not significantly different between TM and Q-HAR. Findings of the present study differ from earlier data on Tibetans and suggest that high nitric oxide in human lungs might not be universal adaptive mechanism to offset hypoxia and hence may vary in different Tibetan derived populations. Moreover, Andean Quechua and Tawang Monpa do not reveal any difference in their exhaled NO, irrespective of their enormous ethnic differences.

OR-19

## IMPACT OF TECHNOLOGICAL ADVANCEMENTS IN BANKING SECTOR FOR THE UPLIFTMENT OF ECONOMIC STATUS OF AGRICULTURE-BASED RURAL POPULATION

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### ABSTRACT

There is an increasing recognition that agriculture being the main economic factor in villages has played a vital role for the development of Indian civilization as 70% Indians live in rural areas and engaged directly or indirectly in agricultural activities. India is the third-largest food producer and the agricultural contribution is more than 20% in India's GDP. Govt. of India has taken many steps such as establishment of SBI, nationalization of banks and constitution of NABARD etc. for the rapid increase of agricultural growth and rural economy. National sample survey data has shown that there is vast potential of development in rural areas in view of large size of rural market consuming about 75% of manufacture goods. There is tremendous potential for agriculture inputs, food processing industry, cold storages and advance modes of fast transportation etc. in rural areas. The enormous research in science and technology is directed towards producing new varieties of crop patterns for increasing agriculture produce as well as devising new ways in farming and irrigation technology.

The financial needs of traditional Indian farmers earlier totally dependent on money lenders, with the spreading banking system in villages have now realized the importance of banks to meet their short to long term financial requirements. The advancement of technology has not only brought revolutionary change in human lives and life style but the exceptional ambience and inclusion of technology in banks in India has assumed immense importance for the socio-economic development of the Nation. The growing competition and expectations from well-informed customers have led to increasing awareness amongst banks on the role and importance of technology in banking and the way the banking services are delivered to the farmers. The arrival of foreign and private banks with their superior

technology-based services has compelled Indian banks also to adopt the latest technologies. A combination of regulatory and competitive reasons have led to increasing importance of total banking automation in Indian banking sector. The benefits of leveraging technology are reduction in transportation costs, efficient services, reach to global customer, increase in customer loyalty, attracting more new customers, easy access, quick convenient, round the clock and cheaper services. The ATM, Debit card, credit cards, visa cards, internet banking, fast transfer of funds through NEFT and RTGS and tranquation clearing system of cheques are the salient banking service features. As finance at a low cost and liquidity are essential requisites to run any project, the banks, undoubtedly are the backbone of the rural development. The advancement in technology is always needed by the banks to reduce the cost and increase the efficiency by providing the satisfactory and innovative services to the customers to uplift the economic status of rural population and improve the GDP of the country.

OR-20

## IMPACT OF CHRYSIN ON VITAMIN-D AND BONE HEALTH- PRECLINICAL STUDIES

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### ABSTRACT

Vitamin D both is one of the important vitamins we consume and is also a hormone which our body makes from cholesterol. It plays an important role in many of the physiological functions. Research studies from the past decade suggested that it plays a much broader role in immunity. Over a billion people worldwide is still vitamin D deficient making the condition endemic. Researchers are working on many approaches to enhance bioavailability of vitamin –D, but approaches targeting metabolism are very less.

Vitamin D undergoes enzymatic degradation by cytochrome P450 enzymes especially by the CYP3A4, CYP24A1 leading to inactive forms of vitamin D. Hence we hypothesized that if the metabolism of Vitamin D is inhibited, vitamin D can be maintained active for longer duration. Our study mainly focused on CYP3A4 which carry out rapid degradation of vitamin D than other CYP isoforms. Chrysin is a well known natural flavonoid and is claimed with several therapeutic activities like anti- oxidant, anticancer, neuroprotective, cardioprotective etc. It is also aproved potent metabolic CYP3A4 inhibitor and is used to study its impact on vitamin D and bone health in the current study.

The *in vivo* activity of chrysin was evaluated on female Wistar albino rats which were fed with vitamin D deficient diet in order to attain vitamin D deficiency. Chrysin was given alone and in combinations with calcium carbonate (CaCO<sub>3</sub>) and/or Vitamin D<sub>3</sub>. All the therapeutic interventions along with vitamin D deficient diet control and normal group were assessed for various serum biochemical parameters, urinary parameters, ash content, bone parameters such as bone weight, bone length and bone hardness. The 4<sup>th</sup>

lumbar hardness, 8<sup>th</sup> thoracic vertebral hardness, femoral bone mineral density was studied using standard procedures. The 25-OH-D3, circulating form of vitamin D was measured in the serum samples by LC-MS analysis.

The animals treated with therapeutic interventions showed marked increase in serum 25-OH-D3 levels along with increased serum biochemical parameters in contrary with decreased excretion of urinary parameters when compared to animals with vitamin D deficient diet suggests that impact of chrysin on vitamin D metabolism. Furthermore chrysin showed beneficial effects on bone ash content, bone parameters like bone weight and hardness, 4<sup>th</sup> lumbar hardness and 8<sup>th</sup> lumbar hardness compared to diet control group indicates its effect on formation of strong bones.

Among all the therapeutic groups studied, the group treated with Chrysin, Vitamin D3 and CaCO<sub>3</sub> showed better therapeutic impact on vitamin D levels as well as on bone formation. The result also clearly indicates that chrysin was able to increase serum vitamin D levels, but to confirm interactions at the site of metabolism further studies are warranted. The study has opened a new option to treat vitamin D deficiency which can be used as a cost effective option to improve bone health.

# Abstracts of Poster Presentations

PO-1

## TELEMEDICINE: A STEP IN DIGITISATION IN HEALTH CARE OF EASTERN UTTAR PRADESH

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### ABSTRACT

The healthcare sector of India is a significant area, which needs considerable ... important parameter of economic development" (Iyengar & Dholakia).

Telemedicine is a rapidly developing application of clinical medicine where medical information is transferred through the phone or the Internet and sometimes other networks for the purpose of consulting, and sometimes remote medical procedures or examinations. Telemedicine may be as simple as two health professionals discussing a case over the telephone, or as complex as using satellite technology and video-conferencing equipment to conduct a real-time consultation between medical specialists in two different countries. Telemedicine generally refers to the use of communications and information technologies for the delivery of clinical care. Telemedicine has been steadily gaining ground in the state with public-private initiatives touching the lives of rural people. It is important considering the fact that rural patients have to travel long distances and also incur additional expenses to have access to super speciality medicare. The setting up of the National Telemedicine Taskforce by the Health Ministry of India, in 2005, paved way for the success of various projects like the ICMR-AROGYASREE, NeHA and VRCs. Telemedicine also helps family physicians by giving them easy access to speciality doctors and helping them in close monitoring of patients. Different types of telemedicine services like store and forward, real-time and remote or self-monitoring provides various educational, healthcare delivery and management, disease screening and disaster management services all over the globe. Even though telemedicine cannot be a solution to all the problems, it can surely help decrease the burden of the healthcare system to a large extent. This facility will mark a significant growth in Health awareness as well as Health facility provider to not only Eastern Uttar Pradesh but also major cities like Varanasi , Lucknow Prayagraj Kanpur and nearby States.

PO-2

## SCIENCE COMMUNICATION TO SOCIETY THROUGH POSTAL STAMPS ( AN INNOVATIVE PROJECT FOR PUBLIC COMMUNICATION OF SCIENCE AND TECHNOLOGY FOR RURAL DEVELOPMENT)

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### ABSTRACT

Public communication of the advances in Science and Technology to Society is an important activity for Science communicators. Various programs and means are employed for this purpose. Among these, use of POSTAL STAMPS for Science Communication is a novel concept which has been recognized by international organizations like PCST, ISKO, UGC etc. Our research group has undertaken this novel project and innovative activity since last Ten years. Pertaining to the Focal Theme of ISCA 2020, Science and Technology: Rural Development, we would like to present our project in science communicator's meet (2020) through Attractive Posters. Relevant and Representative postal stamps (along with brief comments), which throw light on the Impact of recent advances in S and T on Rural Development are selected for this presentation. We have more than 250 relevant postal stamps covering different aspects of Rural Development.



PO-3

**SCIENCE AND TECHNOLOGY: RURAL DEVELOPMENT**

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**ABSTRACT**

Science and technology in the 21<sup>st</sup> century has taken country to a greater heights leading to the revival of agrarian sector resulting in the welfare measure of rural folk of the society. Green, white, yellow and blue revolutions are direct result of the innovations made in the country and brought substantial relief to the people of rural India. India's Gross Domestic Product (GDP) accounts for 14% and more than 45% of the population thriving on agriculture alone. India spends 0.30% of GDP on agriculture research when compared to China (0.62%). Country enjoy tropical type of climatic condition and ever increasing population leads to shortage of food and shelter. Dwindling environmental condition, rural health issues, soil erosion, excessive usage of pesticide, supply of poor quality seeds etc. are some of the major issues and lab-land transfer of technology come in a long way to effectively find solution to the growing problems in the rural areas. With the advent of Genetic Engineering, it becomes possible to overcome seed sterility and dormancy. Application of bio-pesticide and invention of new molecules helps to combat pest and diseases. New transgenic and hybrids have been evolved to increase the yield of plants. Effective water management using new age water devices such as treadle pumps, drip irrigation, fertigation etc. Eco-friendly agriculture is practiced and farmers start producing vermi compost with the available technology. New varieties of mulberry and breeds of silkworm are released to benefit the sericulture farmers which provide gainful employment to the rural people throughout the year and contributing substantially to the national exchequer.

PO-4

## IMPORTANCE OF CULTURAL VALUE INDICES FOR RURAL/TRIBAL DEVELOPMENT: A COMPARATIVE ACCOUNT OF NORTH & CENTRAL GUJARAT

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### ABSTRACT

Plants are an important element of indigenous systems of any region or culture. The evaluation of the cultural significance of plants in ethnobotanical studies is an essential step in various types of research. Researchers have developed several indices to estimate the significance of a plant species for humans. In this context, present study has been conducted in rural and tribal areas of North and Central Gujarat. In this, different plant taxa has been evaluated with three dimensions: cultural, practical, and economical values. Common people were interviewed using specific questionnaire pertaining to their traditional knowledge about plants. Data collected from observations are used to calculate different diversity indices. Present study deals with the calculated "use value indices" for different taxa of different angiosperm families. These indices have been advocated as a tool to compare the value of not just individual species but also of plant families. Furthermore, by dividing these plants into various use categories taxa has been designated as "major" or "minor" as per its specific uses and cultural importance. The result depict the present scenario of traditional knowledge and its utility value of the phytodiversity of the area.

PO-5

## SOLID WASTE UTILIZATION IN MANUFACTURE OF BUILDING BRICKS FOR RURAL HOUSING AND ECONOMY GENERATION

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### ABSTRACT

Science and technology are two crucial components of all efforts aimed at fostering growth and socioeconomic development of nations. Many developing countries face the challenge of increasing the incomes of rural people through different approaches and to minimize the gap of economy between the urban and rural. Application of the outcomes of recent developments in science and technology in rural areas is the need of the hour to increase the socio-economic status of the rural population. My research contribution on manufacture of low cost building brick for rural housing can be a good support to enhance the baseline economy of rural people. The details of my proposed concept will be focused during presentation.

PO-6

## MICROBIAL DIVERSITY OF VERMICOMPOST AND ITS EFFICACY ON ORGANIC VEGETABLES

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### ABSTRACT

Microbial diversity of vermicompost and its efficacy on organic vegetables were studied. Vermicompost was acquired from the Hindustan College of Arts & Science, campus vermicomposting plant and was prepared by using cow products such as milk, curd, urine, ghee, dung and vegetable wastes. The vermicompost was applied to the plants once in a week for 120 days. The morphological characters such as shoot length, internode length, diameter of the internode, number of leaves and leaf surface area of plants were recorded in all groups. Remarkably, vermicompost treated plants showed better growth promoting effects compared to control groups. The microbial examination of vermicompost was performed, it showed the presence of three bacterial strains such as *Bacillus sp*, *Klebsiella sp* and *Azotobactersp*; four fungal isolates were identified such as *Aspergillus sp*, *Microsporiumsp*, *Penicilliumsp* and *Trichophyton sp*. Thus, the obtained results undoubtedly suggest that vermicompost can be recommended as effective for the improved growth of vegetable crops such as (Brinjal) *Solanum melongena*, (Ladies finger) *Abelmoschus esculentus*, (Chilli) *Capsicum annum*, (Tomato) *Solanum lycopersicum*.

PO-7

## INNOVATIVE EFFICIENT METHOD FOR GENERATING ELECTRICITY USING GRAVITATIONAL FORCE OF WATER

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### ABSTRACT

Electricity plays an integral part of human life and without which the world remains standstill. Because of this electricity becomes one of the precious items and highly priced also. We have to ensure steady supply of this for the welfare of mankind. The use of electricity is terribly increasing and hence its availability has become a limiting factor in many occasions. The electricity is produced in many ways, hydro-electric, atomic, wind mills, solar and so on. In recent years a general awareness has increased to generate electricity on a green protocol. The present paper is the outcome of such a thinking on this line. Gravitational force of downward flowing water is rarely being made use of. In this paper the downward flowing water is further used for generating additional electricity. The pictorial representation will be made at the time of presentation. When the downward flowing water in a river system from a height of 1750 m is directed to flow through a pipe to a height of 1100 m then the flowing energy accumulated is sufficient enough to bring up the water up to 1400 m (300 m height without any additional energy). This may be done through the same pipe system. If a tank is constructed at this point of 1400m (or a hill can be chosen where tank can be constructed) where water can be temporarily stored and from there it can be directed down to the generator point through penstock pipes. Like this manner in a river system any number of such units could be constructed so that along the course of a river more electrical energy could be generated without any additional cost and at the same time the running water is reused for energy production. This will also help to recharge the earth with water also. This energy produced will be on a green protocol. Such models if repeated at different places along the course in a river systems it will certainly add to the electricity production output of the state and through which electricity shortages could be solved.

PO-8

## PLANT DERIVED DRUG FORMULATION (*DERMA HIERBAS*) FOR SKIN RASHES -- A CASE STUDY

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### ABSTRACT

Dermatitis is big menace to the people living around the paddy fields due to *Paederus fuscipes* beetles which is important in the biological control of arable crop pests also. Considering its natural role in pest control, a strategy has been developed by formulating herbal drug to cure the illness without targeting the causal organism, the beetle. It is an ointment proved to heal skin rashes and wounds and dermatitis prominently. It is used as pain reliever and has anti-inflammatory property also, and it shortened epithelialization period. The formulation is the combination of ethanolic extracts of various parts of six different medicinal herbs with beeswax as base. The intimately mixed final composition is added to a hydrophobic excipient base and other ingredients for improved stability and for enhanced results. Initially the ointment was supplied to 50 affected persons (students living in hostels nearby the paddy field, where the beetles are habituated). Later, the efficiency of the ointment was presented in the International Conference organized by Chemistry Department of Karunya Institute of Technology and Sciences, Coimbatore and published as proceedings on the title "Towards invention and innovation for sustainable development". (Pp 36-43. 2014. ISBN No. 93-80543-21-2) entitled with the topic "KarunyaPoochi (*Paederus fuscipes*) a nuisance insect and an expedient to ecology". The information about the ointment was disseminated in the conference well. Which was evidenced by the high demand of the drug there after and 1832 persons mostly in Karunya Nagar have applied the ointment topically and got cured prominently. The clinical trials by obtaining proper ethical committee approval in under progress.

PO-9

## ROLE OF CONCENTRATORS IN THE FIELD OF WATER GENERATION FROM ATMOSPHERIC AIR USEFUL IN ARID REGION

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### ABSTRACT

Water is most important asset and it is basic for individual. But day by day availability of fresh water is reducing and hence researchers trying to find the solution of this world war problem. There are various techniques to solve this problem and water generated from atmospheric air is one of them by using concentrator. Most of the scientists used flat plat collector for water generation. In this article, author has been studied the use of concentrators mainly; Scheffler reflector and flat plate in the field of water generation from atmospheric air. Scheffler reflector is fixed focused type of concentrator which concentrated the focus at fixed point. The Scheffler reflector is used to increase the water generation rate. The water has been generated using desiccant materials from the atmospheric air. The process is carried out in two stages. In the first stage adsorption process carried out in nocturnal time whereas regeneration of adsorbed material through solar energy followed by condensation in diurnal time. The desiccant materials can be solid or composite materials as per requirements and seasons. The water generated from this technique can be used for drinking purpose & medical use also. The working of this technique is very simple and effective in rural and arid regions where water scarcity is more.

PO-10

## SCIENCE AND TECHNOLOGY: INTEGRATED RURAL DEVELOPMENT

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### ABSTRACT

Father of the Nation, Mahatma Gandhi stated that India lives in villages. India's rural area is a place that comprises 68.34 % human population, domesticated animals and crop land chiefly and share of economy of 63.34 % of the country. A village consisting of roads, drainage, housing, water supply, electrification and telecommunication as infrastructure. The environmental problems faced by the villagers are poor sanitation, Conversion of farm land to housing land, Lack of proper drainage (open drainage), greenhouse gas (GHG) emissions, deforestation, land degradation, Indiscriminate use of pesticides and fertilizers, desertification and degradation of lands etc. The healthcare needs of individuals living in rural areas are different from those in urban areas, and rural areas often suffer from lack of access to healthcare. They suffer with water born, vector born and other communicable diseases. People living in rural areas also tend to have poor socioeconomic conditions, less education, higher rates of tobacco and alcohol use, and higher mortality rates. Poverty is one of the biggest social determinants of health in rural areas. The chief employment is agriculture and related based income. They get high yields of their crops by using pesticides in a large scale. Subsequently they are developing infrastructure and health facilities. Indiscriminate usage of pesticides leads to environmental, health issues. Hence, Integrated Pest Management (IPM) came in to vogue to control multiple pests at a stretch. IPM has chemical agents, bio agents along with plant products as ecological based pest control. Delivering electricity to all the villages in India has been one of the most celebrated achievements of the government. Wind power production is increased and the government is going to erect over 20,000 wind-powered electrical generators in rural areas. Solar power is another source to improve the social, economic, environment and health indicators of rural population. Almost, 24.4 per cent use LPG, 0.9 per cent use kerosene and a very small segment of the population use biogas for cooking. Biogas, is a renewable natural gas and they are also harnessing



solar and wind energy. All these developments can improve the quality of life, health, environmental health, economy of a village. These developments are direct result of science and technology has been adopted to increase efficiency in production, productivity and marketing phases of rural sector. However, much progress has not been witnessed due to the slow social and economic development process.

PO-11

## ROLE OF SPACE TECHNOLOGY IN IDENTIFICATION OF FOREST COVER CHANGES IN BISHNUPUR DISTRICT, MANIPUR

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### ABSTRACT

This paper mainly deals with the forest cover assessment of Manipur as well as the district wise for the last 11 years (1997 to 2007) using the ancillary data and satellite data using Normalised Difference Vegetation Index. The forest cover of Bishnupur, Churachandpur, Senapati, Tamenglong and Thoubal are increased but remaining districts are decreased. The forest cover of the state is 17,280 km<sup>2</sup> (2007) which was 17,418 km<sup>2</sup> (1997). During 11 years the state's forest cover is decreased by 138 km<sup>2</sup>. This forests degradation is due to timber logging, firewood extraction, floriculture on the hill slopes and shifting cultivation. Hence, there is a need for immediate actions to check this trend.

PO-12

## COMPARATIVE BIOASSAY STUDY OF NEW IMPROVED MULBERRY VARIETIES IN JAMMU REGION, J&K

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### ABSTRACT

Sericulture is an agro based cottage industry. It plays a very important role in uplifting the socio-economic conditions of rural people in India. It gives good returns to the farmers within a month. Jammu and Kashmir is known for producing world's best bivoltine silk. The agro climatic conditions of Jammu and Kashmir State are most ideal for bivoltine silkworm rearing. However, quality cocoon production at commercial level has suffered mostly because of inadequate quality of leaves, due to lack of infrastructure facilities for silkworm rearing at farmers level, improper diffusion of technologies required for silkworm rearing at farmers level. Besides, these factors the mulberry variety cultivated by farmers also affects the silkworm rearing. In this direction, the present study was carried out at RSRS Central Silk Board, Miran Sahib, Jammu to study the mulberry varieties suitable for growth and economic characters of cocoons produced by the silkworm *Bombyx mori* L. Four different mulberry varieties viz. S-146, C-2038, G-4 and Vishala were selected and fed to bivoltine silkworm double hybrid, FC1 x FC2. Rearing was done as per the established procedure of Krishanaswamy (1988). Mulberry varietal impact on silkworm growth and development was recorded for their economic parameters. Results revealed that among the varieties G-4 and C-2038 shows better performance in most of pre-cocoon and post-cocoon parameters.

PO-13

**QUAIL FARMING FOR REDUCTION OF POVERTY**

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**ABSTRACT**

Japanese quails commonly known as 'Bater 'are found in East Asia and are hardy birds. Quails are small birds commercially grown for their meat & eggs, that thrive in small cages and are inexpensive to keep it. These birds require less floor space for bird farming. It is a nutritious bird have been long used as a model for vertebrate study. The Japanese quail is easily managed, fast growing, small in size, and these birds are easily breeder in capacity & produce large number of eggs at a high rate, the bird farming is being done in large quantities across the globe. Countries such as Japan, India, China, Italy, Russia, and the United States all have established commercial Japanese quail farming industries. It is highly proteinous bird, good source of Thiamin, Riboflavin, B6, Iron, Zinc and Selenium. It is very good source of protein, Niacin, Phosphorus and Copper. The bird has played a major role in Industry and scientific research and is widely utilized in genetics, nutrition, physiology, pathology, embryology, cancer, behavior, and the toxicity of pesticides. Quail farming requires low investment and labour cost to startup. Commercial farming of these birds is very successful in our country too, rural poor people can rear quails in their backyard or on land not fit for agriculture and in this way they can earn money in a very minimum time especially for women it is a profitable business. The paper deal about quail farming in detail.

PO-14

## MORE SCIENCE NEWS IS NEEDED IN RURAL UPLIFTMENT FOR SUSTAINABLE DEVELOPMENT: AN EPISTEMOLOGICAL STUDY IN INDIAN NEWSPAPERS

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### ABSTRACT

In this research, the main objective is to explore the need of the study of present scenario of science news in major Indian newspaper media houses over the last 15 years and its relation to rural upliftment in India in the background of sustainable development. Obviously the questions arise, what about the role of major newspapers which are published from those metro cities of India? How far those translated news is correct and not distorted? Is there any science specialist in each media house? Two-way research methodology was used here-one from sample survey analysis of newspaper clippings and another through questionnaire. In this research, 16 capital cities of all corners of India were chosen and also considered one largest circulated English morning daily from that each capital city and sample survey was done. Metro cities for this sample survey were Delhi, Kolkata, Mumbai, Chennai, Ahmadabad, Chandigarh, Ranchi, Guwahati, Shillong, Hyderabad, Bhopal, Jaipur, Bangalore, Visakhapatnam, Nagpur and Bhubaneswar. The study period was from 2001 to 2015. The following newspapers were chosen as relevant to that particular city: Daily News and Analysis (DNA) for Mumbai and Ahmadabad, The Telegraph for Kolkata and Bhubaneswar, Hindustan Times for Delhi and Ranchi, Assam Tribune for Guwahati and Shillong, The Hindu for the cities Chennai and Hyderabad, The Indian Express for Chandigarh and Nagpur, Deccan Herald for Bangalore and Visakhapatnam, and The Times of India for Bhopal and Jaipur. Then every 6<sup>th</sup> day and its multiple i.e. 6<sup>th</sup>, 12<sup>th</sup>, 18<sup>th</sup>, 24<sup>th</sup>, 25<sup>th</sup> and 30<sup>th</sup> day was taken as sample for each month of each newspaper and different types of science news were tried to be found according to the space share, i.e. column-centimetre. Sample size was 5 days in a month, 8 newspapers in 15 years, i.e. total 7200. Also, among 50 people of each city, i.e. among 800 people, questionnaires were sent and feedback

was analyzed and percentage was given to each research question. Multiple findings show that percentage of space share of science news in India is only 4.2 percent and there is needed a major boost-up through media for better sustainable development with respect to political-crime-sports-financial news which needs to be changed.

PO-15

## SCIENCE AND TECHNOLOGY: RURAL DEVELOPMENT

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### ABSTRACT

India is still a predominantly agrarian society owing to nearly 70 percent of the country's population lives in rural areas. Agriculture is the backbone of rural India since it is still the largest employment sector engaging half of its country labor forces. Thus, the development of agriculture shall reflect rural India *vis a vis* development of the country. Science and Technology hold an important role in all sphere of life including rural and agricultural development. Science and Technology have contributed significantly to the development of Rural India. The key ingredients of development are science, technology, and innovation, which are solely based on the scientific aptitude of society. Because of science & Technology uses, rural livelihood and farming have been revolutionized, enhanced uses of farm power and machinery, making agriculture less time consumer and cumbersome drudgery involved in agriculture. Uses of modern tools like mobile apps, decision support tool (DSS), weather forecasting for efficient water management in the event of drought and rain, an outbreak of insect paste and disease leads to smart farming know as precession farming. Govt. of India program like 'Mera Gaon Mera Gaurav' launched for technological backstopping for farming and 'Soil Health Card' for Soil test-based nutrient management etc. These technologies are not only cost-effective but producing a large quantity of quality agriculture produces, ultimately securing more profit than ever. Obviously income generate from less expenditure is used for development primarily and Upscaling of lifestyle.

PO-16

**TEXT MINING AND STATISTICAL MODEL FOR BIOMEDICAL DATA TO PREDICT DISEASE-DRUG-GENE ASSOCIATIONS**

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**ABSTRACT**

As the magnitude of biomedical data is upward day by day, discovery of knowledge from structured, semi-structured and un-structured data termed as big data is a challenge. The scientific literature serves as a rich source to gain the knowledge on associations of disease, gene and drug in practise. Even though, many techniques are reported to find the relation among the biomedical concept, an attempt has been made to find the hidden associations of biomedical data in different approach which may contribute to the drug discovery, progress in detection of novel therapeutic targets and patient segment biomarkers. Text mining concept is used to download the research articles from PubMed and pre-processed based on requirement. A statistical model is built to identify the associations and enhanced to extend the predictions and further validated. The contribution towards the society is reuse of the same drug for various diseases which is not known so far.

PO-17

**SCIENCE AND TECHNOLOGY: RURAL DEVELOPMENT**

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**ABSTRACT**

Modern Science and Technology has a revolutionized impact on rural development. The backbone of the rural economy is agriculture. Nearly 70 percent of the country population lives in rural areas so science and technology can be utilized as an important tool to increase efficiency in production, productivity and providing basic amenities in rural sector. The father of the nation Mahatma Gandhi ji also said "India lives in its villages". In 1965 the government of India decided to take major steps on agriculture by promoting green revolution from mid 60's to 80's. The green revolution of 1970 was in fact powered by scientific work in agriculture research institutions. The Department of Science and Technology plays a very significant role in promotion of science and technology in India. The labs under CSIR system are having charter to utilized technology for rural application so that, technology can meet the needs of rural sector. Science and Technology has to connect with people of rural areas and mass. Science converting into technology is helping mankind, making life easy and improving the standard of living especially in rural areas.

PO-18

## RECENT CHALLENGES AND ADVANCES IN QUALITY CONTROL & STANDARDIZATION OF HERBAL PRODUCTS

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### ABSTRACT

The full potentials of the herbal products are mainly not utilized due to the insufficient knowledge of the holistic quality & chemical composition of most herbal products. The growth potentials of the herbal product industry can only be achieved if the composition of herbal product is standardized in order to ensure proper quality control and accountability. In recent years more people throughout world have realized to use herbal products in health care system. Worldwide need of alternative medicine has resulted in growth of herbal product markets and interest in traditional systems of medicine. Herbal drug technology is used for converting botanical materials into medicines, where standardization and quality control with proper integration of modern scientific techniques and traditional knowledge is important. In order to prove constant composition of herbal preparations, adequate analytical methods such as photometric analysis, thin layer chromatography, high performance liquid chromatography, gas chromatography, DNA fingerprinting and metabolomics are used. Phytochemical standardization encompasses all possible information generated with regard to the chemical constituents present in herbal products. In recent years World Health Organization and many herbal industries worldwide have emphasized on the importance of qualitative and quantitative methods for characterizing the samples, quantification of the biomarkers, chemical markers and the fingerprint profiles. If principle active components are known, it is most logical to quantify these compounds. My talk will cover current trends, challenges and advances in quality control and standardization of herbal products.



PO-19

## HORTICULTURE FOR INDIGENOUS DEVELOPMENT IN MEGHALAYA

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### ABSTRACT

The North-Eastern state of Meghalaya is blessed with a bountiful diversity of wild fruit and vegetable plant species like *Morus indica*, *Myrica nagi*, *Syzgium jambos*, *Artocarpus heterophyllus*, *Spondia spinnata*, *Prunus nepalensis*, *Baccaurea ramiflora*, *Elaeagnus latifolia*, *Garcinia cowa*, *Myrica esculentus*, etc to name a few. These are packed with macro-nutrients, micro-nutrients and anti-oxidants which are ideal in boosting our immune system to prevent from various non-communicable diseases like cancer, diabetes and heart ailments. In fact, most of these wild plant species are key resources to traditional medicines that have become an integral part of the tribal communities of Meghalaya. Due to the confinement of these plant species in small pockets of tribal dominated areas they lack popularity with the rest of the country. As a result, these fruit and vegetable plant species are not exploited and their potentiality in nutraceutical, commercial and processing industry is not fully realised. Therefore, the roles of horticultural sciences contribute immensely to the exploration and identification of such wild plant species that may harbour medicinal components that can be isolated further for the pharmaceutical industry. Additionally, post-harvest technologies can aid the tribal communities of Meghalaya in preservation of their produce making them available in the off season and also for the prospective of promoting small scale processing industries at the grass root level. Equipped with the knowledge of post-harvest processes of horticultural products and the knowledge of identification of medicinal plant species, the livelihood of the tribal communities of the region can be improved by generating employment and financial upliftment thereby promoting the development of indigenous communities of India as a whole.

PO-20

## SOME PROTOTYPE OPERATIONS RESEARCH MODELS AND THEIR APPLICATIONS

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### ABSTRACT

Operations Research (OR), also known as *decision science* or *management science*, is an interdisciplinary scientific approach that deals with the application of advanced analytical (mathematical) methods(tools) to help the organizations and governments in making better decisions with the use of science and technology. The OR tools are being successfully applied in the agriculture, farming, management, scheduling, facility planning, production management, oil gas and petroleum, energy, data reconciliation, transport and logistics, services and government, Information and communication technologies, data mining, simulation, network routing/scheduling and queuing problems etc. India is an agriculture-based rural economy and some of the OR tools are also being successfully utilized to solve the problems in this domain for making better (optimal) decisions pertaining to finance management, budget allocation, agricultural processes, farming, irrigation, marketing, weather forecasting, crops management, health services, data analysis and transportation etc.

In this presentation, insights are given on the use of OR tools by illustrating prototype Operation Research models of some of the problems with cases drawn from the literature on the topics, namely; *Resource Allocation, Linear programming, inventory control, replacement and maintenance, queuing, job sequencing, network routing* etc. These prototype models can be further extended with same mathematical structures, analyzed and solved by the known methods for taking better decisions for the sake of development and welfare of the society.

PO-21

## WHIRL WIND WHEEL- WHEEL REVOLUTION WITH AIR REACTOR

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### ABSTRACT

Human life became critical due to lack of suitable energy. The reality is that for about 42 million Indians who live in remote villages are lack of reliable access to Electricity. The year 2022 has been earmarked for India to achieve 24X7 power for all mean electrifying more than 70000 house-holds every month. We have many stories of change and case study challenges for human survival with the efforts for constructing perpetual motion machines. We need eco friendly and low cost machines but not perpetual motion machines. The Greeks suppressed perpetual motion machines. But Bhaskaracharya and Bramhagupta inspired the world for perpetual motion machines through Persians, hence they became indo Persian machines like indo Arabic numbers. Filled balloon moves if there is leak and atmospheric pressure push the Piston into the empty syringe since wind blows from high pressure area (source) to low pressure area (sink). If a machine is capable of doing more useful work in reverse direction when effort applied is removed (mass deletion weaken the body and mass addition strengthen the body) is known as reversible machine Nature abhors vacuum. Work in two cases is reversible and displacement. Work is not a thermodynamic property. These are the base for Air Reactor Theorem. If a permanent vacuum is arranged (low pressure area) in a cylindrical shaped body fixed with six pistons to its side like a regular hexagon and connected to an axle at its centre then atmosphere push the obstructed pistons inwards and keep the cylinder in rotation with outside high pressure as long as there is pressure difference like spokes covered Anemometer cups. The second law of thermodynamics states that in whatever form energy exist work can only be obtained if the energy is present in a state of greater intensity in one portion of the system and lesser intensity in another portion of the system. This is true in this Whirlwind Wheel. Evacuation with pump and filling due to leaking take place in this Air reactor, similar to nuclear reactor. Fission and evacuation process split the molecules away but fusion and

leaking in combine molecules and make molecules nearer. In this condition atmospheric pressure dominate the area and try to bring the area to equilibrium like whirlwind. Wind at high pressure has high free energy and spontaneous process with their accompanying decreasing free energy can occur. The differences in pressure in and out and drag coefficient at front and back of the vertical axes wind mill provide opportunities for rotation. Evacuation work with pump develops negative equal Gibbs free energy. The resultant couple of moments is approximately equal to  $n$  times the area of hexagon acts on the cylinder which tends to set the boundary into rotation like a whirling tube. For a static system if the leak rate is reduced to  $10^{-10}$  torr liters per second then the time for one centimeter cube STP air inflow is 240 years which be less for a dynamic system. By connecting with gears it is possible to generate electricity without interruption by evacuating leaked air in cylinder now and then. The work done time on it is less than work done time by the free atmospheric pressure on it since it is a closed cylindrical shaped double-walled vacuum chamber. This will not only be a solution on UN decade of Sustainable energy for all and decarbonization but also a solution to rural energy crisis.

## LIST OF PARTICIPANTS

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