



In Association with



INTERNATIONAL CONFERENCE ON ADVANCES IN INFORMATION TECHNOLOGY AND MANAGEMENT

Leveraging Information Technology for Sustainability in Agriculture and Healthcare - Carbon Neutrality

11 - 12 February 2023



Thakur Educational Trust's (Regd.)

Thakur Institute of Management Studies, Career Development & Research

(Approved by AICTE, Govt. of Maharashtra & Affiliated to University of Mumbai)

**ISO 9001 : 2015 Certified • MCA Program Accredited by National Board of Accreditation, New Delhi
Accredited with A+ Grade by National Assessment and Accreditation Council (NAAC), Bangalore**

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Our PEOs and POs

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

1. To enable students to gain knowledge across all domains of Information Technology with in-depth understanding of their applications.
2. To enable students to analyze problems and to design and develop software solutions using emerging tools and technologies.
3. To enable students to continue Life-long learning, Research and Entrepreneurial pursuit in their chosen fields.
4. To develop communication, teamwork, and leadership skills necessary to manage multidisciplinary projects and serve the society as responsible and ethical software professionals.

PROGRAM OUTCOMES (POs)

PO-1: Computational Knowledge – Apply domain specific knowledge of computing and mathematics for designing of software solutions for defined problems and requirements.

PO-2: Problem Analysis – Understand and analyze a problem and suggest feasible solutions.

PO-3: Design/ Development of Solution – Design, evaluate, and develop effective solutions for complex computing problems to meet desired needs.

PO-4: Conduct investigation of complex computing problems – Design and conduct experiments and use research-based methods to investigate complex computing problems.

PO-5: Modern tools usage – Use appropriate techniques and software tools for computing activities.

PO-6: Professional Ethics – Understand and commit to professional norms, regulations and ethics.

PO-7: Life long Learning – Recognize the need for and have the ability to engage in independent learning for continual professional development.

PO-8: Project management and finance – Understand and apply project management principles, as a member or leader in multidisciplinary environments.

PO-9: Communication Efficacy – Effectively communicate technical information, both oral and written with range of audience.

PO-10: Societal & Environmental Concern – Analyze societal, environmental, cultural and legal issues within local and global contexts when providing software solutions.

PO-11: Individual and Team Work – Work as a member or leader in diverse teams in multidisciplinary environments.

PO-12: Innovation and Entrepreneurship – Use Innovation and Entrepreneurship for creation of value and wealth.

VISION

Thakur Institute of Management Studies, Career Development and Research will become a premier Institute renowned internationally for providing education in Software Application to graduates from various disciplines.

MISSION

To achieve excellence in providing software education so that students can grasp existing as well as emerging technologies and to inculcate leadership and managerial qualities in them so that they can deliver results in the organization they join.

QUALITY POLICY

We, the staff, faculty and management of Thakur Institute Of Management Studies, Career Development and Research are committed to offer excellence in software education, conducive academic environment and state of-the-art infrastructure to our students. We work as a team and interact with students in pro-active manner to achieve our Quality Objectives and fulfill all academic, statutory and regulatory requirements to entire satisfaction of our students as well as for continual improvement of QMS.



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Chief Patron's Message for ICAIM-2023

TIMSCDR has worked towards excellence in its journey in the field of academics. With yet another platform set for distinguished deliberations, ICAIM 2023 International Conference titled – ‘Leveraging Information Technology for Sustainability in Agriculture and Healthcare - Carbon Neutrality’ focuses on the perils of Global Warming.

The Conference has invited experts from the domains of Agriculture and Healthcare to understand the effects of global warming and how these can be curbed. Further, Information Technology plays a pivotal role in assisting in reducing the impacts of Global Warming. ICAIM 2023 with a backing of national and international organizations like NASSCOM, GIST and MACCIA, including NCSH, Sweden is greatly enriched with erudite speakers and experts.

I take this opportunity to congratulate the organizing committee for their dedication and hard work for effectively arranging this event. I wish the Conference organizers a huge success in their endeavour of ICAIM 2023.

V. K. Singh

Chairman



Thakur Educational Trust's (Regd.)

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CEO's Message for ICAIM-2023

Welcome you all for the upcoming International Conference on Advances in Information Technology and Management titled “Leveraging Information Technology for Sustainability in Agriculture and Healthcare - Carbon Neutrality” organized by TIMSCDR, under the aegis of Thakur Education Group (TEG).

The un-organized use of natural resources by mankind since the Industrial Revolution has definitely brought progress in our living and increased the life span too. However, this progress is complemented by the threat of Global Warming. Today, we are in a stage where, if certain amendments are not made in our way of living and progress, we as a human race would near extinction. Several efforts are being made globally to curtail the dangers of Global Warming.

ICAIM 2023 is a sincere effort made by TIMSCDR towards creating awareness by holding erudite deliberations with Experts from the domains of Information Technology, Agriculture and Healthcare. The zeal and enthusiasm with which the organizing committee has come forward is commendable. I extend my best wishes to the faculty, delegates, and the organizing committee for excellence in their endeavours.

Ms. Karishma Singh

CEO



Thakur Educational Trust's (Regd.)

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Director's Message for ICAIM-2023

“At present we are stealing the future, selling it in the present and calling it gross development product.” – Paul Hawken

We are indeed stealing the future and the proof of it is Global Warming. Ever since the Industrial Revolution in 1850 – 1900 global temperatures have consistently risen and are now at +0.6°C to +1.5°C. In the rising heat of Global Warming ICAIM 2023 titled “Leveraging Information Technology for Sustainability in Agriculture and Healthcare– Carbon Neutrality” sets the platform ready for the most crucial deliberations of saving our only livable planet - EARTH.

ICAIM has been focusing on two prime domains - Agriculture and Healthcare. Though ICAIM 2023 prevails with the Agriculture and Healthcare domains, the center of attention is Global Warming. All across the world serious discussions are in session to tackle the dangers of Global Warming.

The Agriculture sector contributes to nearly 19 to 29% of the GHG emissions which leads to Global Warming. However, the Agriculture sector is the major contributor to the Food Supply Chain, which in turn is essential to nourish the ever growing population of this world. Of the several GHGs which warm up the Earth's atmosphere, CO₂ is the major contributor. It is therefore necessary to reduce carbon emissions. Agriculture is a source and sink of Carbon emissions. It is therefore necessary to enhance food growing techniques which will minimize Carbon emissions. Zero Till Farming is one such technique which has been applied to reduce methane emission when harvesting rice crops. Agriculture domain can help to sequester Carbon

thus behaving as a sink or storage of Carbon. Instead of emitting the Carbon, it can be stored in the earth or in plants.

Information Technology can be efficiently implemented across several sectors to curb Global Warming. Using IT tools we are able to get current and live visuals through satellite data about the rate at which our globe is warming. Which are the regions contributing to high levels of Carbon emissions specifically due to burning of fossil fuels. The accurate and informative data visuals provided by using latest IT tools aids in making strategic sustainable plans to counter the perils of Global Warming.

Though the Healthcare sector is not a direct contributor to Global Warming, several processes in this sector demand use of Energy which is mainly acquired by burning fossil fuels. Further the emissions due to incineration of biomedical waste are harmful. However, ICAIM 2023, when deliberating in the Healthcare sector, provides useful insights to the Digital Health Mission of our country. The challenging yet futuristic mission of Digitizing Healthcare in the largest developing economy in the world demands a big shout out to our nation - India.

ICAIM 2023 successfully laid an erudite platform for discussion on the topics of current urgency in association with NCSH (Nordic Center of Sustainable Healthcare), Sweden, AMC (Association of Medical Consultants), MACCIA (Maharashtra Chamber of Commerce, Industry and Agriculture), CSI (Computer Society of India) and NASSCOM. The challenges of Global Warming and digitization are here to grow and to brave us to innovate sustainable solutions.

The ICAIM 2023 proceeding introduced a new feature of publishing Research Posters along with several noteworthy Research Papers authored by the students and academicians.

My gratitude to my wonderful team of TIMSCDR, our proactive Management whose support to our Institute is unflinching and all our well wishers whose blessings have marked the success of ICAIM 2023.

A warm welcome to all to be a part of ICAIM 2023. Let's reduce Global Warming together.

About TIMSCDR

The Thakur Educational Group comprises of three Trusts namely Thakur Educational Trust (Regd.), Zagdu Singh Charitable Trust (Regd.) and Zagdu Singh Educational Trust (Regd.) managed by the Thakur family and runs 19 Institutes located in Kandivali, western suburb of Mumbai.

TIMSCDR (Thakur Institute of Management Studies, Career Development and Research) is dynamic institute striving to provide quality higher education. The institute is an ISO 9001:2015 certified providing three years MCA (Master of Computer Application) course. The MCA Course of TIMSCDR is NBA Accredited. All possible ways of acquiring academic insight and undertaking appropriate academic initiatives are explored at the institute. TIMSCDR also has an ISTE (Indian Society of Technical Education) chapter. Residence-cum-study facility is available for boys and girls in secured modern Hostel Buildings with green, clean and healthy ambience situated near the Institute.

TIMSCDR is organizing next International Conference ICAIM-2023 which serves as a platform for gathering all academicians, industrialist, researchers and professionals in the disciplines of Information Technology, Agriculture and Medicine (Nutrition).

About AMC

The Association of Medical Consultants (AMC) was established in 1972 by a small group of energetic active and concerned medical consultants from distant suburbs who often assembled and animatedly discussed their common problems. Over the years, the immense need rose for an organisation of this nature and the Association grew rapidly. It is now one of the fastest growing Associations of Specialist Doctors in Mumbai and boasts of a membership strength of more than 9000 Medical Consultants. AMC represents Consultants practicing at corporate and non corporate Tertiary care referral Hospitals (both Government and Private) and individual Consultants practicing through their own consulting rooms, Clinics & Nursing Homes spread across Greater Mumbai, Navi Mumbai and Thane districts. It is recognized as a frontline Medical Organization and is an important opinion making body which addresses vital public health and professional issues facing the medical profession in general and medical consultants in particular. AMC has effectively brought together consultants of various disciplines on one platform and aims to highlight and offer solutions to all the important day to day problems faced by consultants.

About MACCIA

Maharashtra Chamber of Commerce, Industry & Agriculture (MACCIA) is the Apex Chamber of the State. The Chamber plays a pivotal role in supplementing and augmenting the efforts of Government for the economic development of the State and advancement of its people. With more than 3500 direct Members, comprising of large, medium and Small-Scale Industries, Traders, Agriculturist and Professionals, MACCIA is the only Chamber in Maharashtra, which has deep-roots in all the 35 Districts encompassing 355 Talukas of Maharashtra. In addition over 800 Local Trade and Industry Associations and professional bodies having collective membership of over 700,000 business organizations from all over the State are affiliated to the Chamber and thus it virtually functions as the State's Apex Chamber.

About NCSH

Nordic Center for Sustainable Healthcare (NCSH) is a cross-sectoral arena and network involving stakeholders, organizations, projects and expertise in the area of sustainable healthcare, all sharing the goal to create a more sustainable healthcare sector. The network of NCSH includes companies, hospitals, regions, universities, NGOs, clusters and more. Together they form an arena which generates collaborations, projects, business, knowledge and new innovative ideas.

About GIST

Global Indian Scientists & Technocrats Forum (GIST) is a visionary organization that was formed to become a key platform to bring together scientists and technocrats from the Indian diaspora from across the world, who are maestros in their fields.

About DMI

Development Management Institute (DMI) was set up on February 13, 2014 pursuant to a desire of the Government of Bihar to establish a High Performing Knowledge Institution (HPKI). DMI believes that the livelihoods of small producers and marginalised people can be enhanced by organising them to form member participation based, democratically governed institutions that leverage the strengths of collectives and build enduring partnerships with professionals for reaping the benefits of technology and market integration. Inspired by and recognising the growing need for Development Management Professionals, the Government of Bihar took the initiative to establish DMI as an autonomous institution. The rationale of DMI is best captured in its mission.



Mr. Lalit Gandhi
President, MACCIA

I take this opportunity to convey my best wishes for International Conference - ICAIM 2023 scheduled on Feb 11 & 12, 2022, organised by TIMSCDR Thakur Institute of Management Studies, Career Development & Research.

I'm honoured to be invited as the Chief Guest for the Conference on "Leveraging Information Technology for Sustainability in Agriculture & Medicine - Carbon Neutrality" which provides a forum for experts to discuss on crucial issues.

I wish Dr. Vinita Gaikwad Director TIMSCDR and her team an effective, successful and productive Conference.



Mr. Dineshkumar Singh
Group Leader, Digital Food Initiative
(DFI), TCS Research

2022 was the worst year ever for greenhouse gas (GHG) emissions including carbon. It was 0.8% higher than in 2021. Agriculture is one of the Top 3 contributors and we need to explore new innovative approaches to reduce this or bring it to a plateau. Digital technologies such as remote sensing, IoT, Big Data, and Artificial Intelligence and Machine Learning (AIML) can drive such innovation and can help generate insights that were invisible to us. It can help to discover changes in land use land cover (LULC), erratic patterns of rainfall, extreme events like floods, droughts, and so on. ICAIM provides a good platform for researchers, academics, progressive farmers, social change agents, and industry to collaborate and disseminate their knowledge and experience.



Mr. Manohar Khake
Agro Consultant

I must thanks to you for keeping continuous contact with grassroots workers just like me and also with farmers. Our country is mostly depending on agriculture(Krishipradhan) . Being a technocrats you must know the need of our rural communities and farmers. By keeping good rapo with the same I know you will definitely develop the proper technology for our fellow countrymen.

My good wishes for you and Institute Team



Mr. Sudhanshu Ojha
VP-Govt Affairs, CSR & D-Link
Academy-Head

Future of the world economy and humanity lies in the hands of Zen Z and young people as they're the stakeholders in the present and builders of tomorrow. ICAIM-2023 brings together the trustees of our future generations from across the G-20 Countries to deliberate, discuss and deduce innovative, sustainable and actionable solutions especially in the realm of social development.

I feel proud and pleasant to inscribe a message for my dearest TIMSCDR campus and I also feel great to look at the continued success journey of ICAIM Journey so far. The progress and success of TIMSCDR under dynamic leadership of Dr. Vinita Gaikwad and Team has been achieving, is a matter of pride and joy for all of us. TIMSCDR is continuously marching towards the path of excellence.

I express my hearty wishes for the success of grand event. India began its one -year- G-20 -Presidency in December 2022 and I hope this event will not only speak ;but also provide an audience to youth from across the world, to be heard in the world's largest democracy amongst those young leaders geared up with the baton to the future. We must demonstrate to the world to shape the way India evolve and portray India's cultural ambassadors in an effort to forge a lasting with G-20 community.

So, I wish my best goodwill for the success for our participants, students, Faculty, Industry and Thakur Education Trust, and G-20 Community.

Wishing best of the success to all!



Mr. Vikram Bansal
Zerosum Technologies Pvt Ltd.,
Founder, CEO

Sustainability and carbon neutrality should be focus area for the world so that humanity can survive and live to see the next century. Information Technology can be a big force multiplier in this. I hope that the conference will be able to throw up solutions towards this motive.



Ms. Rasika A. Phatak
Farmer and Social Worker

Rice crop becomes solution to save our planet when cultivated by Saguna Regenerative Technique(SRT)*

Normally rice crop is considered as threat to the planet because of it's ability to generate methane and gulping large quantity of water. Methane the greenhouse gas is 22 times more harmful than CO₂ in the process of global warming. It is generated from rice fields where anaerobic condition prevails. Also to produce 1 kg of rice it needs 3000 litres of water. Both these aspects pose difficult situation to the world. The new trend in agriculture is to carry out farming without tillage of the soil. Tillage cause big damage to the microbiota of the soil who infact are responsible for good crop growth. Tillage also negatively effects water infiltration into soil and increases soil erosion. All of this increases drudgery to the farmer, especially to the women farmer and reduce crop productivity. The new change in the rice cultivation from traditional method of planting to no-till SRT method has made the farmer happy and confident. More importantly SRT promises fixing of 9 tons of CO₂ per year for acre of land. Thus this innovative technique solves both problems of the world, global warming and food shortage only by changing of the agronomic practice of rice growing.

Congratulations to all of you and I Wish a grand success for the Conference .



**Mr. Chandrashekhar
Bhadsawle**
Managing Trustree at Saguna Rural
Foundatio

Carbon neutrality is the key issue for today's society. Without understanding the problem there can not be a practical solution and its application. Able youth, such as university students can play the most important role in this subject. This is very impressive that TIMSCDR is holding this International conference on the subject.



Dr. Amitava Rakshit
Associate Professor, IIT-Kharagpur

One of the most prominent features of the sustainable development goals (SDGs) is that they are directly related to soil health. Basically the SDGs aim to reach the goal of having 75% healthy soils by 2030 – and this could provide abundant possible benefits for on-farm productivity and are directly credited to soil health, most notably soil microbiome and soil degradation. In terms of soil microbiome and the overall diversity of soil health, the diversity of soil microbiome is crucial as it affects the productivity and community dynamics via plant growth promotion, production and modification of phytohormones, and nutrient acquisition. Moreover, while plants have a direct impact on their specific microbiome, creating healthier soil structures may help enhance crop growth. Sustainable development goals aim to promote overall soil fertility, and in turn, this can provide substantial benefits for both the climate change movement and farmers directly. The complex complexities of soil directly influence overall crop production; furthermore, the concept of soil security also contributes to this, outlining the manageable properties of soil health and structure overall.



Mr. Ravinkumar Sivalingam
Heads of Strategy and Business
Development for Digital Food
Initiatives at TCS

Innovative technologies coupled with scalable business models will play a crucial role in achieving sustainable goals in agriculture. We are already seeing a large scale adoption of technologies to reduce usage of inputs at farm level that contributes to significant emissions. Further technologies can fast-track adoption of regenerative farming by providing monitoring capabilities for agri processing and financial institutions and create new business models such as carbon trading for long term viability.

Looking forward to sharing my thoughts to the participants and learn from other experts. Wishing ICAIM all the very best and I really hope these discussions trigger concrete actions on the ground.



Mr. Gaurav Jha
Assistant Professor - Precision
Agriculture, Kansas State University

Climate change is one of the biggest challenges to the world in present times including its threat to global food (and nutritional) security and hunger issues. Globally ~750 million people were undernourished as a direct and indirect effect of climate change in 2019, which is being majorly contributed by a decline in food production, hike in food prices, and increase in social conflicts for land and water availability. The integrated impacts have confronted agricultural community to adopt precision agriculture technologies on spatial and temporal scale to enhance resiliency in crop production systems. The 4R stewardship for input management in field accounts for right source, right time, right rate and right place. However, with digital agriculture there is a need to account for fifth “R” – Right Data. Sensing platforms both proximal as well as remote sensors, collect big data sets from the agriculture fields. It is essential to wrangle around the generated data and delineate the “Right Data” to aim for management practices in the farm. The digital revolution can contribute in maximizing soil health, minimizing the impacts of disease and pests, or even optimizing the yield benefits. All of which target the same goal of sustainably feeding the future world population. I congratulate all the attendees of ICAIM 2023 for being part of this big initiative to move together towards carbon neutrality. My best wishes to all participants,

Well Wishers of ICAIM - 2023



Mr. Lalit Gandhi
President, MACCIA



Dr. Mukesh Gupta
Founder Director – Le’Nest,
Immediate Past President – AMC



Mr. Harsh Parikh
Founder, DRiefcase



**Mr. Johannes
Brundin**
Co-Founder NCSH, Sweden



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- Prof. Rohini Bagul

PREFACE

International Conference – ICAIM 2023 focuses on the most challenging issue of Global Warming. The reason it is challenging is because of its Global impact and the sole contribution of mankind in elevating the seriousness of its effects.

Global Warming is caused due to the emission of Greenhouse Gases (GHG). GHGs trap the heat within the earth's atmosphere. Out of the 3 prominent GHGs (CO₂, CH₄ and N₂O), CO₂ is the major chunk, upto 79%. Thus, Carbon Neutrality comes topmost in priority to reduce Global Warming.

ICAIM 2023 provides a platform to discuss the effects of Global Warming in general and in the domains of Agriculture and Healthcare in specific. Based on the yearlong interactions with experts from both the domains, and literature review, it was observed that Agriculture sector contributes up to 18.4% and Healthcare sector contributes between 3-8% of global carbon emissions. The Healthcare sector is only a source of carbon emissions, whereas the Agriculture sector is the source and sink of carbon emissions. Thus, the Agriculture sector plays a crucial role in sequestering the atmospheric Carbon emitted in the form of GHG.

ICAIM 2023 was able to bring eminent speakers from the domains of Agriculture, Healthcare and Information Technology with the support of associating partners - NCSH (Nordic Center for Sustainable Healthcare) - Sweden, MACCIA (Maharashtra Chamber of Commerce, Industry and Agriculture), AMC (Association of Medical Consultants), and CSI (Computer Society of India) to discuss about the challenges of Global Warming and the alternative solutions for sustainability.

ICAIM 2023 Proceedings is a compilation of Research Papers, Research Poster and Articles authored by Students and Academicians. Most of the Research papers focus on the ill effects of Global Warming and indicate solutions that

help in bringing about Carbon Neutrality. The Proceedings encompasses various technologies that have been devised to reduce Carbon emissions explained through Research Papers and Posters.

Information Technology by itself is a source of Carbon emissions as energy is consumed to execute technologies through software programs and applications. Several IT tools like AI, Robotics, Data Analytics, Machine Learning, IoT, etc. provide sustainable solutions to reduce and effectively manage Carbon emissions in various domains including Agriculture and Healthcare.

ICAIM 2023 Proceedings provides interesting research work that focuses on the theme of the Conference - Carbon Neutrality. Publication of Research Posters is a new introduction of ICAIM 2023 Proceeding.

Dr. Vinita Gaikwad
Director

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