COMSATS - ITS CONFERENCE 2026

BOOK OF ABSTRACTS

EMERGING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

June 10, 2026

Institut Teknologi Sepuluh Nopember
Surabaya, Indonesia

In collaboration with

ANSO
Alliance of National and International
Science Organizations for the Belt and Road Regions

COMSATS Coordinating Council

8-10 June 2026 | Indonesia

Hosted by: Institut Teknologi Sepuluh Nopember (ITS)

COMSATS - ITS CONFERENCE 2026

Book of Abstracts

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RUNDOWN

COMSATS–ITS Conference

"EMERGING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT"

Wed, 10 June 2026 | 08.00 AM - 10.00 AM

Research Center Auditorium, 11th Floor

Prof. Ir. Bambang Pramujati, S.T., M.Sc.Eng, Ph.D., IPU, Aeng	Amb. Dr. Mohammad Nafees Zakaria	Prof. Liu Weidong	Dr. Fauzan Adziman, S.T., M.Eng.
Rector Institut Teknologi Sepuluh Nopember, Indonesia	Executive Director COMSATS	Executive Director Alliance of National and International Science Organization for the Belt and Road Regions (ANSO), China	Director General of Research and Development, The Ministry of Higher Education Science and Technology of Indonesia

Time	Program
08.00 - 08.05	**Welcome Remarks** **Prof. Dr. Bambang Pramujati** (Rector, Institut Technology Sepuluh Nopember (ITS), Indonesia)
08.05 - 08.45	**Dr. Mohammad Fauzan Adziman, S.T., M.Eng.** **Director General of Research and Development Ministry of Higher Education, Science, and Technology of the Republic of Indonesia**
08.45 - 09.00	**Opening Remarks** **Amb. Dr. Mohammad Nafees Zakaria** (Executive Director COMSATS)
09.00 - 09.30	**Prof. Liu Weidong** Executive Director, Alliance of National and International Science Organication for the Belt and Road Regions (ANSO), China
09.30 - 10.00	**Vote of Thanks**

CONFERENCE THEMES

AI, Big Data, and Digital Transformation • Renewable Energy, Energy Storage, and Green Technologies • Climate Change Mitigation, Adaptation, and Environmental Technologies Water, Food, and Agricultural Technologies for Resource Security Biotechnology, Health Technologies, and Bio-innovation Advanced Materials, Nanotechnology, and Industrial Innovation STI Policies, Innovation Ecosystems, and Technology Governance in Developing Countries

RUNDOWN

COMSATS–ITS Conference

"EMERGING TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT"

Wed, 10 June 2026 | 08.30 AM - 16.00 PM

Research Center Auditorium, 11th Floor
Opening

DRPM Meeting Room, 5th Floor
Paralel Technical Session

Research Center GRIT, Lobby
Break and Closing

Time	Room	Program
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08.35 - 08.40		**Opening Remarks** **Amb. Dr. Mohammad Nafees Zakaria** (Executive Director COMSATS)
08.45 - 08.50		**Prof. Liu Weidong** Executive Director, Alliance of National and International Science Organication for the Belt and Road Regions (ANSO), China
08.50 - 09.30		**Dr. Mohammad Fauzan Adziman, S.T., M.Eng.** Director General of Research and Development Ministry of Higher Education, Science, and Technology of the Republic of Indonesia
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		Session 1: AI Enhanced Earth System Modeling and Prediction for Sustainable Development in the Global South **Prof. Lin Zhaohui** (Director, International Centre for Climate and Environment Sciences, China)
		Session 2: The Impact of Copilot AI in Education and Society **Prof. Adhi Dharma Wibawa** (Head, Center for Artificial Intelligence and Health Technology, Institut Teknologi Sepuluh Nopember, Indonesia)
10.20 - 11.00	Room B	**Theme 2 - Renewable Energy, Energy Storage, and Green Technologies**
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		Session 1: Green Chemistry: Transforming Local wastes into High-Value Products for Sustainable Development **Mr. Yousef Alshekh** (Vice Director, Higher Institute for Applied Sciences and Technology, Syria)
		Session 2: Development of Sustainable Energy and Agriculture Integration Platform **Dr. Dedet Chandra** (Head, Research Center for Energy and Mineral Resources Studies, Institut Teknologi Sepuluh Nopember, Indonesia)
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		Session 2: Emerging Technologies For Disaster Resilience And Climate Adaptation Toward Sustainable Development **Dr. Hepi Hapsari Handayani** (Head, Research Center for Disaster Mitigation and Climate Change, Institut Teknologi Sepuluh Nopember, Indonesia)

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		Session 2: From Nano to Nation: Accelerating Industrial Innovation Through Advanced Materials Research at ITS **Prof. Agung Purniawan** (Head, Research Center for Advanced Materials and Nanotechnology Studies, Institut Teknologi Sepuluh Nopember, Indonesia)
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		Session 2: Current Developments in Drug Delivery Systems **Prof. M. Raza Shah** (Director, International Center for Chemical and Biological Sciences, Pakistan)
		Session 3: Leveraging on technology to have insight into Temporal-Spatial dynamics of infectious diseases **Prof. Benjamin O. Oyelami** (Director/Chief Executive, National Mathematical Centre, Nigeria)
		Session 4: Integrating Bioscience and Biodiversity: From Genomic to Food Security and Health **Prof. Nurul Jadid** (Head, Subdirectorat of Community Service, Institut Teknologi Sepuluh Nopember, Indonesia)
		Session 5 : Isolation and Control of Fungal Post Harvest Rot Pathogens of Cucumber (Cucumis sativus) using Ethanolic Leave and Stem Bark Extract of Jatropha Tanjorensis **Dr. Emmanuel Francis** (Research Fellow, National Mathematical Centre, Abuja, Nigeria)
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		Session 2: Innovation: A solution to the Cassava grown societies **Engr. Humphrey Peter NDOSSI** (Director, Industrial Research Tanzania Industrial Research and Development Organization,Tanzania)
		Session 3: Circular Bioeconomy through Biovalorization of Agricultural Waste **Prof. I D A A Warmadewanthi** (Head, Research Center for Sustainable Infrastructure and Environment, Institut Teknologi Sepuluh Nopember, Indonesia)
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		Moderator : Mr. Lazuardi Al Muzaki
		Session 1: ICENS: Supporting Science Policy and the SDGs in Jamaica and Beyond **Ms. Leslie Ann Hoo Fung** (Senior Research Scientist, International Centre for Environmental and Nuclear Sciences, Jamaica)
		Session 2: AAHSI Programme: Leverage the Integration of Science, Technology and Industrial Innovation under the Open Science Policy **Dr. Yi Zhijun** (Deputy Executive Director, Alliance of National and International Science Organizations for the Belt and Road Regions, China)
		Session 3: Revolutionizing Recognition of Prior Learning (RPL) Through AI-Driven Modular Education at Nusantara Digital University **Dr. Arman Hakim** (Head, Research Center for Industrial Development and Public Policy Studies, Institut Teknologi Sepuluh Nopember, Indonesia)
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THEME

1

Artificial Intelligence, Big Data, and Digital Transformation for Sustainable Development

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

AI enhanced Earth System Modeling and Prediction for Sustainable Development in the Global South

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Abstract

Abstract: Reliable modeling and prediction of climate extremes are important for disaster preparedness and mitigation, and advanced earth climate system model is the key component for the improvement of climate prediction skill. In this study, we firstly introduce the Earth System Model of the Chinese Academy of Sciences (CAS-ESM), then we present the framework and evaluate the performance of IAP climate prediction system version 3.5, i.e. IAP-DCPv3.5, based on the CAS-ESM component model with introduction of a land surface initialization scheme and bias correction methodology. Utilizing a 30-year ensemble hindcast experiment results from 1991 to 2020, we evaluated the system's seasonal prediction skill for summer precipitation anomalies over China. The results demonstrate that IAP-DCPv3.5 exhibits reasonable predictive capability for summer precipitation anomalies in eastern China, with the bias correction method significantly improve the system's prediction skills for summer precipitation. It is further demonstrated that IAP-DCPv3.5 can successfully predict the interannual variation of East Asian Summer Monsoon Index and reasonably reproduce the relationship between monsoon activity and precipitation anomalies in eastern China, indicating that the successful prediction of East Asian summer monsoon circulation can contribute significantly to the reliable prediction of summer precipitation anomalies over China. It's well recognized that the integration of machine learning technique is an effective approach to enhance the modeling and prediction capability of climate extremes from subseasonal to seasonal and interannual time scales. In this study, we further develop a U-net based machine learning technique, with consideration of the model's deficiency in underestimating the observed interannual variability of summer rainfall, it is found that the seasonal prediction skill of the IAP-DCPv3.5 for summer rainfall anomalies has been significantly improved, with MAE (mean absolute error) reduced significantly, and pattern correlation coefficient between the prediction and observation increased significantly. Furthermore, a diffusion model guided by physical fields is proposed for the super-resolution downscaling for summer rainfall prediction, and it is found the seasonal rainfall prediction skill can also be significantly improved, with the spatial resolution of the rainfall prediction product increased from 100km to 10km. The

MAE of rainfall prediction can also be reduced, along with the increase of prediction skill in terms of pattern correlation coefficient (PCC) between predicted and observed rainfall anomalies.

KEYWORDS:

Seasonal Prediction, Machine Learning, Rainfall Prediction, Super-Resolution, Earth System Model.

EXTENDED ABSTRACT

The Impact of Copilot AI in Education and Society Balancing Innovation, Human Intelligence, and Social Responsibility

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Abstract

The rapid advancement of Copilot Artificial Intelligence (AI), including generative AI systems such as ChatGPT, Microsoft Copilot, Gemini, and similar intelligent assistants, has transformed the way individuals learn, work, and interact with information. In educational settings, Copilot AI offers numerous benefits, including personalized learning support, instant access to knowledge, automated content generation, language translation, research assistance, and improved productivity for both students and educators. Likewise, in broader society, AI-powered assistants facilitate communication, decision-making, creativity, and access to digital services, contributing significantly to technological innovation and economic growth. Despite these advantages, the widespread adoption of Copilot AI also raises important concerns regarding its long-term impact on education and society. Excessive reliance on AI-generated responses may encourage cognitive offloading, reducing learners' engagement in critical thinking, problem-solving, and independent knowledge construction. In higher education, the use of AI for completing assignments, reports, and academic writing presents new challenges related to academic integrity, authorship, plagiarism, and the assessment of genuine student competencies. Furthermore, the convenience of instant AI-generated content may gradually diminish motivation for deep reading, reflective learning, and intellectual perseverance. Beyond education, Copilot AI has introduced significant societal risks. The ability of AI systems to generate highly convincing text, images, audio, and video content has accelerated the spread of misinformation, disinformation, deepfakes, and automated propaganda. These technologies can be exploited to manipulate public opinion, amplify social polarization, and undermine trust in digital information ecosystems. In addition, increasing automation may reshape labor markets by replacing routine cognitive tasks previously performed by humans. This presentation critically examines both the benefits and the unintended consequences of Copilot AI in education and society. It argues that while Copilot AI has enormous potential as a tool for human empowerment, its responsible use requires digital literacy, ethical governance, educational reform, and a renewed emphasis on uniquely human capabilities such as critical thinking, creativity, judgment, and social responsibility.

KEYWORDS:

Copilot AI, Generative Artificial Intelligence, Education, Critical Thinking, Academic Integrity, Misinformation, Deepfake, Digital Literacy, Society, Ethical AI.

THEME

2

Renewable Energy, Energy Storage, and Green Technologies

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

Development of Sustainable Energy and Agriculture Integration Platform

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Abstract

Indonesia has strong commitment to achieve Net Zero Emission in 2060 by stepping out renewable energy power plant. According to NZE 2060 roadmap, 70% to 72% electricity will come from renewable energy (RE). AmongtheREresources, solar power will dominate the generation mix since Indonesia is located at equator with 4.8 kWh/m2/day potential of irradiance. In 2060 Indonesia will have 108 GW photovoltaic generation which is 24.6% from total generation. Land requirements will be a challenge because on the other hand, Indonesia is also launching a food security program which of course requires very large areas of land. Renewable Energy Integration Demonstrator of Indonesia (REIDI) offers solution by integrating energy generation system and agriculture so called Agrivoltaic. Agrivoltaic is an effort to utilize land for both solar photovoltaic power generation and agricultural. The photovoltaic array is elevated to allow farming activities underneath. Inter-module spacing allows shade-tolerant crops to thrive. Also it increases land productivity, creates shaded for cooler environments to reduce water evaporationfor plants.

KEYWORDS:

Energy, Photovoltaics, Agriculture, Sustainability.

THEME

3

Climate Change Mitigation, Adaptation, and Environmental Technologies

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

Emerging Technologies For Disaster Resilience And Climate Adaptation Toward Sustainable Development

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Abstract

Climate change and increasing disaster intensity have become critical challenges for sustainable development, particularly in disaster-prone countries such as Indonesia. Multi-hazard threats including floods, earthquakes, tsunamis, landslides, sea-level rise, and environmental degradation require integrated mitigation and adaptation strategies supported by emerging technologies. Conventional disaster management systems are often fragmented, reactive, and limited in real-time monitoring, predictive capability, and public preparedness. Therefore, innovative and multidisciplinary approaches are necessary to strengthen climate resilience and environmental sustainability. This study presents the strategic framework and innovation initiatives of MKPI ITS in utilizing Artificial Intelligence (AI), Internet of Things (IoT), UAV-LiDAR mapping, Digital Twin systems, Virtual Reality (VR), geospatial analysis, and smart infrastructure technologies for climate adaptation and disaster risk reduction. The framework integrates resilient infrastructure assessment, early warning systems, environmental monitoring, predictive modeling, VR-based disaster education, and food resilience strategies to support emergency response and community preparedness. The findings demonstrate that emerging technologies significantly improve hazard prediction, rapid response, environmental monitoring, public awareness, and evidence-based policy development. Furthermore, interdisciplinary collaboration and community-centered innovation strengthen adaptive capacity and sustainable governance. In conclusion, the proposed framework provides a scalable approach for advancing climate resilience, environmental sustainability, and sustainable development through integrated technological innovation.

KEYWORDS:

Climate Change,Disaster Resilience, Environmental Sustainability, Emerging Technologies,Smart Systems, Sustainable Development.

THEME

4

Advanced Materials, Biomaterials, Nanotechnology, and Industrial Innovation

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

Mathematical Modeling for Crevice and Pitting Corrosion in Petroleum Industry

Benjamin O. Oyelami* | Abiri O. | Oluwaniyi S. | Christopher Ekeocha | C. Awogbemi

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Present Address

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Abstract

In the oil and gas industry, Mathematical modelling and simulation have been playing a dominant role in exploration, production, transportation and refining of crude oil and gases. In this paper, partial differential equations together with geometric models are used for simulation of corrosion problems. Modeling crevice and pitting corrosion in a refinery and the pipeline distribution in the petroleum industry are considered. We have obtained analytic solutions to some mathematical equations for crevice and putting corrosions. We explored electrochemical processes to study corrosion rate and develop numerical simulations using Fourier series using maple codes and Finite Element Method using App modeler in the Matlab and interesting results obtained.

KEYWORDS:

Crevice, Putting, Finite Element, Maple Codes, Models Simulation, App Modeler in Matlab,MSC 2020: 35D99, 74R15.

EXTENDED ABSTRACT

From Nano to Nation: Accelerating Industrial Innovation Through Advanced Materials Research at ITS

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Abstract

The development of advanced materials and nanotechnology is opening new opportunities for contributions across many areas of life. These innovations are being recognized not only for their role in shaping the future of global industries but also for the significant chance they present for Indonesia to advance. At the Center for Advanced Materials and Nanotechnology Study – ITS, it is believed that innovation is sparked by curiosity, strengthened through collaboration, and given true meaning when tangible benefits are delivered to society. Research is being directed toward materials that are lighter, stronger, cleaner, and smarter materials that can be applied to enhance healthcare, improve energy efficiency, and support sustainable industrial growth. Through close collaboration with partners from academia, government, and industry, scientific discoveries are being transformed into solutions that improve people's lives and reinforce national resilience. This vision encourages a future in which Indonesia is not merely positioned as a consumer of advanced technologies but is empowered as a creator, where breakthroughs in materials and nanotechnology lay the foundation for a more innovative, competitive, and sustainable nation.

KEYWORDS:

Advanced Materials, Nanotechnology, Biomaterials, Innovation, Sustainable Nation.

THEME

5

Biotechnology, Health Technologies, Pharmaceuticals, Medical Devices, Healthcare Informatics, and Bio-innovation

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

Biomanufacturing Cooperation: Empowering Sustainable Development Across the Global South

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Abstract

As a core driver of the fourth industrial revolution, biomanufacturing fueled by synthetic biology and AI innovation delivers distinctive edges including renewable feedstocks and eco-friendly low-carbon production. It can drastically slash resource consumption, pollutant emission and manufacturing costs across food production, pharmaceuticals, new materials and clean energy sectors. Major economies such as China, the US and the EU have rolled out top-tier national bioeconomy strategies to accelerate industrial-scale deployment of relevant technologies. Most COMSATS member states are endowed with abundant biomass and affordable labor resources yet constrained by insufficient core expertise, deficient R&D capacity and incomplete industrial chains. Against such backdrop, the COMSATS Joint Centre for Industrial Biotechnology (CCIB) hosted by Tianjin Institute of Industrial Biotechnology carries out demand-oriented South-South cooperation covering joint R&D, systematic talent training and cross-border technology transfer. Deepened cross-border collaboration on engineered microbial strains, CO bioconversion and agricultural waste valorization will unlock huge bioeconomic potential for the Global South and accelerate progress toward UN Sustainable Development Goals.

KEYWORDS:

Biomanufacturing, Synthetic Biology, South-South Cooperation.

EXTENDED ABSTRACT

Leveraging on Technology to Have Insight into Temporal-Spatial Dynamics of Infectious Diseases

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Abstract

Developing and deployment epidemiological models to capture of growth with time across a given geographical area can pose serious problems. Mathematical models of tempo-spatial family are of great value for emergency preparedness and response, understanding disease progression through a population, in a given community. Building procedural models(mathematical models) merged with models built through machine learning(data modelling) can easily provide tools that enable forecasting and control spread of diseases in across communities. In this paper, the SIR model is considered to study temporal-spatial dynamics, a series of simulations made and exploited by Explore facilities in Maple 2026 to design and implement computer solutions to investigate how an epidemic can spread from hot sports across the region. The information obtained at each state of growth can be used to strategically control the disease.

KEYWORDS:

SIR, Metamodelling, Models, Simulation, Infection, Hot Sports.

EXTENDED ABSTRACT

Integrating Bioscience and Biodiversity: From Genomics to Food Security and Health

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Abstract

Global challenges such as climate change, food insecurity, biodiversity loss, and emerging health concerns require innovative and interdisciplinary approaches. These studies highlight how the integration of bioscience and biodiversity research can contribute to sustainable agriculture, food security, and human health. Several case studies were conducted using several approches including molecular biology, ethnobotanical study, and plant tissue culture. Genomic studies using Micro-Tom tomato mutants revealed that alterations in the SlIAA9 gene enhance plant adaptability to heat stress through improved photosynthetic performance, stress-responsive gene expression, and fruit production under adverse conditions. Complementing these genomic approaches, ethnobotanical investigations of the Tengger Tribe in East Java documented valuable traditional knowledge on medicinal plant utilization, identifying diverse species used for healthcare and emphasizing the importance of biodiversity conservation. Furthermore, plant biotechnology strategies, including in vitro culture and elicitation techniques, were applied to medicinal plants such as Stevia rebaudiana and Gynura pseudochina. The use of methyl jasmonate and silver nanoparticles successfully enhanced plant growth, biomass accumulation, secondary metabolite production, and the expression of flavonoid biosynthetic genes. These studies demonstrate how modern bioscience, ranging from genomics and molecular biology to biotechnology and ethnobotany, can be integrated with biodiversity resources to address contemporary challenges. The presented work underscores the importance of conserving biological diversity while simultaneously harnessing its potential for developing climate-resilient crops, sustainable medicinal plant production systems, and improved human well-being.

KEYWORDS:

Biodiversity, Climate Resilience, Food Security, Human Health, Medicinal Plants, Plant Biotechnology.

EXTENDED ABSTRACT

Isolation and Control of Fungal Post Harvest Rot Pathogens of Cucumber (Cucumis sativus) using Ethanolic Leave and Stem Bark Extract of Jatropha Tanjorensis

Emmanuel Francis

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Abstract

The study attempted to find out Isolation and Control of Fungi Associated with rot of cucumis sativum using ethanolic leaves and stem bark extracts of Jatropha tanjorensis in Mubi Local Government Area, Adamawa State. Total number of samples of spoilt of cucumber and healthy ones (5) of them were collected from the Mubi market metropolis and transported to botany laboratory Adamawa State University, Mubi. Potatoes Dextrose Agar (PDA) was the culture media used for the isolation of fungi from the sampled cucumber and the preparation of pure culture. A technique was used for the identification of the isolated fungi. Pathogenicity test was carried out in order to know if the isolated fungi were really responsible for the spoilage of the cucumber. The preparation of the ethanolic leave and stem bark extract was carryout by the procedures described. The extract was prepared into three different concentrations ranging from 200-600mg/ml (i.e. 200, 400 and 600mg/ml). The agar plate diffusion method was used to determine the growth of inhibition of fungi isolated by plant extract. The data on the average zone of inhibition produced was analyzed using ANOVA with the help of Statistical Package for Social Sciences (SPSS). Result from the study showed that two (2) pathogens were identified to be responsible for the rot of cucumber in mubi R microsphorus and R-stolonifer. The result further revealed both ethanolic leave and stem bark extract of Jactroph tanjorensis has an effect on both pathogens isolated from the sample but the ethanolic leaves extract is more effective than stem bark it concluded that R-microphorus R-stolonifer are pathogens causing rot in cucumber in Mubi market, Ethanolic leave and stem bark extract was found to be effective in inhibiting the growth of pathogens.

KEYWORDS:

Cucumber, Ethanolic Leave, Fungi, Isolation and Control, Stem Bark Extract.

THEME

6

Water, Food, and Agricultural Technologies for Resource Security (including Halal Industry and Sustainable Food Supply Chains)

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

Postharvest Losses and Food Safety of Fruit and Vegetables in Sri Lanka: Current Status and Way Forward

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Abstract

Being an agricultural country, Sri Lanka is blessed with a range of fruit and vegetables. However, high postharvest losses of fruit and vegetables remain a major challenge with an estimated loss of 20-40% between harvest and retail due to lack of adherence to Good Agricultural Practice (GAP), poor handling practices, improper packaging and transport, and limited access to cold chain and storage infrastructure. These losses reduce farmer income, increase food prices, decrease food availability, and contribute to food insecurity. Food safety is another critical concern in the fresh fruit and vegetable export industry in Sri Lanka due to strict sanitary and phytosanitary requirements imposed by importing countries. Issues such as microbial contamination, excessive pesticide residues, poor hygiene and sanitation in the supply chain, and inadequate compliance with food safety standards continue to affect the quality and safety of food products. Although regulatory frameworks and monitoring systems exist, enforcement and awareness among stakeholders remain uneven. To address these issues and to empower women in value chains, a project on FRESH: Fresh Fruit and Vegetables for Sustainable Healthy Diets, was initiated in 2022 and continued as a CGIAR project, Better Diets and Nutrition (BDN) with funding from IFPRI (International Food Policy Research Institute, USA). Ten selected commodities, 3 fruits (mango, papaya, pineapple), 3 vegetables (beans, cabbage, tomato) and 4 leafy greens grown in Sri Lanka were considered in this study. Postharvest loss assessment studies revealed that the losses are reduced in some fresh fruit and vegetable supply chains. This study revealed that pesticide residues are prevalent in the majority of the analyzed commodities, although the level and severity of contamination vary depending on the commodity type, production practices, and source. A clear association was observed between non-GAP (Good Agricultural Practices-GAP) production systems and the occurrence of higher levels of pesticide residues. The GAP-certified samples generally showed better compliance indicating that an effective implementation and monitoring of GAP practices are essential, beyond

certification alone. The microbial analysis demonstrated an improvement in microbiological levels in freshly consumed vegetables produced under GAP compared with non-GAP production protocols in the field. Furthermore, training of farmers and stakeholders in the supply chain on best pre and postharvest practices will help to improve the quality and safety of fresh fruit and vegetables.

KEYWORDS:

Postharvest Losses, Food Safety, Good Agricultural Practices.

EXTENDED ABSTRACT

Circular Bioeconomy through Biovalorization of Agricultural Waste

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Abstract

Indonesia generates over 30 million tons of agricultural and food waste annually, presenting both environmental challenges and significant opportunities for resource recovery through circular bioeconomy approaches. Poor waste management practices have resulted in substantial economic losses and environmental degradation, necessitating innovative biovalorization strategies that transform waste streams into value-added products. This study examines the integration of circular bioeconomy principles with biovalorization technologies to address agricultural waste management challenges in the Indonesian context. The objective of this research is to evaluate sustainable pathways for converting diverse agricultural waste streams including palm oil mill effluent (POME), rice husks, food waste and food loss (FWL), and horticultural residues into bioenergy, biofertilizers, and other high value bioproducts through integrated valorization systems. Results demonstrate that integrated systems combining multiple valorization pathways, such as anaerobic digestion coupled with BSFL composting, achieve superior resource recovery rates while generating multiple revenue streams. Among these waste streams, palm oil mill effluent (POME) from Indonesia's extensive palm oil industry represents a particularly nutrient-rich substrate containing high concentrations of ammoniacal nitrogen ($NH_4^+ - N$) and phosphate (PO_4^{3-}), making it an ideal feedstock for nutrient recovery. Research found that recovery of slow-release fertilizer (struvite) is possible with high purity. The implementation of these circular bioeconomy approaches can significantly reduce greenhouse gas emissions, recover valuable nutrients, and create economic opportunities for communities.

KEYWORDS:

Agricultural Waste, Biovolarization, Resource Recovery, Valuable Nutrient.

THEME

7

STI Policies, Innovation Ecosystems, and Technology Governance in Developing Countries

Emerging Technologies for Sustainable Development

EXTENDED ABSTRACT

ICENS : Supporting Science Policy and the SDGs in Jamaica and Beyond

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Abstract

The contributions of research institutions are not limited to scholarly publication. At the International Centre for Environmental and Nuclear Sciences (ICENS), the research programmes are closely linked to the Jamaican government's Vision 2030, which is itself based on the United Nations' Sustainable Development Goals (SDGs). Additionally, both the data generated and the expertise of researchers at ICENS has contributed to the development of standards, policies and regulations at the national, regional and international levels. The contributions of ICENS' research and researchers to science policy, the SDGs, and Jamaica's national development, are highlighted here.

KEYWORDS:

Science Policy, Sustainable Development Goals, Environmental and Nuclear Sciences.

EXTENDED ABSTRACT

Leverage the Integration of Science, Technology and Industrial Innovation under the Open Science Policy

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Abstract

The deep integration of science, technology and industrial innovation has become a core pathway to break through the development bottlenecks. Focusing on Africa, an important representative of developing economies where all 52 African nations together with the African Union have endorsed the Belt and Road Initiative, this presentation outlines the founding background, institutional arrangement and operational roadmap of the ANSO Africa Hub of Science Innovation (AAHSI), in alignment with UNESCO recommendation on open science. AAHSI has received official endorsement from UNESCO as a Programme under the United Nations Decade of Science for Sustainable Development (UNDSSD). Governed via a multi-tiered governance framework, the Hub's implementation work is undertaken by the dedicated working groups focusing respectively on food security, clean energy, artificial intelligence computer science, and public health. Guided by open science principles throughout on-the-ground delivery, AAHSI has formulated three core activity modules and built a dynamic platform enabling equitable access to knowledge, expertise and research data. The pilot initiative titled Strategic Roadmap and Capacity Building for Enhancing Food Security in Africa through Scientific and Technological Innovation, already underway as an early-gain cooperation prototype under AAHSI, will release its key deliverables at the 2026 AAHSI Conference to be held in Ethiopia this November.

KEYWORDS:

Open Science, ANSO Africa Hub, Sustainable Development.

EXTENDED ABSTRACT

Revolutionizing Recognition of Prior Learning (RPL) Through AI-Driven Modular Education at Nusantara Digital University

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Abstract

Indonesia currently faces a critical higher education challenge, characterized by stagnant enrollment and a severe skills gap where a vast majority of graduates lack industry-relevant competencies. Traditional Recognition of Prior Learning (RPL) frameworks often focus merely on the administrative process of degree acquisition, failing to provide the targeted upskilling required by the modern workforce. To address this disconnect, Nusantara Digital University (NDU) introduces a disruptive, fully digital corporate learning ecosystem. NDU leverages a proprietary AI-based Learning Management System (AIDUX AI-LMS) that transforms RPL into a dynamic pathway for career advancement. By integrating AI Avatars, AI assessments, and a modular curriculum design, the platform delivers a highly personalized and flexible educational experience. Learners utilize built-in talent mapping and gap analyzer tools to independently evaluate their competencies , engaging with structured modules developed directly by global industry experts. Furthermore, this ecosystem actively bridges academic theory with practical application, empowering final-year students and fresh graduates to hone their competencies through direct internship pipelines with NDU's network of corporate affiliates. Ultimately, NDU provides an affordable, scalable solution to align digital education seamlessly with enterprise demand.

KEYWORDS:

Recognition of Prior Learning (RPL), Digital University, Artificial Intelligence (AI), AI Avatar, AI Assessment, Modular Curriculum Design, Talent Mapping, Upskilling, Upragding.

THANK YOU

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