



37th ANNUAL CONGRESS OF PGIA

FOSTERING INNOVATIONS IN AGRI-FOOD SYSTEMS FOR HEALTHY AND
EQUITABLE CONSUMPTION

PROCEEDINGS



21st NOVEMBER 2025

POSTGRADUATE INSTITUTE OF AGRICULTURE, UNIVERSITY OF PERADENIYA

THIRTY-SEVENTH ANNUAL CONGRESS

21st November, 2025

Postgraduate Institute of Agriculture

PROGRAMME

Inaugural Session

Chairperson: Prof. Gamini Pushpakumara, Director, PGIA

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| 8.00 a.m. | Registration |
| 8.30 a.m. | National Anthem & Lighting of Traditional Oil Lamp |
| 8.45 a.m. | Welcome Address by Dr. Rasanjali Samarakoon
Coordinator, PGIA Congress 2025 |
| 8.50 a.m. | Address by Mr. Lakeesha Uthpala
President, Postgraduate Agriculture Students' Association |
| 8.55 a.m. | Address by Prof. Barana Jayawardana
Dean, Faculty of Agriculture, University of Peradeniya |
| 9.00 a.m. | Address by Prof. Gamini Pushpakumara
Director, Postgraduate Institute of Agriculture, University of Peradeniya |
| 9.05 a.m. | Address by Prof. Terrence Madhujith
Vice Chancellor, University of Peradeniya |
| 9.10 a.m. | Address by the Chief Guest Dr. Jairo Villamil-Diaz
Head of Mission,
United Nations Industrial Development Organization (UNIDO) |
| 9.25 a.m. | Launching of the 1 st Issue – 37 th Volume of Tropical Agricultural Research
(TAR) Journal |
| 9.30 a.m. | Keynote Address by Mr. Rizvi Zaheed
Chairman, Sri Lanka Agripreneurs' Forum & Director, Vidullanka PLC |
| 10.00 a.m. | Highlights of PGIA Annual Congress - 2025 |
| 10.05 a.m. | Closure of the Inaugural Session |

Technical Sessions

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| 10.15 a.m. | Commencement of Oral & Poster Sessions |
| 12.30 p.m. | Lunch Break |

Panel Discussion

1.30 p.m. Panel Discussion on 'Food Systems Transformation'

Closing Session

3.00 p.m. Address by the Distinguished PGIA Alumnus

Dr. Thusitha Bandara

Director, Bogawanthalawa Tea Estates PLC

3.15 p.m. 3MT® Competition - Final Battle

3.30 p.m. Award of Gold Medals for Outstanding PhD Students

3.55 p.m. Closing Remarks by **Dr. Rasanjali Samarakoon**

Coordinator – PGIA Congress 2025

4.05 p.m. Vote of Thanks by **Ms. Hasani Alwis**

Secretary, Postgraduate Agriculture Students' Association

4.15 p.m. Closure of Programme

Technical Session I

Water Governance in Agriculture

Chairperson: Emeritus Prof. Nimal Gunawardena

Venue: Room 106, PGIA Old Building

- 10.15 a.m. Industrial Expansion in Attanagalu Oya River Basin: Implications of the Food Industry on Water Resources
W.M.N.L. Weerasooriya, N.D.K Dayawansa, M.I.M Mowjood, and R.P. De Silva
- 10.30 a.m. A Hybrid Machine Learning Framework for Predicting Points and Continuous Soil Water Retention in Tropical Soils
K.A.I.L. Kasthuri Arachchi, and D.N. Vidana Gamage
- 10.45 a.m. Seasonal CO₂ Flux Dynamics in Tropical Man-Made Lakes: Comparative Insights from Wet and Dry Zones of Sri Lanka
G.D.D.J. Bandara, N.D.K. Dayawansa, R.P. De Silva, and M.I.M. Mowjood
- 11.00 a.m. Tragedy of Centralization and the Evolution of Resource Governance in Village Irrigation Systems of Sri Lanka
A.H.M.S.W.B. Abeyrathne, J.M.P.N. Anuradha, D.K.N.G. Pushpakumara, Miho Fujimura, B.V.R. Punyawardena, and I.D.K.S.D. Ariyawanshe
- 11.15 a.m. Spatiotemporal Linkages between Habitat Quality and Water Quality: A Case Study of Yan Oya, Sri Lanka
G.K.L. Wickramasinghe, G.D.D.J. Bandara, G.M.P. Kumara, N.D.K. Dayawansa, and M.I.M. Mowjood
- 11.30 a.m. Assessment of Rainfall Dynamics in the Hurulu Wewa Irrigation Scheme for Climate-Resilient Water Management
W.M.M.G.C.J. Ariyaratne, N.D.K. Dayawansa and R.P. De Silva
- 11.45 a.m. Development of Methodology to Assess Hydrological Drought: A Study in Kantale Irrigation Scheme, Sri Lanka
M.S.F. Husna, R.P. De Silva and N.D.K. Dayawansa
- 12.00 p.m. Impacts of Conversion of Rubber to Oil Palm Plantations on Soil Water Dynamics in the Low Country Wet Zone of Sri Lanka
K.M. Kularathna and D.N. Vidana Gamage

Technical Session II

Soil Health, Crop Production and Sustainable Agriculture

Chairperson: Emeritus Professor D. C. Bandara

Venue: Room 107, PGIA Old Building

- 10.15 a.m. Biochar Co-composting: A Strategy for Improving Compost Quality
D.G.P.S. Delpitiya, R.S. Dharmakeerthi, A.K. Karunaratna and N.R.N. Silva
- 10.30 a.m. Identification and Characterization of Culturable Nitrogen Fixing Cyanobacteria from Rice Fields in the Wet Zone of Sri Lanka
K.C. Guruge, J.M.P.C. Jayasundara and B.L.W.K. Balasooriya
- 10.45 a.m. Assessing the Antibiotic Resistance Levels of Soil Bacteria for Amoxicillin, Ciprofloxacin, Sulfamethoxazole and Trimethoprim
H.P.S.R. Premaratne, W.S. Dandeniya, K.K.C.J. Kamburugoda and S. Thaboshini
- 11.00 a.m. Soil Erosion Assessment in Tea Lands of Nuwara Eliya, Sri Lanka, using the ¹³⁷Cs Tracer Technique
W.A.T.L. Weerakkody, A.G. Chandrapala, H.A.D.I. Madhuroshika, W.M.I. Dissanayake, K.M. Mohotti, and S.P. Nissanka
- 11.15 a.m. Characterizing Physiochemical Properties and Nutrient Leaching Behavior of Different Coir-Based Substrate Mixtures
A. Kavinthini and D.N. Vidana Gamage
- 11.30 a.m. Effect of Reducing Urea Application on Maize Yield and Stylo Nodulation in a Maize-Stylo Mixed-Stand Forage System
G.D.N.M. Gammanpila, W.S. Dandeniya, K. Mithila Devindi, K.A.K.S. Perera, S. Edirisinghe, and M.B.P. Kumara Mahipala
- 11.45 a.m. Assessment of Nutritional Quality of Lettuce as Affected by Iron- and Zinc-Enriched Nutrient Management Techniques
R.M.B.A. Bandara, J.P. Eeswara and D.M.S.B. Dissanayaka
- 12.00 p.m. Anatomical, Biochemical, and Physiological Traits Associated with Drought Tolerance in Wild Rice *Oryza rhizomatis* Vaughan
A.M.D.M. Adhikari, A.V.C. Abhayagunasekara and P.C.G. Bandaranayake

Technical Session III

Animal Production Systems and Crop Development Research

Chairperson: Emeritus Professor K. Samarasinghe

Venue: Room 206, PGIA Old Building

- 10.15 a.m. An Investigation into the Floral Biology of King-Coconut and Developing a Protocol for Artificial Hand Pollination
M.G.O.S. Thilakarathne, S.A.C.N Perera and H.D.M.A.C. Dissanayaka
- 10.30 a.m. Economic and Environmental Viability of Dairy Cattle Farming in Areas under Tea Plantation: A Case Study in Gouravilla Grama Niladhari Division, Central Province, Sri Lanka
S. Manojpraba and G.L.L.P. Silva
- 10.45 a.m. Distinguishing Two Morphologically Similar *Rhinacanthus* Species Using Chloroplast Barcoding Regions
M. Siyama and Y. Somaratne
- 11.00 a.m. Paddy Husk Adulterated Rice Bran in Broiler Diets: Impact on Growth Performance, Nutrient Digestibility and Gut Health
S.M.R. Samarakoon, K. H. M. N. B. Konthasinghe, P. Weththasinghe, N.D. Karunaratne and B.C. Jayawardana
- 11.15 a.m. Factors Contributing to the Adoption of Recommended Dairy Management Practices among Small-scale Dairy Farmers in Sri Lanka
M.G.S.A. Gunarathna, Jasmin Arif Shah, Mark Buda, Ubedullah Kaka, and Uvasara Dissanayeke
- 11.30 a.m. Effect of Dietary Supplementation of Yeast Fractions (Safmannan®) on Growth Performance and Nutrient Digestibility in Broiler Chickens Fed Adulterated Rice Bran
S.M.R. Samarakoon, V.S.A. Vidanapathirana, B.C. Jayawardana, N.D. Karunaratne, V. Munasinghe, and P. Weththasinghe
- 11.45 a.m. Determinants of Adaptive Capacity in Climate-Stressed Dairy Systems: A Bayesian Model Averaging Case Study from Mullaitivu District, Sri Lanka
K. Umashankar and C.S. Otchia
- 12.00 p.m. Lactation Curve Modelling for Dairy Cattle Genotypes in Different Agroclimatic Zones and Management Systems in Sri Lanka
U.D. Ramanayake, C.M.B. Dematawewa and G.L.L.P. Silva

Technical Session IV

Public Health, Nutrition and Agricultural Extension

Chairperson: Professor Renuka de Silva

Venue: Room 207, PGIA Old Building

- 10.15 a.m. Contribution of Daily Diet for Non-communicable Disease Risk Factors: A Pilot Study Conducted in Minuwangoda Divisional Secretariat Division, Sri Lanka
J.M.C.U. Karunarathna, P.G.S.M. De Silva, A.B.G. Silva and W.M.T. Madhujith
- 10.30 a.m. Effectiveness of a Social Media-Based Nutrition Education Program in Promoting Awareness of Low Glycemic Index Foods among Urban Working Women in Sri Lanka
J.P.C.V.T. Jayasinghe, G.M. Somaratne, U. Walallawita and D. Gunasekara
- 10.45 a.m. Musculoskeletal Disorders among Tea Plantation Workers: A Systematic Review and Meta-analysis
A. Abeysooriya and M.W.A.P. Jayathilaka
- 11.00 a.m. The Effect of Customer Service Quality on the Satisfaction and Loyalty of Mobile Broadband Customers
T.M.W.G.V.Y. Bandara and L.N.A.C. Jayawardana
- 11.15 a.m. Assessment of Antioxidant Profile and Vitamin C content in Commercially Cultivated Berries in Sri Lanka and their Processed Jams
K.A.G.D.G.P. Kumara, P.S. Dissanayake, W.L.I. Wijesekara and W.M.T. Madhujith
- 11.30 a.m. Development and Validation of a PostgreSQL-Based Framework for Field-Level Data Collection to Assess Multidimensional Postmenopausal Obesity and Associated Health Complications
N.K. Weerasekara, B.E.P. Mendis, N.P. Rajapakshe, A. Chandrasekara, W.I.T. Fernando, and K.I.C. Kandauda
- 11.45 a.m. Understanding the Use of Marketed Ayurvedic/Herbal Products in the Management of Prediabetes, Diabetes, Hypertension and Hyperlipidaemia among Sri Lankan Communities: An Online Survey
J.I. Liyanage, G.M. Somaratne, R. Jayawardana, P.H.T. Chathuranga, and H.M.L.H.R. Wijewardhane
- 12.00 p.m. An Assessment of Career Prospects of Graduates from the Faculty of Agriculture, University of Peradeniya, Sri Lanka
D.T. de Alwis and S. Kumar

Poster Session

Inclusive Knowledge Practices in Agriculture

Venue: Room 207, PGIA Old Building

- 10.15 a.m. Seasonal Flooding and Its Impact on Growth and Latex Yield of Rubber (*Hevea brasiliensis*) in Kalutara District, Wet Zone of Sri Lanka
P.H.D.N. Jayangani, S. A. Nakandala, V. P. A. Weerasinghe, U.N. Udayakumari, T.U.K. Silva, A.M.R.W.S.D. Ratnayake, H. Subasinghe, and P.K.W. Karunatilaka
- 10.20 a.m. Knowledge and Perceptions of Food Misconceptions and Facts: A Study among a Group of Sri-Lankan Adults in the Puttalam District
S.M.T. Marliya and A. Chandrasekara
- 10.25 a.m. An Integrated Performance Index for Irrigation Schemes in Sri Lanka: An Interdisciplinary and Sustainable Approach
P.S.M. Sarathchandra, R.P. De Silva and N.D.K. Dayawansa
- 10.30 a.m. Transforming Social Inclusion through Emotional Intelligence and Human Flourishing: The LUVORA Paradigm in Agriculture
N.U. Hettige and M.P. Dissanayake
- 10.35 a.m. Beyond Tariffs: Assessing the Role of Import Efficiency in Sri Lanka–Singapore Trade Liberalization
N.M.U.P.K. Namalgama, J. Weerahewa and S. Dissanayake
- 10.40 a.m. Cultivating Empathy: A Love-Informed Framework for Gender-Inclusive Farmer Empowerment
N.U. Hettige and M.P. Dissanayake
- 10.45 a.m. Deep Learning-Based Detection of Adulterants in Pepper Powder using Microscopic Imaging: A Cost-Effective Approach for Food Safety
J.K.W.U.D. Karunathilaka, P.C. Arampath, K.S.P. Amarathunga, W.M.K. Fernando, and Thushari Liyanage
- 10.50 a.m. Development of a Comprehensive Water Conservation Index for Hurulu Wewa Irrigation Scheme, Sri Lanka: An SDG-aligned Assessment
D.S.K.S. Perera, R.P. De Silva and N.D.K. Dayawansa
- 10.55 a.m. Evaluation of Fruit Development Dynamics in King Coconut (*Cocos nucifera* var. *aurantiaca*)
M.G.O.S. Thilakarathne, S.A.C.N. Perera and H.D.M.A.C. Dissanayake

Lunch Break
12.30 p.m. – 01.30 p.m.

Panel Discussion

*Food Systems Transformation: Policy, Innovation, and Community Action for
Food Security*

Moderator: Prof. Buddhi Marambe

Venue: Diamond Jubilee Auditorium, Faculty of Agriculture

Time: 1.30 p.m. Onwards

Closing Session

Chairperson: Dr. Rasanjali Samarakoon
Coordinator,

37th Annual Congress of PGIA- 2025

Venue: Diamond Jubilee Auditorium, Faculty of Agriculture

Time: 3.00 p.m. – 4.15 p.m.

Message from the Chief Guest

My sincere appreciation goes to the organizing committee of the 2025 Annual Congress of the Postgraduate Institute of Agriculture (PGIA), University of Peradeniya. It is an honour to join you for the 37th edition of this distinguished event, which continues to highlight Sri Lanka's leading scientific contributions and its commitment to advancing agriculture nationally and regionally.



I am especially inspired by this year's theme, "Fostering Innovations in Agri-Food Systems for Healthy and Equitable Consumption." This theme is more than a tagline; it is a call to action. It reminds us that innovation in agriculture is not measured only by yield, but by its ability to deliver nutrition, security, and fairness to every citizen. The global challenges of malnutrition, food waste, poverty eradication, and supply chain fragility demand solutions grounded in systems thinking and brave, forward-looking research.

The work shared at this Congress has the power to reshape how we produce, distribute, and consume food. Solutions to rural poverty, climate vulnerability, and food insecurity lie not simply in growing more, but in growing smarter, distributing fairly, and innovating responsibly.

As you engage in academic and technical discussions, I encourage you to reflect on three priorities that can maximize the real-world impact of your work:

- 1. Embrace Interdisciplinarity: Today's agri-food challenges require collaboration across data science, biotechnology, engineering, economics, and climate science.*
- 2. Champion Sustainability: Innovation must align with responsibility. Your research can drive the shift from extractive to regenerative practices, building circular economy and climate-resilient systems that restore ecosystems while strengthening rural livelihoods.*
- 3. Translate Research into Action: The true value of science lies in its influence on practice and policy. Beside farmers, engage with government institutions, and industry partners so your findings reach the field and meaningfully shape national strategies.*

The dedication reflected in this Congress honours PGIA's long-standing legacy of excellence. Your insights are the seeds of tomorrow's policies, innovations, and breakthroughs. May this Congress spark new ideas, strengthen collaboration, and accelerate the transition toward a healthier and more equitable agri-food future.

Dr. Jairo Andrés Villamil-Díaz.

Head of Mission, United Nations Industrial Development Organization (UNIDO)

Message from the Director

It gives me great pleasure to extend my warmest welcome to all participants, presenters, and distinguished guests to the 37th Annual Congress of the Postgraduate Institute of Agriculture (PGIA), University of Peradeniya, which will be held on 21 November 2025 under the theme “Fostering Innovations in Agri-Food Systems for Healthy and Equitable Consumption.”.

This year’s Congress is of special significance as it coincides with the Golden Jubilee of the PGIA (1975–2025), celebrating fifty years of excellence in postgraduate agricultural education, research, and innovation. Over the past five decades, PGIA has been the driving force behind the advancement of agricultural sciences in Sri Lanka, producing over 5,000 graduates who continue to contribute to academia, research, policy, and industry at national and international levels.



The 2025 Congress provides a vibrant platform for postgraduate students, academics, researchers, and industry partners to exchange ideas and showcase innovations addressing contemporary challenges in food and nutrition security, sustainability, and equitable resource management. The oral sessions are organized under the following key thematic areas: Water Governance in Agriculture; Soil Health, Crop Production, and Sustainable Agriculture; Animal Production Systems and Crop Development Research; Public Health, Nutrition, and Agricultural Extension. In addition, a poster session on “Inclusive Knowledge Practices in Agriculture” will highlight contributions from emerging scholars, encouraging interdisciplinary engagement and collaboration.

I extend my sincere appreciation to the Congress Coordinator, Organizing Committee, Boards of Study, Reviewers, Editors, Judges, PGIA staff, the Board of Management, and our sponsors for their dedication and tireless efforts in organizing this important event. Their commitment ensures that the PGIA Congress continues to serve as a catalyst for academic excellence, innovation, and professional growth. As we celebrate 50 years of PGIA’s service to the nation, this Congress reaffirms our vision to strengthen research–industry–community linkages and to inspire innovations that shape a resilient, sustainable, and inclusive agri-food future. The Panel Discussion on “Food System Transformation” will further emphasize this mission by bridging scientific research with policy and practice.

On behalf of the Postgraduate Institute of Agriculture, I wish all participants a productive, inspiring, and memorable 37th Annual Congress, and a heartfelt celebration of PGIA’s Golden Jubilee.

Prof. D.K.N.G. Pushpakumara

Director/ Postgraduate Institute of Agriculture

Message from the Vice-Chancellor

It is with great pleasure that I extend my warm greetings to all participants of the 37th Postgraduate Institute of Agriculture (PGIA) Annual Congress. This prestigious event continues to serve as a vital platform for academics, researchers, practitioners, and students to engage in meaningful dialogue, share new knowledge, and contribute to the advancement of agriculture and allied disciplines in Sri Lanka and beyond.



The theme of this year's Congress, "Fostering Innovations in Agri-Food Systems for Healthy and Equitable Consumption," is both timely and significant. As global food systems undergo rapid transformation in response to climate change, technological advancements, and shifting socio-economic dynamics, the need for innovative, sustainable, and inclusive approaches has never been greater. This theme underscores our collective responsibility to promote research and practices that ensure food security, improve nutritional outcomes, and enhance the resilience of agri-food systems.

I am pleased to note that the oral sessions of the Congress will address a broad spectrum of areas, including Water Governance in Agriculture, Soil Health, Crop Production, and Sustainable Agriculture, Animal Production Systems and Crop Development Research, and Public Health, Nutrition, and Agricultural Extension. These focus areas reflect the interdisciplinary nature of modern agriculture and highlight the importance of integrated solutions in addressing contemporary challenges.

The inclusion of a poster session under the theme "Inclusive Knowledge Practices in Agriculture" further enriches this academic forum by encouraging diverse perspectives and highlighting the importance of shared learning within the agricultural community.

The PGIA Annual Congress is particularly special to me, as I had the privilege of serving as its coordinator in 2010 and have continued to contribute to many congresses thereafter in various capacities, including publishing articles, reviewing, and editing. In addition, I have had the honor of teaching at the PGIA for over two decades. I commend the Postgraduate Institute of Agriculture for its continued leadership in fostering high-quality research and capacity building. I also extend my appreciation to the organizers, presenters, reviewers, and all contributors for their invaluable efforts in making this Congress a success.

I wish all participants a productive and inspiring experience and look forward to the impactful contributions that will emerge from this event.

Professor W.M. Terrence Madhujith
Vice-Chancellor,
University of Peradeniya

Message from the Dean

As the Dean of the Faculty of Agriculture at the University of Peradeniya, it is both an honor and a privilege to convey this message for the 37th Annual Congress of the Postgraduate Institute of Agriculture (PGIA). Throughout the years, I have observed the impressive evolution of this event and its significance as a lively platform where ideas flourish, providing postgraduate students with invaluable exposure and experience.



In order to have meaningful conversations and address important challenges from integrated and holistic perspectives, the Annual Congress has continuously brought together academics, scientists, politicians, the private sector, NGOs, and postgraduate researchers. Enhancing research capability, building human resources, and cultivating a robust research culture in postgraduate education have all benefited from this collaborative attitude. The conference has made a substantial contribution to agricultural growth at the national and regional levels by producing a multitude of ideas and knowledge. The occasion serves as a platform for education, creativity, experience exchange, and contribution to the university and the country.

I would like to express my heartfelt appreciation for the foresight of those who established this congress and for the unwavering commitment of all who have contributed to its continued success over the years. Building on this strong foundation, I take particular pride in the significant contributions made by the members of the Faculty of Agriculture at the University of Peradeniya, whose dedication has been instrumental in shaping the congress into the esteemed event it is today.

Looking ahead, I am confident that this year's congress will once again provide a vibrant platform for presenting and discussing innovative scientific advancements across diverse disciplines. In this spirit, I also extend my sincere gratitude to the Director of the PGIA, the organizing committee, and this year's congress coordinator for their steadfast efforts in bringing this event to fruition.

As the primary academic and research collaborator of the PGIA, the Faculty of Agriculture remains deeply committed to supporting this important endeavor. I genuinely hope that the 37th Annual Congress achieves its objectives and delivers meaningful value to all its stakeholders.

Prof. Barana Jayawardana
Dean/ Faculty of Agriculture
University of Peradeniya

Message from the President, Postgraduate Agriculture Students' Association

It is with immense pleasure and pride that I extend my warmest greetings of the occasion of the 37th Annual Congress of the Postgraduate Institute of Agriculture (PGIA). For decades, this Congress has stood as the flagship academic event of PGIA, eagerly anticipated by postgraduate students, academics, and researchers. It serves as a vital platform for emerging scientists to present their findings, exchange ideas, and engage in meaningful dialogue with experts across diverse fields. These interactions not only highlight the intellectual capacity of our institute but also cultivate collaborations that transcend institutional and geographical boundaries.



The thematic areas of this year's Congress reflect the dynamism of agricultural science. From Innovations in Crop and Livestock Agri-Food Production to Food, Nutrition, and Postharvest Technologies, and from Digital Technologies, AI, and Data Science to Precision Agriculture and Smart Monitoring, the themes underscore how technology, knowledge, and sustainability converge in shaping the future of agriculture. Equally important are discussions on Sustainable Soil, Water and Nutrient Management, Agri-Food Supply Chain Innovations, Policy and Socioeconomic Dimensions, Biodiversity Conservation, and Farmer Empowerment. These areas confirm that agriculture is not merely a scientific discipline but a holistic system deeply connected to people, ecosystems, and society. Together, they pave the way toward resilient, equitable, and environmentally responsible food systems.

Beyond its academic significance, this Congress represents the spirit of PGIA, where knowledge meets purpose and science serves society. On behalf of the Postgraduate Agriculture Students' Association (PASA), I extend my sincere appreciation to the Congress Coordinator, organizing committee, academic staff, and student volunteers for their dedication in making this event a reality. May this Congress inspire all participants to continue exploring, questioning, and contributing to the betterment of our communities and the world.

Mr. Lakeesha Uthpala Athukorala

*President, Postgraduate Agriculture Students' Association (PASA)
Postgraduate Institute of Agriculture
University of Peradeniya*

Message from the Congress Coordinator

37th Annual Congress, Postgraduate Institute of Agriculture

On behalf of the Organizing Committee, it is with great honor and privilege that I extend this message to the 37th Annual Congress of the Postgraduate Institute of Agriculture (PGIA), University of Peradeniya, Sri Lanka. Over nearly four decades, the Annual Congress has evolved into the premier event of the PGIA, serving as a vital platform for postgraduate scholars to share their research, connect with peers and experts, and explore innovative directions in agriculture and allied disciplines.



This academic forum continues to strengthen the link between research and practice by providing opportunities for postgraduate students and researchers to disseminate their findings, publish their work, and engage in constructive dialogue with academia, industry, and policymakers. This year, 45 abstracts were submitted, and 41 were selected for presentation after a careful review process. The congress features four oral presentation sessions and a poster session, making a total of five technical sessions that cover diverse and emerging themes in agricultural sciences. Abstracts presented at the congress are published in the proceedings. Three pre-congress workshops were conducted to enrich the academic experience of postgraduate students and enhance their research and professional skills. The workshops focused on Data Analysis Using Statistical Methods, Effective Use of AI in Science Communication, and Professional Certificate in Food Safety Compliance and Auditing.

It is a great privilege to have Dr. Jairo Villamil-Diaz, Head of Mission, United Nations Industrial Development Organization (UNIDO), as the Chief Guest, and Mr. Rizvi Zaheed, Chairman of the Sri Lanka Agripreneurs' Forum and Director of Vidullanka PLC, as the Keynote Speaker of this year's Congress. Their presence and insights bring immense value and inspiration to the event. My heartfelt appreciation goes to the authors, reviewers, and the editorial board for maintaining the high scholarly standards of our publications. I also extend my gratitude to the resource persons of the pre-congress workshops for their valuable contributions. My sincere thanks are due to the Director and staff of the PGIA for their continued guidance and support, and to the members of the Organizing Committee and Subcommittees for their unwavering dedication and teamwork in making the 37th Annual Congress a success.

Finally, I warmly congratulate all presenters for their valuable contributions and wish them continued success in their academic and professional pursuits.

Dr. Rasanjali Samarakoon
Congress Coordinator, 2025

Past Directors of Postgraduate Institute of Agriculture University of Peradeniya

<i>Prof. C.M.B. Dematawewa</i>	<i>November 2017- January 2024</i>
<i>Prof. S. Samita</i>	<i>July 2014 – September 2017</i>
<i>Prof. B.C.N. Peiris</i>	<i>October 2011 – June 2014</i>
<i>Prof. A.L.T. Perera</i>	<i>August 2006 - September 2011</i>
<i>Prof. R.O. Thattil</i>	<i>January 2002 – August 2006</i>
<i>Prof. H.P.M. Gunasena</i>	<i>March 1997 – January 2002</i>
<i>Prof. Y.D.A. Senanayake</i>	<i>January 1987 – March 1997</i>
<i>Prof. T. Jogaratnam</i>	<i>February 1978 – December 1986</i>
<i>Prof. R.R. Appadurai</i>	<i>June 1975 – February 1978</i>

Past Congress Coordinators

<i>Dr. D.N. Vidana Gamage</i>	<i>2024</i>	<i>Dr. (Ms.) A. Ariyawardena</i>	<i>2005</i>
<i>Prof. W.S. Dandeniya</i>	<i>2023</i>	<i>Prof. C.M.B. Dematawewa</i>	<i>2004</i>
<i>Prof. K.W.L.K. Weerasinghe</i>	<i>2022</i>	<i>Prof. (Ms.) S.P. Indraratne</i>	<i>2003</i>
<i>Prof. P.C.G. Bandaranayake</i>	<i>2021</i>	<i>Prof. D.K.N.G. Pushpakumara</i>	<i>2002</i>
<i>Prof. R.S. Dharmakeerthi</i>	<i>2020</i>	<i>Prof. (Ms.) G.L.L.P. Silva</i>	<i>2001</i>
<i>Prof. (Ms.) A.J. Mohotti</i>	<i>2019</i>	<i>Prof. N.A.A.S.P. Nissanka</i>	<i>2000</i>
<i>Prof. W.A.U. Vitharana</i>	<i>2018</i>	<i>Prof. (Ms.) S.E. Peiris</i>	<i>1999</i>
<i>Dr. (Ms.) S.M.C. Himali</i>	<i>2017</i>	<i>Prof. B. Marambe</i>	<i>1998</i>
<i>Dr. M. Ariyaratne</i>	<i>2016</i>	<i>Prof. (Ms.) D. Kumaragamage</i>	<i>1997</i>
<i>Prof. (Ms.) K.M.S. Wimalasiri</i>	<i>2015</i>	<i>Prof. B.C.N. Peiris</i>	<i>1996</i>
<i>Dr. S. Pathmarajah</i>	<i>2014</i>	<i>Prof. (Ms.) E.R.K. Perera</i>	<i>1995</i>
<i>Prof. (Ms.) R.M. Fonseka</i>	<i>2013</i>	<i>Prof. A.R. Ariyaratne</i>	<i>1994</i>
<i>Prof. T. Sivanathawerl</i>	<i>2012</i>	<i>Dr. (Ms.) A.A. Jayasekara</i>	<i>1993</i>
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The 36th Annual Congress of the PGIA – 2024

Overall Best Presentation:

Nayani Dayarathna, N.U. Jayawardana and V.N.S. Sirimalwatta

Molecular Characterization of Leaves from Selected Accessions of Jackfruit (*Artocarpus heterophyllus* Lam.) available in Sri Lanka

Oral Presentations:

- ***G.D.S.P. Rajapaksha, P.M.P.C. Gunathilake, J.K. Vidanarachchi, B.C. Jayawardana, B. Nirooparaj, M.D.S.T. De Croos. Wijesekara, and P.C.G. Bandaranayake***

Effect of Growing Environment on the Quality and Quantity of *Kappaphycus alvarezii* (Doty) Doty Yield

- ***Nayani Dayarathna, N.U. Jayawardana and V.N.S. Sirimalwatta***

Morphological and Molecular Characterization of Leaves from Selected Accessions of Jackfruit (*Artocarpus heterophyllus* Lam) available in Sri Lanka

- ***C.A.K. Dissanayake, W. Jayathilake, H.V.A. Wickramasuriya, U. Dissanayake and W.M.C.B. Wasala***

Relationship of Perceived Extension Worker Characteristics with the Adoption of Value-Added Technologies by the Beneficiaries

- ***M. M. K. D. Manathunga and A.K. Karunarathna***

Carbon Footprint of Orthodox Black Tea through Life Cycle Assessment: A Case Study of a Medium Scale Tea Factory, Sri Lanka

Poster Presentations:

- ***Fazna Rafeek, Sujeewa Dilhani Maithreepala, Sriyani Padmalatha, and Geeshani Somaratne***

Association of Dietary Patterns and Sarcopenia in the Ageing Population in Polonnaruwa District, Sri Lanka: A Cross-Sectional Study

PGIA Alumni Awards:

Winner: Nayani Dayaratne

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2nd Runner up: R.M.A.U. Rathnayake

Hantana Essence: PGIA Congress in Brief:

Winner: T.A.B.D. Sanjeewa

Current Status of Weed Management in Maize Cultivation in the North Central Province of Sri Lanka

1st Runner up: T. Bavithira

Two-Stage Catalytic Activation of Coconut Shell Biochar for Effective Malachite Green Removal from Water

1st Runner up: M.M.K.D. Manathunga

Assessing the Carbon Footprint of Sri Lankan Black Tea Production

1st Runner up: Sulaima Lebbe Rasmiya Begum

Assessment of Pollution in Lagoons using Water Quality Indices: A Case Study in Sainthamaruthu Coastal Lagoon, Sri Lanka

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- Ms. M.N.D. Vitharana from the Board of Study in Food Science and Technology
- Ms. D.R.N.N. Rathnayake from the Board of Study in Bio-Statistics
- Ms. K.A.M.R.P. Atapattu from the Board of Study in Crop Science
- Prof. (Ms). C.M. Wickramathilake from the Board of Study in Food Science and Technology

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Oral Sessions

SESSION I: Water Governance in Agriculture

Venue: Room 106, PGIA Old Building

Chairperson	Emeritus Prof. Nimal Gunawardena
Judges	Prof. C.S. Kalpage Dr. G.M.P.R. Weerakoon Dr. Pushpika Masakorala
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SESSION II: Soil Health, Crop Production and Sustainable Agriculture

Venue: Room 107, PGIA Old Building

Chairperson	Emeritus Prof. D. C. Bandara
Judges	Prof. J.W. Damunupola Prof. M.G.T.S. Amarasekara Dr. K.R.E. Padmathilake
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SESSION III: Animal Production Systems and Crop Development Research

Venue: Room 206, PGIA Old Building

Chairperson	Emeritus Prof. K. Samarasinghe
Judges	Prof. W.A.D. Nayananjali Dr. Neshma Kumudinie Dr. Gayani Weerasooriya
Session Coordinator	Dr. Nipuna Perera
Assistant Coordinator	Ms. S.V.U.L. Samarasinghe

SESSION IV: Public Health, Nutrition and Agricultural Extension

Venue: Room 207, PGIA Old Building

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Session Coordinator	Dr. H.M.P.C. Kumarihami
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Poster Sessions

Inclusive Knowledge Practices in Agriculture

Venue: Auditorium, PGIA

Judges

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Dr. Uditha Jinadasa
Mr. W. L. Hiran Peiris

Session Coordinator
Assistant Coordinator

Dr. Sewwandi Chandrasekara
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Three Minutes Thesis Competition

Venue: Diamond Jubilee Auditorium, Faculty of Agriculture

Judges

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Dr. Sachinthani I. Karunaratne
Dr. Panduka Neluwala

Final Round:

Prof. Samidi Navaratna
Prof. C.S. Bandara
Dr. Udayana Ranatunga

Session Coordinator

Dr. Sumali N. Dissanayake

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Industrial Expansion in Attanagalu Oya River Basin: Implications of food Industry on Water Resources

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Attanagalu Oya river basin in the western province of Sri Lanka has witnessed a rapid industrial growth over the last twenty years due to its accessibility to transportation, infrastructure and wealth of water resources. This study assesses how industrial expansion has exerted pressure on freshwater resources, focusing on the food and beverage industry. Methodology involves the analysis of rainfall from five gauging stations, monthly river discharge data from Dunmale (2005-2023), and water quality measurements. Water quality was monitored at monthly intervals for six months (January to June, 2025) at sampling 10 points for Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Total Dissolve Solids (TDS), Practical Salinity Units (PSU), and pH. Monthly discharge analysis indicates two distinct periods: high flow (May and October – November) and low flow (February and August). Currently, a total of 47 factories are located within the study area. Downstream water quality (samplings point 6-10) shows severe pollution, with persistently low DO and statistically significant monthly variation ($p < 0.05$). During the low flow in February, DO decreased in midstream to downstream areas, accompanied by elevated COD (up to 217 to 189mg/ L) and elevated Salinity and TDS (741 mg/L) exceeding SLS limit of 500mg/L. In contrast, high flow in May improved water quality through dilution, reducing COD to 6 – 98 mg/L, TDS to 49 – 68 mg/L and PSU to 0.04- 0.06. Overall the results confirm that river discharge dynamics directly influence pollutant dispersion, and industrial expansion has led to measurable freshwater degradation. Evident-based, sector-specific regulations are required for water abstraction and effluent discharge.

Keywords: Attanagalu Oya, Industrial expansion, water quality, food and beverage industry

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A Hybrid Machine Learning Framework for Predicting Points and Continuous Soil Water Retention in Tropical Soils

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Accurate characterization of soil hydraulic properties, including field capacity (FC), permanent wilting point (PWP), and the complete soil water retention curve (SWRC), is fundamental to sustainable water management and hydrological modeling, particularly in heterogeneous tropical environments. However, direct laboratory measurements are resource-intensive and time-consuming and widely used pedotransfer functions (PTFs) like Rosetta 3 often exhibit limited transferability to tropical soils due to inherent biases in their training data. This study presents a dual-stage computational framework to address these challenges using a sparse, region-specific dataset from Sri Lanka, which was filtered by excluding entries with missing values. First, we develop and validate explainable machine learning (ML) models, demonstrating that ensemble methods such as Random Forest (RF), Extra Trees Regressor (ETR) can accurately predict discrete FC and PWP values ($R^2 > 0.90$, RMSE > 3.0). Second, we introduce a novel, physics-informed neural network (NN) that generates continuous and physically plausible SWRCs. This hybrid model integrates a baseline PTF to enforce physical coherence, while a constrained NN trained on local data, refines the output to prevent implausible predictions. The 5-fold cross-validation was employed for unbiased evaluation. All the developed models were significantly outperforming the Rosetta 3 benchmark ($R^2 < 0.37$) for predicting FC and PWP. This integrated framework provides a cost-effective, accurate method for characterizing soil hydraulic properties from sparse local data, as a viable alternative to global PTFs, enabling advanced modeling and precision agriculture in data-scarce regions.

Keywords: Hydrological modeling, Machine learning, Neural Networks, Pedotransfer functions, Soil water

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Seasonal CO₂ Flux Dynamics in Tropical Constructed Lakes: Comparative Insights from Wet and Dry Zones of Sri Lanka

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Tropical man-made freshwater systems are increasingly recognized as significant yet understudied contributors to atmospheric carbon dioxide (CO₂) emissions. It is hypothesized that CO₂ fluxes in reservoirs located in different climatic zones of Sri Lanka would exhibit distinct seasonal patterns due to contrasting environmental drivers. This study examined seasonal CO₂ flux dynamics in *Thalangama* Tank (wet zone) and *Huruluwawa* Tank (dry zone). Monthly six-hour CO₂ flux measurements were conducted for six months using automated floating chambers. Simultaneously, monitoring of water quality and meteorological parameters performed. In *Thalangama* Tank, CO₂ flux remained consistently positive. Turbidity shows the strongest positive correlation ($r = +0.53$), indicating sediment resuspension, reduced solar radiation for aquatic photosynthesis and organic matter decomposition as dominant processes. One-way ANOVA revealed marginal seasonal variation ($F = 2.42$, $p = 0.052$), suggesting stable CO₂ emissions across months. In contrast, *Huruluwawa* Tank exhibited a significant seasonal shift from net CO₂ emission to uptake ($F = 3.90$, $p = 0.008$). Negative correlations were observed between CO₂ flux and wind speed ($r = -0.56$), turbidity ($r = -0.53$), and dissolved organic carbon ($r = -0.35$), implying enhanced mixing and primary productivity promoted CO₂ sequestration. These findings highlight distinct CO₂ flux patterns across climatic zones and highlight the necessity of zone-specific carbon assessments. Further, detailed investigations are essential to accurately identify the environmental controls governing CO₂ fluxes in tropical freshwater reservoirs, particularly in the context of climate change mitigation and ecosystem management.

Keywords: CO₂ Flux, Tropical Freshwater Systems, Irrigation Tanks

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Tragedy of Centralization and the Evolution of Resource Governance in Village Irrigation Systems of Sri Lanka

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Colonial regimes across the Global South imposed centralized reforms that profoundly altered traditional systems of resource governance; Sri Lanka's Village Irrigation Systems (VISs) were no exception. Using Systematic Literature Review methodology, this study reviewed 115 publications selected through rigorous screening and eligibility criteria to trace the evolution of VIS resource governance and climate adaptation rationales from the pre-colonial period to the present. The analysis reveals that centralized reforms, alongside commercialization trends and socio-economic dynamics, led to erode the integrated landscape governance attributes of VISs, *i.e.* self-governance with polycentric decision making, system-wide adaptation, multifunctionality, local institutions, and commons management, transforming them into paddy-upland semi commercial mixed production systems. Climate adaptation, once embedded within the multifunctional village-tank-cascade landscape, was narrowed to agriculture. The reforms also dismantled communal property regimes, converting regulated commons into *de facto* "open access" resources, resulting widespread overuse and degradation of VIS catchment forests, later reclassified as state forests in the 1980s. This transformation, which was resulted by centralization generated governance challenges, and created multiple vulnerabilities. However, governance responses often involved further centralization, rather than restoring order. Despite Sri Lanka ratifying the United Nations Framework Convention on Climate Change in 1993, which introduced integrated approaches at implementation levels, the "tragedy of centralization" continues to constrain resilience. Hence, this study emphasizes the need to restore integrated landscape attributes embedded into the governance, but with adaptation to present social, institutional and market realities, with policy coherence. Long-term sustainability ultimately depends on the VIS's capacity to remain adaptive and responsive to changing contexts.

Keywords: Centralization, Commons, Governance, Local institutions, Reforms

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Spatiotemporal Linkages between Habitat Quality and Water Quality: A Case Study of Yan Oya, Sri Lanka

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Evaluating the relationships between land-use practices, habitat quality, and water quality is crucial for sustainable river management. This study investigates how agricultural and forest land use influence the spatial and temporal dynamics of habitat quality and water quality in the Huruluwewa catchment of the Yan Oya basin. Field data were gathered monthly (January-June 2025) across 12 selected sampling locations in 50 km river reach from Habarana to Kahatagasdigiliya in Yan Oya, representing upstream-downstream gradients and varying land-use conditions. The water quality index was calculated based on pH, temperature, dissolved oxygen, turbidity, total dissolved solids, and electrical conductivity. Habitat assessments were conducted using the U.S. EPA's Rapid Bioassessment Protocol. Land-use quantification was performed by developing a land-use/land-cover map. Correlation analysis revealed that increases in cultivated land were negatively correlated with the HQI ($r = -0.635$, $p < 0.05$) and WQI ($r = -0.277$, $p < 0.05$), reflecting sedimentation and reduced riparian cover from farming. Forest cover improved HQI ($r = 0.406$, $p < 0.05$) by stabilizing banks and enhancing habitat structure, although it showed no significant effect on WQI. Additionally, habitat and water quality index demonstrated a weak but statistically significant positive correlation ($r = 0.235$, $p < 0.05$) indicating that improvements in habitat quality were accompanied by slight increases in water quality. The six-month dataset provides preliminary evidence of interactions among land use, habitat integrity, and water quality, underscoring the importance of integrated watershed management strategies in agriculturally intensive landscapes. However, a more comprehensive understanding requires long-term monitoring and broader spatial coverage.

Keywords: Habitat quality index, Riparian land use, Water quality index, Agricultural pressure, River health

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Assessment of Rainfall Dynamics in the Hurulu Wewa Irrigation Scheme for Climate-Resilient Water Management

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Understanding rainfall variability is vital for managing water resources and sustaining agriculture in the dry zone of Sri Lanka, where water scarcity poses serious challenges to the farming communities. This study examines rainfall variability, its impact on water availability and agriculture within the Hurulu Wewa Irrigation Division located in the dry zone of Sri Lanka, using a 30-year dataset (1995 to 2024) of daily rainfall from three selected stations, namely Kahatagasdigiliya, Kaudulla, and Nachchaduwa. The analysis focused on spatial and temporal rainfall patterns under the hypothesis that the second half of the study period would exhibit a greater prevalence of positive rainfall anomalies compared to the first half, thereby resulting in less intense drought conditions. The study area includes the major Hurulu Wewa reservoir, several medium and minor tanks, and a key paddy-growing region. Results show that 72% of the study years recorded annual rainfall below 1,750 mm. Among the three stations, Kaudulla recorded the highest long-term average annual rainfall (1,494 mm), while Kahatagasdigiliya recorded the lowest (1,154 mm). Seasonal rainfall follows a unimodal pattern, with the dominant Maha season (September-March) and the much drier Yala season (April-August), emphasizing the critical role of storage tanks in sustaining agriculture during the dry months. The Rainfall Anomaly Index identified 38% of the study years as drier; however, the rejected null hypothesis demonstrated less intense drought conditions leading to a greater occurrence of wetter or near-normal years during the most recent 15 years. Furthermore, the analysis revealed a positive relationship between annual rainfall and the number of rainy days per year.

Keywords: Rainfall, Dry zone, Agriculture, Rainfall Anomaly Index, Dry and wet days

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Development of a Methodology to Assess Hydrological Drought: A study in Kantale Irrigation Scheme, Sri Lanka

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Hydrological drought occurs when there is a significant deficit in the availability of surface or groundwater resources. In river basins or watersheds with water storage facilities, reservoir water storage can be considered as an important indicator to assess the hydrological drought since it indicates the inflow, outflow and usage characteristics. This study introduces a refined methodology for assessment of hydrological drought and a distinct approach was employed to compute the magnitude of storage status of reservoir by making use of daily *Reservoir Active Available Water Storage Percentage* (RAAWSP). An assessment was conducted for the Kantale reservoir classified under major irrigation scheme in Trincomalee District in the Dry Zone of Sri Lanka. Reservoir daily storage, outflow and the nearby rainfall data were obtained from the Department of Irrigation, while Key Person Interviews (KPI) were conducted with irrigation officials to gain insights into the prevailing water management practices. Statistical analyses were carried out in Minitab 17 to test normality and examine the seasonal variability of the data series. The magnitude of storage status of reservoir was used to identify the hydrological drought seasons as validated against outflow and irrigation command area rainfall data. The estimated probabilities of hydrological drought occurrence during *Maha* and *Yala* seasons were 0.34 and 0.37, respectively for the assessment of 1995–2024 period and identified the presence of hidden hydrological drought, characterized by the availability of water in the reservoir that remain inaccessible for utilization for the beneficiaries due to the deficit of outflow. The study offers a new lens to understand the hydrological drought using management perspectives with the reservoir water balance.

Keywords: Reservoir, rainfall, seasonal variability, surface water

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Impacts of Conversion of Rubber to Oil Palm Plantations on Soil Water Dynamics in the Low Country Wet Zone of Sri Lanka

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Conversion of land-use from rubber to oil palm may have implications for soil and water resources. This study investigated the impact of converting rubber plantations to oil palm on soil water storage (SWS) dynamics in the low-country wet zone of Sri Lanka. Volumetric soil water content of multiple soil depths (0-25, 25-50, 50-75, and 75-100 cm) was monitored in three replicates in adjacent 12-year-old oil palm and rubber plantations over December 2022 to March 2024 in *Yatadolawatta* estate, *Mathugama*. Soil water dynamics were assessed by comparing the SWS and change in SWS (Δ SWS) at various depths within the 1 m of soil profile. The mean SWS was higher in rubber grown soils (271.56 ± 21.67 mm) compared to oil palm (214.42 ± 21.66 mm), which was attributed to significantly greater soil organic carbon (0-25 cm) and clay content (0-25, 25-50, 75-100 cm). A net increase in surface SWS, attributed to rainfall recharge, occurred in both land uses, while subsurface layers were depleted by root water uptake. Depletion in the 25-50 cm layer was significantly greater under oil palm, likely due to water uptake by its dense shallow root system. However, the extent of water depletion in the deeper layers (50-75 cm and 75-100 cm) and the 0-100 cm layer showed no significant difference. Conversion from rubber to oil palm did not lead to additional depletion of water in the deeper soil layers studied, indicating no significant impact on groundwater recharge potential. Further research across diverse soils and climates is recommended.

Keywords: Change in water storage, Oil palm, Rubber, Soil water storage

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Biochar Co-composting: A Strategy for Improving Compost Quality

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Use of biochar as a raw material in compost mixture has demonstrated numerous benefits during the composting process and to the end product. Changes in quality parameters in compost made by co-composting with poultry litter (PL) and PL biochar (PLB) were studied. Compost was made using the closed heap method. PLB was prepared by co-pyrolysing PL with (5% w/w) or without (0% w/w) Eppawala Rock Phosphate (ERP). Thus, four types of composts were produced: compost without biochar or PL (C), co-compost with 10% (w/w) PL (C_{PL}), co-compost with 10% (w/w) PLB (C_{PLB}), and co-compost with 10% (w/w) PLB co-pyrolysed with ERP (C_{PLB-ERP}). Composts were characterized for chemical parameters in SLS 1635 using standard laboratory methods. Incorporation of PLB and PLB-ERP has significantly increased the total phosphorus in composts by approximately three-fold compared to C and C_{PL}. Applying biochar enhanced the total potassium content by 33-47%, while also increasing the total Ca and Mg contents ($p < 0.05$). There is no significant variation in Fe, Cu, Mn and Zn contents. Compared to C_{PL}, a significant reduction in total nitrogen content was observed in C_{PLB} and C_{PLB-ERP}. The addition of ERP had led to an increase in total As content in C_{PLB-ERP}, but still within the maximum permissible levels. Notably, biochar application reduced the total Pb content, while other heavy metals did not show significant differences among compost types. When considering quality parameters holistically, incorporation of PLB and PLB-ERP during the composting process enhances the quality of the compost produced.

Keywords: Co-pyrolysis, Eppawala Rock Phosphate, Poultry litter biochar

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Identification and Characterization of Culturable Nitrogen Fixing Cyanobacteria from Rice Fields in the Wet Zone of Sri Lanka

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Cyanobacteria represent a highly diverse group of prokaryotes that thrive in aquatic ecosystems. Due to their nitrogen-fixing capabilities, cyanobacteria are considered as potential biofertilizers for paddy cultivation. This study aimed to isolate and identify culturable nitrogen fixing cyanobacteria in selected rice fields in the Wet Zone in Sri Lanka. Soil samples (0-10 cm) were collected from 13 paddy fields distributed in Gampaha, Colombo, Kegalle, Kalutara, and Galle districts and seven cyanobacterial species were isolated and characterized using morphological traits. Molecular analysis further confirmed their identities as four unicellular species (*Chroococcus*, *Synechococcus*, *Aphanothece*, *Chroococcidiopsis*) and three filamentous species (*Leptolyngbya*, *Phormidium*, *Anabaena*). Among them, *Chroococcus* and *Phormidium* emerged as the most widespread unicellular and filamentous species in the studied paddy fields. All isolates were successfully cultured and maintained in BG11 medium under controlled conditions (28 ± 2 °C, 100 rpm, 2,000 lx light intensity, and a 16:8 light-dark cycle). Laboratory assays confirmed their nitrogen-fixing potential. In addition, pairwise cross-streak method showed that all seven strains were mutually compatible. The findings highlight the diversity and abundance of cyanobacteria in the Wet Zone paddy soils, and results underscore the potential of the isolates as candidates to develop into biofertilizers through further research.

Keywords: Cyanobacteria, Biofertilizer, Diazotrophs, Paddy soil, Wet zone

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Assessing the Resistance Levels of Soil Bacteria for Amoxicillin, Ciprofloxacin, Sulfamethoxazole and Trimethoprim

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Antibiotic resistance makes the control of infectious diseases a challenging task. Due to extensive use of animal-manure containing antibiotic residues and antibiotic-resistant bacteria (ARB), agricultural soils have become a main reservoir of antibiotic resistance genes. Investigating ARB populations in natural-ecosystems, using the established clinical breakpoint concentrations which have been developed considering pathogenic bacteria may overlook species important in antibiotic resistance. This study aimed to determine the threshold levels of amoxicillin (AMX), ciprofloxacin (CIP), sulfamethoxazole (SMT) and trimethoprim (TRM) to screen ARB from soil. Soils were collected at 0-10 cm depth from two intensively cultivated vegetable lands using animal-manure and a forest land. Bacteria were enumerated using pour plate technique on tryptic soy agar (TSA) medium spiked with each antibiotic separately at 0, 1, 5, 10 and 15 µg/mL in three replicates. Total bacterial population in cultivated soils ($5.28 \pm 0.35 \text{ Log}_{10} \text{ CFU/g}$) was significantly higher ($p < 0.05$) than that in forest soil ($3.21 \pm 0.16 \text{ Log}_{10} \text{ CFU/g}$). Spiking TSA with 1 µg/mL of antibiotic, reduced bacterial abundance by 69% to 99%. Cultivated soils had significantly higher ($p < 0.05$) abundance of ARB than in the forest soil. But relative abundance of ARB was higher in forest soil than in the cultivated soils. The abundance of ARB declined with increasing antibiotic concentration in TSA. In all three soils, relative abundance of ARB declined below 1% with 10 µg/mL concentration of AMX, SMT and TRM, and 1 µg/mL of CIP. Thus, these concentrations could be used as threshold levels to screen for respective ARB populations from soil. This knowledge can be used to monitor and prevent spread of antibiotic resistance in soils.

Keywords: Antibiotic resistance, Animal manure, Amoxicillin, Ciprofloxacin, Soil bacteria

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Soil Erosion Assessment in Tea Lands of Nuwara Eliya, Sri Lanka, using the ¹³⁷Cs Tracer Technique

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In Sri Lanka, tea is often grown in slopy lands, which increases the risk of soil erosion. This was to assess the erosion status of selected tea plantations during 2022-2023 in Labookellie, Weddamulla and Frotoft estates. For the reference site, nearby montane forest located in Labookellie was selected. Seventy-two soil samples were collected representing two canopy categories (well-grown VP tea and marginal seedling tea) and two slope classes (0-10% and 50 – 60%). At the reference site, cores were sectioned at 5 cm intervals up to 4 cm depth, while study site sampling comprised 40 cm bulk cores. ¹³⁷Cs activity of soil was measured using a HPGe detector. Soil redistribution rates induced by water erosion were estimated by Mass Balance Model II. Forest area showed a lower soil erosion rate compared to the tea growing areas (p=0.002). Erosion rates were compared using an independent samples t-test, and correlations among parameters were assessed by Pearson correlation analysis. The ¹³⁷Cs inventory for the forest site was 325 Bq/m², and it was for tea lands ranged from 72-290Bq/m² (mean=182.26 Bq/m²). With increasing slope, erosion rates increased, and the slope category of 50-60% showed the highest erosion rate of 30.51 tons ha⁻¹ y⁻¹ with a sediment delivery ratio of 88% in Labookellie. Marginal tea lands had higher erosion (42.94 tons ha⁻¹ y⁻¹) compared to VP fields in Labookellie (p=0.002). Erosion rates showed negative correlations with organic matter (r=-0.7) and exchangeable K (r =-0.75) contents. Soil erosion in Nuwara Eliya tea lands is significantly influenced by slope and canopy cover.

Keywords: Cs-137, Mass Balance Model, Reference site, Soil erosion

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Characterizing Physicochemical Properties and Nutrient Leaching Behavior of Different Coir-Based Substrate Mixtures

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High production costs, limited resource availability, and the underutilization of byproducts such as short fiber have highlighted the need for more cost-effective coir substrate formulations in Sri Lanka. This study evaluated the physicochemical properties and nutrient leaching behavior of four factory-made coir-based substrate mixtures: A (100% coco peat), B (70% coco peat + 30% coco chips), C (80% coco peat + 20% short fiber), and D (60% coco peat + 30% coco chips + 10% short fiber). All mixtures exhibited bulk densities between 0.057 and 0.064 gcm⁻³, with substrate C showing the highest total porosity (40.79%) and highest water retention at 50 cm suction (0.66 cm³cm⁻³). Substrate B, with its coarse texture, had the lowest water retention (0.28 cm³cm⁻³) and the highest air-filled porosity (40.42%). Substrate C had the highest cation exchange capacity (CEC = 46.24 cmol⁺/kg) and an electrical conductivity (EC) of 1.63 dS/m, within acceptable limits (0.5–2.5 dS m⁻¹). A fertilizer-pulse leaching column experiment assessed nutrient breakthrough via nitrate and phosphate concentrations in successive leachate. Relative concentration (RC = C/C₀) vs. pore volumes (PVs) revealed retention patterns. The substrate B showed early breakthrough (0.10 PVs) and high RCs (0.90 for both NO₃⁻, PO₄³⁻), indicating poor nutrient retention. Whereas substrate C had delayed breakthrough (0.40 PVs NO₃⁻, 0.30 PVs PO₄³⁻) and lower RCs (0.70, 0.60 respectively), reflecting better nutrient retention from finer particles and higher CEC. Meanwhile, Substrate D outperformed B but was inferior to A and C. Incorporating 20% short fiber is promising, but further protected trials are needed to confirm agronomic and economic benefits.

Keywords: Coir-based substrate mixture, Breakthrough curves, Water retention, Short fiber

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Effect of Reducing Urea Application on Maize Yield and Stylo Nodulation in a Maize-Stylo Mixed-Stand Forage System

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The influence of reduced urea application on biomass of hybrid fodder maize (*Zea mays* L. cv. Veera) yield and nodulation in stylo (*Stylosanthes guianensis*) in a maize-stylo mixed-stand was investigated. The experiment was conducted as a randomized complete block design with four urea levels; 425, 383, 340, and 0 kg/ha representing 100%, 90%, 80%, and 0% of the recommended rate. All treatments received 100 kg/ha TSP and 50 kg/ha MOP. In field experiment, stylo was sown (410,000 plants/ha) a month before establishment of maize (111,000 plants/ha). The same treatments were applied in a pot experiment. Forage sampling was conducted at the tasseling (VT) and dough (R4) stages of maize. In the field experiment, plant weight (PW) and dry matter yield (DMY) of maize were measured. In pots, stylo root nodules were counted. Regardless of fertilizer treatment, fodder maize reached VT and R4 stages at 8 and 10 weeks, respectively. At R4, maize recorded higher ($P<0.05$) PW (197 ± 12 - 243 ± 2 g/plant) and DMY (10.99 ± 0.64 - 13.50 ± 0.10 MT/ha) than at VT (105 ± 5 - 128 ± 8 g/plant; 5.83 ± 0.30 - 7.12 ± 0.42 MT/ha). Reduced urea application decreased ($P<0.05$) PW and DMY, but no significant difference ($P>0.05$) was observed between 100% and 90% rate at VT (125 ± 3 vs. 128 ± 8 g/plant) or R4 (243 ± 2 vs. 217 ± 8 g/plant). Correspondingly, DMY did not differ ($P>0.05$) at VT (6.97 ± 0.16 vs. 7.12 ± 0.42 MT/ha) and R4 (13.50 ± 0.10 vs. 12.08 ± 0.46 MT/ha). Stylo nodule number increased as urea decreased, with the highest ($P<0.05$) value at 0% urea (394.5 ± 29.5 and 451.7 ± 36.9 nodules/plant at VT and R4). Nodule numbers did not differ ($P>0.05$) between stages. A 10% reduction in urea is feasible without compromising maize fodder yield while enhancing stylo nodulation in a maize-stylo mixed-stand forage.

Keywords: Dough stage, Dry matter yield, Maize-Legume intercropping, Tasseling stage

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Assessment of Nutritional Quality of Lettuce as Affected by Iron- and Zinc-Enriched Nutrient Management Techniques

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This study investigated the effect of Fe- and Zn-enriched nutrient management techniques on the fresh weight, and nutritional qualities, including nitrogen, phosphorus, ascorbic acid, antioxidants, and polyphenols of lettuce (*Lactuca sativa*) using Kjeldahl method, dry ashing technique using colorimetric method, visual titration method, DPPH assay and Folin-Ciocalteu assay, respectively. Furthermore, chlorophylls and carotenoids were analyzed by spectrophotometry. Fe and Zn were applied as FeSO₄ and ZnSO₄, respectively using three nutrient management techniques: nutrimpriming (soaking seeds in a nutrient solution), application to the growth medium, and foliar application. This study was conducted in a completely randomized design with three replicates in each treatment. The data were recorded at the physiological maturity stage. The results were subjected to ANOVA and mean separation using SPSS version 26. A significant ($p < 0.05$) contribution of Fe was observed for the production of carotenoids through nutrimpriming. Furthermore, nutrimpriming enhanced the production of pigments such as chlorophylls and carotenoids in both Fe and Zn applications. A significant increase of ascorbic acid could be observed in foliar application of Fe whereas, it was from the growth medium application for Zn. Foliar application of ZnSO₄ recorded a significant difference in antioxidant capacity of lettuce over other treatments, indicating the effectiveness of foliar applied Zn to increase antioxidant capacity of lettuce. In conclusion, nutrimpriming could improve chlorophylls and carotenoids while growth medium application and foliar application had positive influence on improving ascorbic acid content. A significant contribution of Zn was discovered for the improvement of antioxidants by foliar application.

Keywords: Antioxidants, Foliar application, Hidden hunger, *Lactuca sativa*, Nutrimpriming

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Anatomical, Biochemical, and Physiological Traits Associated with Drought Tolerance in Wild Rice *Oryza rhizomatis* Vaughan

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Water scarcity remains a key limitation in rice cultivation, underscoring the need for drought-resilient rice varieties. *Oryza rhizomatis*, an endemic wild rice species, represents a valuable genetic resource for enhancing drought tolerance in cultivated rice. This study investigated anatomical, biochemical, and physiological traits in two contrasting *O. rhizomatis* accessions, namely drought-tolerant accession-1 and drought-susceptible accession-21, collected from Puttalam and Hambantota, respectively. Sixty-five days after planting, plants were subjected to progressive drought stress in a completely randomized design until completely dry. Sets of plants were maintained as a control. Leaf rolling, a key drought-responsive indicator, was assessed using the Standard Evaluation System developed by International Rice Research Institute, and total phenolic content (TPC) was measured using Folin–Ciocalteu method. Leaf and floret anatomy was studied using a light microscope. Accession-21 exhibited a higher early-stage TPC (32.22 ± 1.77 mg GAE/g) than accession-1, likely reflecting an early oxidative defense, whereas low TPC in accession-1 indicated the tendency of conserving energy for survival by limiting phenolic synthesis. Leaf rolling differentiated drought sensitivity, with delayed rolling (11%) in accession-1 versus complete rolling (100%) in accession-21 after 29 days. Anatomically, accession-1 possessed larger bulliform cells (113.00 ± 26.70 μ m height; 215.67 ± 49.07 μ m width) and thicker lower epidermis (32.37 ± 1.60 μ m; $P < 0.05$), reducing transpirational water loss. Although anther height did not differ significantly, accession-21 showed a taller stigma (5379.2 ± 195.6 μ m) than accession-1 (4415.1 ± 227.9 μ m), suggesting a potential reproductive advantage under stress. Overall, drought tolerance in *O. rhizomatis* is mainly associated with structural and physiological adaptations in accession-1, while accession-21 exhibits rapid phenolic accumulation and accelerated leaf rolling. These observations underscored the potential of the species for developing drought-tolerant rice.

Keywords: Climate change, Drought-tolerance, Leaf anatomy, Polyphenols, Sri Lanka

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An Investigation into the Floral Biology of King-coconut and Developing a Protocol for Artificial Hand Pollination

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King coconut (KC) is an intermediate-type coconut form in Sri Lanka and a popular natural beverage. Despite its importance, floral biology remains largely unresearched. The objective of the present study was to investigate the key floral phases of KC in IL1a and IL3 agro-ecological regions (AERs) of Sri Lanka and to develop a protocol for artificial hand pollination. Seven palms aged 18-20 years were randomly selected per AER. All inflorescences emerging between December 2023 and December 2024 were recorded, totaling 74 in IL1a and 66 in IL3. The duration of the key floral phases of each inflorescence were recorded. A general linear model was employed to compare the two locations. The male phase began simultaneously with spathe opening of the inflorescence and lasted approximately 11-12 days in both regions. The female phase began 5-6 days after inflorescence opening and lasted for approximately seven days in both regions. A five to six-day overlap between the male and female phases was observed, indicating a predominant self-pollination breeding behavior in KC. Notably, the extended female phase over the male phase explains the presence of natural hybrids among progenies produced through open pollination. Based on these results, a stepwise hand-pollination protocol was proposed for KC, involving emasculation, bagging, artificial pollination, and subsequent bag removal. This research enhances knowledge of the reproductive biology of KC and offers guidelines for breeding programs, conservation efforts, and the establishment of seed gardens.

Keywords: Controlled pollination, Female phase, Male phase

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Economic and Environmental Viability of Dairy Cattle Farming in Areas under Tea Plantation: A Case Study in Gouravilla Grama Niladhari Division, Central Province, Sri Lanka

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This study evaluated the economic profitability and environmental sustainability of dairy farming in tea plantation areas, focusing on 96 household dairy farms in the Gouravilla GN Division, representing the entire dairy-farming population in the area. Data were collected through a structured questionnaire and field observations, and analyzed using SPSS with descriptive statistics, Spearman rank-order correlation, Pearson correlation coefficients, and the Kruskal-Wallis test. Economic profitability was estimated using monthly average net income based on Wood's equation-predicted milk yields, farmgate prices, and reported feed and variable costs. Profitability was mainly affected by poor breeding management, unstable milk pricing, and limited herd expansion opportunities. Poor breeding contributed to extended lactation lengths, prolonged calving intervals, reduced milk yields, fewer calves per cow lifetime, and reduced income. Unstable farmgate milk prices controlled by intermediaries' further diminished profitability, as 83.4% of farmers received 140 LKR or less per litre of milk. Monthly average net income positively correlated with number of milking cows ($r = 0.665$, $p < 0.01$) and herd size ($r = 0.320$, $p < 0.01$). However, herd expansion was constrained by limited quality feed, insufficient financing, and land scarcity, with 28.1% of farmers lacking land for pasture. Low awareness of greenhouse gas emissions, manure handling, and animal welfare highlighted environmental sustainability gaps. This study further emphasizes strengthening breeding programs, ensuring fair milk pricing through formal collection, improving feeding based on local resources, and enhancing sustainability awareness are necessary to support profitable and environmentally responsible household dairy farming in tea plantation regions specially in upcountry.

Keywords: Breeding management, Economic profitability, Environmental sustainability, Farmgate milk price, Plantation workers

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Distinguishing Two Morphologically Similar *Rhinacanthus* Species Using Chloroplast Barcoding Regions

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Rhinacanthus flavovirens (Maha Anitta) belonging to the family Acanthaceae, is an endemic species to Sri Lanka. *R. flavovirens* is distributed in North central, Central, Southern and Western provinces in the country. *R. flavovirens* and *R. nasutus* possess a high level of morphological similarity, creating confusions in differentiating between the two species. DNA barcoding is a widely used molecular method for herbal plant identification and authentication, especially when morphological features are not sufficient. Chloroplast barcoding regions *matK*, *rbcL* and *trnH-psbA* have been used for this study. DNA was extracted and quantified using a Nanodrop spectrophotometer before amplification. The amplified fragment lengths for *R. nasutus* were 762 bp (*matK*), 369 bp (*rbcL*), and 333 bp (*trnH-psbA*), while those for *R. flavovirens* were 769 bp (*matK*), 370 bp (*rbcL*), and 364 bp (*trnH-psbA*). The Sanger sequencing showed that, among these three markers *trnH-psbA* showed the highest nucleotide variation (68.46%) whereas *matK* showed the lowest (1.3%). Pairwise genetic distance analysis showed that *R. nasutus* and *R. flavovirens* have closer genetic relatedness for *matK* region (0.0133) and higher divergence in *trnH-psbA* region (1.83). The MEME suite program identified a higher frequency of insertion/deletion events in *trnH-psbA* compared to *matK* and *rbcL*. The result of this study showed that DNA barcoding, particularly using variable region *trnH-psbA*, can effectively distinguish *R. flavovirens* from *R. nasutus*. Future studies incorporating whole chloroplast genome sequencing may provide enhanced resolution for species identification, authentication and phylogenetic analysis.

Keywords: DNA barcoding, *Rhinacanthus flavovirens*, *matK*, *rbcL*, *trnH-psbA*

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Paddy Husk Adulterated Rice Bran in Broiler Diets: Impact on Growth Performance, Nutrient Digestibility and Gut Health

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This study evaluated the impact of dietary inclusion of paddy husk-adulterated rice bran on growth performance, nutrient digestibility, and the occurrence of intestinal lesions in broiler chicken. Five isoenergetic and isonitrogenous diets were formulated: a corn-soy-based control diet containing unadulterated rice bran and four diets containing rice bran adulterated with paddy husk at 3% (3PH), 5% (5PH), 8% (8PH) and 10% (10PH). One hundred and twenty Cobb 500, one-day old chicks were randomly fed with one of the five experimental diets (n=4 and 6 birds per replicate). The birds were provided with *ad libitum* water and feed for 35 days. Growth performance, relative organ weights and lengths, ileal dry matter digestibility and occurrence of small intestine lesions of the birds were assessed. Body weight gain (1483-1710 g per bird), feed intake (3137-3210 g per bird), and feed conversion ratio (1.86-2.19 g/g), showed no significant differences among dietary groups ($P>0.05$). Apparent ileal dry matter digestibility was also not significantly affected by the diets ($P>0.05$). Carcass yield and breast muscle yield remained unaffected, though gizzard and caecum weights were higher ($P<0.05$) in birds fed 8PH compared to those fed control diet, suggesting enhanced digestive function. Notably, birds fed 3PH reduced duodenal lesion odds (OR = 0.020, $P<0.05$), indicating a protective effect on gut integrity, while higher levels (5PH, 8PH and 10PH) showed no impact on intestinal lesions ($P>0.05$). In conclusion, rice bran adulterated with up to 10% paddy husk can be included in broiler diets without impairing growth performance or nutrient digestibility.

Keywords: Broiler chicken, Paddy husk adulteration, Rice bran, Growth performance, Nutrient digestibility

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Factors Contributing to the Adoption of Recommended Dairy Management Practices among Small-scale Dairy Farmers in Sri Lanka

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Sri Lanka continues to face a shortfall in dairy production, despite its high livestock production potential. Understanding the production environment of dairy farmers, is essential for enhancing productivity. Therefore, this study was designed to identify factors contributing to the adoption of recommended management practices. The study employed a cross-sectional research design and a quantitative research method. The study was conducted in the Central Province and utilized a questionnaire as the research instrument. A total of 393 small-scale dairy farmers were selected using a multistage sampling method. Adoption of Recommended Management Practices was assessed, based on breeding and reproductive management, feed and fodder management, and clean milk production. The conceptual model was developed by integrating the Unified Theory of Acceptance and Use of Technology, the Theory of Planned Behavior, and the data, information, knowledge, and wisdom framework. Data were collected on demographics of dairy farmers, knowledge, attitude, performance expectancy, effort expectancy, social influences, facilitation conditions, voluntariness, intention to adopt, and adoption of recommended management practices. Partial Least Squares Structural Equation Modeling was employed to analyze the structural relationships between multiple variables. Results revealed that knowledge, effort expectancy, social influence, facilitating conditions, voluntariness, and adoption intention significantly contribute to the adoption of recommended dairy management practices. These findings highlight the need of government interventions to enhance facilitating conditions and leverage social influence for improving national dairy productivity.

Keywords: Adoption, Dairy, Management practices, Sri Lanka

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Effect of Dietary Supplementation of Yeast Fractions (Safmannan®) on Growth Performance and Nutrient Digestibility in Broiler Chickens Fed Adulterated Rice Bran

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This study investigated the effects of dietary supplementation of yeast fractions (Safmannan®) on growth performance and nutrient digestibility in broiler chickens fed rice bran adulterated with paddy husk. A total of 96 one-day-old Cobb 500 broiler chicks were randomly allocated to four treatment groups (n = 4 replicates, 6 birds per replicate) and fed one of four isonitrogenous and isoenergetic diets: T1 – corn-soybean-based control diet, T2 – control diet + 0.05% Safmannan®, T3 – control diet + paddy husk adulterated rice bran, and T4 – control diet + paddy husk adulterated rice bran + 0.05% Safmannan®. Growth performance was assessed weekly, and ileal nutrient digestibility was evaluated on day 33. At the end of the 35-day feeding period, carcass yield, breast muscle yield, and weights and lengths of digestive organs were measured. Dietary supplementation with 0.05% Safmannan® (T2) increased ($P < 0.05$) the final body weight (1691 g per bird), weight gain (1651 g per bird), and improved the feed conversion ratio (1.36 g/g). Inclusion of paddy husk adulterated rice bran (T3) reduced ($P < 0.05$) the growth performance, while the combination of Safmannan® with paddy husk (T4) showed partial recovery. Safmannan® supplementation also improved ($P < 0.05$) the carcass yield (72%), breast muscle percentage (32%), and digestive organ development when fed paddy husk adulterated diets. Apparent ileal dry matter digestibility was higher ($P < 0.0001$) in T2 (82%), with the lowest values observed in T3 (75%). Safmannan® supplementation enhanced growth performance and nutrient digestibility, while mitigating the adverse effects of adulterated rice bran in broiler diets.

Keywords: Broiler chicken, growth performance, nutrient digestibility, yeast postbiotics

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Determinants of Adaptive Capacity in Climate-Stressed Dairy Systems: A Bayesian Model Averaging Case Study from Mullaitivu District, Sri Lanka

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Understanding the determinants of adaptive capacity is vital for enhancing the sustainability of dairy farming systems in climate-stressed tropical drylands. This study investigates the factors influencing the adaptive capacity of dairy cattle farmers in the Mullaitivu District, a heat-stressed and climate-vulnerable region in northern Sri Lanka. Primary data were collected from 391 cattle-farming households across six Veterinary Service ranges. A weighted Adaptive Capacity Index (ACI) was constructed using 14 parameters grouped into seven components—socio-demographics, education, economy, animal husbandry, awareness, food security, and sanitation. Factor analysis ($|\text{loading}| \geq 0.30$) provided data-driven weights, and Bayesian Model Averaging (BMA) was applied across 64 possible model combinations to address model uncertainty and identify the most credible predictors. Six explanatory variables—farmer age, number of improved cattle, crop diversification, nature of farming, distance to grazing land, and freshwater salinity—were analysed. Crop diversification (PIP = 1.00) and farmer age (PIP = 0.9875) emerged as the strongest positive determinants, underscoring the importance of livelihood diversity and experience in coping with climatic stress. Access to grazing land (PIP = 0.6670) and improved cattle (PIP = 0.4260) also showed positive effects. In contrast, freshwater salinity (PIP = 0.6469) had a consistently negative impact and exhibited strong negative jointness with crop diversification (−6.99), suggesting that diversified systems can buffer the effects of salinity. The nature of farming (PIP = 0.5441) showed a modest negative association. Results, confirmed through robust OLS estimation, emphasize integrating water-quality management and diversified farming strategies into climate adaptation policies for livestock-dependent dry land communities.

Keywords: Cattle farmers, Climate adaptation strategies, Dryland livelihoods, Factor analysis weighting, Model uncertainty

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Lactation Curve Modelling for Dairy Cattle Genotypes in Different Agroclimatic Zones and Management Systems in Sri Lanka

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Lactation curve modelling allows for the estimation of individual cow's lactation yield over time, supporting improvements in herd management, genetic selection, and overall productivity and profitability. In local context, evaluating and comparing different lactation models is essential to identify the most appropriate one under varying genetic, environmental, and management conditions in Sri Lanka, as these factors significantly influence lactation performance. This study compared six non-linear lactation models namely Wood, Brody, Gaines, Dijkstra, Wilmink, and Rook, to select the best fit model for dairy cows. Data included 39,198 test-day milk records from 2,976 cows across five parity levels and six genotypes (Friesian, Jersey, Sahiwal, and their crosses), reared under intensive and semi-intensive systems across four agro-climatic zones of up-country wet zone, up country intermediate zone, low country intermediate zone and low country dry zone. In total, 24 genotype-management-environment combinations were analysed. Model parameters were estimated using non-linear regression (PROC NLIN in SAS software) for each group. The goodness of fit was assessed using coefficient-of-determination (R^2), mean-square-error (MSE), Akaike's-information-criterion (AIC), and Bayesian-information-criterion values (BIC). Wilmink and Rook had nearly linear curves, leading to unrealistic predictions and poor fit for all scenarios. Late-lactation yield was also underestimated consistently by Gaines, and unsuitable for long-term milk yield forecasting. Brody model demonstrated a moderate suitability for purebreds, while the Wood was performed well in early lactation but significantly overestimated peak yield, therefore, unsuitable for practical application. Due to the best fit provided, Dijkstra model can be recommended for all scenarios with further cross validations on other scenarios.

Keywords: Lactation curve model, Non-linear regression, Dijkstra model

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Contribution of Daily Diet for Non-communicable Disease Risk Factors: A Pilot Study Conducted in Minuwangoda Divisional Secretariat Division, Sri Lanka

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Non-communicable diseases (NCDs) such as cardiovascular diseases, diabetes, and hypertension are growing public health concerns in Sri Lanka, closely linked to dietary habits. The Ministry of Health Sri Lanka implemented a traffic light colour coding system to reduce NCDs risk factors such as salt, fat, and sugar. This pilot study aimed at examining the daily consumption of salt, sugar, and oil against recommended intakes in Minuwangoda Divisional Secretariat. A cross-sectional survey from March to October 2023 involved 54 randomly selected families, using interviewer-administered questionnaires and 24-hour dietary recalls. Results showed that 94.4% of households used coconut oil for cooking, reflecting traditional dietary patterns. Despite its cultural significance, the highly saturated fatty acid content of coconut oil raises cardiovascular risk concerns. World Health Organization (WHO) recommends fat intake not exceeds 30% of total energy, while actual fat intake averaged 44.17 g (19.63% of total energy), below this limit. Average salt intake was 6.5 g per day, exceeding the WHO's 5 g recommendation ($p < 0.05$), suggesting that excess salt contributes to hypertension and related NCDs. Conversely, free sugar intake averaged 17 g daily, below Sri Lanka's Ministry of Health limit of 25 g (6 teaspoons), indicating free sugar is less likely to be a major NCD risk factor in this population. However, Sri Lankans typically having a carbohydrate rich diet, sugar derived from that main diet was not included. These findings highlight that traditional diets combined with excessive salt intake still as a public health challenge and underscore the need for culturally sensitive nutrition education and policies focused on reducing salt and promoting healthier fats to reduce NCD risk. Further research on the national level is needed to validate these findings and guide broader NCD prevention efforts.

Keywords: Non-communicable diseases, Oil, Salt, Sugar

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Effectiveness of a Social Media-Based Nutrition Education Program in Promoting Awareness of Low Glycemic Index Foods among Urban Working Women in Sri Lanka

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Department of Research and Development, CIC Dairies, Dambulla, Sri Lanka Low glycemic index (GI) carbohydrate-based foods help regulate blood glucose level and reduce the risk of non-communicable diseases, particularly diabetes. However, urban educated working women in Sri Lanka lack awareness and consistent use of these foods. This study assessed their knowledge, attitudes, and dietary practices regarding low GI carbohydrate-based foods, and evaluated the effectiveness of a social media-based nutrition education program. In the first phase, a descriptive cross-sectional survey was conducted among 758 educated working women across major urban areas using stratified sampling. Validated questionnaires were shared through WhatsApp, email, and Facebook. The findings showed low knowledge (mean:5.33/10) and poor dietary practices (mean:25.99/48), but attitudes were generally positive (mean:66.26/80). Statistical analysis revealed a moderate positive relationship between knowledge and attitudes, and a weaker but significant relationship between knowledge and practices. Higher knowledge was associated with younger women and those with postgraduate qualifications. Similarly, better attitudes and practices were linked to higher education and income levels. In the second phase, a three-month educational program was launched through YouTube and Facebook, featuring videos, infographics, and interactive posts. Post-intervention evaluation among 50 participants showed significant improvements in knowledge (mean:9.94), attitudes (mean:78.74), and practices (mean:46.46). Participants rated the content as clear, relevant and high in quality. These findings suggest that well-structured social media-based education is an effective and scalable approach to promote healthy eating habits and lower the risk of diet-related chronic diseases in urban populations.

Keywords: Knowledge, Dietary Practices,

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Prevalence of Musculoskeletal Disorders Among Tea Plantation Workers: A Systematic Review and Meta-analysis

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Musculoskeletal disorders (MSDs) represent a considerable health concern for tea plantation workers, and attribute to physically demanding tasks involving bending, lifting, and repetitive motions in work undertaken by women as pluckers. The work conditions adversely affect worker health, resulting in absenteeism and lower productivity. Addressing MSDs is essential for enhancing worker health, wellbeing and ensuring the sustainability of tea industry. This study evaluated the prevalence of MSDs among tea plantation workers, identified the most affected body regions, and assessed the influence of factors such as gender and land type on the prevalence of MSDs. A systematic review and meta-analysis were performed in accordance with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The methodology comprised of a structured database search, screening, eligibility assessment, and quantitative synthesis of data from 23 observational studies across eight countries. Prevalence rates were pooled through a random effects model, which was chosen over a fixed-effects model, because studies considered varied in geography, population characteristics, and methods, requiring an approach that accounts for between-study heterogeneity. Variability was evaluated using Cochran's Q test and I^2 statistics. Meta-regression found the factors that affect rates of musculoskeletal disorders, and the subgroup analyses detected the affected body regions and worker characteristics. The prevalence of MSDs among tea plantation workers was 76.5% (95% CI: 66.34%–85.36%) exhibiting considerable variability ($I^2 = 97.6\%$, $p < 0.0001$). The lower back was the most 76.02%) affected region followed by the neck (45.04%) and the shoulders (40.60%) regions. The prevalence among female workers was 83.82%, exceeding that of male workers. Geographical differences were apparent, with Bangladesh (84.3%) and Iran (83.5%) exhibiting the high rates. The results highlight the necessity for ergonomic interventions and mechanised harvesting to alleviate physical strain on workers. These findings emphasise the importance of gender-sensitive ergonomic interventions to address the high prevalence of MSDs among tea plantation workers.

Keywords: Musculoskeletal disorders, tea plantation labours, prevalence, ergonomic interventions, gender discrepancies.

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The Effect of Customer Service Quality on the Satisfaction and Loyalty of Mobile Broadband Customers

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The corporate marketing environment has gotten competitive and dynamic. Marketers face the challenge of capturing a larger market share. Securing and retaining loyal customers is critical in achieving a competitive advantage for organizations. This study has examined how the customer service quality affects customer satisfaction and loyalty in the telecommunication sector. Study has also examined the effect of the corporate image on customer retention of organizations. It has further examined the mediation effect of customer satisfaction to the relationship between service quality and customer loyalty. Study has employed a deductive research approach, applying quantitative methods. Colombo district, having the highest mobile broadband subscribers in the country, was selected for the study. A sample of 420 smartphone users in ten divisional secretariat divisions in Colombo district was surveyed using a questionnaire. Descriptive and inferential analyses were employed. Study indicated a significant impact of age and education level on customer satisfaction. Service quality dimensions of tangibility, reliability, assurance, and empathy had a significant effect on customer satisfaction. Age of the customer, service experience, service quality dimensions of assurance, and empathy indicated a significant effect on customer loyalty. Findings also indicated a positive effect of the corporate image on customer loyalty. Customer satisfaction has a mediatory effect on the relationship between the service quality and loyalty of mobile broadband customers.

Keywords: Service quality, Customer satisfaction, Customer loyalty, Corporate image

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Assessment of Antioxidant Profile and Vitamin C Content in Commercially Cultivated Berries in Sri Lanka and their Processed Jams

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Berries are recognized for their high antioxidant capacity and vitamin C content, which contribute significantly to human health. In Sri Lanka, the commercial cultivation of blackberry (*Rubus fruticosus*), blueberry (*Vaccinium corymbosum*), raspberry (*Rubus idaeus*), and strawberry (*Fragaria ananassa*) is expanding; however, limited information exists on their nutritional properties and the effect of processing. This study assessed the antioxidant activity, total phenolic content (TPC), total flavonoid content (TFC), and vitamin C content of fresh berries and their jams processing. Freeze-dried berry and jam extracts were analyzed using DPPH, FRAP, and ABTS assays, while vitamin C was quantified by redox titration. Data were expressed as mean $\pm$ SD (n=3) and analyzed using one-way ANOVA with Tukey's HSD ($p < 0.05$). Results demonstrated that processing significantly reduced the antioxidant and vitamin C content of all berries, though the magnitude varied by fruit type. Fresh raspberries showed the highest DPPH (584.10 ± 14.35 μ mol TE/100g). Interestingly, FRAP activity increased in blackberry jam (169 ± 3 μ mol TE/100g) compared to fresh blackberries (129 ± 6 μ mol TE/100g), suggesting the formation of heat-stable antioxidant compounds during processing. Similarly, raspberry jam (936 ± 42 μ mol TE/100g) displayed elevated ABTS activity despite a marked decline in vitamin C, indicating contributions from non-ascorbic antioxidants. Among compositional parameters, TPC was highest in fresh blueberries (734 ± 13 mg GAE/100g), TFC in fresh blackberries (209.12 ± 6.03 mg QE/100g), and vitamin C in fresh strawberries (67.36 ± 1.51 mg/100g). Jams generally contained lower levels of all measured parameters. These findings highlight that processing markedly alters the antioxidant and nutritional profiles of berries and the importance of optimizing processing conditions to preserve bioactive compounds in berry-based products.

Keywords: Antioxidant activity, Berries, Jam processing, Nutritional quality, Vitamin C

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Development and Validation of a PostgreSQL-Based Framework for Field-Level Data Collection to Assess Multidimensional Postmenopausal Obesity and Associated Health Complications

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Postmenopausal obesity is a complex health issue influenced by anthropometric, nutritional, biochemical, and psychological factors. Healthcare professionals face challenges due to heterogeneous data collection and reporting standards. To address this, the present study developed and piloted a digital data management system using PostgreSQL enabling support multidimensional analysis of postmenopausal obesity. The system includes a relational database for patient demographics and health metrics to store across five domains. Data entry forms designed for effective field data collection, with real-time access, secure storage, and role-based access controls to maintain data integrity and confidentiality. Data stored in PostgreSQL was analyzed using R built in R-Studio. R facilitates statistical computations among variables. A mobile application, developed using Flutter integrated with PostgreSQL database was used to present selected research findings and to collect novel data in both clinical and community settings. Preliminary testing was conducted using secondary datasets on nutrition, physical activity, and obesity sourced from Kaggle. The Center for Disease Control (CDC) was used to validate the usability, scalability, and reliability of the system through validation techniques reinforced by Structured Query Language domain, entity and referential integrity constraints, ensuring data accuracy and validity. The framework integrates modules for anthropometry, dietary intake, biomarker profiling, and psychological assessments, forming the basis for a predictive model based mobile decision support system that facilitates early intervention and management of postmenopausal obesity. Key features include legacy systems compatibility, external repository connectivity, and efficient data management. Future development will focus on predictive model integrated mobile application 'PostMeno360' for effective digital transformation in Sri Lanka's healthcare system.

Keywords: Digital Health Data Collection, Multidimensional Health Assessment, PostgreSQL Framework, Postmenopausal Obesity

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Use of Marketed Ayurvedic/Herbal Products in the Management of Prediabetes, Diabetes, Hypertension and Hyperlipidaemia among Sri Lankan Communities: An Online Survey

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Diabetes, prediabetes, hypertension, and hyperlipidaemia are among major public health concerns in Sri Lanka. Complementary and alternative therapies, particularly herbals are commonly used for these non-communicable diseases (NCDs). This study aimed to examine the types, frequency, and patterns of Ayurvedic/ herbal remedy usage in managing NCDs among Sri Lankans, while assessing sociodemographic influences. It was anticipated that cultural familiarity and perceived safety would drive a high reliance on home-based remedies compared to the marketed products. A descriptive cross-sectional study was conducted using an online questionnaire distributed via social media. A total of 747 Sri Lankans aged above 18 were recruited, representing a nationwide coverage. Data were analysed using descriptive statistics, chi-square tests, and thematic analysis. Among the respondents 71.2% reported at least one immediate family member with an NCD, with the highest prevalence observed among individuals above 60 years (61.42% diabetes, 57.54% hypertension, 52.37% hyperlipidaemia, 6.47% prediabetes). Prevalence was high in urban populations (51.72% diabetes, 44.54% hypertension). Approximately 60% of respondents relied exclusively on home-based remedies, while 20% used only marketed Ayurvedic products. Frequently used remedies included *Costus* spp., curry leaves, garlic, *Osbeckia octandra* and *Coccinia grandis*. Usage of remedial measures was influenced by affordability, cultural familiarity, and lower toxicity. Barriers included limited awareness, preparation challenges and difficulties in finding rare herbs. Many consumed these products as teas/ powders, often alongside conventional treatments. These findings highlight a cultural preference for home-based remedies and relatively low uptake of marketed products, underscoring the need for awareness campaigns, improved standardization, and integration of safe herbal practices within healthcare systems.

Keywords: Natural remedies, consumption pattern, diabetes, hypertension, non-communicable diseases

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An Assessment of Career Prospects of Graduates from the Faculty of Agriculture, University of Peradeniya, Sri Lanka.

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The study aimed to track year-over-year changes (2022-2023) in graduate employment and education, and understand the overall career profile of graduates of the Faculty of Agriculture, University of Peradeniya. Data were collected via separate questionnaire surveys targeting two groups: 40 respondents to the previous tracer study, and 510 graduates from the two most recent batches. This allowed for a comparison with the previous year's tracer study, enabling the analysis of changes during the year. Descriptive statistics and mean comparisons were conducted for the analysis. The results revealed a noteworthy change in income fluctuations, with 59% reporting an increase and 15.4% a decrease. Employment changes were reported by 28.2%, predominantly to permanent positions, with graduates securing jobs in both public (46.9%) and private (40.6%) sectors. Additionally, 36.8% of respondents reported changes in educational qualifications. Overall job satisfaction was positive, though with some dissatisfaction with compensation and opportunities. Specifically, 83.7% of the recent graduates secured their first employment within an average of 20 weeks. A significant ($P < 0.05$) gender difference was found, with female graduates taking longer to secure the first job and male graduates securing higher salaries. Academic performance showed a positive impact on salary. Recommendations for improvement include enhancing research and industry exposure. The study also suggests conducting regular tracer studies to investigate areas such as first employment and employer perspectives on graduates.

Keywords: Career Development, Higher Education, Tracer Study, Undergraduates,

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Seasonal Flooding and Its Impact on Growth and Latex Yield of Rubber (*Hevea brasiliensis*) in Kalutara District, Wet Zone of Sri Lanka

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Rubber plantations extend over large areas in the Wet Zone, where unprecedented annual rainfall often causes seasonal flooding. The rubber plantations in low-lying areas and at riparian sites are therefore more prone to damage and growth retard due to frequent floods. This study investigated the impact of seasonal flooding on immature and mature plantations in Kalutara District in 2024 - 2025. Field experiments were conducted in a 2-year-old immature and a 13-year-old monoclonal mature fields, alongside a survey in smallholder fields in an affected area. In the immature fields, growth parameters including stem girth, leaf count, stomatal conductance and chlorophyll content were periodically recorded. In mature fields, latex yield, bark thickness, bark consumption, and tapping panel dryness were assessed under fully, partially, and non-flooded field conditions. Random sampling and a RCBD design were applied for immature and mature field experiments, respectively. ANOVA and chi-square/t-tests used for SAS analysis. Flood-affected immature plants showed significant ($p < 0.05$) reductions in girth, leaf number, and chlorophyll, with growth decreasing by 25%. In mature trees, latex yield, bark thickness, and bark consumption were significantly reduced under fully and partially flooded conditions compared to non-flooded controls. Survey results further indicated interactions of flood severity and duration with plantation proximity to water bodies. Overall results demonstrate that seasonal flooding imposes severe constraints on both growth and latex yield of rubber, highlighting the need for adaptive land-use planning, careful site selection, and effective flood-mitigation strategies for sustainable cultivation.

Keywords: Flood, Growth, *Hevea*, Rainfall, Yield

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Knowledge and Perceptions of Food Misconceptions and Facts: A Study among a Group of Sri-Lankan Adults in the *Puttalam* District

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Food choices significantly impact on the health and well-being of people. Despite the increasing availability of nutrition related information, food myths remain widespread among adults, potentially influencing dietary behaviors, nutritional status, and the risk of chronic diseases. This cross-sectional survey aimed to investigate the knowledge and perceptions (KP) of a sample of adult Sri-Lankans in Puttalam District regarding a series of food myths and facts. Sixty-five adult participants were recruited (32 males and 33 females, aged 25-50yrs, Sinhalese, Tamils and Muslims) using an interviewer administered questionnaire. Each participant was directed to respond to 30 KP-testing statements in 5-point Likert scale ranging from strongly disagree to strongly agree (+2, +1, 0, -1, -2 scores for very correct, correct, no idea, incorrect and very incorrect responses respectively). The results showed that 69% of participants scored poor KP (scoring- 0 to negative values) and 31% of them scored high KP (scoring positive values). More than 90% of participants believed drinking a glass of water with lemon and honey helps in weight loss, drinking hot water after having a meal will remove fat from the body, spinach is rich in iron compared to other green leaves and eating more carrots will improve the eyesight. Only 6 out of 30 thirty statements were correctly scored by the majority. It was concluded that the study sample had poor nutritional KP, that needs to be debunked, to promote good nutrition among adults.

Keywords: Food myths, Health, Nutritional knowledge, Perception, Sri-Lanka

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An Integrated Performance Index for Irrigation Schemes in Sri Lanka: An Interdisciplinary and Sustainable Approach

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Irrigated agriculture is vital for Sri Lanka's food security but faces growing sustainability pressures from population growth and limited water and land resources. Therefore, assessing and improving the performance of existing irrigation schemes is a crucial, cost-effective strategy. However, most performance assessments use mono- or multidisciplinary approaches that fail to capture the complex and interconnected nature of these systems. To address this gap, a generic, interdisciplinary composite index was developed, prioritizing simplicity, traceability, and interpretability. The index conceptualizes a scheme as two subsystems: the 'Water Delivery System' (includes all activities and components from water sourcing to field delivery) and the 'Agricultural Production System' (includes all activities and components from field application, to crop output and benefit distribution). The index incorporates 26 input, process, and output indicators covering technical, managerial, economic, environmental, and social dimensions. All indicator values are normalized on a 0–100 scale to ensure comparability. The relative importance of indicators in each subsystem is identified using the Analytic Hierarchy Process (AHP) through expert judgment. To obtain the final score for the index, both weighted additive aggregation and weighted geometric methods are used. Based on this score, schemes are classified into one of four performance levels: Poor (<50), Average (50-70), Good (70-90), or Excellent (>90). To demonstrate its utility, the index was applied to a simulated dataset, yielding an overall score of 79 ('Good'). The developed index is a valuable tool for identifying strengths and weaknesses of schemes, comparing schemes across different contexts, and guiding decision-making for future improvements.

Keywords: Composite index, Irrigation scheme performance, Performance assessment

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Transforming Social Inclusion through Emotional Intelligence and Human Flourishing: The LUVORA Paradigm in Agriculture

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Amid increasing calls for equity in agri-food systems, the empowerment of marginalized farmers, especially women and socially excluded groups, requires not only economic interventions but also emotional and psychological transformation. This study introduces the LUVORA framework, a love-based, values-driven model grounded in Positive Psychology, as a novel approach to fostering farmer empowerment and social inclusion. LUVORA, representing Love, Uniformity, Virtue, Openness, Resilience, and Acceptance, was conceptually applied to rural farming communities in Sri Lanka and India to explore how emotional safety, empathy, and connection can catalyse sustainable change. Using a narrative review methodology, the study synthesizes over 32 peer-reviewed articles published between 2005 and 2024 from Scopus, Web of Science, and AGRIS, focusing on affective inclusion, emotional resilience in agriculture, and gender-responsive interventions. Studies lacking a human-centred approach or focusing solely on technological solutions were excluded. Key findings reveal that cultivating emotional intelligence, compassion-based leadership, and relational trust significantly improve women's participation, farmer well-being, and social cooperation in agri-food systems. By aligning human flourishing with sustainable agricultural practices, the LUVORA model promotes a more emotionally inclusive culture of empowerment. This research advocates integrating psychosocial training modules based on LUVORA into agricultural extension programs, rural women's collectives, and Agri-leadership training initiatives. In doing so, it reimagines farmer empowerment not merely as a matter of productivity, but as a profound act of love, healing, and collective upliftment.

Keywords: Farmer empowerment, Love-based interventions, Social inclusion, Gender equity, LUVORA model

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Beyond Tariffs: Assessing the Role of Import Efficiency in Sri Lanka–Singapore Trade Liberalization

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This study evaluates the economic impacts of the Sri Lanka–Singapore Free Trade Agreement (SSLFTA) using a computable general equilibrium (CGE) framework via the Global Trade Analysis Project (GTAP) model. The analysis focuses on both tariff liberalization and reductions in non-tariff barriers (NTBs) through improvements in import efficiency, with particular attention to machinery and paper product imports, sectors strategically linked to Sri Lanka’s industrial and service activities. Four policy scenarios were simulated: tariff reduction in machinery, import efficiency improvement in machinery, tariff reduction in paper products, and import efficiency improvement in paper products. Simulation results demonstrate that import efficiency gains, particularly in the machinery sector, generate substantially larger benefits for Sri Lanka than tariff reductions alone. A 50% improvement in machinery import efficiency increases Sri Lanka’s GDP by US\$196.45 million, with significant gains in trade, industrial output, welfare, and consumer prices, driven mainly by allocative and technical efficiency. Tariff reductions produce only modest impacts, while efficiency improvements in paper products yield limited gains, reflecting lower technological intensity and weaker global linkages. Singapore also experiences positive welfare and trade effects, though smaller due to its advanced trade infrastructure. The findings underscore the critical importance of addressing behind the border trade costs, including customs delays, regulatory bottlenecks, and procedural inefficiencies. Policy priorities should therefore focus on trade facilitation, customs modernization, and infrastructure upgrades, especially in capital intensive sectors, to enhance competitiveness and integration into global value chains. These results reinforce global evidence that NTB reforms often deliver greater welfare gains than tariff liberalization, offering actionable insights for optimizing the SSLFTA’s long-term economic benefits.

Keywords: Liberalization, General Equilibrium, GTAP, Non-Tariff Barriers

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Cultivating Empathy: A Love-Informed Framework for Gender-Inclusive Farmer Empowerment

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While agricultural reforms have prioritized technology and productivity, such approaches often neglect the affective and relational dimensions essential for true empowerment. This study proposes a love-informed psychological framework rooted in the LUVORA model; Love, Uniformity, Virtue, Openness, Resilience, and Acceptance, to explore how empathy and emotional intelligence can drive gender equity and social inclusion within farming communities. Using a narrative synthesis of twenty-one peer-reviewed studies drawn from an initial pool of seventy-three records published between 2008 and 2024 across Scopus, AGRIS, and Web of Science, the paper integrates interdisciplinary insights from Positive Psychology, gender studies, and rural development. The synthesis reveals that emotional safety, self-worth, and communal empathy are decisive catalysts for women's agency in decision-making, leadership, and access to resources. The LUVORA framework operationalizes love not as sentimentality but as a transformative psychological force capable of nurturing shared dignity, collective resilience, and inclusive engagement. The study concludes that integrating empathy workshops, peer storytelling circles, and compassionate leadership training into agricultural extension systems could reframe farmer empowerment as a holistic pursuit of emotional justice and human flourishing rather than a purely economic or functional agenda.

Keywords: Love-informed empowerment, LUVORA framework, Gender inclusion, Emotional intelligence, Rural development

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Detection of Adulterants in Pepper Powder Using Microscopic Imaging: A Cost-Effective Approach for Food Safety

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High-value pepper-based products are intentionally adulterated with papaya (*Carica papaya*) seeds, chilli (*Capsicum annuum*) seeds, and West Indian Lantana (*Lantana camara*). Therefore, the development of a cost-effective and efficient detection system is useful for the spice industry. The plant materials possess its own unique microscopic image fingerprint. Phase contrast microscopes can differentiate those features based on their refraction indices. A total of 5,625 images were collected from 29 samples across 5 adulterated classes. They were split as follows: 3,375 images (60%) for training, 1,125 images (20%) for validation, and 1,125 images (20%) for evaluation. TensorFlow deep learning models (InceptionV3, Inception ResNetV2, ConvNeXtLarge, Xception, VGG-19, and ResNet-50) were used as the backbone. While Google Colab was used for processing images and model training and evaluation activities. The Adam optimizer and categorical cross-entropy were used as a loss function. Categorical Accuracy, Precision, F1Score, False Negatives, False Positives, True Negatives, and True Positives were used to evaluate the trained models. Fine-tuning with learning rates 0.001 and 0.0001 was used for model training. According to the results for evaluation matrices, InceptionV3, Xception, and ResNet-50 showed superior performances in differentiating adulterated pepper powder from genuine pepper powder. Over fitting was identified when increasing the number of training epochs at lower rates, because of challenges in whole image labelling and the training of layer-wise convolutional neural networks. To avoid those limitations, image segmentation and selective hierarchical neural network layer fine-tuning can be implemented. In conclusion, microscopic image-based techniques can be applied to detect authentic pepper powder from adulterated pepper powder.

Keywords: Food Authenticity, Image Classification, Phase Contrast Imaging, Transfer Learning

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Development of a Comprehensive Water Conservation Index for Hurulu Wewa Irrigation Scheme, Sri Lanka: An SDG-Aligned Assessment

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This study aims to develop a comprehensive Water Conservation Index (WCI) for the Hurulu Wewa Irrigation Scheme in Sri Lanka's Dry Zone to assess water conservation performance in line with the Sustainable Development Goals (SDGs). Although water conservation is a key priority in the scheme, a quantitative framework to assess performance across seasons and years is lacking. This study addresses this gap by introducing a structured approach to evaluate and monitor water conservation performance comprehensively. The framework is based on climate-smart irrigation, integrated water resources management, and sustainable agriculture principles, aligned with SDGs 2, 6, 12, and 13. An index-based evaluation method was applied using data from 2013–2022. Indicators were identified through an extensive literature review and field observations. They were classified under four main domains: Reservoir Performance and Utilization, Irrigation Efficiency and Water Productivity, Climatic and Rainwater Utilization, and Community and Institutional Engagement. The Analytic Hierarchy Process (AHP) was used to assign weights within domains and to integrate them into the final WCI, combining the expert judgments. Results showed that the Yala season consistently recorded higher WCI values (0.55–0.75) than the Maha season (0.20–0.70), mainly due to lower irrigated areas, carryover water use, and crop diversification. Maha season values fluctuated with irregular rainfall, high water demand, and operational stress. After 2020, both seasons exhibited a downward trend. The developed index enables monitoring of seasonal performance, supports sustainable water management, and encourages farmers to adopt conservation practices while offering a framework adaptable to other irrigation systems.

Keywords: Analytical Hierarchy Process (AHP), Climate-smart agriculture, Irrigation efficiency, Principal Component Analysis (PCA), Reservoir-Based Irrigation

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Evaluation of Fruit Development Dynamics in King Coconut (*Cocos nucifera* L. var. *aurantiaca*)

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Understanding the process of fruit development is essential for successful management of crops, for determining the optimum harvesting time and criteria, and effective seed collection. Despite the economic importance of King-coconuts (KC), detailed information on fruit development remains scarce. This study was conducted to evaluate physicochemical changes during the development of KC fruits. Seven KC trees from Lunuwila, Sri Lanka were selected. From these trees, bunches aged 1–12 months from fertilization were harvested and pooled by stage. Then, 7–10 fruits per stage were randomly selected. Morphometric data on mesocarp, liquid and solid endosperm were recorded for each stage. Furthermore, the electrical conductivity (EC), pH, and total sugar content (TSC) of the liquid endosperm were measured. The differences between the growth stages were assessed by GLM and ANOVA. The results revealed that the fruits achieve their full size at seven months after fertilization (MAF). The thickness of the polar end of the mesocarp exhibited dynamic changes, whereas that of distal and equatorial ends of the mesocarp remained constant. Solid endosperm formation started from 5–6 MAF and continued up to 8 MAF. The highest water volume and TSC were recorded at 6–7 MAF, suggesting this period is optimal for beverage purposes. Temporal changes in the EC and pH of the liquid endosperm provided insight into its biochemical development. These findings are important in King coconut crop management and will provide novel insights into the coconut fruit development biology.

Keywords: Fruit Development, Kernel Development, Mesocarp Thickness

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Keynote Address & Panel Discussion

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Fostering Innovations in Agri-Food Systems for Healthy & Equitable
Consumption

Mr. Rizvi Zaheed

Chairman, Sri Lanka Agripreneurs' Forum
&
Director, Vidullanka PLC

PANEL DISCUSSION

Food Systems Transformation: Policy, Innovation, & Community Action for Food
Security

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The Director PGIA and the Coordinator extend their sincere appreciation to the following for the assistance provided in numerous ways to make the 37th Annual Congress a success.

- Chief Guest, Dr. Jairo Villamil-Diaz, Head of Mission, United Nations Industrial Development Organization (UNIDO)
- Keynote speaker, Mr. Rizvi Zaheed, Chairman, Sri Lanka Agripreneurs' Forum and Director, Vidullanka PLC
- Invited speakers of the panel discussion, Dr. Derek Headey, Senior Research Fellow at the International Food Policy Research Institute (IFPRI), Prof. (Ms.) Ilmi Hewajulige, Director General/CEO of the Industrial Technology Institute (ITI), Mr. Manju Gunawardana, Group CEO of the Research and Innovation Arm of LOLC Holdings PLC
- Invited Alumni speaker, Dr. Thusitha Bandara, Director, Bogawantalawa Tea Estate, PLC.
- Prof. Terrence Madujith, the Vice Chancellor of the University of Peradeniya
- Prof. B. C. Jayawardana, the Dean of the Faculty of Agriculture, University of Peradeniya
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