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4th December 2024

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Sri Lanka - Japan Study Centre
University of Peradeniya
Sri Lanka

9th Conference on Sri Lanka - Japan
Collaborative Research - 2024

Addressing Global Issues Through Collaboration
and Partnership

Book of Abstracts

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University of Peradeniya, Sri Lanka

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9th Conference on Sri Lanka – Japan Collaborative Research, 2024

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Message from the Vice-Chancellor

Professor W.M.T. Madhujith

University of Peradeniya

Sri Lanka-Japan Collaborative Research Conference (SLJCR) – 2024

I am delighted to send this message on the occasion of the Sri Lanka-Japan Collaborative Research conference (SLJCR) - 2024. Since the post-World War II era, Sri Lanka and Japan have maintained a deep and mutually beneficial friendship. Over the years, our relationship has flourished without any cultural, religious, or economic barriers to collaboration. Our engagement has evolved to include the exchange of knowledge, technology, education, and research, building upon the foundation laid in the initial stages.

The SLJCR, meticulously organized by the Sri Lanka Japan Study Centre (SLJSC) at the University of Peradeniya, presents a significant opportunity for researchers, scholars, and academics from both nations to disseminate new knowledge, share the latest research findings, and engage in important debates in their respective fields. This gathering serves as a catalyst for future collaborations.

I sincerely thank the dedicated members of the Sri Lanka-Japan Study Centre for their admirable efforts in organizing the Sri Lanka-Japan Collaborative Research Conference. Their unwavering commitment has played a pivotal role in bringing this event to fruition.

In closing, I wish all participants a memorable, enjoyable, and highly productive experience. May it contribute to the continued growth and strengthening of the ties between our two nations."

Professor W. M. T. Madhujith
Vice-Chancellor

Message from Director Sri Lanka - Japan Study Centre

Sri Lanka-Japan Collaborative Research (SLJCR) - 2024 Conference

As the Director of the Sri Lanka-Japan Study Centre (SLJSC), it is my great privilege to present this message for the Book of Abstracts of the 9th International Conference on Sri Lanka–Japan Collaborative Research (SLJCR). This annual conference continues to embody our enduring commitment to advancing academic and research collaborations between Sri Lanka and Japan, and it stands as a symbol of the growing vitality of this partnership.

The 9th SLJCR is particularly significant as it is held in a hybrid format, enabling broader participation from both local and international scholars despite ongoing global and regional challenges. This year's event is further strengthened through the special collaboration with the Japan International Cooperation Agency (JICA), whose contribution has enriched the conference and reinforced the shared vision of promoting academic excellence and mutual understanding between our two countries.

At the core of the SLJSC's mission is the aspiration to bring together diverse cultures, disciplines, and technological perspectives. We strive to cultivate an environment that encourages interdisciplinary dialogue, supports the free exchange of knowledge, and builds enduring connections among researchers, scholars, and students from Sri Lanka and Japan. The 9th SLJCR exemplifies this mission by convening a vibrant gathering of participants who share their latest insights, discoveries, and ideas.

The rich array of presentations and discussions at this conference demonstrates the dynamic and evolving nature of Sri Lanka–Japan collaborative research. It is inspiring to witness the wide range of themes being explored, each contributing to our collective efforts to address contemporary global challenges through innovation and academic inquiry.

I wish to express my sincere appreciation to everyone involved in the planning and execution of this conference. Your hard work and commitment have been instrumental in making this event a success.

To all participants, I encourage you to engage deeply with the sessions and networking opportunities available. Your contributions play a vital role not only in advancing your respective fields but also in strengthening the long-standing partnership between our two nations.

Looking ahead, the Sri Lanka-Japan Study Centre remains dedicated to expanding its reach and impact. We will continue to seek new pathways to support collaborative research, foster academic excellence, and enhance the intellectual bond between Sri Lanka and Japan.

I wish you all a rewarding and enriching experience at the 9th SLJCR Conference, and I look forward to the impactful collaborations and achievements that will emerge from this gathering.

Dr. Poornika Seelagama
Director, Sri Lanka Japan Study Centre (SLJSC) University of Peradeniya

SRI LANKA-JAPAN COLLABORATIVE RESEARCH CONFERENCE-2024

December 04, 2024

Session 01: Humanities and Social Sciences
Session Coordinator: Dilki Nawodya Amarathunga

Panel of Judges:
1. Dr. Poornika Seelagama
2. Dr. Shyamantha Subasinghe
3. Prof. Dilrukshi Rathnayake

No	Code	Title	Presenter	Time
01	SLJCR_HS_01	Comparison in Disaster Rehabilitation and Everyday Life: Ethnographic Reflections Between Sri Lanka and Japan	Ryo Tsuchida	1.00 pm - 1.15 pm
02	SLJCR_HS_02	Gendered Disasters: Women and Vulnerability in Disaster Situations	Poornika Kumari Seelagama	1.15 pm - 1.30 pm
03	SLJCR_HS_03	Digitalization of Empowering Women with Disabilities: Overcoming Gender Barriers	Ishari Gunarathna	1.30 pm - 1.45 pm
04	SLJCR_HS_04	Multidisciplinary Approaches for Studying Ainu Indigenous People's Harpoon Heads (Kite) Hokkaido, Japan	NMMRK Karunatilake	1.45 pm - 2.00 pm
05	SLJCR_HS_05	Contours of Healthcare: A Spatial Perspective through Geospatial Analysis	Tharundi Wickramasinghe	2.00 pm - 2.15 pm
06	SLJCR_HS_06	From Map to Reality: Analysing Sri Lanka's School Education Landscape	Nethma Senerath	2.15 pm - 2.30 pm

No	Code	Title	Presenter	Time
07	SLJCR_HS_07	Accepting entry to the dental faculty - Was it a personal choice or influenced by others and how satisfied are you now?	Pabasara Bandaranayake	2.30 pm - 2.45 pm
08	SLJCR_HS_08	Navigating Acculturation: Agency and Structure of Sri Lankan Postgraduate Students in Japan	Dilki Nawodya	2.45 pm - 3.00 pm
09	SLJCR_P_01	Cultural Exchange Between Sri Lanka and Japan	Theekshana Deepaloka	3.00 pm - 3.15 pm
10	SLJCR_P_02	The Role of Zen and the Theravada Buddhist Philosophy in Shaping Concepts of Self and Community in Japan and Sri Lanka	NMBPK Karunathilake	3.15 pm - 3.30 pm

Session 02: Animal Science and Agriculture

Session Coordinator: Dr. S. S. S. de. S. Jagoda
Panel of Judges:
1. Dr. J.D.M. Senevirathne
2. Dr. G.G.N. Thushari
3. Dr. Bimalka Ranasinghe

No	Code	Title	Presenter	Time
01	SLJCR_AS_01	Stabilization of Swine Manure Using Microbial Inoculants at Different Application Frequencies	M.Jeewani Damsara	1.00 pm - 1.15 pm

No	Code	Title	Presenter	Time
02	SLJCR_AS_02	Adverse Effects of Gastrocnemius Muscle Activity in Relation to Anterior Cruciate Ligament (ACL) Injury During Single Leg Drop Landing	S. M. Chamini S. Samarakoon	1.15 pm - 1.30 pm
03	SLJCR_AS_03	Comprehensive Phylogenomic Insights Using Whole Chloroplast Genome Sequences and Multiple Conserved Nuclear Gene Sequences Extracted from Same Raw Data	Eranga Pawani Witharana	1.30 pm - 1.45 pm
04	SLJCR_AS_04	Role of Macrophages in the Development of Cutaneous Lesions in Bovine Lumpy Skin Diseases in Sri Lanka	K.A.S.Kaushalya	1.45 pm - 2.00 pm
05	SLJCR_AS_05	Detection of fungi and fungal toxins from animal feed in central province of Sri Lanka	Nelum Maheshi Aberathne	2.00 pm - 2.15 pm
06	SLJCR_AS_06	Rabies Prevalence in Domestic and Livestock Animals in Anuradhapura District, Sri Lanka: A Five-Year Study and Implications for Control Measures	Waruni R. Jayaweera	2.15 pm - 2.30 pm
07	SLJCR_AS_07	Effect of Somatic Cell Counts on Properties of Set Yoghurt.	Mohottige Jeewani Damsara	2.30 pm - 2.45 pm
08	SLJCR_AS_08	Assessment of Sperm Quality Following Cryopreservation and Long-Term Storage of Bovine Semen	S.H.Rathnayake	2.45 pm - 3.00 pm

Session 03: Science and Technology

Session Coordinator: Dr. Tharindu Weerakoon

Panel of Judges:
1. Dr. Panduka Neluwala
2. Prof. Sanjeewa Malaviarachchi
3. Dr. Bhathiya Athurupana

No	Code	Title	Presenter	Time
01	SLJCR_ST_01	Investigating the Relationship between CO2 Emissions, GDP, and Renewable Energy Consumption	Roshan Manoj Dharmapala	1.00 pm - 1.15 pm
02	SLJCR_ST_02	Optimized Edge AI Framework with Image Processing for Real-Time Speed Prediction in Semi-Automated Electric Vehicles	Himal Godage	1.15 pm - 1.30 pm
03	SLJCR_ST_03	Marine Biodiversity at the Goto Submarine Canyon, Northeastern East China Sea by eDNA Metabarcoding	JDM Senevirathne	1.30 pm - 1.45 pm
04	SLJCR_ST_04	Geoscientific Advancements resulting from Collaborations Between Niigata University and University of Peradeniya	Sanjeewa Malaviarachchi	1.45 pm - 2.00 pm

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HUMANITIES AND SOCIAL SCIENCES

COMPARISON OF DISASTER REHABILITATION AND EVERYDAY LIFE: ETHNOGRAPHIC REFLECTIONS BETWEEN SRI LANKA AND JAPAN

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This paper explores the concept of disaster rehabilitation and everyday life through a comparative ethnographic lens, focusing on multi-sited fieldwork conducted in Sri Lanka and Japan. By examining the lived experiences of individuals in disaster-stricken areas, this study sheds light on the complexities of rehabilitation in contrasting cultural and environmental contexts. Drawing from the author's doctoral research, the author documented the struggles of residents in Ratnapura, Sri Lanka, where recurrent flooding deeply impacts daily life. Despite these adversities, the community's resilience and the local gem industry have flourished in the wake of these persistent natural disasters. While reflecting on disaster recovery and everyday life, the author was struck by the recent occurrences in Japan—the earthquake in the Noto Peninsula on January 1, 2024, followed by a subsequent flood eight months later, forming a cascading disaster. In Japan, through interviews with affected residents, waste management efforts, distribution of relief supplies, and engagement with volunteers, a collective yet deeply personal approach to recovery began to emerge. This experience prompted me to reconsider the interrelationship between myself, the people I engaged with, and the broader recovery process in both Sri Lanka and Japan. By juxtaposing the experiences of Noto's disaster volunteers with the situation in Ratnapura, this study raises questions about the challenges faced, the resources mobilized, the compromises made, everyday life, and the resilience displayed in each location. Ultimately, this paper interrogates the multiplicity inherent in the concept of disaster recovery across these two settings. It considers how individuals and communities strive to reconstitute their lives and identities within the complex and often overwhelming realities of recurring disasters. Through this comparative approach, I aim to reveal the nuanced, layered nature of recovery as both an individual and collective journey, shaped by cultural, environmental, and temporal factors.

Keywords: Comparison; Disaster Rehabilitation; Everyday Life; Water-related/Cascading Disaster; Multi-sited Ethnography.

GENDERED DISASTERS: WOMEN AND VULNERABILITY IN DISASTER SITUATIONS

P.K. Seelagama[1*]

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Climate change related disasters such as floods and land-slides have become very common occurrences that happen on an annual basis in Sri Lanka. With increased disasters, displacement has also escalated significantly. Disasters, displacement, life in IDP camps and resettlement, although seemingly affect people of all walks in a similar manner, have traumatizing impacts on vulnerable groups of people. This paper focusses on how women are affected by disasters and their aftermath. First, women are more likely to be killed in disaster situations and it is not the disaster that kills them. Women are likely to be raped and murdered during the pandemonium of a disaster. When a massive Tsunami hit Sri Lanka in 2004, countless women were attacked when their personal safety was compromised and conveniently listed as Tsunami deaths. Second, some cultural practices are meant to clip women's wings. It is said that during the same Tsunami, women were more susceptible to death and injury because more often than not, women were in sarees. Third, displaced women are particularly vulnerable out in the streets and even inside IDP camps where people are supposed to feel safe. The risk of being attacked, raped or murdered increases many folds for displaced women especially because shelters and camps are not designed with the special needs of women in mind. Needs of pregnant mothers, mothers with infants, menstruating women are usually overlooked in these situations, making disasters and the aftermath an exceptionally traumatic experience for such women. Even though their safety and comfort are compromised, women are not exempted from caring for others such as children, elders and the sick under any circumstance. This is why all stages from disaster risk reduction to resilience must be gender sensitive.

Keywords: disasters; gender; women; vulnerability

DIGITALIZATION ON EMPOWERING WOMEN WITH DISABILITIES: OVERCOMING GENDER BARRIERS

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Working with women with disabilities provides unique insights into their experiences shaped by gender and disability. The intersectionality of being a woman, a woman with a disability, and an unemployed woman with a disability exposes them to multiple layers of prejudice, leading to social isolation from institutions and society. Despite facing everyday discrimination, the digital age has fostered interaction within the disability community, offering new opportunities for inclusion and empowerment. Social workers recognize digitalization as a crucial tool for advocacy. This research adopts an emic approach to explore the experiences of women with disabilities on social media. Over the past decade, our efforts as lecturers, researchers, and disability rights advocates have focused on understanding and addressing the challenges faced by these women. The study employs a qualitative research design, utilizing five in-depth phenomenological interviews, field study conversations, and field notes, with thematic analysis of the data. Emerging themes highlight that social phenomena in participants' lives motivate their shift to social media. These platforms provide a space to connect with peers facing similar challenges, combat isolation, raise awareness, build collective action, and enhance social skills, including leadership. The study sought to understand how digital tools empower women with disabilities through the lens of gender, empowerment, and social capital theories. Findings indicate that digital platforms significantly empower women with disabilities by improving self-esteem, challenging negative social attitudes, overcoming gender stereotypes, enhancing job opportunities, strengthening networks, and facilitating advocacy. Integrating digitalization with social work interventions is vital for fostering an inclusive society that values women with disabilities. This can involve digital literacy programs, support networks, employment facilitation, public awareness campaigns, and policy advocacy, creating a society that recognizes their contributions.

Keywords: Digitization: Empowerment: Gender Barriers: Multiple Social Barriers: Social Work Interventions: Women with Disabilities

MULTIDISCIPLINARY APPROACHES FOR STUDYING AINU INDIGENOUS PEOPLES' HARPOON HEADS (KITE) HOKKAIDO, JAPAN.

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Multidisciplinary Approaches for Studying Harpoon Heads (*kite*) Hokkaido, Japan, is an advanced continuation of my research publication in 2021, Ethnoarchaeology of Indigenous Material Culture: A comparative study on hunting and fishing tools with reference to the Sri Lankan and Japanese indigenous people. Republic of Moldova, Europe: Eliva Press. Throughout history, the Ainu were a hunting, fishing, and gathering people who inhabited what are now Sakhalin, Hokkaido, and the Kuril Archipelago. This study is focused on eighty-five harpoon heads from the collection of hunting and fishing tools at the Hokkaido University Natural History Museum. Their distribution covered the Ainu settlements such as Shiraoi, Horobetsu, Shikifu, Shadai, Muroran, Abuta, Oshamanbe, Shizunai, Harutachi, Shiranuka, Mokoto, and Tokachi district in Hokkaido. The objective of this study is different from those of the former researchers, such as Kazuyoshi Ohtsuka and Hiroshi Utagawa. They were mainly focused on toggling type harpoon heads. However, this study is based on the analysis of specific data of tools such as measurements, material recognition, identification of general and specific features. The main implication is that the samples were classified by their attributes. According to the classification, eight types were identified. As a multidisciplinary approach to draw conclusions, the harpoon heads are analysed in the following disciplines: archaeology, anthropology, ethnobotany and ecological studies, history and cultural heritage studies, material culture studies, art history, conservation science, and geographical and environmental studies. Results demonstrate that the tool type and its morphology are significantly related to the foraging strategies. Similar tools around the world, often adapted to local environments and hunting methods. The design and materials used, however, would vary widely based on the specific regional resources and hunting practices. A comprehensive grasp of the meaning, design, and cultural context of harpoons utilised by indigenous peoples such as the Ainu can be obtained by researchers by combining knowledge from these different disciplines.

Keywords: Ainu; Hokkaido; Harpoon head; Ethnoarchaeology; Multidisciplines

CONTOURS OF HEALTHCARE: A SPATIAL PERSPECTIVE THROUGH GEOSPATIAL ANALYSIS

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Sri Lanka is globally recognized as a model for universal healthcare, providing free healthcare services and achieving strong health outcomes, particularly among developing countries. However, the spatial analysis illustrates the uneven distribution of healthcare facilities, which necessitates targeted policy interventions to ensure equitable access to care and improve health outcomes for all citizens. Sri Lanka contains more than 1500 healthcare institutes including both curative and preventive in mid-2022. Publications on the spatial distribution of healthcare institutes in Sri Lanka are scarce. Using methods of resource mapping, accessibility analysis, and overlay analysis, an argument that should be considered in healthcare decision-making at the national level can be developed. This research provides valuable insights into the spatial distribution of healthcare facilities in Sri Lanka. Colombo is facilitated with an impressive network of health care services with 24 hospitals, including one national hospital, one teaching hospital, and 9 specialized hospitals. This makes Colombo one of the ideal place to get health care while Kilinochchi is served by only one provincial General Hospital and a few divisional hospitals, which reflects people in that area are required to travel significant distance to meet healthcare services. By identifying areas with inadequate coverage and potentially underserved populations, policymakers can make informed decisions to optimize resource allocation and improve accessibility. The findings of the study also can be utilized to enhance community well-being and guide the establishment of new healthcare facilities based on evidence-driven approaches, thereby ensuring equitable access to healthcare services for all of Sri Lanka.

Keywords: Geospatial; Health; Inequity; Location

FROM MAP TO REALITY: ANALYZING SRI LANKA'S SCHOOL EDUCATION LANDSCAPE

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The school education landscape in Sri Lanka is structured into two main categories, namely national schools and provincial schools. The national schools are under the administration of the Ministry of Education, while Provincial councils govern the provincial schools. Based on their functional grade, they are further classified as 1AB, 1C, Type 2, and Type 3, according to the facilities available in them. Geographical Information System (GIS) plays a major role, in performing spatial and temporal analysis to understand the relationship between spatial location variation and student performance. This study examines the approachability and feasibility of utilising GIS to explore this relationship. The educational data was obtained through the Ministry of Education website and spatial data was taken from the survey department of Sri Lanka. The spatial patterns were analysed using the Arc GIS Pro. The spatial analysis reveals a huge disparity in the spatial distribution of schools nationwide. The majority are concentrated in urban centres, particularly in Colombo, Jaffna, Galle, and Kandy. Within that, the Northern Province shows a relatively higher density than the rest of the country, yet it marked the predominance of type 3 schools which facilitate mostly primary-level education. It is not different to the rest of the districts with a significant scarcity of 1AB schools which facilitate all existing advanced level stream education. This uneven distribution has consequential impacts on student performance and efficiency in multiple stages. Analysis indicates that schools achieving over 70% performance in GCE O/L are predominantly located in the Western Province and Kandy district, which mirrors trends observed in GCE A/L performance. These findings indicate the essentiality of further investigation into the spatial dynamics of educational spatial distribution pattern and their correlation with student performance and utilizing GIS would facilitate a more detailed analysis of the correlation of disparity of educational resources, human resources and their impact on student achievement.

Keywords: GIS; Schools; Spatiality; Education

ACCEPTING ENTRY TO THE DENTAL FACULTY – WAS IT A PERSONAL CHOICE OR INFLUENCED BY OTHERS AND HOW SATISFIED ARE YOU NOW?

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Entry into tertiary education is a result of lifelong learning. Students can decide on their tertiary education options voluntarily, or it may be influenced by parents and other factors. This study aimed to explore the percentage of dental students who entered to the Faculty of Dental Sciences voluntarily and their academic achievements, as well as the factors affecting their satisfaction or dissatisfaction about choosing dentistry. The study was designed as a mixed method study. A cross-sectional survey was conducted using a self-administered Google Form questionnaire among 101 first-year undergraduates at the Faculty of Dental Sciences, University of Peradeniya. Both quantitative and qualitative methodologies were used for the data analysis. A cross-sectional quantitative data analysis was done using IBM SPSS software. In the descriptive analysis, first semester GPA was compared with the various choices the participants had made before, during and after the Advanced Level (A/L) examination. Majority (89.9%) have chosen biology stream for A/Ls on their own. Only 5.0% have selected dentistry as their first choice to enter the university. However, there was no statistically significant difference in academic performance between those who choose dentistry as the first choice and those who did not ($p=0.358$). Inductive qualitative methodology was used to explore the factors behind satisfaction or dissatisfaction of choosing the Faculty of Dental Sciences. Semi-structured questions were used for that. Qualitative content analysis identified three common factors contributing to the satisfaction: (1) personal perceptions regarding the university and university life, (2) personal perceptions regarding the profession, (3) facilities and guidance given from the faculty. Two common factors contributing to dissatisfaction identified were: (1) factors related to the curriculum, (2) personal perceptions and experiences. The study suggests that fostering positive perceptions and improving guidance could enhance satisfaction with the study experience in the Faculty of Dental Sciences.

Keywords: dental students; dentistry; choice; academic performance

NAVIGATING ACCULTURATION: AGENCY AND STRUCTURE OF SRI LANKAN POSTGRADUATE STUDENTS IN JAPAN

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Acculturation refers to the changes individuals experience in their culture and behavior when in long-term contact with a different cultural background. The adaptation of international students is complex, influenced by structural and personal factors. This study explores the acculturation experiences of Sri Lankan postgraduate students in Japan, focusing on the interplay between agency (individual capacities) and structure (external systems, such as institutions and social networks). Through ten case studies—four doctoral students at Saitama University (with families) and six master's students at Saitama and International University of Japan—the study uses thematic analysis of qualitative data from in-depth interviews. Findings reveal that while Japanese language barriers initially challenge adaptation, they are mitigated by social networks and personal efforts. Students maintain a balance between their Sri Lankan identity and integration into Japanese society through formal (institutional support) and informal (friendship networks) mechanisms. The research highlights how institutional and social structures facilitate agency-driven adaptation and integration without alienation. Further research on intergenerational acculturation among Sri Lankan families in Japan is recommended.

Keywords: Sri Lankans, Japan, Acculturation, Adaptation, Postgraduate Students, Agency, Structure

CULTURAL EXCHANGE BETWEEN SRI LANKA AND JAPAN

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The cultural exchanges between Sri Lanka and Japan stem from a very longstanding interaction that has contributed immensely to the social, artistic, and spiritual dimensions of both countries. This research will, therefore, attempt to explore shared cultural heritage, trace historical ties, and analyze contemporary developments between these two nations. This work examined the flashpoints of cultural intercourse between Sri Lanka and Japan in terms of the transmission of Buddhist philosophical thought, traditional forms of aesthetic expression, and modern consequences this has had in societal thinking through formal systems of education. The nature of this work thus demanded a qualitative perspective by way of a review of historical texts, academic work, and records of bilateral exchanges. In order to have a complete understanding of this exchange, interviews with cultural historians and practitioners were conducted in Sri Lanka and Japan. The results indicated that Sri Lanka's Buddhist heritage predominantly influenced the spiritual practices of Japan, while Japanese art and aesthetic philosophies found a way through the artistic forms of Sri Lanka. Of late, there is an increasing tendency toward educational collaboration in the form of joint academic programs and student exchanges, which have helped further ties between the two countries. Cultural exchange between Sri Lanka and Japan testifies to the importance of their continued collaboration in maintaining mutual understanding and respect. Under globalization, which already affects these exchanges, prospective partnerships increasingly depend on the preservation of cultural identity represented through shared values.

Keywords: Cultural Exchange; Sri Lanka; Japan; Buddhism; Art; Education; Mutual Influence

THE ROLE OF ZEN AND THERAVADA BUDDHIST PHILOSOPHY IN SHAPING CONCEPTS OF SELF AND COMMUNITY IN JAPAN AND SRI LANKA

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This research examines how Zen Buddhism in Japan and Theravada Buddhism in Sri Lanka shape societal concepts of self and community, focusing on the unique philosophical perspectives each tradition brings to personal identity and social responsibility. In Japan, Zen Buddhism encourages mindfulness, simplicity, and the transcendence of ego, fostering a view of the self as deeply interconnected with society and nature. Zen principles prioritize personal reflection and harmony, leading Japanese culture to value social cohesion, respect for others, and minimalism as pathways to inner peace. In contrast, Theravada Buddhism in Sri Lanka emphasizes a communal approach, with ethical conduct, compassion, and karma central to personal and collective progress. Theravada philosophy promotes communal well-being, where acts of charity and service are considered integral to personal fulfillment. This belief system influences cultural practices that prioritize community support and ethical responsibility, shaping a Sri Lankan cultural focus on social duty and collective harmony. Using qualitative interviews and cultural literature, the study reveals that Zen Buddhism's focus on personal mindfulness fosters a sense of individual harmony within the broader social order, while Theravada's emphasis on collective welfare encourages ethical living in support of community growth. These findings highlight how Buddhist philosophies can guide approaches to social cohesion and well-being, offering insights for cross-cultural philosophy, mental health, and public policy on fostering harmonious societies grounded in both individual and communal values.

Keywords: Zen, Buddhism; Theravada Buddhism, Japanese Culture; Self and Community

ANIMAL SCIENCE AND AGRICULTURE

ADVERSE EFFECTS OF GASTROCNEMIUS MUSCLE ACTIVITY IN RELATION TO ANTERIOR CRUCIATE LIGAMENT INJURY DURING SINGLE LEG DROP LANDING

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Single leg drop landing is considered as one of the demanding tasks for anterior cruciate ligament (ACL) and main research focus has been on the functions of the quadriceps and hamstrings. Gastrocnemius is the major muscle that passes the knee joint however, it has been given a less attention regarding ACL injuries. The current focus was to investigate the gastrocnemius force during the single leg drop landing with five different foot position patterns at the landing. A healthy subject was asked to land from 30cm height box. Ground reaction forces (GRF), trajectory data collected using Vicon motion analysis system. The EMG data of seven muscles in the lower limb were collected. OpenSim used to perform musculoskeletal simulation and extracted kinematics, muscle forces and joint reaction forces during the initial contact (IC) and peak-GRF moment. The EMG profile and the muscle force during the landing phase were in good agreement, which supports the outcome of the simulation. Muscle forces of gastrocnemius were high compared to that of the quadriceps and hamstrings during almost all the tasks. Furthermore, it was observed that the lateral gastrocnemius force was reducing from toe-in, neutral to toe-out position while the medial gastrocnemius force remains the same. The discrepancy between the medial and lateral gastrocnemius activity may lead to rotational moment in the knee joint. Therefore, the gastrocnemius cannot be ignored as a contributor that potentially provides adverse effect on knee joint biomechanics in landing.

Keywords: ACL injuries; single leg drop landing; foot position; gastrocnemius force; musculoskeletal simulation

COMPREHENSIVE PHYLOGENOMIC INSIGHTS USING WHOLE CHLOROPLAST GENOME SEQUENCES AND MULTIPLE CONSERVED NUCLEAR GENE SEQUENCES EXTRACTED FROM SAME RAW DATA

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Phylogenomics has become a critical tool for unraveling complex evolutionary patterns. The advent of high-throughput sequencing has made chloroplast (cp) genomes popular in phylogenetics due to their cost-effectiveness, small size, conserved gene order, and typical maternal inheritance. However, cp genomes alone may not fully capture evolutionary dynamics. In contrast, nuclear gene sequences, inherited biparentally, offer higher resolution and a more comprehensive evolutionary view. Despite this advantage, their use has been restricted by the high costs and quality demands of nuclear sequences. To address these limitations, we employed Read2Tree, a cost-efficient tool for extracting multiple conserved nuclear gene sequences from raw sequencing data. Using the same dataset, we generated phylogenetic trees based on both nuclear and whole cp genome sequences, enabling direct comparison of evolutionary insights from both genomic perspectives. We focused on approximately 40 species within the Aurantioideae subfamily, including economically and nutritionally important *Citrus* species and its relatives. Our comparative analysis showed nuclear phylogenies congruent with prior RAD-Seq analyses based on high-throughput sequencing methods, while substantial discordances emerged between nuclear and cp genome trees. To investigate these differences, we implemented an integrative workflow that combined multiple alignments from each gene generated by Read2Tree with other phylogenomic methods. This approach allowed us to examine genetic differentiation processes, including incomplete lineage sorting (ILS), introgression, and ancient introgression. Our analysis indicated that ILS is the primary driver of discordances, with introgression and ancient introgression further complicating relationships in specific lineages. This study demonstrates the feasibility and cost-efficiency of using a same raw sequencing dataset for both nuclear and cp genome analyses. This approach is promising for exploring the evolutionary histories of taxonomically ambiguous species in Sri Lanka, providing critical insights for conservation and crop improvement efforts.

Keywords: Read2Tree; Chloroplast genome; *Citrus* and its relatives; Phylogenetic discordances; Incomplete lineage sorting; Introgression

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ROLE OF MACROPHAGES IN THE DEVELOPMENT OF CUTANEOUS LESIONS IN BOVINE LUMPY SKIN DISEASE IN SRI LANKA

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Lumpy skin disease (LSD) is a novel, notifiable infectious viral disease in cattle caused by lumpy skin disease virus, belonged to the family *Poxviridae*. The disease has been a catastrophic threat to large, domesticated ruminants in Africa, the Middle East, Europe, and Asia, which causes severe economic losses in livestock. However, the haematological changes and the pathogenesis of cutaneous lesions in LSD remains obscure. Therefore, this study was conducted to determine the haematologic changes and the histopathological findings in cattle naturally infected with LSD, in Sri Lanka. The findings were compared with normal cattle. Blood and skin biopsies were collected from thirty (n = 30) LSD infected cattle and (n = 30) normal cattle. Skin sections were fixed in 10% neutral buffered formalin, routinely processed and wax embedded. Then sectioned at 3 µm and stained with haematoxylin and eosin for histopathology and azan-Mallory for collagenolysis. The number of macrophages per 0.2 mm2 was counted. Haematology revealed a significant increase in lymphocyte count in LSD infected animals ($p < 0.05$, 70.45%) in comparison to control group (33%). Furthermore, a significant decrease in neutrophil count was observed in LSD infected animals (17.22%) in comparison to the control (55%). Histopathology revealed a significant increase in collagenolysis and macrophage count in in LSD infected animals in comparison to control ($p < 0.0001$). Furthermore, most macrophages were seen in and around the collagenolytic areas. These findings reveal that LSD associated cutaneous lesions are induced by macrophages. This would shed some light into the pathogenesis of LSD. The findings will be helpful in treatment and control of cutaneous lesions associated with LSD.

Keywords: Cattle; collagenolysis; haematology; histopathology; poxviridae

DETECTION OF FUNGI AND FUNGAL TOXINS FROM ANIMAL FEED IN CENTRAL PROVINCE OF SRI LANKA

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Background: Animal feed is a vital component that directly impacts on animal husbandry. However, quality of these animal feeds should be monitored frequently as it can be a source of fungi and mycotoxins that influence the health of animals and subsequently human health. Accordingly, the current study was conducted to monitor the fungal contamination of animal feed obtained from central province of Sri Lanka.

Methods: A total of fifty-four feed samples from goat, horse and cattle owners were collected from the central province of Sri Lanka using non-probability sampling method. Fungal isolation was carried out with Sabourauds Dextrose agar and lactophenol cotton blue stain. Morphological identification was conducted using macromorphological features including colony color and texture and micromorphological characteristics of mycelia, fruiting head, and conidiophores. In addition, fungal contaminated feed samples were analyzed for the presence of aflatoxins using a commercial Elisa kit for detection of total aflatoxins.

Results: Results revealed contamination of feed with either bacteria or fungi in 96.4% (52/54) samples where 70.37% (38/54) was bacteria only, 11.11% only fungi (6/54), and 14.82% (8/54) with both fungi and bacterial contamination. Further, cattle, goat and horses showed a fungi isolation rate of 0%, 36% and 38% respectively. The majority of isolated fungi belongs to *Aspergillus flavus* (40%) while Yeast, Zygomycetes and Fusarium spp. accounted for 13% each. Also, aflatoxin analysis revealed the presence of aflatoxins above 20ppb in 54.5% (6/11) and above 100ppb in 9.09% among the feed that contained toxicogenic fungi.

Conclusions: Therefore, our study points out the existence of potentially harmful fungi and aflatoxins in the animal feed in central province. In conclusion, it warrants the importance of implementing stringent regulation and surveillance of animal feed quality. Furthermore, molecular identification of these isolated fungi is in progress.

Keywords: Fungi, Aspergillus, aflatoxins, animal feed

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RABIES PREVALENCE IN DOMESTIC AND LIVESTOCK ANIMALS IN ANURADHAPURA DISTRICT, SRI LANKA: A FIVE-YEAR STUDY AND IMPLICATIONS FOR CONTROL MEASURES

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Rabies is a fatal zoonotic disease with significant impacts on public health and the livestock economy, leading to considerable socio-economic challenges. Domestic animals like dogs and cats are primary sources of rabies transmission to humans, while livestock such as cattle and goats are incidental victims, suffering from disease-related mortality and restrictions on movement and trade. In Sri Lanka, despite ongoing rabies control efforts, challenges persist in rural areas, where access to veterinary services is limited.

This study examines the prevalence of rabies in domestic and livestock animals within the Anuradhapura District over a five-year period (2017–2023). Brain tissues were collected from cattle, goats, dogs, and cats that exhibited rabies-like clinical signs at the Veterinary Investigation Centre in Kurundankukama, Anuradhapura, and analysed at the Rabies Diagnostic Laboratory, Department of Veterinary Pathobiology, Faculty of Veterinary Medicine and Animal Science, University of Peradeniya. A total of 50 brain samples were examined, including cattle (n=20), goats (n=2), dogs (n=27), and a single cat (n=1). Samples were assessed using clinical signs and the direct Fluorescent Antibody Test (FAT) using monoclonal antibodies.

Among the tested animals, 18 of the 20 cattle (90%), both goats (100%), and 25 of the 27 dogs (92.5%) tested positive for rabies with FAT. The single cat sample tested negative. These findings highlight an urgent need for targeted rabies control measures for cattle, goats, and dogs, including increased surveillance, vaccination campaigns, and public awareness through collaborative efforts among veterinary authorities.

Timely reporting of suspected cases and prompt administration of pre-exposure and post-exposure prophylaxis are essential to reduce rabies transmission in both animals and humans. Further research should focus on evaluating the effectiveness of existing rabies control measures and understanding the socio-economic impacts on farming communities in Anuradhapura District, supporting efforts to improve control strategies.

Keywords: Rabies, FAT, Brain, Sri Lanka

EFFECT OF SOMATIC CELL COUNTS ON PROPERTIES OF SET YOGHURT

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Mastitis, the inflammation of the mammary gland elevates somatic cells in milk, leading to poor milk and dairy product quality. This study was focused on elevated somatic cell count on properties of yoghurt. The Physical and chemical properties of set yoghurt made with different somatic cell counts, low (161,000 cells /ml), intermediate (368,000 cells / ml) and, high (834, 000 cells/ml) were analysed during storage on days 1, 10, 20, and 30 following manufacturing. As the parameters; pH, titratable acidity, free fatty acid, apparent viscosity, Syneresis, colour index, and microbial load were examined. The viscosity and percentage of Free fatty acids of the high Somatic cell count yoghurt increased significantly ($P < 0.05$) from 1047± cP to 1128± cP and from 0.53% to 0.61%, respectively during storage time (Day 10 – Day 30) compared to that of low and intermediate SCC yoghurt. The pH, Titratable acidity, Syneresis, and colour were not significantly ($P > 0.05$) different among three categories. The microbial count was measured only on the last day, the total plate count, yeast and mould counts were higher by 5-fold and 2 fold in yogurt made from high SCC milk compared to low SCC milk. In conclusion, the yoghurt produced from higher SCC milk showed comparatively higher viscosity, FFA and poor keeping quality with the storage time. Therefore, it is suggested to use low Somatic cell milk for yoghurt manufacture.

Keywords: Yogurt quality, Somatic Cell Count, Viscosity, Syneresis, Brix value

ASSESSMENT OF SPERM QUALITY FOLLOWING CRYOPRESERVATION AND LONG-TERM STORAGE OF BOVINE SEMEN

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Artificial insemination is extensively practiced in the dairy industry, where its success relies on numerous factors, with semen quality being a key determinant. Regular evaluation of semen quality during long term storage is essential to ensure optimal semen characteristics are maintained for successful artificial insemination. This study aims to evaluate semen quality following cryopreservation and extended storage by accessing post thawing motility, sperm membrane integrity and live: dead ratio. Semen samples from Friesian bulls (codes 442,443 and 445) and Jersey bulls (codes 299 and 601) were selected based on the past records. Individual straws were manually selected by screening the bulk stock at Central Artificial Insemination Station (CAIS), Kundasale. Post thawing motility test, HOS test and live: dead ratio were performed for each sample and results were obtained. Initial motility and initial post thawing motility were obtained from the past records and compared to the results of post thawing motility obtained after cryopreservation and long-term storage. Hyper Osmotic Swelling Test (HOS) positive percentage and live sperms percentage were compared against the industry-standard benchmarks. The results indicated that post thawing motility remained 40% across all samples in all semen codes, while HOS-positive percentages exceeded 58% for each sample. Additionally, live sperm cell percentages surpassed 50% in nearly all samples, with exceptions in one sample each from semen codes 445,299 and 601. In conclusion, most semen straws maintained adequate semen quality for successful artificial insemination following cryopreservation and long-term storage.

Keywords: Semen Cryopreservation; Long-term Storage; Post-thawing Motility; Sperm Membrane Integrity; Live: Dead Ratio

SCIENCE AND TECHNOLOGY

INVESTIGATING THE RELATIONSHIP BETWEEN CO2 EMISSIONS, GDP, AND RENEWABLE ENERGY CONSUMPTION

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This paper investigates the intricate relationship between CO2 emissions, GDP, and renewable energy consumption across nine countries: Brazil, China, Germany, India, Japan, the Philippines, Russia, Sri Lanka, and the United States, over the period 1990-2020. Utilizing regression analysis and Akaike Information Criterion (AIC) model selection, this study examines how economic growth and renewable energy adoption impact CO2 emissions. The findings reveal that economic growth generally leads to an increase in CO2 emissions. However, renewable energy consumption has the potential to mitigate emissions, particularly in developed countries with robust renewable energy policies, such as Germany and the United States, where CO2 emissions have been reduced by over 30% since 1990. In these countries, effective state and federal initiatives have contributed significantly to emissions reductions. On the other hand, rapidly industrializing countries like China and India face continued challenges as their economic growth continues to drive high emissions despite increasing renewable energy usage. Country-specific analyses highlight Germany's success with its Energiewende policy, while China's and India's experiences underscore the difficulties of balancing economic expansion with environmental sustainability. These findings highlight the importance of adopting tailored renewable energy strategies and economic policies that address the specific needs of each country. Furthermore, international cooperation is crucial in mitigating the global climate crisis. The study concludes with recommendations for policymakers, emphasizing economic diversification and renewable energy investments to support sustainable development.

Keywords: CO2 emissions; GDP; renewable energy consumption; economic growth; environmental sustainability.

OPTIMIZED EDGE AI FRAMEWORK WITH IMAGE PROCESSING FOR REAL-TIME SPEED PREDICTION IN SEMI-AUTOMATED ELECTRIC VEHICLES

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The rapid evolution of autonomous vehicles (AVs) is transforming transportation, yet integration with human-driven vehicles remains challenging due to complex interactions and costly onboard sensors. This study optimizes a semi-automated electric vehicle (EV) framework, developed with Assembly Point JP, a Japanese EV manufacturer, for urban environments like Manila, Philippines. A pilot takes control for immediate maneuvers, managing unpredictable environments best handled by human intervention, while the edge AI system predicts speed adjustments 30 seconds in advance. Leveraging 5G/6G networks, high-computation tasks are offloaded to edge servers, reducing continuous data streaming and enhancing energy efficiency. Edge AI minimizes cloud dependency by processing data locally, with offline models ensuring functionality in constrained network conditions. The framework improves resource management and prediction accuracy for connected public transport by optimizing bandwidth and latency. Using the Zenseact Open Dataset's Frames category with images from five European countries, it focuses on critical road features (vehicles, pedestrians, traffic signs) and addresses data imbalances with SMOGN. Docker containers simulated client and edge servers, measuring Round-Trip Time (RTT), bandwidth, and prediction accuracy. Results show an average RTT of 0.002 seconds with 25% image compression, reducing bandwidth usage by 30%, while maintaining object detection accuracy at 89% and achieving an average R^2 value of 0.85 for speed prediction. A 30-second lead time was sufficient for legitimate information flow, supporting proactive adjustments in semi-automated operations. Future work will explore dynamic prediction intervals and adaptive time gaps to address changing conditions and optimize the framework further. This study highlights efficient network utilization, scalability, and improved decision-making in semi-automated public transport, showcasing the potential of edge computing to balance efficiency and sustainability in diverse urban environments.

Keywords: semi-automated vehicles; edge AI; electric vehicles; speed prediction; image compression

MARINE BIODIVERSITY AT THE GOTO SUBMARINE CANYON, NORTHEASTERN EAST CHINA SEA BY eDNA METABARCODING

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Marine habitats are difficult to assess the biodiversity due to dynamic nature, large size, and sampling issues. However, eDNA metabarcoding has successfully addressed these difficulties. In this study, we used surface water samples from Goto Submarine Canyon region to isolate eDNA and metabarcoding assessment. This canyon is famous as a toothed whales' habitat; however, the biodiversity of this area has been rarely studied. An 18S rRNA eukaryotic universal primer set was used for PCR amplification of the full length of the gene, then the amplicons were subjected to next-generation sequencing (NGS). The NGS data were analyzed with databases using bioinformatics methods. All samples contained eDNA and concentrations ranged from 51.2 to 1080 ng/ml. Amplicon size was approximately 1750 bp and sequence results confirmed the presence of Eukaryotic and Euryarchaeotic DNA in the selected area. Most of the Eukaryotic DNA was found in SAR; Alveolata group based on the SILVA database. Accordingly, Thermoplasmata was the highest hit of Euryarchaeal and around 44% was marine group II. Around 60% of Eukaryotes were identified based on the PR2 database, however, around 20% of archaea were present. This full length 18S rRNA gene's eDNA analysis may be a suitable approach identifying both marine eukaryote and euryarchaeal biodiversity. This eDNA approach will be useful for further biodiversity assessment and management of future changes of marine inhabitants.

Keywords: eukaryotes, euryarchaeota, environment DNA, metabarcoding, Okinawa Trough

GEOSCIENTIFIC ADVANCEMENTS RESULTING FROM COLLABORATIONS BETWEEN NIIGATA UNIVERSITY AND UNIVERSITY OF PERADENIYA

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The Gondwanan orogeny (orogeny – a mountain building process of the Earth) is one of the hot topics in the research arena of geological sciences. The widespread and intense tectonothermal events associated with the contruction of the Gondwana Supercontinent more than 550 million years ago. Geoynamic processes of this orogeny overprinted much of the pre-Gondwanan geological record in rocks of the related terrains, including those of Sri Lanka, India and Antarctica. The ‘‘Mozambique Ocean” is inferred to have existed between pre-existing continents before the final amalgamation of the Gondwana supercontinent. The meta-sedimentary rocks of Sri Lanka related to the Gondwana are therefore considered to have been deposited in the Mozambique Ocean. Hence, the meta-carbonate rocks are ideal candidates for helping to construct the paleo-tectonic setting of the extinct Mozambique Ocean. Since the Highland Complex (HC) in Sri Lanka, is considered a zone of ocean closure dominated by trench-fill sediments, the carbonate rocks in the HC can provide key information about the ancient oceans that existed between the above continents.

By geological collaboration between the Departments of Geology of Niigata University and the University of Peradeniya, we have concluded the following findings: hybridization of mantle-derived melts from juvenile and ancient crustal components from Sri Lanka providing new insights to the geodynamic setting of ancient continents carbonate rocks in continental collision zones as a means to understand the environment of ‘‘lost oceans” in Earth’s history Further studies are ongoing to unravel more complicated geological issues pertaining to the Gondwana, by comparing studies from Sri Lanka, India, east Africa and Antarctica.

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