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MESSAGE FROM THE ADVISOR TO THE SYMPOSIUM

Today marks a significant milestone for our country and National Productivity Secretariat, as we convene our first National Productivity Symposium, in 2024, under the theme of “*Sustainable Transformation through Productivity*.” Our agenda is ambitious, our vision broad, and our commitment to advancing national productivity unwavering.

As a member of the Asian Productivity Organization (APO) Sri Lanka aligns with the APO’s framework, and we are committed to embracing “**productivity gainsharing**” as a strategic pathway to shared value creation. Our journey towards productivity excellence is one of collective commitment, and today’s symposium stands as a testament to that unity of purpose. We have brought together seasoned and budding researchers, practitioners, and innovators whose contributions are invaluable as we work to build a Sri Lanka that is productive, inclusive, resilient, and sustainable.

I am honoured to have the prominent panel of experts representing key industries and agencies in Sri Lanka gracing this symposium. Their participation has made it possible to bring together a multidisciplinary approach to this symposium. I would like to extend my sincere appreciation to the distinguished panelists and reviewers for diligence, the organizing committee led by the Deputy Director (Development ii) and her team for their dedication. Their efforts and hard work have brought this event successful, allowing us to convene, collaborate, and set a course for a more productive Sri Lanka.

I congratulate all the presenters and authors, and encourage all participants to actively engage in the symposium while making use of networking opportunities for enhancing productivity and transformation. I look forward to your continued involvement in future initiatives of the National Productivity Secretariat. Together, we will bring to life the vision of sustainable transformation, driven by productivity, for the benefit of every individual, community, and enterprise in our nation.

Thank you

Niranja S. Jayakodi (SLAS)

BSc. (Food & Nutrition), MA (Sociology)

Director, National Productivity Secretariat
Advisor to the Symposium



MESSAGE FROM THE SYMPOSIUM CHAIR AND EDITOR

It is with great pleasure and deep gratitude that I write this message for the National Productivity Symposium 2024. What began as a challenging idea has evolved into a significant platform, bringing together practitioners and academics to engage in thoughtful discussions under the theme “Sustainable Transformation through Productivity.”

The success of this symposium is due in no small part to the papers we received. Experienced professionals and researchers, as well as emerging voices in the field, have contributed their insights, furthering the discourse on productivity. These papers ranging from public administration to climate change present a variety of innovative approaches and practical solutions, enriching our understanding of how productivity can be a key driver of sustainable transformation across industries and sectors in Sri Lanka.

Our review panel, comprising a unique blend of academics, practitioners, and international experts, worked diligently to ensure the high standards of this symposium. Their expertise and commitment were instrumental in shaping the program, and I am deeply grateful to each of them for their invaluable contributions. I would also like to extend my heartfelt thanks to the distinguished panelists—both practitioners and academics—whose achievements in their respective fields have enriched the conversations today.

The guidance and unwavering support of Mr. Niranja S. Jayakodi, Director of the National Productivity Secretariat and Advisor to the Symposium, has been invaluable, as has the backing of the former Director, Mr. Suranga Guneratne, who helped secure approval for this initiative, the first of its kind, in 2023. This symposium would not have been possible without the tireless efforts of the symposium team. I am particularly thankful to Mr. Tharinda Marasinghe, the Symposium Secretary, who managed the entire process with dedication and professionalism throughout this demanding year. Finally, I would like to acknowledge my colleagues at the National Productivity Secretariat, who supported this journey in numerous ways. Their teamwork and determination played a vital role in bringing this symposium to fruition.

It is my hope that the presentations, discussions, and networking opportunities throughout this symposium will inspire and empower all participants to contribute to Sri Lanka’s path toward greater productivity, inclusiveness, and sustainability. I look forward to seeing how the insights shared here will continue to shape the productivity landscape of our country in the years to come.

Pranidhi P. Algama Bopagamage (SLAS)

BSc (Physical Science), LLB, MAIR

Deputy Director (Development ii), National Productivity Secretariat
Symposium Chair and Editor



MESSAGE FROM THE KEYNOTE SPEAKER

It is my privilege to address this inaugural National Productivity Symposium 2024, an event that holds great significance not only for the National Productivity Secretariat but also for the broader national agenda of promoting sustainable and inclusive productivity growth across all sectors in Sri Lanka. Under the theme “Sustainable Transformation through Productivity,” this symposium provides a timely and critical platform for researchers, practitioners, and policymakers to share their knowledge, explore innovative strategies, and collaborate on advancing productivity throughout the country.

The intersection of research and practice is essential in developing a holistic and integrated approach to productivity growth. As a nation, we are at a juncture where productivity is no longer an isolated concern of specific industries but a comprehensive national imperative. The key to realizing this vision lies in the production, dissemination, and application of research across all sectors, ensuring that advancements in productivity are informed by rigorous, evidence-based insights.

In this context, the role of research in enhancing productivity cannot be overstated. Research provides the foundation upon which we can critically assess current practices, identify gaps, and develop targeted interventions. It also enables us to adopt a more forward-thinking perspective, one that anticipates future challenges and opportunities. By sharing research findings through forums such as this symposium, we ensure that knowledge is not siloed but is accessible and actionable for all stakeholders. The integration of research into policy and practice is crucial to achieving long-term productivity gains that are sustainable, inclusive, and resilient.

This symposium has brought together a diverse and distinguished array of contributors, from seasoned professionals to emerging researchers, who have provided us with a wealth of insights. The papers presented today reflect the breadth and depth of productivity-related issues facing Sri Lanka—from public administration to health, from regional segments to environmental sustainability. These contributions not only enhance our understanding of the complex factors influencing productivity but also offer practical solutions that can be applied across sectors. Importantly, they underscore the need for a collaborative approach that brings together different stakeholders—academics, practitioners, policymakers, and the private sector—to create an ecosystem conducive to productivity enhancement.

A key outcome of this symposium is the recognition that productivity is not the sole responsibility of one sector or one institution. Rather, it is a shared goal that requires the concerted efforts of all sectors—public and private, academic and industrial. It is through interdisciplinary collaboration and the continuous exchange of ideas that we can foster a culture of productivity that transcends sectoral boundaries and contributes to national development. This

symposium is a testament to the power of such collaboration, and I am confident that the discussions here will serve as a catalyst for future research and innovation in this field.

I would like to take this opportunity to commend the National Productivity Secretariat for its vision and leadership in organizing this symposium. Under the able guidance of the Director, Mr. Niranja S. Jayakodi, the Secretariat has successfully brought together a diverse group of experts, practitioners, and researchers, facilitating a meaningful dialogue on productivity. The dedication and professionalism of the symposium committee, the review panel, and all those involved in making this event a success, deserve our deepest appreciation.

In particular, the National Productivity Secretariat has demonstrated a remarkable ability to convene a multidisciplinary event that reflects both academic rigor and practical relevance. This is no small feat, especially for an inaugural symposium, and it speaks to the Secretariat's commitment to fostering a culture of productivity that is grounded in research and innovation. I am confident that the work initiated here will have far-reaching impacts, both in terms of policy development and in practical applications across various sectors of our economy.

In conclusion, I encourage all participants to take full advantage of the knowledge and networking opportunities this symposium provides. It is through sustained dialogue and collaboration that we can continue to advance the cause of productivity in Sri Lanka, ensuring that our nation is not only productive but also inclusive, resilient, and sustainable. The research presented here today lays a strong foundation for the next steps in our collective journey towards productivity excellence, and I look forward to seeing how these ideas and insights will shape the future of our nation.

Thank you

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SERVICE QUALITY AND CUSTOMER SATISFACTION: A CASE STUDY OF SOCIAL SERVICE BRANCH OF NALLUR DIVISIONAL SECRETARIAT, JAFFNA DISTRICT.

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ABSTRACT

Service quality has become ever more vital to the achievement of customer satisfaction and competitive advantage. Public service delivery to the needy poor is found to be unsatisfactory due to the increasing complexities of the need and expectation of customers. As a result, ordinary poor citizen has been affected adversely. The objective of the study is to explore the relationship between service quality and customer satisfaction in respect of public sector organizational. Hence, the study was carried out to evaluate the effect of service quality on customer satisfaction with reference to social service delivery taking Nallur Divisional Secretariat as a case study. For this study, the quality of service is evaluated by tangibility, responsiveness, reliability, assurances and empathy. A questionnaire survey and personal interviews were conducted to collect data using the purposive sampling method. A modified questionnaire was prepared based on SERVQUAL instruments. A sample of 100 social service beneficiaries was drawn. The result was analyzed using descriptive statistics, especially frequency tables, percentage and mean was used to analyze the data. Further, inferential statistic tools also were used to analysis and interpret the data such as regression and correlation analysis and factor analysis. The study found that the correlation value between service quality and customer satisfaction is 0.421 and shows a significant relationship ($p < 0.05$). Therefore, there is a positive linear relationship between the service quality and customer satisfaction. According to the Regression analysis, service quality impact on customer satisfaction is 17.7 %. Among the five dimensions considered, all of them except reliability have a significantly positive effect on overall satisfaction. It is concluded that service quality influence customer satisfaction. The study points out serious implications on policy regarding service as service quality is inter related with customer satisfaction.

Key words: service quality, customer satisfaction, Social services, Divisional Secretariat, public sector

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ASSESSMENT OF SATISFACTION OF OUT-PATIENTS ON DIGITAL HEALTH SERVICES AT BASE HOSPITAL SAMMANTHURAI

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ABSTRACT

Sri Lanka has implemented Hospital Health Information Management System (HHIMS) in selected hospitals according to digital health architecture blue print. There is little knowledge available on satisfaction level of end users. This study was aimed to fill this gap by assessing the satisfaction of out-patients on digital health services at BH Sammanthurai. This cross-sectional study was conducted among randomly selected 300 out-patients from January to March 2024. Data were collected by interviewer-administered questionnaire to measure the level of satisfaction. Data analysis was done with SPSS 22. Most of the respondents were male (57.5%) and half of patients had secondary education. Most of them (76%) had smart phones. All of them were issued with an e-health card. But, Majority (60%) were not aware of the purpose of it since they were not properly informed. Significant number (48%) wanted to book their appointments in advance. All the respondents preferred mobile phone service alerts. Ninety percent (90%) of patients had e-prescription and medicines without any errors. Most of them (70%) satisfied with the less waiting time for investigation and dental services. Overall out-patient satisfaction score found to be high. Statistically significant relationship was found in education level and number of hospital visits versus satisfaction. Identifying the bottle-necks, challenges for the staff, factors affecting client's satisfaction and infra-structure gaps in the post-implementation of HHIMS is critical to sustain the project. Study assessed client satisfaction in low-resource setting and is crucial to improve the quality care and patient safety. The findings cannot be generalized to HHIMS providers since it was limited to only one secondary care hospital.

Key words: base hospital, digital health, Hospital Health Information Management System, out-patients, Patient satisfaction

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COMMUNITY EMPOWERMENT: A CASE STUDY OF ARIYALAI EAST VILLAGE - LED SUSTAINABLE ENVIRONMENTAL PRACTICES

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ABSTRACT

The community of Ariyalai East Village is facing several pressing socio-economic and environmental challenges, including unstructured waste management, tree cutting, sand mining, water scarcity, salty water intrusion, and climate change. These challenges are significantly threatening the local ecosystems and residents' livelihoods. The Nallur Divisional Secretariat in Jaffna has implemented specific public-private partnership (PPP) approaches. However, it is essential to assess the sustainability of these methods. Therefore, the case study approach was employed to evaluate the efforts for implementing sustainable measures through a community-led approach. The study employed a qualitative approach and was centred on 60 residents from Ariyalai East who were randomly chosen as stakeholders, community leaders, and members of local organizations involved in environmental initiatives. Interviews were carried out from September 10 to 17, 2024. The questions were structured as in-depth interviews and focus group discussions on key environmental issues. The collected data were analyzed to identify challenges and propose solutions for sustainable development. The respondents' feedback was instrumental in understanding their perspectives on critical issues. The findings reveal that community-led initiatives have led to noticeable improvements in the village's ecological sustainability. Sustainable practices include an 11% improvement in waste management through proper garbage disposal. The water scarcity issue has been resolved through pond renovation, and the water scarcity problem has been resolved by 10%. There is a strong desire for the Divisional Secretariat to introduce water conservation techniques and infrastructure improvements to help the community adapt to these changes. Residents have reported illegal tree cutting, and the police have taken measures to secure sand soil excavation, reducing the offense by 8%. The saltwater intrusion into the village decreased after the construction of ditches and bunds along the coastal region. The perceived effectiveness of initiatives stands at 8%, indicating that there may be room

for improvement in this area. In conclusion, the case study has illustrated the potential for positive change when local communities take ownership of their environmental impact on the water scarcity issues in Ariyalai East Village. To ensure the long term success of these initiatives and policies, the authors recommend testing their sustainability by creating further entrepreneurship opportunities and increasing community involvement.

Key Words: bottlenecks, entrepreneurship, environmental issues, socio economy, sustainability

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IMPLEMENTING THE ePERSONAL FILE MANAGEMENT SYSTEM (ePFMS) FOR ENHANCED EFFICIENCY, SECURITY, AND ENVIRONMENTAL SUSTAINABILITY IN ORGANIZATIONAL FILE MANAGEMENT

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ABSTRACT

Efficient and secure file management is crucial for both organizational productivity and employee satisfaction, yet traditional paper-based systems can introduce delays, errors, and environmental burdens. The research introduces a model for ePersonal File Management System (ePFMS) to address these issues by implementing a digital solution for managing personal employee files from hiring through retirement. The ePFMS is designed to streamline file retrieval and processing, enhance data accuracy and security through automation and encryption, and reduce paper usage in support of sustainability goals.

This reserach examined the operational, environmental, and cost benefits of transitioning to a digital file management system, with objectives centered on operational efficiency, security, and eco-friendly practices. Key components include automated data validation, encryption, user-friendly interfaces for employees of all digital literacy levels, and integration with existing systems to ensure seamless workflow and regulatory compliance. Additionally, the proposed ePFMS is recommended to be built to scale, accommodating future organizational growth, and incorporates comprehensive training and support for employees. Through these features, the ePFMS can foster a more productive, secure, and inclusive work environment, ultimately supporting an efficient and environmentally responsible approach to file management within organizations.

Keywords: time management, efficiency, digitalization, data accuracy, accessibility, sustainability

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THE EFFECTS OF GOVERNMENT REGISTRATIONS ON THE PRODUCTIVITY GROWTH OF SMES IN THE FOOD SECTOR

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ABSTRACT

Business Name Registration (BNR) is the main regulatory requirement for starting a business in Sri Lanka. The food sector accounts for more than 40% of Sri Lankan SMEs. The research problem was assessing the impact of BNR on productivity growth in SMEs producing food products. Based on the same, this research examined government involvement in getting BNR for food sector SMEs and how it affects the productivity in Sri Lankan food sector. The main productivity issues in the food sector are as high food costs, safety concerns with value-added food products, environmental issues due to food packaging, and food wastage in the value chain. This scope of study was limited to Western Province, Sri Lanka

The study focused on SMEs that contributed the most to the consumable portion in the food industry, such as cereals, fruits, vegetables, fruit juice, bakery items, meat and fish shops and restaurants. A mixed methods approach was done, including quantitative analysis of regulatory compliance data and qualitative interviews with government officers and SME owners. A sample of 249 SMEs was drawn for the quantitative analysis. BNR procedure, food regulations established by the Ministry of Health, the role of the provincial council on SMEs registrations, and the premises registration of food industries by the Public Health Inspectors were qualitatively examined in this research. The efficiency of the above processes and technology adaptation were found out.

The findings indicated that the BNR process positively affects food related SMEs and its procedures significantly affect productivity growth in the food sector. Following the provisions of the Food Act, No. 26 of 1980 and the role of the public health unit are key to the success of the BNR. Evidence-based recommendations suggested by the researcher are developing a basic online data base to strengthen support mechanisms for maintaining a competitive business environment, maintaining safety standards, developing value-added food chains, and improving waste management practices in the food sector.

Keywords: BNR procedures, productivity, Food Act, food sector SMEs

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ADAPTION OF CIRCULAR ECONOMY AND PRODUCTIVITY USING THE R-STRATEGIES: A STUDY OF NALLUR DIVISIONAL SECRETARIAT'S USAGES

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ABSTRACT

A linear economy leads to excessive waste generation and inefficient resource use. By encouraging the reuse, recycling, and remanufacturing of products, the circular economy seeks to reduce the strain on natural resources and minimize waste sent to landfills. Therefore, this case study outlines the implementation of Circular Economy (CE) practices at the Nallur Divisional Secretariat Office, covering waste paper management, energy-saving initiatives, e-waste management, garbage management, community involvement, and environmental activities under the R-Strategies. A mixed-method approach was employed in this study, combining quantitative and qualitative methods. Data collection was primarily conducted through a structured online questionnaire to assess critical aspects of CE practices. The target population consisted of 358 staff members, with a high response rate aimed at ensuring meaningful feedback. The initiatives have shown promising results in promoting sustainability and responsible resource management within the office and the community. The Nallur Divisional Secretariat Office has implemented technology-driven solutions to reduce paper waste and improve operational efficiency. They have transitioned to electronic databases for digitizing records, forms, and official documents, integrated e-post and email systems for communication, and utilized social media and virtual meetings to minimize paper usage and promote resource efficiency. The office has implemented a "switch off" policy to encourage staff to turn off electrical devices when not in use. Awareness programmes were conducted to educate preschool children from 54 schools about proper garbage usage. The office has set up a waste paper collection system and ran campaigns to promote paper disposal. The office has significantly minimized paper consumption and improved operational efficiency by transitioning to electronic systems and integrating e-post and email communication. In addition, 20 entrepreneurs have been collecting plastic bottles and supplying them for recycling. The office also established a designated area for collecting electronic waste,

collaborated with certified e-waste recycling companies, and successfully recycled a significant amount of e-waste, generating cost savings. Additionally, the office engaged in community driven environmental activities and measures such as tree planting programmes in educational institutions and rainwater harvesting. The technology transformation at the Nallur Divisional Secretariat Office represents a significant step towards achieving sustainable development through resource efficiency, waste reduction, and environmental responsibility—implementing CE activities within the Nallur. Continuing efforts to promote CE practices, ongoing staff training, and expanding community involvement would be recommended to enhance the CE initiatives' effectiveness further.

Keywords: e-waste, recycling, reduce, repair, reuse

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WORK ENVIRONMENT FACTORS AFFECTING THE PERFORMANCE OF HOSPITAL STAFF: A STUDY OF THE REGIONAL DIRECTOR OF HEALTH SERVICE AREA, COLOMBO

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ABSTRACT

Work environment factors are the set of conditions under which an organization operates in the physical, social, and psychological domains. A supportive working environment is a key contributory factor for the performance of the employees particularly in the hospital settings, and it paves the way to ensure the quality of patient care. Regional Director of Health Service (RDHS) area, Colombo has eleven hospitals with 2023 staff and bed strength is 1510. This study assessed the factors existing in the hospital environment which affect the job performance of the hospital staff in RDHS area, Colombo.

A cross-sectional study was conducted in all hospitals with a sample size of 580. Sample size from each hospital was decided according to population proportionate method. Random generation number method was used to select participants from each category of staff. A pre-tested and validated self-administrative questionnaire with answers ranked by the Likert scale was used. Descriptive statistics, chi-square and one-way anova tests were performed to analyse the data.

The majority (82%, n= 475) of participants were satisfied with the facilities of dining, rest, sanitary, light and ventilation of the premises. However, only 15.8% (n=91) are satisfied with their salary and allowances disregarding the category of staff ($p= 0.410$). Moreover, 63% (n= 365) of participants were satisfied with their daily workload. The regular supervision was appreciated by majority of all categories of staff ($>68\%$). Further, 71% (n=145) of nursing officers mentioned that training programmes are needed to update their technical knowledge and

skills than other professions ($p=0.001$). Some categories of staff were unsatisfied with the opportunity to communicate official matters and grievances ($p< 0.05$). A satisfactory level of cooperative work is available only among 49.3% ($n=286$) of participants. The physical factors available in the hospital work environment are satisfactory, while certain psychosocial factors, particularly lines of communication and cooperative works, need to be improved. Moreover, in-service training should be conducted to address the needs of the staff, especially nursing category.

Key words: supportive environment, job satisfaction, health sector

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THE PRODUCTIVE ROLE OF BEACH BOYS IN ENHANCING SRI LANKA'S TOURISM INDUSTRY: A STUDY BASED ON THE HIKKADUWA AREA

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ABSTRACT

The Beach Boys play a crucial and integral role in the tourism industry of Sri Lanka. According to numerous scholarly studies, their contributions are often misunderstood and undervalued. They are frequently stereotyped as being involved in illegal activities such as sex work or drug dealing, a perception shaped by societal assumptions and media portrayals, though this is not consistently supported by evidence. This study seeks to explore the positive contributions beach boys make to the tourism sector and examines how their informal roles can be more productively integrated into the formal tourism industry.

The research focuses on Hikkaduwa, a well-established tourist area on the southern coast of Sri Lanka. A qualitative research approach was employed, with primary data collected through in-depth interviews and participant observations involving beach boys, tourists, and local stakeholders. Secondary data sources included relevant literature, media reports, and government documents on tourism and the informal labour sector. Snowball sampling was used to identify participants due to the marginalized status of beach boys. This study was primarily analysed qualitatively, as the issue pertains to socio-economic challenges. To ensure the rigor of the study, quantitative insights from tourism reports were also incorporated to provide a broader perspective on industry trends.

Findings reveal that a majority of beach boys, estimated at over 90%, come from disadvantaged socio-economic backgrounds, limiting their opportunities for formal employment in the tourism industry. Despite these challenges, many beach boys offer valuable services such as tour guiding, cultural interpretation, and logistical assistance to tourists. These services are highly appreciated by international visitors, with over 80% of interviewed tourists reporting that the beach boys significantly enhanced their overall experience. Additionally, many beach boys build long-term relationships with repeat visitors, contributing to positive word-of-mouth promotion and increased tourist loyalty.

The study highlights the need for targeted professional training and regulatory frameworks to integrate beach boys into the formal tourism sector. Recommended training programs include customer service, tour guiding, business management, and sustainable tourism practices. Beach boys' roles will need to be formalized through proper training and regulation, which will help unlock their full potential, contribute to a more sustainable and inclusive tourism industry, and strengthen Sri Lanka's reputation as a leading tourist destination.

Keywords: beach boys, tourism, productivity, informal tourism sector, socio-economic inclusion

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IMPROVING PUBLIC SERVICE QUALITY AND CREATING A CUSTOMER-FRIENDLY ENVIRONMENT AT THE DIVISIONAL SECRETARIAT

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ABSTRACT

Providing high-quality customer service is essential for government agencies, despite their non-profit nature. Improved service quality boosts productivity, reduces costs, and meets customer needs efficiently. In Sri Lanka, Divisional Secretariats, play a critical role in delivering public services, where customer satisfaction is directly linked to service quality. This study evaluated the impact of service quality on both customer satisfaction and the internal work environment at the Divisional Secretariat, with special reference to the Nallur Divisional Secretariat. By addressing the expectations of both internal (staff) and external (public) customers, the study fosters a more customer-centric service model. Data was collected using different methods, including face-to-face interviews (548 respondents: 390 satisfied, 140 partially satisfied, 18 not satisfied), questionnaires (31 responses: 14 satisfied, 14 partially satisfied, 3 not satisfied), suggestion boxes (77 responses: 48 satisfied, 23 partially satisfied, 6 not satisfied), and customer suggestion registers, for data triangulation. Analysis of data provided insights into aligning service delivery with customer expectations.

Additionally, the study examined the internal work environment, focusing on employee motivation and stress reduction through tailored initiatives. This approach fostered a more productive, harmonious workplace, which in turn improved service quality. The results serve as a model for Divisional Secretariats aiming to improve service quality and efficiency. The outcomes guide future efforts to strengthen public service productivity through customer feedback and internal employee well-being.

Keywords: productivity, customer service, service quality, work environment, methodology

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EXPLORATION OF BIODEGRADABLE BACTERIA TO ELIMINATE CADMIUM FROM THE HEAVY METAL CONTAMINATED WATER

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ABSTRACT

Cadmium Cd(II) is A non- biodegradable metal which bioaccumulates through the food chains. It also has a strong carcinogenic effect on humans. Even though There are chemical techniques to removal of Cd(II) from wastewater, they are limited due to high cost and very hard to implement in a country like Sri Lanka. Bioremediation is a process for removing or degrading pollutants from the environment. Bio remediation potentially uses to remove heavy metals such as Cd(II) from wastewater by using naturally occurring bacteria. This study aims to extract cadmium-degrading bacteria from the heavily metal-contaminated environment and investigate their efficiency of Cd(II) degradation. Therefore, water samples were collected from Beira Lake, Sri Lanka is known for its severe contamination with heavy metals. Water samples were collected from three different spots, and bacterial isolates were grown on Muller -Hinton agar (MHA) plates using the pour plate method with serial dilution. Bacterial strains were identified based on their morphological characteristics and gram staining. Isolated microbial strains were compared with *Pseudomonas aeruginosa* and *Bacillus cereus* pure microbial strains which have high ability to detoxify cadmium Cd(II). The Minimum Inhibitory Concentrations were determined by inoculating bacteria on Mueller Hinton Agar (MHA) plates containing varying concentrations of cadmium until the growth of the isolate was inhibited. MIC was determined at 37°C for 24h. To evaluate the effect of cadmium, the growth of each isolate was analyzed by using UV-spectrophotometer by taking absorbance at 600nm after 24h, 48h and 72h incubation. The minimum inhibitory concentration (MIC) for each bacterial strain is, respectively, *Pseudomonas aeruginosa*_ (500ppm –700ppm), > beire lake bacteria (1800ppm -2500ppm), > *Bacillus cereus*_ (500ppm- 600ppm). Furthermore, a biodegradation assay was performed to calculate the Cd(II)_degradation efficiency of each strain by using Atomic Absorption Spectrophotometer. According to the analysis report, bacterial strains isolated from Beira Lake

showed biodegradation capacities of 98.96%, 95.29%, and 96.67%, while *Pseudomonas aeruginosa* and *Bacillus cereus* showed respectively 91.29%, 82.62% degradation capacity. The study results concludes that the observed bacterial species exhibit resistance to Cd (II) and demonstrate efficient biodegradation. They can be utilized as a cost-effective, eco-friendly biosensor tools for the removal of Cd (II) from effluent and wastewater.

Keywords: bacterial-species, bioremediation, Cadmium (Cd(II)), Minimum Inhibitory Concentration(MIC), wastewater treatment

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HEALTH IMPACTS OF CLIMATE CHANGE AND THE ROLE OF BIOGAS GENERATION IN MITIGATING GLOBAL WARMING: INSIGHTS FROM IPESF 2023

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ABSTRACT

Climate change, defined as a statistically significant trend in climate parameters such as rainfall and temperature over several decades, has profound effects on planetary systems and public health. Biogas generation has been explored as a potential strategy to mitigate climate change by diverting methane emissions from landfills. However, methane, a significant contributor to global warming, remains a concern if there are leakages in biogas systems. A qualitative systematic review was conducted using PubMed and Google Scholar to identify published articles addressing the health impacts of climate change, the role of biogas in reducing greenhouse gas emissions, and abstracts presented at the Indo-Pacific Environmental Security Forum (IPESF) 2023.

Climate change contributes to increased mortality and morbidity from non-communicable diseases, exacerbates public health issues, affects mental health, and increases the risk of civil unrest. Collaborative efforts at scientific, governmental, and policy levels are crucial for addressing these public health challenges. Populations most vulnerable to climate change require targeted interventions to mitigate adverse health effects.

Biogas generation, while a potential alternative energy source, faces challenges due to concerns over methane leakage and CO₂ emissions during combustion. Nevertheless, it has proven effective in reducing emissions from organic waste through anaerobic digestion. The case study presented at IPESF 2023 highlighted a reduction in liquid petroleum gas (LPG) and fossil fuel consumption by 1,683.75 kg per month from January to July 2022 compared to the same period in 2021. Additionally, 300 litres of liquid bio-fertilizer per month were used for organic

agriculture, contributing to sustainability. The average methane (CH₄) emission reduction was calculated at 17,793.75 kg, with a CO₂ emissions prevention of 56,768.20 kg per month.

Climate change is an emerging public health issue, and biogas generation, despite its challenges, offers a promising solution for reducing methane and CO₂ emissions. However, further advancements in technology and policies are necessary to maximize its benefits.

Keywords: climate change, public health, biogas generation, methane emissions, greenhouse gas mitigation

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ADVERSE HEALTH EFFECTS OF MARINE PLASTICS AND MITIGATION: A SUCCESS STORY

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ABSTRACT

Plastic waste degradation generates micro (MP) and nano-sized plastic particles (NP), causing critical environmental and health issues. These particles, more harmful than macro plastic pollution, pose significant risks to aquatic ecosystems and human well-being through bioaccumulation and bio magnification in the food web. Adverse effects include physical harm, malnutrition, disrupted feeding behaviours, and impaired reproduction in marine species. A qualitative systematic review was conducted using PubMed, Google Scholar articles on the harmful health effects of marine plastics.

Sri Lanka Navy's (SLN) monthly beach cleaning project, removed 5,409 kg of plastic waste in 2021/22 from the east coast of Sri Lanka, in collaboration with civil-military partnerships. Notably, 100% of the suitable marine plastic was recycled through a technical partnership with Eco-Spindle Private Limited, adding economic value to the process.

Recent studies have identified MPs in human stool samples, indicating that humans are exposed to MPs through food and drinking water. While research on the health effects of MPs and NPs remains limited, they are suspected to cause toxicity through physical and toxicological effects, serving as vectors for harmful substances. Potential health impacts include the dysregulation of molecular pathways, disruption of gut microbiota, and the induction of epigenetic changes and metabolic disorders. Physical damage, increased intestinal permeability, and local inflammatory responses are also noted concerns.

MPs and NPs may have significant adverse health outcomes. Recycling efforts, such as the SLN beach cleaning project, offer effective mitigation strategies to ensure water and maritime environmental security.

Keywords

Plastic waste, toxicological effects, micro plastics, recycling, marine environment

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