DEVELOPMENT OF A SUSTAINABLE MODEL FOR OPERATION OF WASTE TO ORGANIC FERTILIZER FACILITIES IN SRI LANKA

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Thesis/Dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Engineering in Energy Technology

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March 2025

DECLARATION

Under the guidance of Prof. P.G. Rathnasiri and Dr.(Mrs.) MMID Manthilake I have completed the below thesis.

I would like to declare that I have not submitted this report in whole or in part, to any university or other institution, for the purpose of earning another degree or diploma.

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ACKNOWLEDGEMENT

I would convey my special gratitude towards Prof. PG Rathnasiri from the Chemical and Process Engineering Department and Dr.(Mrs.) M.M.I.D. Manthilaka from the Mechanical Engineering Department of University of Moratuwa, for providing me with valuable supervision for this research project.

I also would like to thank Dr H.K.G. Punchihewa (former Energy Technology course coordinator) and Dr.N.A.I.D Nissanka (current course coordinator) from the Department of Mechanical Engineering, who guided me throughout the course. Further, I would like to extend my gratitude to the Mechanical Engineering Department staff including Mr.Sandanayake, Mr.Upul and Ms. Udari.

I am thankful to all the Site Managers of all organic fertilizer facilities, Dikowita, Karadiyana, Pohorawatta and Horana site and Ms. Priya from Western Province Waste Management Authority who immensely supported me during my research.

Further my Gratitude extends to Ms.Vilka Gangodawila, Deputy Director from Central Environmental Authority and other officials who supported me during and after my visits. I thank Ms. R.M Ranasinghe, Assistant Director from the Ministry of Environment and all other officials who provided information and documentaries. I am grateful to all the companies, hotels, household and local authority officials, including Mr. Wasantha from Dehiwala Mt-Lavinia Municipal Council, who spent their valuable time answering my questions, interviews and providing me necessary information. Finally I thank all the participants who completed the questionnaire and provided me feedback on their problems and methods of waste management.

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ABSTRACT

This study was conducted to create a sustainable operational model for waste-to-organic fertilizer (W2F) facilities in Sri Lanka, while providing a solution to related issues of waste management and organic fertilizer production from Municipal Solid Waste (MSW). The aforementioned study mainly focused on identifying key determinants for the success or the failure of composting facilities, assess the existing practices, and propose an integrative model that goes a long way in improving the sustainability, by enhancing bearability to the environment, equitability to society and economic viability aspects of such facilities.

The adopted methodology includes field visits to existing composting sites ranging from data collection, through interviews with key stakeholders to the detailed assessment of operational practices in-existing facilities. Waste handling, composting process, regulatory and policy framework were assessed in great depth. Best practices from around the world were reviewed and compared with local conditions concerning solid waste management and organic fertilizer technologies.

Among key findings were critical operational issues encompassing lack of source segregation of waste, inadequate infrastructure and environmental pollution. This study established that public skepticism regarding the quality of compost produced from MSW, poses a challenge. It emerged from the findings that most of the composting facilities which were studied, operate without the required Environmental Protection Licence, further fueling public grievances. The study made a conclusion that for sustainable operations of composting, there must be stringent regulations, implementation of quality management systems, standardization, adequate infrastructure and investment. Community participation, small-scale facilities located within the local government, environmental protection measures and managing human resources throughout the supply chain are main pathways for success. The study proposes the introduction of a compost quality certification scheme, pollution control measures, use of economic instruments with polluter pays principle and traceability through a batch identification system. Limitations of the study are the focus on the MSW composting process, limited geographical coverage of the study (Western Province), and lack of financial data on operational costs.

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LIST OF ABBREVIATIONS

Abbreviation	Description
CEA	Central Environmental Authority
EPL	Environmental Protection Licence
FMEA	Failure Mode and Effect Analysis
GHG	GreenHouse Gas
HARTI	Hector Kobbekaduwa Agrarian Research and Training Institute
JICA	Japan International Cooperation Agency
MSW	Municipal Solid Waste
NGO	Non-governmental organization
NDC	Nationally Determined Contributions
UDA	Urban Development Authority
US EPA	United States Environmental Protection Agency
WPWMA	Western Province Waste Management Authority
W2F	Waste to Fertilizer

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