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The Effectiveness of the Existing Waste Management Practices in Hostels of the University of Peradeniya

S. M. D. N. K. Senavirathna, Marshals Division, University of Peradeniya,
nilusenavirathna@gmail.com

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Abstract

The University of Peradeniya is one of the oldest and largest residential and the most beautiful Universities in the country. Its environmental and aesthetic beauty is one of its identities. But the Solid Waste has been a significant and harmful challenge to the beauty of the University. Therefore, it is identified that Solid Waste has become a free dominant environmental, social, aesthetic, and economic issue on the premises of the University of Peradeniya with the growing residential student population in hostels, changing the lifestyle and consumption patterns and the rapid development in every aspect of the University community. It is essential to find a sustainable solution to overcome this issue because the daily Solid Waste generation has increased rapidly day by day. If Solid Waste can be managed properly with best practices, very few negative impacts come out. Currently, Solid Waste has become a big issue at the University of Peradeniya due to Existing Solid Waste management practices. Therefore, the Existing Solid Waste management practices should be evaluated to find a sustainable solution for this issue. By focusing on the above matters, this study

mainly targeted to evaluate the effectiveness of the existing Solid Waste Management practices in residential hostels in the University by using SWOT analysis. Further, it focused on proposing proper and sustainable strategies to overcome this issue and implement an eco-friendly sustainable solution. A mixed method of data collection has been used in this research and SWOT analysis was used as qualitative analysis. Both primary & secondary data were used for SWOT analysis. According to the SWOT analysis, it is identified that the existing Waste Management practices are inefficient. Therefore, sustainable strategies are proposed to minimize waste generation and to maintain a sustainable and eco-friendly solid Waste Management mechanism within the University hostels.

Keywords: Solid Waste, Solid Waste Management, SWOT Analysis, University of Peradeniya

Introduction

With the increasing residential student population in hostels, changing lifestyle and consumption patterns, and the rapid development in every aspect of the University community, Solid Waste Collection has become a free dominant environmental, social, aesthetic, and economic issue in the premises of the University of Peradeniya. Solid Waste is a range of garbage produced by human and animal activities that are discarded as unwanted and useless. Solid Waste Management is defined as the discipline associated with the control of generation, storage, collection, transport or transfer, processing, and disposal of solid waste materials in a way that best addresses the range of public health, conservation, economic, aesthetic, engineering, and other environmental considerations (Sasikumar and Krishna, 2009).

The normal practice of Solid Waste Management at the University of Peradeniya was collecting and dumping Solid Waste in a nearby abandoned land area in Udaperadeniya, river banks in the river Mahaweli on University premises, resulting in many environmental and health problems as well as negative impacts in the area. Some dumping sites are very close to the streams or waterways and the

Udaperadeniya Village area and the water is also getting polluted. Solid Waste Management is not just collection and dumping; it is defined as the systematic administration of activities that provide for the collection, source separation, storage, transportation, transfer processing (including recycling) treatment, and disposal of Solid Waste (Nemerow, Agardy, Sullivan, Salvato, 2009: 179).

Although the University of Peradeniya has sufficient resources such as intellectuals who have sound knowledge and experience in waste management, financial capabilities, land, and manpower to nicely manage the Solid Waste within the University premises and minimize the harmful impacts created by the waste in the University, Still it is not properly established and implemented a sustainable Solid Waste Management mechanism within the University to minimize negative impacts of it and implementing an efficient Waste Management practices.

When considering the existing Solid Waste Management practices in the University, only a few hostels are being practised correctly, only a few are functioning up to some extent and some are neglected or abandoned. It is not implemented properly owing to the following reasons. No proper adaptation, no observations, and actions against those who don't follow the product, more open access everywhere within the University, and sometimes due to financial capabilities are caused by those practices.

According to the generally accepted concept of Solid Waste Management hierarchy, priority is given to changing the behavior of people, minimizing waste generation, and achieving zero landfills. The primary goal of Solid Waste Management is reducing and eliminating adverse impacts of waste materials on human health and the environment to support economic development and superior quality of life. This is to be done in the most efficient manner possible, to keep costs low and prevent waste buildup (Rick LeBlanc, 10/27/20). Therefore, the most repairable method is waste prevention or minimizing the collection in hostels by introducing sustainable Waste Management techniques by enacting a legal framework in hostels.

This study is targeted to encourage the establishment of a sustainable, efficient Solid Waste Management mechanism in the University hostels. Finally, the study aims to encourage the University community to reduce the daily Solid Waste generation, implement and adopt well-established Solid Waste Management practices within hostels, and restrict outsiders from bringing and dumping their waste within the University premises to bestow a sustainable and harmless environment for our future generation to create a most environmental friendly environment, to produce most intellectuals from this University to bring our country to the top of the development as environmental friendly community. The University of Peradeniya has bestowed world-recognized intellectuals and professionals such as doctors, engineers, professors, scientists, authors, astrologists, artists, and teachers to solve the world's problems. But still, it was unable to pay attention to solve the problems of Solid Waste within the University premises especially in hostels by using the above resource persons. If Solid Waste can be managed properly with best practices, very few negative impacts come out. Solid Waste has become a free dominant environmental, social, aesthetic, and economic issue on the premises of the University of Peradeniya up to now. Existing Solid Waste management practices are the main reasons for that. Therefore, the Existing Solid Waste management practices should be evaluated to find a sustainable solution for this issue. It was evaluated in this research by using SWOT analysis. Residential hostels are the major points where highly Solid Waste is generated daily. Therefore, this study aims to persuade or motivate students and the University community to practise Waste Prevention or reduce Waste Generation within the hostels and aims to encourage establishing a sustainable, efficient waste management mechanism in the University hostels.

Literature Review

There is ample evidence that the ancestors paid attention to and respect the environment where the human-environment relationship is concerned. The man had to interact with the environment to fulfil his necessities. With time, he started exploiting natural resources almost to the fullest extent. This led to irregular

environmental changes. The ultimate result of the exploitation of natural resources by humans was environmental pollution.

With the recognition of the importance of minimizing pollution of natural resources, much attention has been drawn to the management of Solid Waste; waste which results in the pollution of the whole environment including the hydrosphere, atmosphere, and lithosphere. As a result of growing awareness and inclination towards the necessity of Waste Management, an increase in research and studies on the field of Solid Waste Management can be identified. As a result of this trend at international, regional, and country levels, the literature on the field of Solid Waste Management is flourishing with conferences, reports, studies, and research etc. on this subject.

Several international studies on solving Solid Waste related issues have been used for this research. Charles R. Rhyner, Leander J. Schwartz, Robert B. Wenger, Mary G. Kohrell have researched on the topic of "Waste Management and Resource Recovery" published in Boca Raton in 1995 is one of them. This study discusses in detail the waste management problems and issues faced by modern society. Scientific, technical, and environmental principles are emphasized to illustrate the processes of municipal and industrial solid wastes and liquid wastes, and the nature of impacts resulting from waste dispersal and disposal in the environment. Economic, social, legal, and political aspects of waste management are also addressed. Environmental issues and concerns receive thorough coverage in discussing waste reduction, resource recovery, and efficient and practical waste disposal systems. Other specific topics include recycling, physical and chemical processing, the biological treatment of waste solids, incineration, pyrolysis, energy recovery, hazardous wastes, and landfill management. The role of government and other institutions in waste management and resource recovery matters is also detailed. This research is a great source of the knowledge required for the research on Waste Management.

Kuruppuge and karunarathna (2014) study based on “Issues in Management of Municipal Solid Waste: Institutional Capacity of Local Authorities in Sri Lanka” have mentioned that the reforms introduced in 1978 following the introduction of trade liberalization had changed socio-economic development in Sri Lanka. It has caused an increase in urbanization and urban population, economic growth, and improved living standards of people in Sri Lanka. The above researchers pointed out that urbanization, the rapid development of urban infrastructures, and public services have resulted in a significant increase in the quantity and characteristics of Municipal Solid Wastes (MSW) during the last 36 years in their research. Further, they have mentioned that in Sri Lanka, MSW collection, transportation, and disposal fall into the scope of the local authorities (LA’s); such as Municipal Councils, Urban Councils, and Pradeshiya Sabha. They have studied the present status of Municipal Solid Waste (MSW) Management by Local Authorities (LA) of Sri Lanka was assessed via a comprehensive survey to identify the lapses in legislation, management, and implementation. When reviewing their research on Solid Waste in Sri Lanka has become a considerable environmental, and social issue in Sri Lanka. The development in all socioeconomic and environmental aspects and rapid urbanization as well as the population growth mainly caused Solid Waste problems in municipal areas in Sri Lanka. Therefore, they have done research in municipal areas in Sri Lanka.

Silpa Kaza, Lisa Yao, Perinaz Bhada-Tata, Frank have done a study on “*What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050*”(2018). The report “A Global Snapshot of Solid Waste Management to 2050” indicated that the world generates 2.01 billion tonnes of Municipal Solid Waste annually, with at least 33 percent of that extremely conservatively not managed in an environmentally safe manner. Worldwide, waste generated per person per day averages 0.74 kilograms but ranges widely, from 0.11 to 4.54 kilograms. Though they only account for 16 percent of the world’s population, high-income countries generate about 34 percent, or 683 million tonnes, of the world’s Waste. Further, they pointed out that, when looking

forward, global waste is expected to grow to 3.40 billion tonnes by 2050, more than double population growth over the same period. Overall, there is a positive correlation between waste generation and income level. Daily per capita waste generation in high-income countries is projected to increase by 19 percent by 2050, compared to low- and middle-income countries where it is expected to increase by approximately 40% or more.

A very important point that they have mentioned is Waste generation initially decreases at the lowest income levels and then increases at a faster rate for incremental income changes at low-income levels than at high-income levels. They predicted that the total quantity of waste generated in low-income countries is expected to increase by more than three times by 2050.

Jensen and Christensen (1986) conducted a study on Waste Management Incorporating Modern Technology. The study titled "Solid and Hazardous Waste Disposal Site Selection Using Digital Geography Information System" focuses on selecting an optimal site for waste disposal using GIS technology. This research can be identified as an important geo-scientific study that can be the basis for a study on the environmental, social, and economic impacts of dumping sites.

In addition to the above, "Encyclopaedia of Environmental Pollution and its Control" by G.R. Chatwal et al, published in India in 1945, is an important document where Waste Management is concerned. This sheds light on 'Advanced Treatment' Applicable for Modern Day waste. Although first and second treatments remove biological substances, physical and chemical substances are not thus removed. This study focuses on treatments for such matter and recycling waste using scientific and technological methodologies, which are also applicable for water treatment. This is useful when suggesting strategies for sustainable Solid Waste Management, which is an objective of this study.

The research on "Solid Waste Pollution" by P.R.Trivedi and Raj Gurdeep, published in 1992, shows that Solid Waste can be hazardous. People consume food, and the waste

produced is absorbed into the soil. With the Industrial Revolution, more and more people concentrated in urban areas. Higher population density in these areas resulted in higher levels of waste, and the study discusses the environmental problems occurring due to this scenario. These researches focused on evaluating the existing Solid Waste management practices in hostels of the University of Peradeniya and how effective solid waste management practices are.

A book by C.S. Rao, "Environmental Pollution Control Engineering" concentrates on Solid Waste Management. It discusses the generation of solid waste through domestic, commercial, industrial, and agricultural activities and the increase in degradable Solid Waste with increased earnings. Furthermore, it also analyses the composition of solid waste from 05 Indian cities. It also discusses the ability of solid waste to generate biochemical energy, how waste can cause ailments in humans, and waste collection and disposal methods. This study is important from an engineering and scientific point of view. Since this research focuses on evaluating the existing Solid Waste management practices in hostels of the University, composition waste, and sustainable methodologies of waste management, this study is relevant to my study to a certain extent.

Accordingly, it is evident that various experts have conducted research on Waste Management but from different points of view. These may be, for example, a social or materialistic point of view. All scopes must come together under the phenomenon of sustainability. Hence, the importance of the study can be identified from a geographical point of view based on time and space. Accordingly, I wish to introduce new knowledge while paying more attention to evaluating the effectiveness of existing Waste Management practices in the hostels of the University of Peradeniya.

When considering the Solid Waste issues in Universities, the number of University students has rapidly increased up to now. But the land and the other resources have not been developed in parallel. Therefore, Solid Waste Management has become a big issue in Sri Lankan Universities as well as the University of Peradeniya.

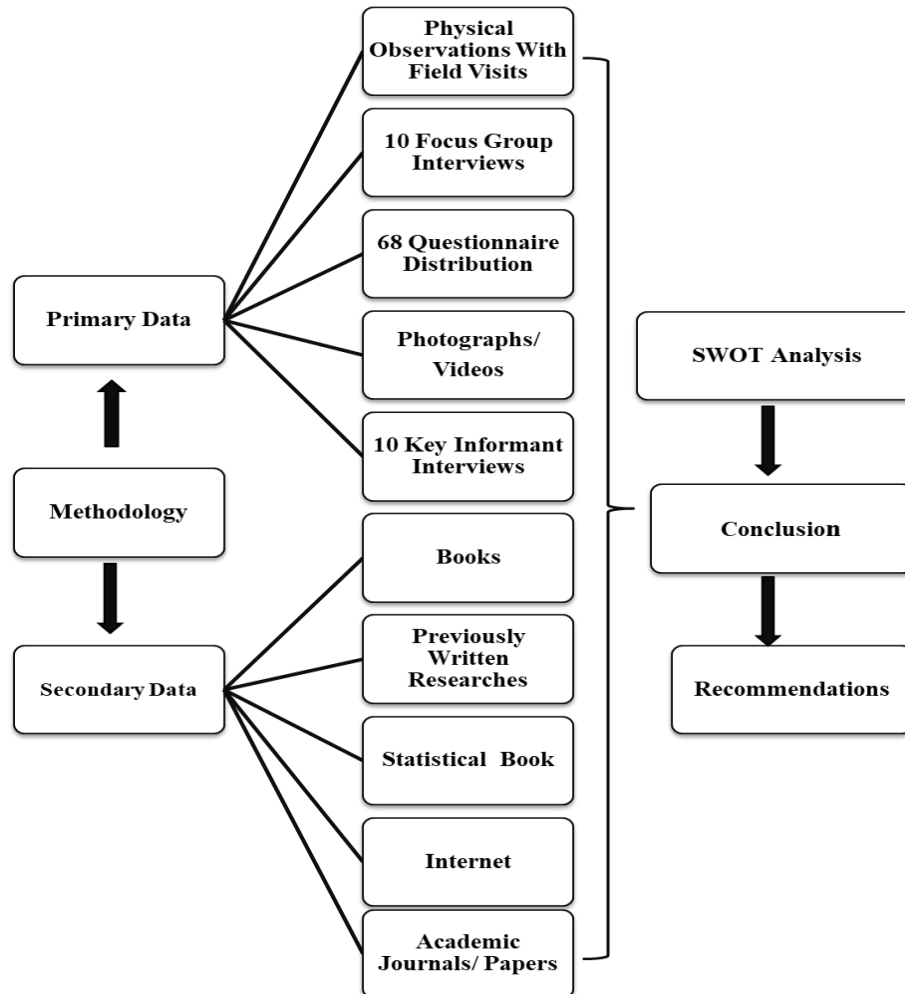
According to the literature review, many researchers have done their research on the topic of Solid Waste Management and its effectiveness in different areas, municipal councils, and Universities in Sri Lanka.

However, According to the knowledge and understanding of the researcher there is a dearth of research on the topic of Solid Waste Management and its effectiveness in the hostels of the University of Peradeniya. Therefore, a research gap was found in the research cycle to conduct valuable research on a current problem at the University of Peradeniya.

Objectives of the Research

- Evaluate the effectiveness of existing Solid Waste Management practices in hostels of the University of Peradeniya by using SWOT analysis.
- Propose proper and sustainable strategies to better Solid Waste Management practices in hostels.

Figure 1: Data Collection Methods



Source: Constructed by the Researcher, 2022

The effectiveness of existing Solid waste management practices in hostels at the University was analyzed by using SWOT as a qualitative analysis. Both primary and secondary data sources were used to evaluate the effectiveness of existing Solid Waste Management practices in hostels and examine the current status of Waste Management practices in hostels of the University of Peradeniya by using SWOT analysis. Secondary data sources such as thesis, research on the above topic, statistical data, background

information, Map information of the study area, and data on selling quantities of recyclable Solid Waste of the University were used for this study.

Five methods of data collection were used in this research including physical observation with field visits, questionnaire distribution, reviewing literature, such as books, academic journal papers, and previously written research, Focus interviews, and Key informant interviews. During the field visits, photographs and videos were taken from some Solid Waste collection points and dumping sites. Transportation mechanisms and activities in the Solid Waste Management Center at the University were also observed. There are altogether 24 hostels for both girls and boys which provide 65% of residential facilities for all students besides second years in each facility in the University. This study is based on 17 hostels including 9 boys' hostels and 8 girls' hostels in the University of Peradeniya. All these hostels are on the University premises and 3,091 undergraduates can be accommodated in all boys' hostels and 4,792 girls can be accommodated in girl's hostels. In this study, Ediriweera Srachchandra & Gunapala Malalasekara halls are considered as one hostel, but now it is considered as two hostels for administrative purposes.

Aq 40 hall and Jayathilake hall hostels are closed due to renovations. Mahakanda hall is a newly built hostel therefore it was not completely furnished during the study period. Sangaramya and Kehelpannala are bhikkhu hostels. Mahailuppalama girls' hall and boys' hall are out of the University premises. Therefore, besides these 6 hostels, 17 hostels which consist of 8 girls hostels such as Ramanathan hall, Sangamitha hall, Sarasavi Medura hall, Ediriweera Srachchandra & Gunapala Malalasekara hall, Hilda Obesekara hall, Sarasawi Uyana hall, Wijewardaha hall, Lalith Atulathmudali and 9 boys hostels such as Akbar hall, Ivor Jennings, Marrs hall, Hindagala hall, Arunachalam hall, James Peries, Marcus Fernando hall, New Akbar hall, Senaka Bibile hall were taken as the study population for this study out of 24 hostels. The Purposive sampling method was used for this research because the population is small, and the other reasons are, the number of students accommodated in a hostel and the sizes of the hostels are different from each other.

On one hand, if one of the other sampling methods was used, it would not represent the whole population. On the other hand, it is very difficult to accurately generalize the existing Solid Waste Management Practices in hostels by taking samples. Therefore, the purposive sampling method was used for this study.

Ten key informant interviews were conducted to collect primary data for this study which consisted of a group of laborers who were allocated to the Health Centre of the University of Peradeniya for the duties of Solid Waste Management, employees of the Solid Waste Management Centre of the University, Some laborers of private cleaning services who allocated for University hostels, some permanent employees of the University carder were interviewed to collect more information on existing Solid Waste Management practices in University hostels. A questionnaire survey has been done to collect data. Four employees from one hostel including the sub warden, the cleaning supervisor of the hostels labourers on waste-related activities in the hostels, and laborers who engage in duties in compactor used to collect and transport Solid Waste from hostels were selected for the questionnaire survey. A questionnaire survey was done by taking four employees from one hostel including the above described categories who are responsible for handling Solid Waste activities in hostels in all hierarchies. Altogether 68 questionnaires were distributed to collect data for this study.

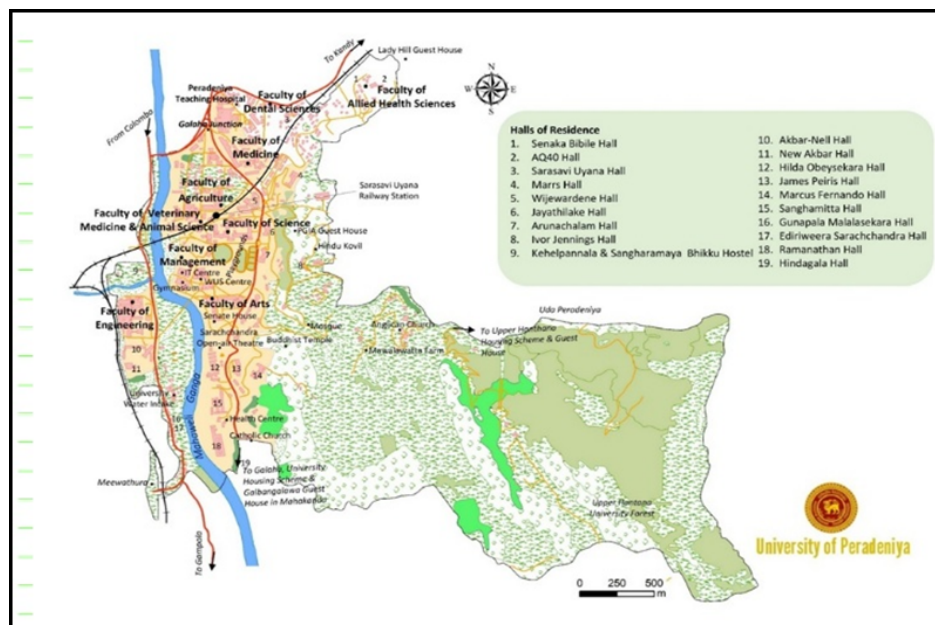
Field observations have been done in all 17 hostels and their canteens, the Upper Hanthana sanitary waste dumping site, the Waste Management Centre at the University, the river bank area of the river Mahawali, and garbage rooms of hostels and many unnecessary Solid Waste dumping points in University premises were observed in this field observations and photographs and videos related to existing Solid Waste Management practices were taken at a suitable point which connected with to this study.

Furthermore, relevant information on Solid Waste Management in hostels was also extracted from reports of the University Health Center and literature such as books,

academic journal papers, and previously written research on Waste Management. Other secondary data included documents taken from the institutional reports of the University and the explicit selection of specific interviewees to get Complete insight into the whole Solid Waste Management system in the hostels of the University. Those were formal face-to-face focus groups and key informants' interviews, and they have a relatively in-depth understanding of the Solid Waste Management practices in hostels of the University premises. Moreover, laborers at the Solid Waste Management Center were interviewed. The effectiveness of existing Solid Waste Management practices in both male and female hostels was evaluated by using SWOT analyses with primary and secondary data as qualitative analysis.

It is mainly focused on evaluating the effectiveness of the existing Solid Waste Management practices in hostels by using the SWOT analysis of the University of Peradeniya and proposing proper and sustainable strategies for Solid Waste Management practices in hostels at the University.

Figure 2: Study Area



Source: Statistical Report of the University of Peradeniya, 2019

Result and Discussion

Current Status and Responsibility of Solid Waste Management in Sri Lanka

It is useful to consider the background of Solid Waste Management in Sri Lanka. Sri Lanka generates 7000MT of Solid Waste per day. Each person generates an average of 1-0.4kg of waste per day (<https://efl.lk/status-waste-management-srilanka>). Western Province contributes to nearly 60% of waste generation. According to the Waste Management Authority and the Central Environmental Authority, only half of the waste generated is collected.

Waste collection and disposal responsibilities are vested with the local authorities of the particular Divisional Secretariat, either a municipal council (as per the Municipal Councils Ordinance -1947), Urban Council (Urban Councils Ordinance – 1939), or Local Council (Pradeshiya Sabha Act – 1987). Provisions related to Waste Management and disposal, are made under the National Environmental Act No.47 of 1981 and Public Nuisance Ordinance.

There are many institutions concerned with Waste Management at different stages in Sri Lanka, including the Ministry of Local Government and Provincial Councils, the Ministry of Mahaweli Development and Environment, the Ministry of Megapolis and Western Province Development, the Central Environmental Authority, Urban Development Authority, National Solid Waste Management Support Centre, Western Province Waste Management Authority, Local Authorities.

For the last 20 years or so, government institutions have attempted to figure out the best waste management strategy for the country. While some policies and actions supported sanitary landfills, some initiatives were driven towards waste-to-energy projects. Further in 2008, CEA initiated a 10-year Waste Management Programme named “Pilisaru Programme” with the goal of “Waste Free Sri Lanka by 2018”. Unfortunately, the lack of an integrated strategy (unified coherent strategy) has led to

inconsistent and ineffective practices (<https://efl.lk/status-waste-management-srilanka>).

Solid Waste Management has become a critical social, economic, and environmental problem in Sri Lanka up to now (Muller, 2002). The failure to address this escalating issue promptly resulted in unsanitary eyesores in Karadiyana, Bluemendhal, Meethotamulla, and Kolonnawa, and the degradation of wetlands, coastline, rivers, and other streams which become dumping sites for plastic and polythene waste, and other mixed waste. With mountains of the garbage accumulating at Bluemendhal and Meethotamulla, on the 14th of April, Sinhala Hindu New Year dawned with the burst of Meethotamulla Garbage Mountain, killing 30 people and destroying more than 100 houses.

According to the available data of the modern information society, it proved that the tasks of Solid Waste Management have been complex technical challenges at present. These challenges bring a variety of administrative, economic, and social problems that must be managed and solved for society as well. *Solid Waste Collection and Disposal* have become major *environmental* issues in *Sri Lanka* and the common practices adopted by the public and some local authorities are dumping *garbage* on roadsides and sensitive areas such as wetlands, marshy lands, and reservations are related issues with that. Reducing and eliminating adverse impacts of waste materials on human health and the environment to support economic development and superior quality of life is the primary goal of Solid Waste Management. Rick LeBlanc pointed out in his research that, It should be done in the most efficient manner possible, to keep costs low and prevent waste buildup (Rick, 2020).

Whether individuals personally manage their waste or the government or local governance authorities provide waste management services to their cities and societies, Solid Waste Management affects every single person in the world and every ecosystem in the earth. Therefore environmentalist, governments, local authorities, and people pay attention to Solid Waste Management, and the World Bank estimate

that waste generation will increase from 2.01 billion tons in 2016 to 3.0 billion tons in 2050 (The World Bank, 2019) due to several factors, such as population growth, urbanization, and economic growth, as well as consumer shopping habits. At least 33% of this waste is managed globally today through open dumping or burning (The World Bank, 2019). Projected generation of Municipal Solid Waste worldwide from 2016 to 2050 (in billion metric tonnes) report's statistics represents the amount of Municipal Solid Waste generated worldwide in 2016 with projections for 2030 and 2050. It has been Projected generation of Municipal Solid Waste worldwide from 2016 to 2050 indicated that it is projected that in 2050, some 3.4 billion metric tonnes of Waste generation have increased massively around the world in recent decades, and there are no signs of it slowing down. By 2050, worldwide Municipal Solid Waste generation is expected to have increased by roughly 70 percent to 3.4 billion metric tonnes (The World Bank, 2019).

Historical Background of Solid Waste Handling and Management Practices at the University of Peradeniya

All types of Solid Waste of the University of Peradeniya have been dumped into the Mahaweli river bank area situated behind the gymnasium of the University from the beginning of the University to the year 2005. That was the normal practice of Solid Waste Management on the University premises which continued for a long time. The Health Centre of the University has been handling this matter from the beginning of the University. All Solid Waste was collected by using a University tractor and dumped in the above-mentioned areas. When Solid Waste was collected as little heaps, It was practiced to dig a sudden pit in that area, put collected garbage into that and close it with soil by using a backhoe.

Occasionally, the heap of Solid Waste collected on the river bank was burnt by labourers who engaged in waste removal activities. Then there were complaints from the officials of the gymnasium regarding that practice because the ash of burning Solid Waste had mixed into the swimming pool of the gymnasium. Then that practice

was stopped according to the instructions given by the registrar of the University during that time.

Then the solution was to dump collected Solid Waste into a selected place in the Upper Hanthana area, where the University Guest house is located. It was practiced for two years.

Then it started to dump University Solid Waste into the Gohagoda Solid Waste Dumping Site from 2007 to 2015. The University has to pay a fee for dumping waste there to the Kandy Municipal Council each Rs.5000/= per load. The monthly Solid Waste dumping fee of the University was approximately 1.5 lakhs. The Rotary Club donated a tractor to the University for transporting Solid Waste before 2015, and it was used up to 2015. After breaking down, it has not been repaired up to now, and it is in the garage of the University Health Centre which is below picture 1.

Picture 1: The tractor donated by the Rotary Club to the University for transporting SW which is at the garage of the UHC now due to breakdown



Source: Survey Data, 2022

In 2015, world people as well as Sri Lankans were also concerned about the concept of Solid Waste Management issues. According to that, the Kandy Municipal Council had ordered the University that Solid Waste should be separated and dumped into the Gohagoda dumping site.

According to their instructions, a committee was appointed under the Chief Medical Officer of the University to look into this matter. They have started an awareness programme on that matter to make the University community aware of separating their Solid Waste and dumping it. With that programme, Central Environmental Authority (CEA) has introduced some buyers to the University who buy recyclable Solid Waste from the University. Solid Waste separation and dumping practices started in that way within the University. Solid Waste bins for paper, polythene, plastic, and waste food were introduced to the University in 2015. Residual Waste was dumped in the Upper Hanthana area again.

After that, some Solid Waste handling practices were introduced to the University in 2015 and implemented at the end of 2016. That practice was established within the University with the guidelines of CEA and their practice and the Director of CEA in Central Province has come and introduced that to the University with the coordination of the above committee.

A building was established for solid sorting and separations in 2016 next to the present Sarasavi Medura hostel area opposite the Meewathura water treatment plant. Now the University Community calls it the Waste Management Centre.

That centre was mainly established to sort the unsorted Solid Waste there and store recyclable solid waste such as paper, cardboard, plastic, glass, and polythene till buyers buy them. All collected Solid Waste is unloaded there and separated there.

After separating the residential Solid Waste, transport and dump them into the Upper Hanthana area again. But one of the former DVCs of this University, prof. S.K. Hennayake, who had accommodation facilities near the Upper Hanthana area,

strongly objected to this practice and stopped dumping Solid Waste in the Upper Hanthana area in 2017.

Then again Solid Waste has been a huge problem for the University and as a solution, a pit was dug near the Waste Management Centre and dumped there and closed by the time when it became a heap by using a backhoe.

That practice was observed by the Meewathura water board officials, and they have objected. Then that area also was prohibited from dumping garbage. Then a quarter's area near Kuringi Kumaran Kovil was selected to put Solid Waste and dug a pit by using a backhoe. It failed in a very short period due to employees who live in quarters in that area having highly objected to dumping Solid Waste in that area. Therefore, again all residual and sanitary waste of the University has been dumped in the Upper Hanthana area up to now. The below picture shows the present condition of that dumping site.

Picture 2: Upper Hanthana dumping area for all residual SW and sanitary



Source: Survey Data, 2022

Picture 3: The compactor which is used in the University from



Source: Survey Data, 2022

Picture 4: The Belling Machine is at the WMC



Source: Survey Data, 2022

A compactor was bought by the University in 2015, and it has been used up to now. Above picture 3 shows it. A belling machine was also bought into the Waste Management Centre (WMC) and is shown in above picture 4 which can be used to pack papers, cardboard, and plastic polythene into bulk.

Existing Solid Waste Handling and Waste Management Practices in University Hostels

Solid Waste separation and dumping method was introduced to the University hostels by the Health Centre under the supervision of the Chief Medical Officer (CMO) and this procedure is monitored by PHIs at the Health Centre. Accordingly, three types of Solid Waste bins are introduced and located in hostels such as plastic/polythene, waste food, and paper. There are selected places in hostels to keep them and there are Solid Waste collecting rooms (garbage rooms) in hostels where there are above-separated bins.

When considering girls' hostels, some girls separate their Solid Waste and dump it properly into the bins. This practice should be implemented and monitored by the full-time Sub Wardens of the hostels. According to my observations, students still have not adapted to this practice, and they don't sort their waste and not dump it properly into the correct bins. This practice is not properly implemented and monitored by the responsible officials. Some follow the correct practice but not the majority.

All types of Solid Waste are not separated and dumped by mixing them. The cleaning services of hostels have been handed over to the private sector from the University and 10-12 cleaning service employees have been allocated for every hostel in the University with a cleaning supervisor for the duties of Solid Waste. Sub warden of the hostels should be responsible to do the duties of those employees as per the requirements of the hostels.

These employees separate Solid Waste as much as possible and hand it over to the compactor, and they transport it into WMC and unload it there. Unsorted solid is separated there again and stored as recyclable Solid Waste and others are transported and dumped in the Upper Hanthana area.

The Waste handling practice of some hostels is implemented in a good way such as Wijewardane hall, but not all are implemented effectively and efficiently.

When considering boys' hostels, the majority have not adopted to separate and dump their Solid Waste. They normally sweep the room and keep all their Solid Waste in front of their rooms without sorting or dumping it into a bin. Then hostel laborers collect and separate them as far as possible and hand them over to Compactor. Sometimes while loading Solid Waste mix them and unload them at the Waste Management Centre.

After separating Solid Waste there, some residual waste such as lunch paper, yoghurt cups, Nescafe cups, milo covers, milk packets, shopping bags, milk packets, and snack boxes, are remaining, and other recyclable Solid Waste was bought from the above buyers. Waste food baskets were supplied by pig farmers to collect them and they take waste foods for pigs. They come daily and collect them without paying, and they take waste food and that practice has been continuing for a long time now. Residual waste was dumped in the Upper Hanthana area again.

The University is the place where more intellectuals, and graduates produce according to the present requirements of the country. Although lots of intellectuals were born in this University to sort out the world's critical problems. But still, the University of Peradeniya has failed to manage Solid Waste in a sustainable and eco-friendly manner within University premises. Therefore, existing Waste Management practices at the University of Peradeniya are questionable. Therefore, this study aims to identify types of Solid Waste generation in hostels and evaluate proposed sustainable solutions to minimize waste generation in hostels.

When there is a breakdown of the compactor used to transport Solid Waste, a tractor is borrowed from the Department of Maintenance and the Faculty of Agriculture to transport Solid Waste on the University premises.

Hostels can be identified as main sources of Solid Waste generating and spreading places in the University of Peradeniya. It is identified that the number of students in a hostel, their daily consumption patterns, their lifestyle, resources they used and differences in waste disposal methodologies were affecting factors of the composition of Solid Waste collection in hostels, Paper Waste, Wood Waste, Plastic/Polythene, Waste Food, Sanitary waste, Glass, Sewerage, Iron/Steel, Waste Building Material, Unusable Clothes, and Broken Equipment are the major types of waste generates in hostels which identified in this research.

SWOT Analysis

This is the SWOT Analysis of this study which is used to evaluate the effectiveness of existing Solid Waste Management practices in the University. Accordingly, the Strengths, Weaknesses, Opportunities, and Threats can be identified as follows:

Figure 3: SWOT Analysis

STRENGTHS	WEAKNESSES
<ol style="list-style-type: none"> 1. Availability of resources. <ul style="list-style-type: none"> ● Human resources – 17 wardens, Sub Wardens and Laborers. ● Availability of intellectuals and experts in the field of SWM. ● Availability of equipment: - compactor, A belling machine, other equipment ● Availability of land, water & electricity. 2. Sufficient financial capabilities. 3. Use of separate bins for waste segregation. 4. Separation and disposal of 	<ol style="list-style-type: none"> 1. Lack of Supervision of existing Solid Waste Management practices. 2. Administration failures. 3. Solid Waste disposal is not being monitored properly. 4. Lack of contribution of students towards proper Waste Management. 5. Solid Waste is not being transported daily. 6. Transporting waste by mixing up them all. 7. Defective vehicles and

<p>waste.</p> <ol style="list-style-type: none"> 5. Timely garbage disposal. 6. Minimizing the use of polythene. 7. Properly placed garbage bins. 8. Solid Waste Management activities are assigned to MO and PHIs in their job descriptions. 9. Having an opportunity to sell and get an extra income by selling recyclable Solid Waste items. 	<p>insufficient number of vehicles for garbage transportation.</p> <ol style="list-style-type: none"> 8. Waste management is not included in the rules and regulations of hostels. 9. Lack of adequate facilities for cleaning workers. 10. 10.Lack of proper waste management system. 11. Lack of well-trained employees to operate WM equipment. 12. Students don't adhere to WM Practices at the hostel. 13. Lack of knowledge of laborers who engage in Solid Waste duties. 14. Making pets (dogs/cats) in hostels and feeding them by students. 15. Having opportunities to bring and dump outsiders' waste in hostels.
OPPORTUNITIES	THREATS
<ol style="list-style-type: none"> 1. Create an environmental management plan for the University. 2. Obtain world-recognized standards such as ISO14001 to the University. 3. Appoint an environmental manager to the University. 4. Opportunity for innovations. 5. The emergence of a new source of income. 6. Creation of an opportunity for composting. 7. Waste management through the participation of the private sector. 8. 8. Ability to conduct Waste Management programs and develop attitudes of students. 	<ol style="list-style-type: none"> 1. University premises belong to 3 local government authorities. 2. The threats from wild animals (e.g. monkeys) due to improper disposal of waste and Influence from Rats, Cockroaches, and other animals in landfills. 3. Faults of equipment used for collecting waste. 4. Inability to obtain an incinerator for burning waste. 5. Irregular waste disposal by external persons as there are many access roads to the University. 6. Obstacles arose against proper Waste Management due to the unlawful staying of students in hostels.

<p>9. Launching new training programs, and projects and motivating the University community for proper Waste Management practices through them.</p>	<p>7. Violations of rules and regulations of hostels by the students.</p> <p>8. Lesser intervention from other public institutions.</p> <p>9. Students don't pay attention to waste management practices.</p> <p>10. The rapid increase in residential students and the number of students entering University education.</p> <p>11. Keeping employees in the long term in the same Hostels without a service rotation.</p>
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Source: Constructed by the Researcher, 2022

When considering the Strengths that the University possesses to implement an effective Solid Waste Management mechanism within the University, availability of resources is one of them. It is rich in both human and physical resources as well. When considering the land availability of the University, it covers about 700 hectares of land, and more than enough land resources belong to the University. Further Availability of infrastructure such as roads, water and electricity are also strengths for the University. The availability of human resources is an enormous strength of the University with more talented and experienced intellectuals and experts in the field of SWM available in the University. As an example, there are 17 Wardens, 17 Sub Wardens in all hostels, and enough laborers for the smooth functioning of Solid Waste activities in hostels. When considering the availability of equipment, a compactor, a belling machine, and all the other equipment are available at the University.

The use of separate bins for waste segregation is an existing good practice of Solid Waste Management in hostels and one of its strengths as well. Separate garbage bins are used and located in separate places at hostels to dispose of the different types of waste in each hostel, i.e., green colour bins for food waste, red for polythene and

plastic, and blue for paper disposal. In some hostels, there were garbage bins for glass and other waste as well. The below types of waste can be identified as the major categories of waste generated in hostels. According to this study, it is identified that below types of Solid Waste contribute to the daily generation from largest to smaller as Waste Food, Sanitary waste, Plastic/Polythene, Paper Waste, Glass, Iron/ Steel, Wood Waste, Waste Building Material, Unusable Clothes, Broken Equipment, Tools (Sewerage).

Hostel administration has introduced a method to students that Separates their Solid Waste and disposes of it in separate bins in hostels is also a strength. Separation of waste from girls' hostels is relatively at a satisfactory level compared with boys' hostels. There is a garbage room in the dormitory to dispose of the Solid Waste. Garbage bins have been set on the side of hostels to dispose of waste and steps have been taken to dispose of Solid Waste properly.

Based on the study, it has been identified that some hostels implemented a separate time in the day to dispose of waste on time. For example, in dormitories such as Wijewardena and Sanghamitta hostels, students are given a specific time to dispose of their daily Solid Waste under the supervision of the Sub-Warden and the superintendent of the sanitation division.. Further, the hostel administration strictly observed and instructed students to collect their waste and dispose of it separately timely.

The other strength of existing Waste Management practices in hostels is Minimizing the use of polythene. Out of the Solid Waste discharged from hostels, polythene can be identified as a type of Solid Waste that is difficult to manage. Therefore, using polythene like bags, and lunch papers is prohibited in some hostels and canteens due to this Solid Waste problem.

The Weaknesses have been identified when evaluating the effectiveness of the existing Waste Management practices in university hostels as per the SWOT analysis done in this research. Administration fliers are the major weaknesses that were

identified t. Solid Waste disposal is not being monitored properly as one of them. Students do not dispose of their waste properly due to a lack of supervision of hostels' Sub-Wardens, the cleaning staff and the other relevant authorities. The relationship among students, officers, and employees is not satisfactory. Due to the lack of supervision and reluctance of students to accept the advice of officials, especially in Arunachalam and New Akbar halls, it has been difficult to dispose of waste properly and fail to adhere to students. Administrative failures and lack of supervision directly affected that.

On the other hand, the lack of contribution of students towards proper waste management is a big Weakness of existing practices. The study found that both girls and boys pay attention at a minimal level to this and especially boys contribute very little to the function of a proper waste management system in hostels.

Solid Waste not being transported daily is also a considerable Weakness identified in this research. Problems have arisen because Solid Waste accumulated in the University hostels is not carried away daily by the workers of the University Health Center. The data obtained from the study showed that in some hostels, such as Sarasavi Uyana Hostel and Lalith Athulathmudali Hostel, Solid Waste is not removed on a daily basis, and a formal Solid Waste Management system is not implemented.

Mixing Solid Waste while transporting them is another Weakness of the existing practices. Although it is separated and collected at hostels, it is to be re-segregated at the waste disposal Centre as it is mixed and transported. Reseparation of Solid Waste requires more time and more labour. Therefore, the workers associated have been severely inconvenienced in sorting the waste.

Defective vehicles and an insufficient number of vehicles for Solid Waste transportation caused issues in hostels. The inadequacy of compactors and tractors is a major weakness in existing Solid Waste Management practices at the University. It has led to daily Solid Waste collection and created related issues in hostels.

Waste Management is not included in the rules and regulations of hostels and is identified as a Weakness of the SWOT analysis done in this research. The study made it clear that there are no specific rules and regulations about the places where Solid Waste is disposed and managed in hostels, and no penalties for illegal dumping. Awareness programs on Waste Management are not implemented at the hostel level.

The lack of adequate facilities for cleaning workers is caused by failures of Solid Waste Management activities in the University. Workers currently employed in hostels and the Waste Management Centre do not have adequate facilities to meet their basic needs. They have been severely inconvenienced without having a place to have their meals at the working place.

The lack of implementing a proper Waste Management system is the major Weakness in the University. There is no formal Solid Waste Management system in the University at present, and there is very little contribution from the responsible authorities of the University in this regard. There are no proper or good practices from Waste Generation to final disposal.

When considering the Opportunities of SWOT analysis, there are opportunities for innovations. Students can be directly involved in Waste Management by recycling waste such as paper, polythene, and plastic and being able to create innovative products with these materials and motivate students to earn extra income. For *Solid Waste recycling*, students can reuse manufactured goods from which resources such as steel, copper, or plastics can be recovered and reused. *Recycling* is a significant way to keep large amounts of *Solid Waste* out of landfills, conserve resources, and save energy. They can use the 7 Rs such as Rethink, Refuse, Reduce, Repurpose, Reuse, Recycle, and Rot for Sustainable Solutions.

The university hostel and relevant authorities can conduct Waste Management programs for students and develop their attitudes toward it is also an opportunity for this. The establishment of a proper Solid Waste Management system in the University

with the knowledge and guidance of experts on Solid Waste Management and the attention and contribution of the University staff and students.

Further University has the opportunity to participate in the private sector for Solid Waste management activities. The ability to obtain financial facilities required for Solid Waste Management in coordination with government and non-government organizations is more efficient than existing ways.

Launching new training programs/projects and motivating the University community directly for a proper Solid Waste Management practice through them. The establishment of the composting system will be an opportunity to get fertilizer free of charge for cultivated lands of the University and to obtain additional income from selling fertilizer.

As per the SWOT analysis done in this research, it was identified that the existing Solid Waste Management Practices were Threatened by below reasons in the University. University premises belong to 3 local government authorities such as Kandy Municipal Council, Udunuwara Pradeshiya Sabawa, Four Gravate, and Gangawata Korle Prdeshita Sabawa is the biggest threat to them. All 3 local government authorities rejected the collection of the University Solid Waste. But all other universities' Solid Waste is collected by the relevant local government authorities. Therefore, this has become a big threat to the University.

Wild animals are the other threat to this. The threats from wild animals (e.g. monkeys) due to improper disposal of waste can be seen in many places. Taking away and scattering polythene waste in hostels by animals such as dogs and monkeys is a hindrance to Solid Waste Management, and issues can be minimized by storing it in a place where it cannot be taken away by animals.

Faults of equipment used for waste collection are also a threat to existing Solid Waste Management practices in the University. The Sorted Solid Waste generated daily in the hostels is transported by the employees of the University Health Centre. However,

the number of vehicles currently used to transport the Solid Waste is not sufficient. Due to the breakdowns and faults of the existing vehicles, transportation cannot be done daily and properly. Therefore, the daily Solid Waste collection in hostels has been a challenge to collect and transport due to faults of relevant equipment.

The inability to obtain an incinerator for burning waste is a big threat to the University. The amount of Sanitary Waste generated at girl's hostels is very high and managing this type of waste has become a challenge. The lack of financial facilities to procure incinerators for waste incineration has become a challenge.

Obstacles arising against proper Solid Waste Management practices due to unlawful staying of students in hostels are also identified as a threat to existing practices. Improper Solid Waste disposal has become a challenge due to the unlawful staying of former University students in some hostels. This is mainly due to having many accesses to hostels such as Arunachalam and New Akbar, and the lack of supervision by the Sub-Wardens and other officials.

The rapid increase of the student Community has become a threat now while handling Solid Waste in hostels. A large number of students are now entering University education every year. The University student population has increased by a considerable amount in the recent past. There were 8217 Students in 2006, and it has been increased up to 14623 in 2022 without external students. The number of residential students also increased, in this way 5377 Students were accommodated in 2000, and it will increase to 9161 in 2020. University provides residential facilities to up to 65% of the students' population including illegal staying of students at present. Six hostels were added to the university to cater to the increasing number of students. Therefore, it identified that Solid Waste Collection has become a free dominant environmental, social, aesthetic, and economic issue on the premises of the University of Peradeniya with the increasing residential student population in hostels, changing the lifestyle and consumption patterns and the rapid development in every aspect of the University community. The amount of waste generated is very

high depending on the amount of resources they use. Hence, waste Management has become a challenge now.

Violation of rules and regulations of hostels by the students is another threat that was identified in this research. It has become a major challenge to get the support of students for Solid Waste Management because the residential students act on their own accord, disobeying the instructions of the authorities and rules and regulations in hostels.

Conclusion

The University of Peradeniya is one of the oldest and largest residential Universities in Sri Lanka and the most beautiful University in the country. Its environmental beauty is one of its identities. Solid Waste has become a significant and harmful challenge to the beauty of the University. Therefore, it is identified that Solid Waste has become a free dominant environmental, social, aesthetic, and economic issue on the premises of the University of Peradeniya with the increasing residential student population in hostels, changing the lifestyle and consumption patterns and the rapid development in every aspect of the University community. It is essential to find a sustainable solution to overcome this issue because the daily Solid Waste generation is increasing rapidly day by day. There are 24 residential hostels in the University. Altogether 17 hostels were included in this research consisting of 9 boys' hostels and 8 girls' hostels. Therefore, by focusing on the above matters, this study is targeted to evaluate the existing Solid Waste management practices in residential hostels of the University of Peradeniya and identify strengths, weaknesses, opportunities, and threats of existing practices to go for an eco-friendly sustainable solution to overcome this issue.

This study focussed on evaluating the effectiveness of the existing Solid Waste Management practices in hostels of the University of Peradeniya and proposed proper and sustainable strategies for Solid Waste Management practices for these hostels.

According to the SWOT analysis, it was identified that the existing waste management practices are inefficient due to these weaknesses such as lack of supervision of existing waste management practices. Administration failures, Solid waste disposal not being monitored properly, Lack of contribution of students towards proper waste management, Solid waste not being transported daily, Transporting waste by mixing up them all, Defective vehicles and an insufficient number of vehicles for garbage transportation, Waste management is not included in rules regulations of hostels, Lack of adequate facilities for cleaning workers, Lack of proper waste management system, Lack of well-trained employees to operate WM equipment, Students don't adhere to WM Practices at the hostel, Lack of knowledge of laborers who engage with solid waste duties, Making pets (dog/cats) at hostels and feeding them by students, Having opportunities to bring and dump outsiders' waste in hostels. Further, it is found that these are the threats that course for the inefficiency of existing solid waste management practices in hostels of the University of Peradeniya. There are University premises belong to 3 local government authorities, The threats from wild animals (e.g. monkeys) due to improper disposal of waste and Influence Rats, Cockroaches, and other animals in landfills, Faults of equipment used for collecting waste, Inability to obtain an incinerator for burning waste, Irregular waste disposal by external persons as there are many access roads to the university, Obstacles arising against proper waste management due to illegal staying of former students at hostels, Violation of rules and regulations of hostels by the students, lesser intervention from other public institutions, students don't pay their attention on waste management practices, rapid increasing of students entering to university education, keeping employees in long term in same hostels without a service rotation. Therefore, the below strategies are proposed to be implemented in hostels to minimise waste generation and to maintain a sustainable and eco-friendly solid waste management mechanism within the university. The below types of waste can be identified as the major categories of waste generated in hostels as Paper Waste, Wood Waste, Plastic/Polythene, Waste Food, Sanitary waste, Glass, Sewerage,

Iron/Steel, Waste Building Material, Unusable Clothes, and Broken Equipment are the major types of waste in this research.

The following sustainable solutions can be proposed to establish and implement an efficient solid waste management practice mechanism in the university to heritage waste-free university for future generations. Environmental management plan should be introduced to the university and appoint a well-qualified and experience environmental management officer to hand over the waste management responsibility properly and legally in the university, Environmental auditing should be done periodically, Administrative officers should rotate from a fixed time period, Responsible Authorities in the university need to utilize scientific experts to identify the best model to manage Solid Waste in the University, incineration or a combination of both, Preparation of a policy on university Solid Waste management, Preparation of strategies for the solid waste management, Provision of training on effective solid waste management including education and awareness for relevant officers, Provision of necessary facilities for implementation of solid waste management projects and programs, Strengthening the legal framework for solid waste management, Conduct Education and awareness programs, Provision of Compost bins at low cost for all hostels, Waste management by establishing a biogas production system at the end point of solid waste disposal, Profitable venture should be started by selling recyclable solid waste such as plastic/polythene, glass, steel and iron, paper to recycling Centres, In parallel, waste collection by local authorities should have to be regularized and facilitate collection of segregated waste otherwise separation at the point of generation will be a futile exercise, The way of Solid Waste collecting, disposing and separating should be done with sound management mechanisms, The local councils should make involved to facilitate this process according to the responsibilities vested from the government according to the ordinance and acts, A as a suggestion it is proposed to establish a Solid Waste Management Canter since enough resources' are available in the university. As a result, this centre can be used as a model for other institutions which are interested

in this matter. Responsible authorities in university administration should prioritise biodegradable waste conversion to compost and biogas in partnership with the corporate sector. Business opportunities should be created based on the technology and financial feasibility, and it should not be based on gaining political or personal benefits, Gap between waste generators and collection and transportation in hostels should be filled by establishing a more regular mechanism than existing practices, Educate students and the university community to move towards more sustainable and resource efficient consumption patterns, Waste is a resource and profitable ventures should be created in the waste business, and it should be developed as a service that generates profit rather a business with no service value, Take international standards like ISO 14001 to standardize the existing practices, Updating daily reports on the composition and quantities of waste generated in hostels and recording daily the amounts of waste disposed at Waste Management Centres, Advise on proper disposal of sanitary waste generated mostly from ladies' hostels and providing incinerators for incinerating waste, Involve not only the hostel staff and students but also the entire university community in waste management, Launch of waste recycling projects for recycling waste such as paper and glass, Supervise the proper disposal of waste and provide separate bins for disposal of discarded clothes and electronic waste, Punish students who dump garbage improperly and strictly enforce hostel rules, Utilizing efficient staff for waste management and launching waste management training programs, Establishment of a Waste Management Centre at the University employing the knowledge of the experts, and launching training programs for staff as well as students on waste management, Provide sanitary services to solid waste disposal workers, encourage them to work efficiently and provide financial facilities to increase the quantity of vehicles, especially tractors and compactors, Establish a waste management system and appoint a competent authority to implement waste management strategies, Minimising or Preventing Waste Generation, reusing resources and commodities, separation of garbage at the source, collecting and transporting waste separately, recycling waste and resource recovery should be carried out as significant measures of solid waste management.

Practising 3R concept: Reduce, Reuse, and Recycle

As individuals, every person in hostels needs to be responsible for his or her waste, starting from minimising waste generation to ensuring responsible waste disposal. By reducing the use of plastic and polythene, paper, etc, One of the main responsibilities of students' is to separate the waste into biodegradable (perishables) and non-biodegradable categories and dump it correct garbage bins is the most important and initial practice to establish a sustainable Solid Waste Management Plan within the University.

The Suggestions are proposed to reduce the generation of polythene and plastic waste in the hostels of the university. Motivate students to do these things in the hostels such as Bring their own shopping bag, Carry a reusable water bottle, Bring your own cup, Pack your lunch in reusable containers, Say no to disposable straws & cutlery, Skip the plastic produce bags, Polythene and plastics are valuable resources that can be converted into cash and used as commodities through recycling, It is advisable to encourage the use of lunch boxes instead of food parcels to reduce polythene waste generated at hostels, an alternative material should be used to wrap food instead of the polythene lunch sheets in hostels canteens, As students are now more inclined towards fast food, steps can be taken to reduce use of polythene wrappers at canteens, giving instruction to reduce the accumulation of various polythene wrappers and plastic packaging, specially girls' hostels, educate students on alternative packaging methods and the use of reusable or decomposable packaging instead of polythene bags and plastic packaging, By reusing the polythene bags used when bringing food from outside the hostel, amount of polythene generated daily can be reduced, Advise students from home to reduce the use of polythene as much as possible when carrying various foods, and allowing entry after checking for polythene, Reducing the bringing in of food from outside by students by making arrangements for proper preparation of tastier food at the canteens, Regularly check former students who come to hostels for weekend jobs, and punish students who act against the rules, Awareness of hostel staff and students on the use

of sustainable packaging and reusable packaging, and implementing attitude development programs for students.

Paper waste generation can be reduced in university hostels by implementing these proposed solutions such as selling paper waste to recycling Centres. Students in hostels take a lot of photocopies for academic activities and the amount of paper collected daily is high. Therefore, appropriate methods should be used to minimize this, encouraging students to make innovative products using paper and recycle them so that they can be reused.

For establishing a sustainable, efficient waste management mechanism in the University hostels, It is proposed to establish a legally formed Waste Management Centre in the university with qualified officials in the field of waste management to minimize negative impacts, due to the weaknesses of existing waste management practices and specially engage University community to reduce the daily waste generation and restrict outsiders to bring and dump their waste within the University premises to donate a sustainable and harmless environment for our future generation to create a most environmental friendly environment, to produce most intellectuals from this University to bring our country to the top of the development as environmental friendly community.

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