

**SOLID WASTE MANAGEMENT PRACTICES OF
BUTWAL SUB-METROPOLITAN CITY**

By

ASST-LECTURER SANJU GAIRE

KRITI PANDEY

AAKRITI KHANAL

LUMBINI BANJIYA CAMPUS, BUTWAL-11, DEVINAGAR

RESERARCH COMMITTEE

LUMBINI BANJIYA CAMPUS, BUTWAL

Falgun, 2080

CERTIFICATION OF AUTHORSHIP

I hereby corroborate that I have researched and submitted the final draft of Mini research project.

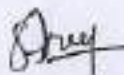
Report entitled "Solid Waste management practices of Butwal Sub-Metropolitan city". The work of Mini research project report has not been submitted previously nor it has been proposed and presented as part of requirements for any other academic purposes. The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the Mini Research Project Report.

Name of the Faculty and Group

Signature:

Sanju Gaire, Kriti Pandey, Aakriti
Khanal

Date of submission:



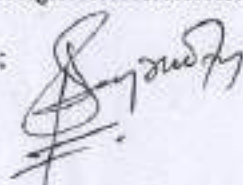
REPORT OF RESEARCH COMMITTEE

Ms./Mr. [Name] has effectively defended the Mini research project proposal entitled "Waste management practices of Butwal Sub-Metropolitan city". The research committee has officially approved the title for the Mini research project report to proceed further. It is advised to adhere to the prescribed format and guidelines for the project and submit the Mini research project report for evaluation and viva voce examination.

Name of Head of Research Department

Asst. Prof. Pitamber Sapkota

Signature:



Mini Research Project Proposal
Defended Date:

2080/03/13

Mini Research Project Report
Submitted Date:

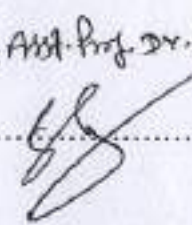
2080/11/17



APPROVAL SHEET

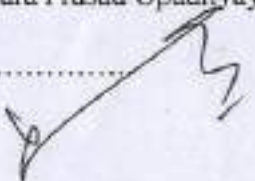
We have assessed the Mini research project report titled 'Waste management practices of Butwal Sub-Metropolitan city' presented by [Sanju Gaire, Kriti Pandey, Aakriti Khanal]. We confirm that the Mini Research Project Report meets the required standards and is deemed acceptable.

Head of Research Department:

Signature:Mini Research Project Report Viva
Voce Date:External Expert:  2080/11/17

Signature:

Campus Chief: Prof. Dr. Tara Prasad Upadhyaya

Signature:

Date:



ACKNOWLEDGEMENT

First and foremost, I would like to express my gratitude to the Campus Chief of Lumbini Banijya Campus Prof. Dr. Tara Prasad Upadhyaya. Without his continuous assistance and dedicated involvement in every step throughout the process, this paper would have never been accomplished.

A special gratitude I give to Assoc. Prof. Pitambar Sapkota Head of research department whose contribution in providing appropriate suggestions, consistent guidance and encouragement helped me to complete Mini research project report.

Furthermore, I would also like to thank external examiner for providing appropriate feedback for further improvement of my Mini research project report work. My sincere thanks also go to Assoc. Prof. Dr. Bhagwati Chaudhary MBA-BF program director of Lumbini Banijya Campus for continuous support and motivation. I must be thankful to Mr. Govinda Gyawali, a faculty member of Lumbini Banijya Campus, for providing valuable suggestions for data collection and analysis. I would also like to acknowledge Mr. Suresh Sapkota, Lecturer, and Furthermore, I express my sincere gratitude to all the Professors and Lecturers of Lumbini Banijya Campus, for their encouragement, insightful comments, and motivation other non-teaching staffs for providing their valuable time and support to complete this research work.

Furthermore, I would also like to acknowledge with much appreciation the crucial role of my family members and friends for their continuous encouragement and support.

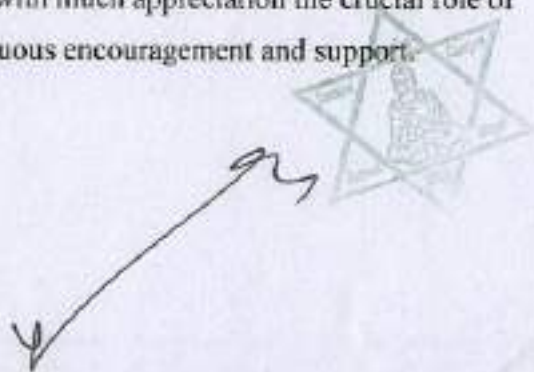


TABLE OF CONTENTS

<i>Title page of the Mini Research Project Report</i>	<i>i</i>
<i>Certification of authorship</i>	<i>ii</i>
<i>Report of Research Committee</i>	<i>iii</i>
<i>Approval sheet</i>	<i>iv</i>
<i>Acknowledgement</i>	<i>v</i>
<i>Table of contents</i>	<i>vi-vii</i>
<i>List of tables</i>	<i>viii</i>
<i>List of figures</i>	<i>viii</i>
<i>Abbreviations</i>	<i>ix</i>
<i>Abstract</i>	<i>x</i>
Chapter I Introduction	
Background of the Study	1
Problem statement	12
Objectives of the Study	14
Hypothesis of the Study	14
Rationale of the study	15
Limitation of the study	15
Chapter II Literature Review and Framework	
Theoretical review	16
Empirical review	17
Chapter III Research Methods	
Research design	26
Population and sample, and sampling design	26
Instrumentation	27
Nature and sources of data	28



Primary data collection	28
Tools for data collection	28
Statistical tools for data analysis	28
Research framework and definition of variables	28

Chapter IV Results, Discussion and Conclusion

Results	30
Discussion	72
Conclusion	76
Implication	76
References	77
Appendices	84



LIST OF TABLES

Table No	Title	Page No
1	Demography based on Ward Number	30
2	Rank of Waste Generated Categories of Ward Number	31
3	Waste Generated Based on Ward Number	32
4	Waste Generated Based on Age Group	34
5	Waste Generated Based on Gender	36
6	Waste Generated Based on Education Level	38
7	Waste Generated Based on Occupation	39
8	Waste Collection Based on Ward	42
9	Waste Collection Based on Gender	44
10	Waste Collection Based on Age Group	46
11	Waste Collection Based on Education	49
12	Waste Collection Based on Occupation	51
13	Waste Transportation Based on Ward	54
14	Waste Transportation Based on Gender	57
15	Waste Transportation Based on Age group	60
16	Waste Transportation Based on Education	63
17	Waste Transportation Based on Occupation	66
18	Descriptive Statistics of Solid Waste Management	69
19	Reliability Analysis	69
20	One Way Anova Based on Age Group	71

LIST OF FIGURES

Figure No	Title	Page No
1	Research Framework	28
2	Normality Test	70
3	Normality p-p plot	71

ABBREVIATIONS

LBC: Lumbini Banijya Campus

TU: Tribhuvan University

MSW: Municipal Solid Waste

SWM: Solid Waste Management

SSWM: Sustainable Solid Waste Management

MSWM: The Management of Municipal Solid Waste

DSW: Domestic Solid Waste

HHW: Household Hazardous Waste

HW: Household Waste

NPSW: National Policy on Solid Waste

WFD: Waste Framework Law

MRF: Material Recovery Facility

ULB: Urban Local Bodies

WTP: Willingness To Pay

PPPs: Public-Private Partnerships

Ghgs: Greenhouse Gases

Wte: Waste-To-Energy

SAARC: South Asian Association For Regional Cooperation



Abstract

This study intends to explore Solid Waste Management Practices in Butwal Sub-Metropolitan City based on waste generation, waste transportation, waste collection and waste disposal. Data for the study was collected through probability proportionate sampling technique and sample size was 395. Data was collected on five points Likert scale and frequency based through a self-administrative questionnaire. Descriptive research design was used to conduct the research study. The frequencies with proportionate values for each question's responses has been analyzed to find out the respondent's practices related to waste management. Also, the findings of the study revealed that Solid Waste Management Practices have significant relationship with the age group. In this regards, local government can re-formulate their policies and strategies with regards to Solid Waste Management Practices.

✓ 93



CHAPTER - I INTRODUCTION

1.1. Background

An increasing number of people are suffering from the unhygienic environmental conditions that are becoming worse every year. Consideration of all factors directly or indirectly related to solid waste and its management is part of the broad range of problems related to solid waste management. The rapid rate of urbanization, the structure and density of urban areas, the physical planning and regulation of development, the physical makeup and density of waste, the influences of temperature and precipitation, the activity of trash collectors to separate recyclable materials, and the ability, sufficiency, and constraints of individual municipalities to manage solid waste, including storage, collection, transportation, and disposal, are some examples of these aspects (Mahar et al., 2007).

According to a United Nations Development Programme in survey of 151 city mayors, the worst issue people are facing, after unemployment, is poor solid waste management. The remaining 60% of waste is disposed of directly in streets and drains, causing blockages, the growth of flies and rats, flooding, and the spread of disease. Only 40% of waste is collected. The collected waste is dumped straight into an open, unscientific disposal site. These sites produce leachate, which contaminates the quality of groundwater. These landfill sites also release greenhouse gases that contribute to global warming, primarily methane and carbon dioxide (Jain & Singhal, 2014).

The problem of waste management exists everywhere. Currently, waste generation is an activity that is difficult to control. Solid waste produced by business, industrial, and



residential activities is frequently disposed of carelessly. When such wastes are managed carelessly, major environmental issues occur. Since the amount of waste being generated exceeds the capacity of disposal facilities, the situation is already dangerous in many cities and towns. The use of unhygienic methods to dispose of solid waste poses a major risk to public health. Increased health issues across all regions are linked to inadequate solid waste management (Mawihoh, 2007).

Mostly, Solid waste management poses a challenge for municipalities in developing nations because of the rising amount of waste production, the burden it places on the municipal budget due to the high costs associated with its management, the lack of knowledge about the variety of factors that influence the various stages of waste management and the links required to make the entire handling system functional (Guerrero et al., 2013).

The term "municipal solid waste" (MSW) is an abbreviation of the trash that municipalities collect and handle as a result of human-related commercial, residential, and construction-related waste. The amount of MSW generated has increased globally as a result of the exponential growth in population and urbanization, the development of the social sector, and an increase in living standards (Karak et al., 2012). Waste management is a top priority for all economies worldwide. As of today, the volume of trash generated globally has given rise to challenges such as growing land prices, local communities' refusal to accept new technology, severe environmental rules, health and safety concerns, and so on (Edodi, 2023).

Most municipalities in Nepal use a similar strategy to trash management. Waste management involves three primary processes: waste collection, transportation, and



landfill disposal. Municipalities have to deal with difficulties such as a lack of technical support, financial limits, the need to wait for the government's decision and approval for purchasing land of planned dump sites, issues with area selection, and significant opposition from nearby neighborhoods. Other geographical issues in the selected area include flooding, a shallow water table, highly porous soil, and slope instability. Physical elements such as height, temperature, rainfall, and humidity, as well as socioeconomic factors such as population, economic position, and consumption habits, influence the kinds of garbage generated (Maharjan & Lohani, 2019).

An effectively managed solid waste management system is essential for improving environmental qualities, the standard of life, and economic advancement in urban centers in the face of population increase, particularly in emerging nations. Lack of municipal waste management resources, improper waste management practices, and improper discharge of waste in the environment, all have a negative effect (Rahman & Bohara, 2023).

MSW management is one of the most important components in establishing sustainable and smart cities, but it remains a big burden for municipal authorities, especially in developing countries. Insufficient facilities, unplanned settlements, a lack of resources and capacity, and low levels of local awareness are all factors in the difficulty of managing MSW (Bharadwaj et al., 2020).

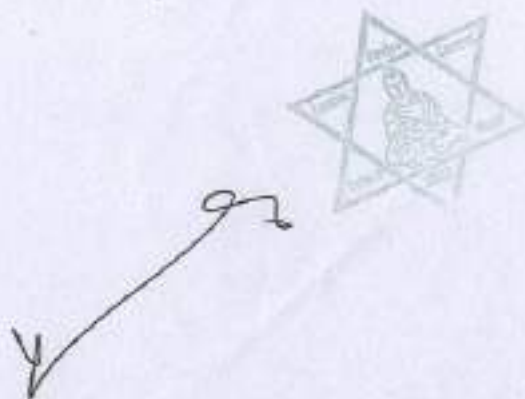
In most developing nations, the issue of upgrading rules and methods for the disposal of municipal solid waste is far more challenging than in developed countries. There are several causes for these issues, but they are all eventually brought on by poverty, a lack of access to opportunities and education, and in certain cases, the observance of traditions that do not easily fit into the modern era (Al-Khatib et al., 2007).



The city's environment has been significantly shaped by the city's population size, growth rate, and distribution. The primary impact of population on the environment is the use of natural resources and the production of waste, both of which are caused by economic development and consumption. The most serious form of environmental stress in the city is the loss of biodiversity, as well as water, air, and waste pollution. The major environmental issues arising from the process of urban development are increased pollution levels as a result of the concentrated discharge of residential wastes into the environment i.e. gaseous, liquid, and solid wastes, and destruction of the fragile urban ecosystem (Hemalatha, 2008).

The generation of municipal solid waste has been rising over the last ten years. Recycling is becoming more and more important since it's the only way to keep the environment sustainable and healthy. Moreover, recycling is not a completely autonomous process; a significant amount of the waste needs to be handled by hand. The growing amount of waste products at recycling facilities requires the implementation of new and creative procedures. It is recommended that practical methods for identifying and categorizing waste materials be included in inefficient solid waste management systems (Li & Chen, 2023).

Household waste collection by the municipality is irregular and limited to wealthy neighborhoods. The majority of disposal sites typically lack weighing facilities and provide insufficient disposal services. Hazardous waste is poorly managed, and no appropriate technique is being used in the current disposal procedure. An examination of the legal framework reveals the necessity for clear and straightforward regulations



regarding solid waste in especially. The main corrective actions to guarantee sound environmental maintenance also include financial and economic calculations, public awareness campaigns, legislation, strengthened institutional capacity, enforcement of regulations, and the establishment of a suitable sanitary landfill (Amoah & Kosoe, 2014). Municipalities of low-income countries dispose of municipal solid waste (MSW) in low-lying areas on the outer edges of the city, filling these areas haphazardly one after the other because of a lack of knowledge and awareness about waste reduction methods, contamination, and other aspects of MSWM. In those cities, huge collections of trash can frequently be arranged in an unpredictable style in all small spaces (D. Khan et al., 2016).

Every human society has included solid waste management or SWM. Asian nations are not unique when it comes to the requirement of SWM approaches that are in line with the characteristics of the local society. Global trends influence the system's focus on sustainability issues, primarily through the use of 3R (reduce, reuse, and recycle) technologies. However, the kind and degree of sustainability advancements fluctuate and are dependent on the financial condition of a country. Rich nations with a lot of resources, like South Korea and Japan, can afford to invest more in 3R technologies (Shekdar, 2009). Globally, the amount and composition of municipal solid waste (MSW) are currently rising significantly. It is generally accepted that effective and efficient management of municipal solid waste (MSW) is a necessary component of future social development. This requires not only technological innovation but also the participation of all stakeholders and the integration of social, economic, and psychological elements. This reality makes



research on the social aspects of MSW management critically necessary (Ma & Hipel, 2016).

In sustainable solid waste management (SSWM), waste reduction and waste separation are the two recommended approaches. Without strong community awareness and support from the city authorities, these two strategies appear to be impossible to put into practice. According to this study, several important factors contribute to waste generation, which includes population growth, economic expansion, improved well-being, and rapid urbanization (Shekdar, 2009).

Pollution in cities is a global problem, but it is particularly serious in developing nations due to a lack of basic services such as waste collection, transportation infrastructure, sanitation facilities, and water supply. A more luxurious lifestyle has caused a huge rise in the amount of solid waste generated in cities. Waste develops on roads and in other public areas because municipal corporations in developing nations are unable to manage the growing volumes of waste. The establishment of a sustainable waste management system requires the sustainability of the environment, institutions, finances, economy, and society. A growing worldwide agreement requires creating solutions at the local level and involving the community to improve waste management (Rathi, 2006).

The management of municipal solid waste (MSWM) comprises the following activities: resource recovery, collection, transfer, recycling, and treatment. The main goals of MSWM are to safeguard public health, improve environmental quality, foster sustainability, and boost economic productivity. Local governments must accept sustainable solid waste management systems and work with the public and private sectors



to achieve these goals. Even though less solid waste is produced in urban areas in developing nations than in developed nations, MSWM is still insufficient in these areas (Henry et al., 2006).

The waste that is generated at homes is known as domestic solid waste (DSW), and it is strongly correlated with daily consumption patterns in terms of composition. Products such as boxes, packaging, and essentials like paints, batteries, syringes, cleaning supplies, oils, and outdated medications are generated as a result of consumer goods consumption. These particular waste materials are toxic, flammable, explosive, reactive, acidic, and infectious. If they are not properly managed, then they pose a risk to the environment and public health. Additionally, because of changing public consumption patterns, household hazardous waste (HHW) is becoming an increasingly problematic issue (Otoniel et al., 2008).

A major component of the municipal solid waste (MSW) stream is made up of household waste (HW). It is necessary to quantify and characterize HW to create a waste collection and management plan that works for the city's residential block. Household waste (HW) is a heterogeneous material that includes a variety of wastes of different chemical and biological nature (e.g., solid, semi-solid, inert, biologically contaminated, biodegradable, non-biodegradable, etc.). To reduce the environmental and occupational health risks associated with the entire waste management process, such materials need to be carefully considered when designing the primary waste management processes (handling, segregation, transportation, and treatment). To create an efficient waste management plan



for the city's urban residential areas, an in-depth characterization of HW is fundamentally required (Suthar & Singh, 2015).

The primary goals of MSW decomposition are to minimize the amount of material that needs to be disposed of eventually and to sanitize the waste. Most recently constructed waste disposal facilities also have the goal to recover energy, either as heating energy or industry-use process steam or electricity. The majority of nations have adopted extremely strict air pollution control regulations in the last ten years due to concerns about pollution in the air from these facilities, which has raised the cost of building and running burning facilities. Nonetheless, some nations are currently putting new policies into place to lower the amounts of post-recycled waste that end up in landfills by requiring the material to have less than 5% organic content. This supports the use of decay systems as part of an integrated waste management strategy (Sakai et al., 1996).

Indicators of MSW management that are environmental, social, and economic frequently examine municipal performance as well as particular technologies and practices to assist and direct the decision-making process and provide positive impacts on various sustainability factors. To ensure the effective implementation of an integrated system, the indicator should cover both the technical and qualitative aspects of sustainability. New policies aimed at the system's ongoing and permanent development are also made possible by the indicators. Indicators track the population's needs and preferences in addition to the services provided to them in this way. As part of this, the landfill's sustainability, the expenses associated with collection and transportation, and the effects on the local economy and society are all being monitored (Deus et al., 2020).



Changing the focus from short-term local goals to sustainability and global environmental issues requires systemic and technological changes in waste management. However, due to their complexity and potential effects on the environment, the new systems are being questioned in addition to their sustainability from an economic point of view. Some people claim that even though the goal is to minimize the impact on the environment, the net systems effect will have the opposite effect (Björklund et al., 1999).

Integration between the different stages of management (sorting, collection, transport, and final destination) is essential for MSW management. To evaluate this integration and the standard of solid waste management, several methods and instruments are available. The Brazilian National Policy on Solid Waste (NPSW) includes the primary principles regarding the management of municipal waste management and they are sustainable development; a systemic and holistic approach to solid waste management; shared responsibility between the public and private sectors; the nation, states, and municipalities as well as consumers; and society's rights to information and social control. This policy includes goals like implementing reverse logistics systems, adopting sustainable production and consumption patterns, and promoting social integration (de S. Pereira & Fernandino, 2019).

More solid and efficient waste management systems are required to improve public health and safety. They need to protect public health by stopping the spread of disease and guarantee worker safety. An efficient solid waste management system needs to meet these requirements as well as by being economically and environmentally sustainable. Environmentally sustainable: It must minimize the negative effects of waste management on the environment. Economically sustainable: It needs to run at a price that the

A handwritten signature in black ink, consisting of a stylized 'Y' followed by a diagonal line and a small loop. To the right of the signature is a faint, circular official stamp with a star in the center.

community can afford. It is obvious that minimizing costs and environmental impact at the same time is challenging (Udhaya Banu, 2020).

From a global resource management perspective, education and awareness in the area of waste and waste management are becoming more and more important. Reducing the quantity of waste produced is the goal of sustainable waste management, which also aims to lessen the amount of waste released into the environment. Most waste is burned in open fires or disposed of in rural areas. Pollution from these sources can have negative effects on the environment and hygiene. It is necessary to design concepts to improve such circumstances. Public education is necessary regarding wastes that harm the environment and endanger human health. Educating citizens will also reduce potential health and environmental hazards and increase the effectiveness of the waste management system. (Demirbas, 2011).

During recent periods of slow global expansion, there has been a higher priority on economic innovation and entrepreneurship, which caused a greater focus on waste management in economic policy. Over the past ten years, significant policy innovations in waste management have grown in response to the growing demand for materials and the increasing amount of evidence showing the negative social and ecological effects of our disposable consumerist economy. Some policies seek to reform the traditionalist frameworks for waste management, while others completely change and redefine it (Silva et al., 2017).

Integrated waste policies have replaced traditional waste disposal and recycling practices for both municipal and industrial waste in the field of waste management. Projects with



zero waste aims and 100% diversion from disposal facilities are becoming increasingly prominent due to rising urban density and land prices in major cities globally. Circular economy initiatives, sustainable production and consumption practices, and sustainability results encourage new norms in governance frameworks and waste policy action. Furthermore, the benefits of environmentally friendly design that link the final stages of life waste materials a/s recycled or got back to earlier production stages are becoming more widely recognized due to environmental regulations, material costs, and material shortages (Silva et al., 2017).

Infrastructure issues, financial limitations, insufficient service coverage and operational inefficiencies of services, inefficient technologies and equipment, inadequate landfill disposal, and restricted use of efforts to reduce waste are confirmed to be the primary challenges to solid waste management in developing nations. The issues with municipal solid waste management in developing nations in the modern world are confirmed to be caused by a lack of cooperation and group efforts among the important components. Stated alternatively, it is recognized that a multitude of administrative, financial, and technical challenges hamper the achievement of sustainable results in the field of municipal solid waste management (MSWM) in developing nations (Elmo & Ogato, 2023).

1.2. Statement of Problem

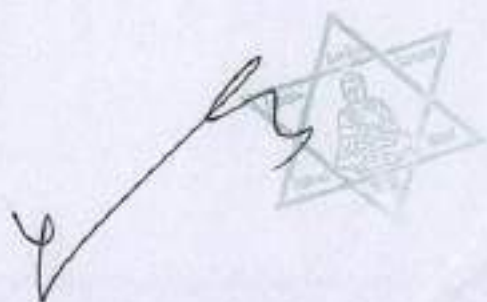
In developing nations, waste management is given very little priority, and their budgets are too tight to handle solid waste. Ineffective SWM has significant negative effects on the environment and causes issues in health and safety. Due to their inability to provide services efficiently, local governments such as corporations, municipalities, towns, and village panchayats frequently engage in the unlawful dumping of industrial and domestic waste. Due to insufficient funding allocated to budgets, local governments have found it



more and more difficult to play a significant role in managing solid waste. This has led to poor service quality and an inability to deliver cost-effective services more effectively. Waste management faces difficulties because of changing lifestyles and the shift to a consumeristic society because developing nations' waste management systems are unable to adapt to these changes in lifestyle frequently (Muthuraman, 2015). The study "Solid Waste Management Challenges for Cities in Developing Countries" demonstrates that a thorough list of stakeholders involved in waste management systems as well as a set of factors showed the most significant causes of system failure (Guerrero et al., 2013).

From the extraction of raw materials to the product's end of life, waste is an integral part of every production process. To meet market demands, modern industrial production and development heavily rely on the extensive use of natural resources, which raises waste-related issues. Waste disposal is a significant issue in any nation, but in many developing nations without adequate waste management (WM), it is particularly crucial for sustainable development. Through the use of waste, WM may help developing nations promote cleaner production and cleaner pollution by recycling materials (like plastic and paper) and metals (like copper and aluminum) back into the supply chain (Ikhlayel, 2018).

In the context of Nepal, many municipalities' efforts to manage solid waste are inadequate, and it in turn generates many other problems related to the environment and ultimately human health (Maharjan & Lohani, 2019). The study of an Analysis of Households' Demand for Improved Solid Waste Management in Birendranagar Municipality, Nepal demonstrates the elements impacting the households' WTP for the upgraded SWM in Birendranagar municipality are the bid amount, level of education, current waste collection service, and level of income (Bhattarai, 2017). Several factors in waste management systems including the volume of waste production, the location of the disposal site, the cost

A handwritten signature in black ink is written over a faint, circular official stamp. The stamp contains a portrait of a person and some text, but it is mostly illegible due to fading.

of the treatment, and the connections between them, might be unknown and will have an impact on the optimum techniques which follow along with them. Various methods of programming were used to handle these uncertainty issues in waste management (Singh, 2019).

The studies on solid waste generation and characterization with their relationships with different determinants are limited in Nepal which helps in the implementation of the solid waste management approach (Regmi et al., 2021). The management of solid waste continues to be a significant concern in metropolitan areas all over the world, but particularly challenging in the cities of developing nations that are experiencing rapid urbanization. A huge amount of solid waste is being produced as a result of rapid population increase and rising per capita income, endangering both environmental quality and human health (Afroz et al., 2009).

Solid waste management in the Kathmandu Valley of Nepal has been difficult, particularly when it comes to landfill siting for more than ten years. A significant environmental and public health issue has been raised by the existing practice of illegally disposing of solid garbage along riverbanks. The purpose of this study was to evaluate Nepal's solid waste management system using data that had been published. Approximately 70% of Nepal's solid waste is derived from organic sources, according to the data. Therefore, the greatest method of disposing of solid waste is to compost it and use it on the land (Pokhrel & Viraraghavan, 2005).

In developing countries, as money and social awareness are constraints, immediate switching to effective integrated MSW management is extremely difficult. There will be a substantial amount of transition period between these two extreme phases. In the



transition period, while developing the source segregation and other waste treatment facilities for an integrated system, mixed waste will be disposed of in the newly built engineered landfill, were along with leachate collection and treatment facilities, gas collection facilities will also be there (Chattopadhyay, 2018). This study aimed to find out some questions related to waste management practices, which are presented below.

1.3. Research Question

1. How the residents of Butwal Sub-Metropolitan City view the Solid Waste Management practices?

1.4. Research Objectives

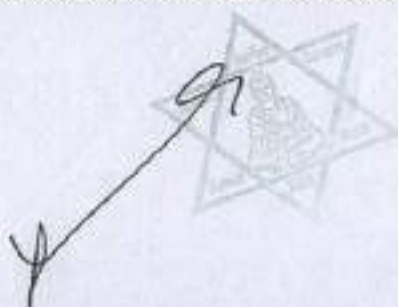
1. To explore the Solid waste management practices of the Butwal sub-metropolitan city.

1.5 Research Hypothesis

H₁: There is significance relationship between Gender, Age, Education, Occupation and Solid waste management practices.

1.6. Significance of the study

This study is beneficial to different level of government, municipalities, and individual citizens. solid waste management techniques are essential for preserving the sustainability of the environment and preserving public health. Communities can mitigate the adverse effects of irresponsible garbage disposal, such as air pollution, water and soil contamination, and resource depletion, by putting in place appropriate waste management. Additionally, effective solid waste management reduces the load on landfills and promotes



material recycling and reuse, all of which help to preserve important resources. Reducing greenhouse gas emissions and the amount of garbage dumped in landfills are two benefits of the waste sorting, recycling, and composting practices.

1.7. Limitations of the Study

This mini-research will focus on relative measures rather than absolute measures.

- This study is limited to the Butwal sub-metropolitan.
- The waste of industry and business are not included.



CHAPTER II

RELATED LITERATURE AND THEORETICAL FRAMEWORK

2.1. Theoretical review

A conceptual framework of solid waste management hierarchy was created to direct and rank waste management choices at both the individual and organizational levels. Priority is placed on waste prevention, reuse, recycling, recovery, and disposal. An inverted pyramid with five tiers is a common way to represent the hierarchy. The solid waste management hierarchy expands on the traditional waste management strategy with the three Rs; (reduce, reuse, and recycle), making it a five-step process where the most favored activities are at the top and the least preferred actions are at the bottom of the inverted pyramid. The Waste Framework Law (WFD), a European Union law that aims to create a long-term route toward sustainable waste management, is motivated by this all-encompassing approach to waste management. The waste hierarchy is made enforceable by Article 4 of the WFD, which requires enterprises and governments in member states to dispose of trash while taking into account optimal waste management techniques. (European Parliament, 2008). It seeks to hold companies accountable for the effects of their products on the environment at every stage of the product chain, from design to post-consumer. It was thought that doing this would lessen the financial burden on governments and taxpayers associated with handling end-of-life products, decrease the volume of garbage going to final disposal, and boost recycling rates (OECD, 2016).



A new approach to circular economy is to generate value and, eventually, wealth. It is effective by increasing the life of the product through a better layout and service, and waste relocation from the supply chain endpoint to the start—in practice, making better use of resources, by repeatedly utilizing them, never just once. However, in a circular economy, items are made to be durable, reusable, and recyclable, and materials for new products are sourced from old ones. Everything is recycled, used as a source of energy, reused, remanufactured, recycled back into a raw material, or in extreme cases, disposed of (United Nations Industrial Development, 2017). Decentralized waste management refers to the concept that each community manages and processes its garbage locally rather than shipping it all to a centralized, large processing landfill. The two guiding concepts of decentralized waste management are as follows: Waste can become a resource when it is managed at the source. My garbage is in my backyard, not someone else. The resource recovery is significantly better and the expenses of transportation and processing decrease. Separate and processing the trash can be faster. We must all take responsibility for our rubbish; we cannot dump it in someone else yard and have them pay the price for our heedless, consumption-based lifestyle.

2.2. Empirical Review

An effective MSW management system is required in the city because the generated MSW is dumped in an uncontrolled landfill without a protective covering or bio-gas collection system. Five different scenarios were developed as an alternative to the waste management system that is in place now. Trash transportation and collection, a material recovery facility



(MRF), recycling, composting, burning, and landfilling practices were all taken into account in these scenarios (Banar et al., 2009).

The management of municipal solid waste (MSWM) has become extremely difficult due to the huge quantities of waste produced as well as health and environmental issues. Many research studies indicate that the majority of urban local bodies (ULBs) in India are unable to manage the huge amounts of solid waste that they generate because of institutional and financial weaknesses. Additionally, ULBs don't typically have the infrastructure, finances, resources, or suitable plans needed for better solid waste management. Waste segregation, door-to-door collection, waste treatment technology, land resources, and scientific disposal techniques are a few of the main obstacles (Mani & Singh, 2016).

The huge amount of solid waste generated in metropolitan areas has continuously beyond the capacity of solid waste management (SWM) services. At the moment, there isn't an effective system in place for collecting, managing, storing, and moving solid waste. In Kathmandu Metropolitan City, the majority of households (89%) are willing to separate their garbage into organic and non-organic categories. In 2003, the overall efficiency of collecting was 94%. The private sector's involvement, the closure of the second transfer station near the airport due to local protests, a lack of funding for truck and equipment maintenance, the significant rise in plastic waste, and people's willingness to separate their waste into separate bins all contributed to an increase in waste collection (Alam et al., 2008).

A study of solid waste management systems shows that solid waste management is not merely about the disposal of garbage and street cleansing. Solid waste management is an

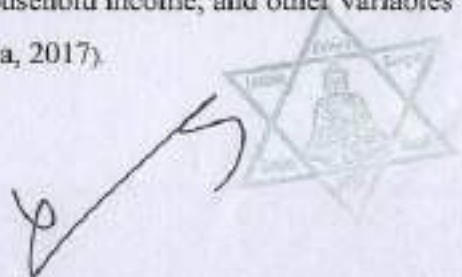


issue closely related to public health and sanitation and has a tremendous impact on the environment. Solid waste management is also an aspect of a broader problem of urbanization. Increasing urbanization, ever-growing industrialization, changing lifestyles consumerism, and materialistic cultures - all not only contribute to the increased volume of solid waste but also lead to changes in the nature and composition of waste (Satya Sagar, 2017).

The study of an Analysis of Households' Demand for Improved Solid Waste Management in Birendranagar Municipality, Nepal demonstrates the elements impacting the households' WTP for the upgraded SWM in Birendranagar municipality are the bid amount, level of education, current waste collection service, and level of income (Bhattarai, 2017).

A study on the Households' Willingness to Pay for Improved Waste Collection Service in Gorkha Municipality was conducted. The study explores that monthly household income, household head education, environmental consciousness, and garbage collection service have significant relationships with WTP (Bhattarai, 2015). The study in Bharatpur Metropolitan City was done to investigate improving municipal solid waste collection services which explores the waste collection frequency, timing of door-to-door waste collection services, and cleanliness of the streets are the elements of municipal waste collection (Rai et al., 2019).

The research was conducted at Lekhnath, Kaski on Determinants of Willingness to Pay for Improved Solid Waste Management System which reveals that the main influencing factors are house ownership, remittance received in the last year, and having any family members overseas. However, other variables like respondents' sex, education, total number of employed residents, total number of literate residents, primary occupation, estimated weight of daily solid waste accumulation, monthly household income, and other variables like these should also be taken into account (Dhungana, 2017).



The study conducted on the Development of an Efficient Solid Waste Management System for Chittorgarh City demonstrates that Solid waste management is a required function of urban local governments, but it is often given the lowest priority. Inadequate financial resources, ineffective institutional arrangements, ineffective technology, ineffective legislative measures, and the public's lack of awareness about solid waste management have rendered the service unsatisfactory and inefficient (Samdani, 2021).

The study on Process Development for Conversion of Municipal Solid Waste to Value Added Products shows that Municipal solid waste (MSW) generation is increasing steadily in developing countries such as India, China, and Indonesia in proportion to GDP. In India, the most common MSW treatment technologies are composting, incineration, and landfilling (Bhatt, 2023).

A study of the perception and practices of adults on solid waste management in Shillong shows that Solid waste management is closely related to the practices that people use in their homes. A simple method of collection, segregation, and disposal can improve practices and create a better environment. To play a meaningful role in key solid waste management activities, municipalities, policymakers and planners, government, and traditional institutions must be integrated into the strategic planning process of solid waste management. More emphasis should be placed on teamwork rather than individual efforts in the strategic planning process of solid waste management (Mawthoh, 2007).

In a Study on the technological and economical viability of municipal solid waste management systems in India and other SAARC countries, an approach for sustainability reveals that the majority of MSW processing facilities have been established in India and other SAARC countries over time, at the initiative of both the private and public sectors. However, their success rates are poor. The majority of waste processing plants are either operating at low capacity or have been shut down for a variety of reasons. The list of successful MSW treatment plants is quite short (Aich, 2017).

A Study of Solid Waste Management Practices Adopted by Selected Municipalities in Satara Solapur and Kolhapur Districts reveals that the basic planning strategies, such as



town planning layouts, transportation schedules, and vehicle allocation, have not been updated. The current solid waste management system planning is entirely based on past experiences and also it concludes that the number of solid waste transport vehicles in the selected town municipalities is insufficient due to a lack of funds or a diversion of funds to another project (Deshmukh, 2015).

The law and policy relating to municipal solid waste management from international and national perspectives with special reference to Visakhapatnam shows that sorting at the source, recycling at the source, and processing at the source (for example, yard composting) all contribute to waste reduction. However, the entire SWM law in India is oriented toward disposal and recycling, while reduction or reuse has yet to gain traction at the formal level (Satya Sagar, 2017).

A study carried out (Gupta, 2018) highlighted that Recycling is one of the most efficient ways of managing solid waste at the school level. It is the most possible, measurable, and enforceable method of establishing environmentally sound practices that a school can implement. Solid waste recycling can also be used to generate income, generate energy, and develop environmentally friendly products.

The relevant study was conducted by (Kashyap, 2012) in Gauhati. This study revealed that to ensure good sanitation and a clean environment, appropriate solid waste management systems must be designed and operated. Whereas the community should recognize the importance of solid waste management, there should be some economic benefit for the sustainability of cleanliness activity.

The financial support of waste management services is a significant issue; often municipalities are unable to collect enough revenue from providing the service locally. The reasons for inadequate local revenue generation include ineffective revenue collection, residents' unwillingness or inability to pay more than a small amount for waste collection services, and the lack of prioritization of waste management services in the municipal budget (van Niekerk & Wegmann, n.d.).

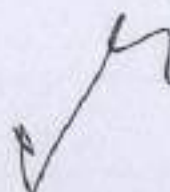


The management of solid waste continues to be a significant concern in metropolitan areas all over the world, but particularly challenging in the cities of developing nations that are experiencing rapid urbanization. A huge amount of solid waste is being produced as a result of rapid population increase and rising per capita income, endangering both environmental quality and human health (Afroz et al., 2009).

Integrated and sustainable solid waste management systems should go beyond technical aspects to include various key elements of sustainability to ensure the achievement of the objectives of solid waste processing and disposal projects. Planning and designing of integrated sustainable processing and disposal of municipal solid waste require, first evaluate the i) extent of the waste problem then ii) characteristics of the project region followed by iii) financial situation, iv) market condition, and v) socioeconomic and political situation of that region to assess the most economical and appropriate method for waste processing and disposal (Aich, 2017). In recent times, efforts have been made towards the safe disposal of solid waste while various issues associated with them are nearly unattended. Many of the steps taken toward the safe disposal of MSW have resulted in a concentration of pollutants in the environment (M, 2020).

The development of integrated waste management for municipal solid waste has to guarantee an equal relationship between the different types of residual waste and selective collection. A possible scenario is created in which the remaining municipal solid trash is made up entirely of non-recyclable materials. The organic component plays a crucial role, and its content in residual trash can be significantly reduced by selective collection. The implications of this unstable situation for planning, design, and management are the main topics of this paper (Rada et al., 2009).

The management of municipal solid waste (MSW) in developing Asia is described in this paper, with a focus on low- and middle-income nations. Based on several national and urban case studies, a proposed framework that maps out trends observed in the region about two



parameters i.e. waste compositions and urban dimension, supported by the analysis that is done. The primary public health imperative that drives MSW management in developing Asian nations is the collection and disposal of waste to prevent the spread of disease transmitters from uncollected waste (Aleluia & Ferrão, 2016).

An effectively managed solid waste management system is essential for improving environmental qualities, the standard of life, and economic advancement in urban centers in the face of population increase, particularly in emerging nations. Lack of municipal waste management resources, improper waste management practices, and improper discharge of waste in the environment, all have a negative effect (Rahman & Bohara, 2023). It's important to understand the amount of waste generated and the composition of the waste collection system to develop an effective waste management strategy for a specific area (Bandara et al., 2007).

The municipal waste management study indicates that fewer waste disposal facilities and more energy and material recycling result in fewer adverse effects on the environment, less energy use, and lower financial expenses. Energy-rich waste shouldn't be disposed of in landfills as much as possible, mainly due to the poor resource recovery that occurs there as well as the negative impacts on the ecosystem. There are not many differences between burning, nutrient recycling, and material recycling; but, in general, plastic recycling is somewhat better than burning and biological treatment (Eriksson et al., 2005).

The paper's main goal was to support the creation of transparent waste composition datasets by offering an organized structure for municipal solid waste characterization activities. The specific goals were to: (i) introduce a methodology for waste sampling and sorting that involved an organized list of waste fractions (e.g., a sequential subdivision of fractions at three levels); (ii) implement this methodology in a real-life sampling campaign; (iii) assess the methodology using statistical analysis of the waste datasets that were obtained, with an emphasis on the effects of sorting procedures and classification criteria (e.g., the impact of sorting food waste packaging on other packaging materials); and (iv) identify possible trends in source-segregation efficiencies among sub-areas (Edjabou et al., 2015).



According to the study, the success of the SWM program is greatly impacted by the staff's reward and other benefits, their dedication, the political leadership's support, and motivation, as well as the contributions of society and the business community. Several administrative issues have prevented the SWM from being successfully implemented, which include inadequate land for final dumping, composting, and recycling; a lack of required vehicles and an integrated SWM program; a lack of modern technology and necessary instruments; a weak regulatory framework; lower labor productivity and quantity; a lack of resident awareness; and inappropriate political intervention (Fernando, 2019).

In sustainable solid waste management (SSWM), waste reduction and waste separation are the two recommended approaches. Without strong community awareness and support from the city authorities, these two strategies appear to be impossible to put into practice. According to this study, several important factors contribute to waste generation, which include population growth, economic expansion, improved well-being, and rapid urbanization (Shekdar, 2009).

Globally, the amount and composition of municipal solid waste (MSW) are currently rising significantly. It is generally accepted that effective and efficient management of municipal solid waste (MSW) is a necessary component of future social development. This requires not only technological innovation but also the participation of all stakeholders and the integration of social, economic, and psychological elements. This reality makes research on the social aspects of MSW management critically necessary (Ma & Hipel, 2016).

Vietnam aims to enhance its integrated solid waste management capabilities by 2025, with a focus on 2050, as demonstrated by a decision that focuses on four solutions: (1) improving solid waste storage, collection, transportation, reuse, recycling, and treatment; (2) broadening the network for collecting solid waste; (3) encouraging the classification of solid waste at the source to prevent and minimize the generation of solid waste in daily life, production, business, and services; (4) promoting socialization and attract investment from the private and foreign sectors in domestic solid waste management. With its rapid



urbanization and poor planning, Vietnam still has trouble implementing appropriate and proper municipal SWM systems (Tong et al., 2021).

According to the study, there are certain policies and actions taken by the Assembly of the local government that limit the public-private partnerships (PPPs) in municipal solid waste management for operating effectively. Additionally, the PPPs lack effective stakeholder collaboration, consultation, and beginning levels of participation, which has an impact on how well the municipality manages the growing amounts of solid waste it generates (Afful et al., 2023).

Except for the larger towns, most Indian cities dispose of their municipal solid waste (MSW) through open dumping. Because burning and/or waste decay releases harmful greenhouse gases (GHGs), this practice has a major adverse effect on the environment and public health. Implementing the Waste-to-energy (WtE) policy under the Municipal Solid Waste Management (MSWM) Rules is a major step that the Indian government has taken. For example, Kitchen waste is utilized for anaerobic digestion and composting but also waste generated from one process may be useful for another in these technologies through which we can get results of environmental, economic, and technological sustainability (Kundariya et al., 2021).

Local governments and citizens use a variety of strategies, laws, and guidelines to reduce the negative effects of waste and to identify recyclable materials. Waste generation, waste handling at source, collection, transportation, processing and transformation, and disposal are the six organizational functions that makeup waste management. The elements of the activities remain the same, even though they change depending on the location. The producer disposes of waste in two ways: either by separating it into parts or by placing it in a container. After that, the trash may be gathered and moved by an official or unofficial actor to another location where it can be processed and reused (S. Khan et al., 2022).



CHAPTER III

RESEARCH METHODS

3.1. Introduction

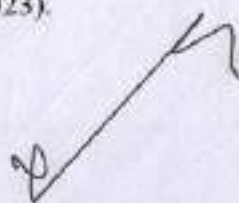
This research sought the solid waste management practices of the Butwal sub-metropolitan city Rupandehi. Questionnaires for an inquiry were designed to cover major aspects of solid waste management practices. The researcher used quantitative methods in the analysis of the data gathered from the questionnaire survey. It includes the research design, population, and sampling procedure, sources of data, method of data collection, and methods of data analysis. The details of the methodological issues associated with this study are described in the following subsections:

3.2. Research Design

The nature of the research design involved in this research is a descriptive and causal-comparative research design. This design has been implemented for examining adequate information about the solid waste management practices of Butwal sub-metropolitan city of Rupandehi. These designs have also been used to evaluate the characteristics of respondents concerning their preferences.

3.3. Population and sample

The population refers to the complete set of individuals, subjects, objects, or events having common observable characteristics in which the researcher is interested. The population of this study includes most populated all eligible voters of the wards 3,8 and 11 of Butwal sub-metropolitan city which in total is 27,553. (NEC, 2023).



Digitally structured questionnaires were administered to the sampled respondents. The questionnaire was administered to the sampled unit via social media groups and asked them to fill up the google form. As google Forms cannot be submitted without completing every response, the response rate was 100%. Altogether 400 responses were collected via google form and written survey which is more than the determined sample size of 395. The following formula has been used for sample size calculation;

Sample size formula: Yamane Equation:

$$n = \frac{N}{1 + Ne^2}$$

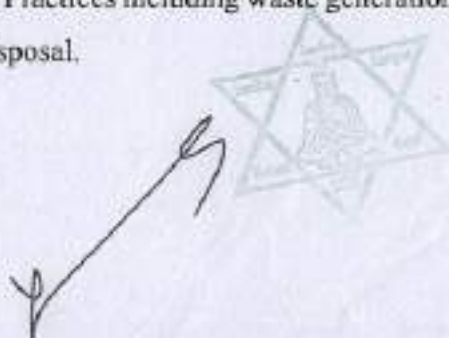
n= sample size, N= population size, e²= margin of error

3.4 Instrumentation

Kothari (1984) refers to survey as the method of securing relevant information concerning a phenomenon under study since; it has the advantage of wider scope and accuracy of information. So, the instrument should be designed properly. A questionnaire is an instrument to gather the data for the study. The questionnaire was prepared based on the studies carried out by the earlier researchers relating to the Solid Waste Management Practices.

The questionnaire schedule designed for collecting required data relating to the objectives of the study consists of two sections:

- Demographic factors.
- Details relating to a Solid Waste Management Practices including waste generation, waste, collection, waste transportation and disposal.



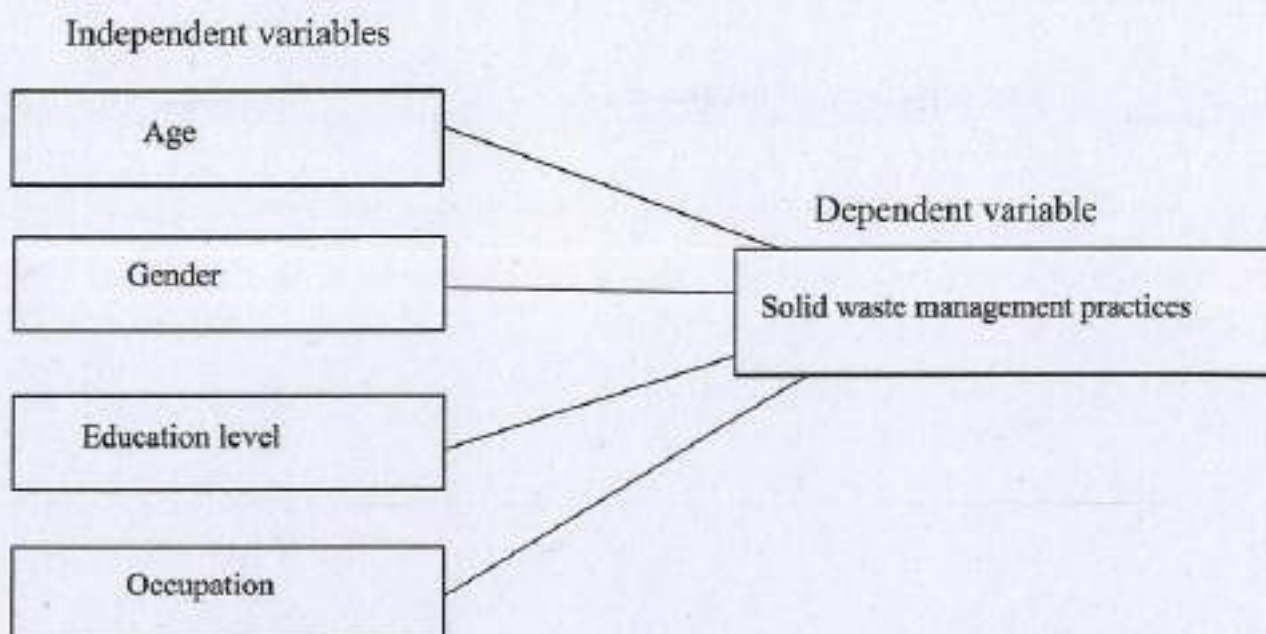
3.4 Sources of Data

3.4.1 Primary Data Collection

This study is primarily an empirical study. Most of the data were collected from primary sources using a frequency-based question and well-structured questionnaire on a five Likert point scale as 1-strongly disagree, 2- disagree, 3-neutral, 4- agree, 5- strongly agree. The questionnaire was developed to collect two types of information including general information like age, gender, etc. and details relating to Waste Management Practices.

Figure 1

3.5 Research Framework



Operational definition

Waste management practices encompass a wide range of techniques and procedures for efficiently handling, reducing, and disposing of garbage to reduce environmental impact and promote sustainability.



Waste generation is the process of creating waste materials through a variety of human activities, including residential, commercial, industrial, and agricultural processes.

Waste transportation is the conveyance of waste products from their site of origin to treatment, recycling, or disposal facilities. This may necessitate the use of vehicles such as trucks, trains, or ships, depending on the type and quantity of trash and the distance to the disposal location.

Waste collection is the systematic gathering and removal of waste products from their source of generation to designated collection locations or facilities. This procedure comprises the collection of waste for transportation using specialized equipment and vehicles, such as garbage trucks or bins.

Waste Disposal is the ultimate stage of waste management, in which waste products are disposed of safely and environmentally responsibly. Landfilling, incineration, composting, and other treatment processes are examples of disposal strategies that aim to reduce environmental impact and health concerns (<https://www.epa.gov/waste>).



CHAPTER IV

RESULT, DISCUSSION, CONCLUSIONS

4.1 Results

The statistical tools used in this study were simple descriptive statistics. Correlation analysis was done to check the relation between the predictors and dependent variables. Multiple regression analysis was used for testing the hypothesis. ANOVA was used to check the overall fitness of the model. The result of the analysis has been properly tabulated, analyzed, and interpreted. Data processing is done with the help of an SPSSv21.lbc (Statistical Package for Social Science). Frequency tables and other statistics are used to make the comparison of different groups of respondents.

Table 1

Demography based on Ward Number

		Ward Number			Total
		3	8	11	
Gender of Respondents	Female	78 (27.4%)	82 (28.8%)	125 (43.9%)	285 (72.2%)
	Male	31 (28.2%)	41 (37.3%)	38 (34.5%)	110 (27.8%)
Age of Respondents	18- 27	19 (23.8%)	29 (36.3%)	32 (40.0%)	80 (20.3%)
	28- 37	39 (32.8%)	39 (32.8%)	41 (34.5%)	119 (30.1%)
	38- 47	44 (25.7%)	47 (27.5%)	80 (46.8%)	171 (43.3%)
	48 and above	7 (28.0%)	8 (32.0%)	10 (40.0%)	25 (6.3%)
Education Level of Respondents	Illiterate	2 (11.8%)	5 (29.4%)	10 (58.8%)	17 (4.3%)
	Able to read and write	1 (16.7%)	2 (33.3%)	3 (50.0%)	6 (1.5%)
	SLC or equivalent	15 (35.7%)	13 (31.0%)	14 (33.3%)	42 (10.6%)
	10+2 or equivalent	20 (30.8%)	16 (24.6%)	29 (44.6%)	65 (16.5%)
	Bachelor	60 (28.6%)	73 (34.8%)	77 (36.7%)	210 (53.2%)
Occupation of Respondents	Master	11 (20.0%)	14 (25.5%)	30 (54.5%)	55 (13.9%)
	Business	23 (21.8%)	33 (31.4%)	49 (46.7%)	105 (26.8%)
	Entrepreneur	4 (21.1%)	8 (42.1%)	7 (36.8%)	19 (4.8%)
	Others	60 (31.3%)	59 (30.7%)	73 (38.0%)	192 (48.6%)
	Service Holder	22 (27.8%)	23 (29.1%)	34 (43.0%)	79 (20.0%)
Total		109	123	163	395

Table 4.1 demonstrates the number of respondents of demographic variable. Based on the findings, thorough breakdown of the respondents in Wards 3, 8 and 11 according to gender, age, occupation, and degree of education is shown in the table. When comparing the gender distribution, it is clear that 285 (72.2%) respondents are Female followed by 110 (27.8%) Male respondent.

Similarly, 171 (43.3%) respondent were from age group of 38–47 with highest percentage, following with 25 (6.3%). Respondent of age group 48 and above.

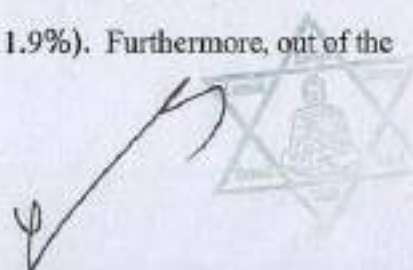
Additionally in terms of educational level, 210 (53.2%) respondents with a bachelor's degree have highest population followed by 6 (1.5%) respondents belonging the able to read and write group with the lowest representation. Finally, in the classifications, the "Others" group has the highest respondent i.e, 192 (48.6%), followed by 19 (4.8%) having entrepreneurship background.

Table 2

Rank Of Waste Generated Categories based on Ward Number

		3	8	11	
Rank of Waste Generated Categories	Glass	14 (32.6%)	12 (27.8%)	17 (39.5%)	43 (10.9%)
	Organic Waste	32 (28.4%)	26 (21.5%)	63 (52.1%)	121 (30.6%)
	Others	2 (14.3%)	3 (21.4%)	9 (64.3%)	14 (3.5%)
	Paper and Paper Products	9 (19.1%)	28 (59.6%)	10 (21.3%)	47 (11.9%)
	Plastic	4 (30.8%)	5 (38.5%)	4 (30.8%)	13 (3.3%)
	Rubber and Leather	47 (32.6%)	46 (31.9%)	51 (35.4%)	144 (36.5%)
	Textile	1 (7.7%)	3 (23.1%)	9 (69.2%)	13 (3.3%)
Total		109	123	163	395

Table 4.2 exhibits the waste generation first rank categories based on wards. Out of 395 (100%) total respondents, 144 (36.5%) across all wards marked that their houses generated more organic waste than other waste categories followed by Rubber and Leather with 121 (30.6%) and Paper and Paper Products with 47 (11.9%). Furthermore, out of the



121 (100%) respondents from Ward 11 ranked Rubber and Leather products as top waste category in terms of number i.e. 63 (52.1%).

Table 3

Waste Generated Based on Ward Number

		3	8	11	Total
waste generated more in terms of quantity	Bio degradable	80 (27.4%)	82 (28.1%)	130 (44.5%)	292
	Non-biodegradable	29 (28.2%)	41 (39.8%)	33 (32.0%)	103
makes your household waste as compost	No	56 (27.9%)	64 (31.8%)	81 (40.3%)	201
	Yes	53 (27.3%)	59 (30.4%)	82 (42.3%)	194
	Maybe	8 (17.4%)	24 (52.2%)	14 (30.4%)	46
waste generation can be reduced at the household level	No	3 (25.0%)	5 (41.7%)	4 (33.3%)	12
	Yes	98 (29.1%)	94 (27.9%)	145 (43.0%)	337
	0.5 kg	17 (25.4%)	13 (18.4%)	37 (55.2%)	67
kg of waste is produced in your house per day	1 kg	53 (27.6%)	67 (34.9%)	72 (37.5%)	192
	3 kg	35 (31.0%)	32 (28.3%)	46 (40.7%)	113
	5 kg and above	4 (1.0%)	11 (2.8%)	8 (2.0%)	23
Total		109	123	163	395

Table 4.3 exhibits the waste generation based on wards. Out of 395 total respondents, 292 across all age group agreed that their houses generated more biodegradable waste than 103 respondents across all wards revealed that their houses generated more non-biodegradable waste.

Furthermore, out of 292 (100%) respondents who stated their houses generated higher quantity of biodegradable waste than non-biodegradable waste, majority of respondents i.e., 130 (44.5%), were from ward 11 followed by 82(28.1%) from age group of Ward 8, and 80(27.4%) from Ward 3.

Additionally, when asked about whether respondent make household waste as compost, out of 395 total respondents, 201 respondents revealed that they didn't make household waste as compost compared to 194 respondents who stated that they turned household waste into compost. Furthermore, out of 201 (100%) respondents who stated that they didn't turn household waste as compost, majority of respondents i.e., 81(40.3%),



were from ward 11 followed by 64(31.8%) from Ward 8, and 56(27.9%) from Ward 3 respectively.

As the response from the question was almost equally distributed i.e. 201 as NO and 194 as YES, it can be seen that the 194(100%) respondents who agreed that they turned household waste into compost, the ward 11 was higher that is 82 against 81 respondents from the same group who stated that they didn't make household waste as compost.

Out of 395 total respondents, 337 across all Wards agreed that waste generation can be reduced at household level than, 12 respondents across all Wards revealed that that waste generation cannot be reduced at household level while, 46 respondents across all Wards were unsure about it .Furthermore, out of 337 (100%), the respondent who stated that waste generation can be reduced at household level majority of respondents i.e., 145(43%), were from ward 11 followed by 94(27.9%) from Ward 8, and 98(29.1%) from Ward 3 respectively.

Out of 395 total respondents, 192 across all Wards stated that 1kg of waste is generated in their household per day while, 113 respondents across Wards revealed that 3kg of waste is generated in their household per while, 67 respondents stated that 0.5kg of waste is generated in their household per day similarly 23 respondents stated that 5kg of waste is generated in their household per day.

Furthermore, out of 192 (100%), the respondent who stated that 1kg of waste is generated in their household per day. majority of respondents i.e., 72(37.5%), were from ward 11 followed by 67 (34.9%) from Ward 8, and 53(27.6%) from Ward 3 respectively.



Table 4

Waste Generated Based on Age Group

		18- 27	28- 37	38- 47	48 and above	Total
waste generated more in terms of quantity	Bio degradable	52 (17.8%)	92 (31.5%)	127 (43.5%)	21 (7.2%)	292
	Non-biodegradable	28 (27.2%)	27 (26.2%)	44 (42.7%)	4 (3.9%)	103
make your household waste as compost	No	19 (9.5%)	65 (32.3%)	105 (52.2%)	12 (6.0%)	201
	Yes	61 (31.4%)	54 (27.8%)	66 (34.0%)	13 (6.7%)	194
	Maybe	25 (54.3%)	8 (17.4%)	13 (28.3%)	0 (0.0%)	46
waste generation be reduced at the household level	No	3 (25.0%)	3 (25.0%)	6 (50.0%)	0 (0.0%)	12
	Yes	52 (15.4%)	108 (32.0%)	152 (45.1%)	25 (7.4%)	337
	0.5 kg	24 (35.8%)	16 (23.9%)	21 (31.3%)	6 (9.0%)	67
kg of waste is produced in your house per day	1 kg	45 (23.4%)	48 (25.0%)	89 (46.4%)	10 (5.2%)	192
	3 kg	8 (7.1%)	49 (43.4%)	50 (44.2%)	6 (5.3%)	113
	5 kg and above	3 (13.0%)	6 (26.1%)	11 (47.8%)	3 (13.0%)	23
Total		80	119	171	25	395

Table 4.4 exhibits the waste generation based on age group. Out of 395 total respondents, 292 across all age group agreed that their houses generated more biodegradable waste than 103 respondents across all age group revealed that their houses generated more non-biodegradable waste.

Furthermore, out of 292 (100%) respondents who stated their houses generated higher quantity of biodegradable waste than non-biodegradable waste, majority of respondents i.e., 127 (43.5%), were from age group 38-47 followed by 92(31.5%) from age group of 28-37, and 52(17.8%) from age group 18-27.

Additionally, when asked about whether respondent made household waste as compost, out of 395 total respondents, 201 respondents revealed that they didn't make household waste as compost compared to 194 respondents who stated that they turned household waste into compost. Furthermore, out of 201 (100%) respondents who stated that they didn't turn household waste as compost, majority of respondents i.e., 105(52.2%), were from age group 38-47 followed by 65(32.3%) from age group 28-37, and 19(9.5%) from age group 18-27.

As the response from the question was almost equally distributed i.e. 201 as NO and 194 as YES, it can be seen that the 194(100%) respondents who agreed that they turned

household waste into compost, the age group 18-27 was higher that is 61 against 19 respondents from the same group who stated that they didn't make household waste as compost.

Out of 395 total respondents, 337 across all age group agreed that waste generation can be reduced at household level than, 12 respondents across all age group revealed that that waste generation cannot be reduced at household level while , 46 respondents across all age group were unsure about it .

Furthermore, out of 337 (100%), the respondent who stated that waste generation can be reduced at household level majority of respondents i.e., 152 (45.1%), were from age group 38-47 followed by 108(32%) from age group of 28-37, 52(15.4%) from age group 18-27 and 25 (7.4%) from age group 48 and above.

Out of 395 total respondents, 192 across all age group stated that 1kg of waste is generated in their household per day while, 113 respondents across all age group revealed that 3kg of waste is generated in their household per while, 67 respondents across all age group were stated that 0.5kg of waste is generated in their household per day similarly 23 respondents across all age group stated that 5kg of waste is generated in their household per day.

Furthermore, out of 192 (100%), the respondent who stated that 1kg of waste is generated in their household per day . majority of respondents i.e., 89 (46.4%), were from age group 38-47 followed by 48(25%) from age group of 28-37, 45(23.4%) from age group 18-27 and 25 (7.4%) from age group 48 and above.



Table 5*Waste Generated Based on Gender*

		Female	Male	Total
waste generated more in terms of quantity	Bio degradable	212 (72.6%)	80 (27.4%)	292
	Non-biodegradable	73 (70.9%)	30 (29.1%)	103
make your household waste as compost	No	143 (71.1%)	58 (28.9%)	201
	Yes	142 (73.2%)	52 (26.8%)	194
	Maybe	35 (78.1%)	11 (23.9%)	46
waste generation be reduced at the household level	No	5 (41.7%)	7 (58.3%)	12
	Yes	245 (72.7%)	92 (27.3%)	337
	0.5 kg	64 (80.6%)	13 (19.4%)	67
kg of waste is produced in your house per day	1 kg	143 (74.5%)	49 (25.5%)	192
	3 kg	74 (85.5%)	39 (34.5%)	113
	5 kg and above	14 (60.9%)	9 (39.1%)	23
Total		285	110	395

Table 4.5 exhibits the waste generation based on age group. Out of 395 total respondents, 292 across all age group agreed that their houses generated more biodegradable waste than 103 respondents across all age group revealed that their houses generated more non-biodegradable waste.

Furthermore, out of 292 (100%) respondents who stated their houses generated higher quantity of biodegradable waste than non-biodegradable waste, majority of respondents i.e., 127 (43.5%), were from age group 38-47 followed by 92(31.5%) from age group of 28-37, and 52(17.8%) from age group 18-27.

Additionally, when asked about whether respondent made household waste as compost, out of 395 total respondents, 201 respondents revealed that they didn't make household waste as compost compared to 194 respondents who stated that they turned household waste into compost. Furthermore, out of 201 (100%) respondents who stated that they didn't turn household waste as compost, majority of respondents i.e., 105(52.2%), were from age group 38-47 followed by 65(32.3%) from age group 28-37, and 19(9.5%) from age group 18-27.

As the response from the question was almost equally distributed i.e. 201 as NO and 194 as YES, it can be seen that the 194(100%) respondents who agreed that they turned



household waste into compost, the age group 18-27 was higher that is 61 against 19 respondents from the same group who stated that they didn't make household waste as compost.

Out of 395 total respondents, 337 across all age group agreed that waste generation can be reduced at household level than, 12 respondents across all age group revealed that that waste generation cannot be reduced at household level while, 46 respondents across all age group were unsure about it .

Furthermore, out of 337 (100%), the respondent who stated that waste generation can be reduced at household level majority of respondents i.e., 152 (45.1%), were from age group 38-47 followed by 108(32%) from age group of 28-37, 52(15.4%) from age group 18-27 and 25 (7.4%) from age group 48 and above.

Out of 395 total respondents, 192 across all age group stated that 1kg of waste is generated in their household per day while, 113 respondents across all age group revealed that 3kg of waste is generated in their household per while, 67 respondents across all age group were stated that 0.5kg of waste is generated in their household per day similarly 23 respondents across all age group stated that 5kg of waste is generated in their household per day.

Furthermore, out of 192 (100%), the respondent who stated that 1kg of waste is generated in their household per day. majority of respondents i.e., 89 (46.4%), were from age group 38-47 followed by 48(25%) from age group of 28-37, 45(23.4%) from age group 18-27 and 25 (7.4%) from age group 48 and above.



Table 6*Waste Generated Based on Education Level*

		Able to					Total
		Illiterate	read and write	SLC or equivalent	10+2 or equivalent	Bachelor	
waste generated more in terms of quantity	Bio degradable			32			292
		14 (4.8%)	5 (1.7%)	(11.0%)	53 (18.2%)	149 (51.0%)	39 (13.4%)
	Non-biodegradable	3 (2.9%)	1 (1.0%)	10 (9.7%)	12 (11.7%)	61 (59.2%)	16 (15.5%)
	No			20			201
		9 (4.5%)	3 (1.5%)	(10.0%)	37 (18.4%)	99 (49.3%)	33 (16.4%)
make your household waste as compost	Yes			22			194
		8 (4.1%)	3 (1.5%)	(11.3%)	28 (14.4%)	111 (57.2%)	22 (11.3%)
	Maybe	1 (2.2%)	0 (0.0%)	5 (10.9%)	4 (8.7%)	32 (69.6%)	4 (8.7%)
	No	0 (0.0%)	0 (0.0%)	3 (25.0%)	3 (25.0%)	6 (50.0%)	0 (0.0%)
waste generation be reduced at the household level	Yes			34			337
		16 (4.7%)	8 (1.8%)	(10.1%)	58 (17.2%)	172 (51.0%)	51 (15.1%)
	0.5 kg	1 (1.5%)	2 (3.0%)	9 (13.4%)	9 (13.4%)	38 (56.7%)	8 (11.9%)
	1 kg	11 (5.7%)	1 (0.5%)	17 (8.9%)	32 (16.7%)	107 (55.7%)	24 (12.5%)
kg of waste is produced in your house per day	3 kg			13			113
		4 (3.5%)	2 (1.8%)	(11.5%)	18 (15.9%)	58 (51.3%)	18 (15.9%)
	5 kg and above	1 (4.3%)	1 (4.3%)	3 (13.0%)	6 (26.1%)	7 (30.4%)	5 (21.7%)
Total		17	6	42	65	210	55
							395

Table 4.6 reveals that Out of 395 total respondents, 292 across across different education backgrounds agreed that their houses generated more biodegradable waste than 103 respondents across all education level revealed that their houses generated more non-biodegradable waste.

Furthermore, out of 292 (100%) respondents who stated their houses generated higher quantity of biodegradable waste than non-biodegradable waste, majority of respondents i.e., 149(51%), were from bachelor degree followed by 53(18.2%) were from +2 and equivalent, and 39(13.4%) from masters degree, 32(11%) from slc or equivalent, 14(4.8%) were illiterate and 5(1.7%) were from the group who was able to read and write.

Additionally, when asked about whether respondent made household waste as compost, out of 395 total respondents, 201 respondents revealed that they didn't make

household waste as compost compared to 194 respondents who stated that they turned household waste into compost.

Furthermore, out of 201 (100%) respondents who stated that they didn't turn household waste as compost, majority of respondents i.e., majority of respondents i.e., 111(57.2%), were from bachelor degree followed by 28(14.4%) were from +2 and equivalent, and 22(11.3%) from masters degree, 22(11.3%) from slc or equivalent, 8(4.1%) were illiterate and 3(1.5%) were from the group who was able to read and write.

Out of 395 total respondents, 337 across different education backgrounds revealed that waste generation can be reduced at household level than, 12 respondents across different education background revealed that that waste generation cannot be reduced at household level while, 46 respondents across all different education backgrounds revealed that are unsure about it.

Furthermore, out of 337 (100%), the respondent who stated that waste generation can be reduced at household level majority of respondents i.e., majority of respondents i.e., 172(51%), were from bachelor degree followed by 58(17.2%) were from +2 and equivalent, and 51(15.1%) from masters degree, 34(10.1%) from slc or equivalent, 16(4.8%) were illiterate and 6(1.8%) were from the group who was able to read and write.

Table 7

Waste Generated Based on Occupation

		Business	Entrepreneur	Others	Service Holder	Total
waste generated more in	Bio degradable	67 (22.9%)	8 (3.1%)	154 (52.7%)	62 (21.2%)	292
terms of quantity	Non-biodegradable	38 (30.9%)	10 (9.7%)	38 (30.9%)	17 (16.5%)	103
make your household	No	59 (29.4%)	11 (5.5%)	85 (42.3%)	46 (22.9%)	201
waste as compost	Yes	46 (23.7%)	8 (4.1%)	107 (55.2%)	33 (17.0%)	194
waste generation be	Maybe	7 (15.2%)	1 (2.2%)	31 (67.4%)	7 (15.2%)	46
reduced at the household	No	5 (41.7%)	2 (16.7%)	3 (25.0%)	2 (16.7%)	12
level	Yes	93 (27.6%)	16 (4.7%)	158 (46.9%)	70 (20.8%)	337
	0.5 kg	13 (19.4%)	3 (4.5%)	38 (56.7%)	13 (19.4%)	67
kg of waste is produced in	1 kg	53 (27.6%)	7 (3.6%)	97 (50.5%)	35 (18.2%)	192
your house per day	3 kg	32 (28.3%)	8 (7.1%)	47 (41.6%)	26 (23.0%)	113
	5 kg and above	7 (30.4%)	1 (4.3%)	10 (43.5%)	5 (21.7%)	23
Total		105	19	192	79	395

Table 4.7 reveals that out of 395 total respondents, 292 across across different occupation backgrounds agreed that their houses generated more biodegradable waste than 103 respondents across different occupation revealed that their houses generated more non-biodegradable waste.

Furthermore, out of 292 (100%) respondents who stated their houses generated higher quantity of biodegradable waste than non-biodegradable waste, majority of respondents i.e., 107(55.2%), were from others group followed by 46(23.7%) were from business backgrounds, and 33(17%) from service holder and 8(4.1%) from entrepreneur background.

Additionally, when asked about whether respondent made household waste as compost, out of 395 total respondents, 201 respondents revealed that they didn't make household waste as compost compared to 194 respondents who stated that they turned household waste into compost. Furthermore, out of 201 (100%) respondents who stated that they didn't turn household waste as compost, majority of respondents i.e. 154(52.7%), were from others group followed by 67(22.9%) were from business backgrounds, and 62(21.2%) from service holder and 9(3.1%) from entrepreneur background.

As the response from the question was almost equally distributed i.e. 201 as NO and 194 as YES, who don't agree that they turned household waste into compost, the business group was higher that is 59 against 46 respondents from the same group who stated that they make household waste as compost.

Out of 395 total respondents, 337 across different occupation backgrounds revealed that waste generation can be reduced at household level than, 12 respondents across different education background revealed that that waste generation cannot be reduced at household level while, 46 respondents across all different occupation backgrounds revealed that are unsure about it.

Furthermore, out of 337 (100%), the respondent who stated that waste generation can be reduced at household level majority of respondents i.e. majority of respondents i.e. 158(46.9%), were from others group followed by 93(27.6%) were from business backgrounds, and 70(20.8%) from service holder and 16(4.7%) from entrepreneur background.



Out of 395 total respondents, 192 across different occupation backgrounds stated that 1kg of waste is generated in their household per day while, 113 respondents across different occupation backgrounds revealed that 3kg of waste is generated in their household per while, 67 respondents across different occupation backgrounds stated that 0.5kg of waste is generated in their household per day similarly 23 respondents across different occupation backgrounds stated that 5kg of waste is generated in their household per day.

Furthermore, out of 192 (100%), the respondent who stated that 1kg of waste is generated in their household per day. majority i.e,97 (50.5.9%), were from others group followed by53 (27.6%) were from business backgrounds, and 35(18.2%) from service holder and 7(3.6%) from entrepreneur background.



Waste Collection:**Table 8***Waste Collection Based on Ward*

		3	8	11	Total
store your household waste	Cardboard	1 (25.0%)	2 (50.0%)	1 (25.0%)	4
	Dustbin	92 (26.7%)	105 (30.5%)	147 (42.7%)	344
	Others	2 (50.0%)	1 (25.0%)	1 (25.0%)	4
	Plastic Bag	14 (32.6%)	15 (34.9%)	14 (32.6%)	43
aware of segregation of waste based on their nature	No	7 (33.3%)	8 (38.1%)	6 (28.6%)	21
	Yes	102 (27.3%)	115 (30.7%)	157 (42.0%)	374
if YES, are you segregating waste at your home	No	14 (45.5%)	6 (18.2%)	11 (36.4%)	31
	Yes	89 (26.0%)	111 (32.3%)	143 (41.7%)	343
have separate bins at home for biodegradable and non-biodegradable waste	No	8 (20.5%)	20 (51.3%)	11 (28.2%)	39
	Yes	101 (28.4%)	103 (28.9%)	152 (42.7%)	356
door-to-door waste collection system	No	4 (23.5%)	8 (47.1%)	5 (29.4%)	17
	Yes	105 (27.8%)	115 (30.4%)	158 (41.8%)	378
how often do they collect	Daily	6 (30.0%)	9 (45.0%)	5 (25.0%)	20
	In a week	7 (20.0%)	16 (45.7%)	12 (34.3%)	35
	Once in three days	48 (42.9%)	24 (21.4%)	40 (35.7%)	112
	Once in two days	48 (21.1%)	74 (32.5%)	106 (46.5%)	228
	Very satisfied	6 (28.6%)	6 (28.6%)	9 (42.9%)	21
extent you satisfied with the current waste collection service	Satisfied	62 (30.1%)	90 (29.1%)	84 (40.8%)	206
	Neutral	37 (22.8%)	56 (34.6%)	69 (42.6%)	162
	Dissatisfied	3 (60.0%)	1 (20.0%)	1 (20.0%)	5
	Very dissatisfied	1 (100.0%)	0 (0.0%)	0 (0.0%)	1
Total		109	123	163	395

Table 4.8 reveals that out of 395 total respondents, 344 across all ward stated that they store household waste in dustbin, 43 across all ward stated that they store household waste on in plastic bag, 4 respondents across all ward revealed that they store household waste on cardboard and 4 respondents stated others. Out of 344 (100%) respondents who stated that they store household on dustbin, majority of respondents i.e., 147 (42.7%), were from Ward 11 followed by 105(30.5%) from Ward 8, and 92 (26.7%) from Ward 3.

Additionally, when asked about whether respondent was aware of segregation of waste based on their nature, out of 395 total respondents, 374 respondents replied YES that

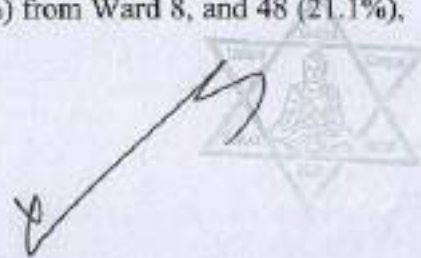
they are aware about segregation while 21 respondents stated that they are not aware of segregation of waste based on their nature. Furthermore, out of 374 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 157 (42%), were from Ward 11 followed by 115 (30.7%) from Ward 8, and 102 (27.3%) from Ward 3.

Furthermore, when asked about whether respondents were segregating waste based on their nature, out of 374 total respondents, 362 respondents revealed that they segregate while 31 respondents stated that they do not segregate waste on their house. Furthermore, out of 343 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 143 (41.7%), were from Ward 11 followed by 111(32.3%) from Ward 8, and 89(26%) from Ward 3.

Out of 395 total respondents, 356 across all Wards stated that they have separate bins for bio-degradable and non-biodegradable waste, 39 across all Wards stated that they do not have separate bins for bio-degradable and non-biodegradable waste at home. Furthermore, out of 362 (100%) respondents across all Wards stated that they have separate bins for bio-degradable and non-biodegradable waste i.e., 152 (42.7%) from Ward 11 followed by 103 (28.9%), from Ward 18, and 101 (28.4%) from Ward 3.

Out of 395 total respondents, 378 across all Wards stated that there is door-to door waste collection system, and 17 across Wards stated that have there is no door-to door waste collection system. Furthermore, out of 378 (100%) respondents across all Wards who stated that there is door-to door waste collection system majority of respondents, 158 (41.8%), were from Ward 11 followed by 115 (30.4%), from Ward 8, and 105 (27.8%), from Ward 3.

On the statement about how often the waste is collected, out of 395 total respondents, 228, across Wards stated that once in a two days waste is collected, 112 across all age group stated that stated that once in three days, 35, stated that once in week have there, and 20 stated daily collection. Furthermore, out of 228, (100%) respondents across all Wards who stated once in a two days waste is collected, majority of respondents i.e., 106 (46.5%), were from Ward 11 followed by 74 (32.5%) from Ward 8, and 48 (21.1%), from Ward 3.



When asked, "to what extent you satisfied with the current waste collection service", out of 395 total respondents, 206, across all Wards stated that they are satisfied with collection system, 162, respondent stated that they have neutral feeling 21 respondent stated that they are very satisfied once, 5, respondent stated they are dissatisfied and, 1 respondent stated he/she is very dissatisfied.

Furthermore, out of 206, (100%) respondents across all Wards who stated that they are satisfied with collection service majority of respondents i.e., 84 (40.8%), were from Ward 11 followed by 60 (29.1%) from Ward 8, and 62 (30.1%), from Ward 3.

Table 9

Waste Collection Based on Gender

		Female	Male	Total
store your household waste	Cardboard	0 (0.0%)	4 (100.0%)	4
	Dustbin	253 (73.5%)	91 (26.5%)	344
	others	1 (25.0%)	3 (75.0%)	4
aware of segregation of waste based on their nature	Plastic Bag	31 (72.1%)	12 (27.9%)	43
	No	13 (61.9%)	8 (38.1%)	21
	Yes	272 (72.7%)	102 (27.3%)	374
If YES, are you segregating waste at your home	No	20 (63.6%)	11 (36.4%)	31
	Yes	250 (72.9%)	93 (27.1%)	362
have separate bins at home for biodegradable and non-biodegradable waste	No	21 (53.8%)	18 (46.2%)	39
	Yes	264 (74.2%)	92 (25.8%)	356
door-to-door waste collection system	No	8 (35.3%)	11 (64.7%)	17
	Yes	279 (73.8%)	99 (26.2%)	378
how often do they collect	Daily	11 (55.0%)	9 (45.0%)	20
	In a week	25 (71.4%)	10 (28.6%)	35
	Once in three days	84 (75.0%)	28 (25.0%)	112
	Once in two days	165 (72.4%)	63 (27.6%)	228
extent you satisfied with the current waste collection service	Very satisfied	17 (81.0%)	4 (19.0%)	21
	Satisfied	137 (66.5%)	69 (33.5%)	206
	Neutral	127 (78.4%)	35 (21.6%)	162
	Dissatisfied	4 (80.0%)	1 (20.0%)	5
	Very dissatisfied	0 (0.0%)	1 (100.0%)	1
Total		285	110	395

Table 4.9 reveals that out of 395 total respondents, 344 across all gender stated that they store household waste in dustbin, 43 across all gender stated that they store household waste on in plastic bag, 4 respondents across all gender revealed that they store household waste on cardboard and 4 respondents stated others. Out of 344 (100%) respondents who stated that they store household on dustbin, majority of respondents i.e., 253 (73.5%), were female followed by 91(26.5%) were male.

Additionally, when asked about whether respondents were aware of segregation of waste based on their nature, out of 395 total respondents, 374 respondents replied YES that they are aware about segregation while 21 respondents stated that they are not aware of segregation of waste based on their nature. Furthermore, out of 374 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 272 (72.7%), were female followed by 102 (27.3%) were male.

Furthermore, when asked about whether respondents were segregating waste based on their nature, out of 374 total respondents, 343 respondents revealed that they segregate while 31 respondents stated that they do not segregate waste on their house. Furthermore, out of 343 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 250 (72.9%), were female followed by 93(27.1%) were male.

Out of 395 total respondents, 356 across all gender stated that they have separate bins for bio-degradable and non-biodegradable waste, 39 across all gender stated that they do not have separate bins for bio-degradable and non-biodegradable waste at home. Furthermore, out of 356 (100%) respondents across all gender stated that they have separate bins for bio-degradable and non-biodegradable waste, 264 (74.2%) were female followed by 92 (25.8%), were male.

Out of 395 total respondents, 378 across all gender stated that there is door-to door waste collection system, and 17 across gender stated that have there is no door-to door waste collection system. Furthermore, out of 378 (100%) respondents across gender who stated that there is door-to door waste collection system majority of respondents, 279 (73.8%), were female followed by 99 (26.2%) were male.

On the statement about how often the waste is collected, out of 395 total respondents, 228, across gender stated that once in a two days waste is collected, 112 across



all gender stated that stated that once-in-a-three days, 35 stated that it is collected once in week, and 20 stated waste was collected. Furthermore, out of 228, (100%) respondents across all gender who stated once in a two days waste is collected, majority of respondents i.e., 165 (72.4%), were female followed by 63 (27.6%) were male.

When asked, "to what extent you satisfied with the current waste collection service", out of 395 total respondents, 206, across all gender stated that they are satisfied with collection system, 162, respondent stated that they have neutral feeling 21 respondent stated that they are very satisfied once, 5, respondent stated they are dissatisfied and, 1 respondent stated he/she is very dissatisfied.

Furthermore, out of 206, (100%) respondents across all gender who stated that they are satisfied with collection service majority of respondents i.e., 137 (66.5%), were female followed by 69 (33.35%) were male.

Table 10

Waste Collection Based on Age Group

		18- 27	28- 37	38- 47	48 and above	Total
store your household waste	Cardboard	1 (25.0%)	2 (50.0%)	1 (25.0%)	0 (0.0%)	4
	Dustbin	66 (19.2%)	103 (29.9%)	154 (44.8%)	21 (6.1%)	344
	Others	2 (50.0%)	0 (0.0%)	2 (50.0%)	0 (0.0%)	4
	Plastic Bag	11 (25.6%)	14 (32.6%)	14 (32.6%)	4 (9.3%)	43
aware of segregation of waste based on their nature	No	11 (52.4%)	8 (38.1%)	2 (9.5%)	0 (0.0%)	21
	Yes	69 (18.4%)	111 (29.7%)	169 (45.2%)	25 (6.7%)	374
If YES, are you segregating waste at your home	No	18 (57.6%)	6 (18.2%)	7 (21.2%)	1 (3.0%)	31
	Yes	58 (16.9%)	107 (31.2%)	155 (45.3%)	23 (6.6%)	343
have separate bins at home for biodegradable and non-biodegradable waste	No	24 (61.5%)	7 (17.9%)	7 (17.9%)	1 (2.6%)	39
	Yes	56 (15.7%)	112 (31.5%)	164 (46.1%)	24 (6.7%)	356
door-to-door waste collection system	No	24 (61.5%)	7 (17.9%)	7 (17.9%)	1 (2.6%)	39
	Yes	56 (15.7%)	112 (31.5%)	164 (46.1%)	24 (6.7%)	356
how often do they collect	Daily	7 (35.0%)	7 (35.0%)	6 (30.0%)	0 (0.0%)	20
	In a week	33 (94.3%)	0 (0.0%)	2 (5.7%)	0 (0.0%)	35
	Once in three days	14 (12.5%)	39 (34.8%)	57 (50.8%)	2 (1.8%)	112
	Once in two days	26 (11.4%)	73 (32.0%)	106 (46.5%)	23 (10.1%)	228
	Very satisfied	6 (28.6%)	5 (23.8%)	8 (38.1%)	2 (9.5%)	21

extent you satisfied with the current waste collection service	Satisfied	26 (12.6%)	79 (38.3%)	87 (42.2%)	14 (5.8%)	206
	Neutral	43 (26.5%)	35 (21.6%)	75 (46.3%)	9 (5.6%)	162
	Dissatisfied	4 (80.0%)	0 (0.0%)	1 (20.0%)	0 (0.0%)	5
	Very dissatisfied	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1
Total		80	119	171	25	395

Table 4.10 reveals that out of 395 total respondents, 344 across all age group stated that they store household waste in dustbin, 43 across all age group stated that they store household waste on in plastic bag, 4 respondents across all age group revealed that they store household waste on cardboard and 4 respondents stated others.

Furthermore, out of 344 (100%) respondents who stated that they store household on dustbin, majority of respondents i.e., 154 (44.8%), were from age group 38-47 followed by 103(29.9%) from age group of 28-37, and 66(19.2%) from age group 18-27 and 21(6.1%) from age group 48 and above.

Additionally, when asked about whether respondent was aware of segregation of waste based on their nature, out of 395 total respondents, 374 respondents replied YES that they are aware about segregation while 21 respondents stated that they are not aware of segregation of waste based on their nature. Furthermore, out of 374 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 169(45.2%), were from age group 38-47 followed by 111(29.7%) from age group 28-37, and 69(18.4%) from age group 18-27 and 25(6.7%) from age group 48 and above.

When asked about whether respondents were segregating waste based on their nature, out of 395 total respondents, 362 respondents revealed that they segregate while 32 respondents stated that they do not segregate waste on their house. Furthermore, out of 343 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 169(45.2%), were from age group 38-47 followed by 111(29.7%) from age group 28-37, and 69(18.4%) from age group 18-27 and 25(6.7%) from age group 48 and above.

Out of 374 total respondents who stated that they were aware about segregation of waste, 343 across all age group stated that they were aware about segregation of waste

based on nature and segregate household. Moreover, out of 343 (100%) respondents who said they segregated waste the highest number of respondents was 169 (45.2%) from age group 38-47 followed by 111 (29.7%) from age group 28-37 and 69 (18.4%) from age group 18-27 respectively.

Out of 395 total respondents, 362 across all age group stated that they have separate bins for bio-degradable and non-biodegradable waste, 33 across all age group stated that they do not have separate bins for bio-degradable and non-biodegradable waste at home.

Furthermore, out of 362 (100%) respondents across all age group stated that they have separate bins for bio-degradable and non-biodegradable waste i.e., 164 (45.3%), were from age group 38-47 followed by 113 (31.2%), from age group of 28-37, and 61 (16.9%) from age group 18-27 and 24 (6.6%) from age group 48 and above.

Out of 395 total respondents, 356 across all age group stated that there is door-to-door waste collection system, 39 across all age group stated that there is no door-to-door waste collection system.

Furthermore, out of 356 (100%) respondents across all age group stated that there is door-to-door waste collection system majority of respondents i.e., 164 (45.3%), were from age group 38-47 followed by 112 (31.2%), from age group of 28-37, and 56 (15.7%), from age group 18-27 and 24 (6.7%) from age group 48 and above.

On the statement how often the waste is collected Out of 395 total respondents, 228, across all age group stated that once in a two days waste is collected, 112 across all age group stated that once in a three days, 35, stated that once in week have there, 20 stated daily. Furthermore, out of 228, (100%) respondents across all age group stated once in a two days waste is collected majority of respondents i.e., 106 (46.5%), were from age group 38-47 followed by 73 (32.0%) from age group of 28-37, and 26 (11.4%), from age group 18-27 and 23 (10.1%), from age group 48 and above.

When asked, "to what extent you satisfied with the current waste collection service", out of 395 total respondents, 206, across all age group stated that they are satisfied with collection system, 162, respondent stated that they have neutral feeling 21 respondent stated that they are very satisfied once, 5, respondent stated they are dissatisfied and, 1 respondent stated he/she is very dissatisfied.

Furthermore, out of 206, (100%) respondents across all age group stated across all age group stated that they are satisfied with collection service majority of respondents i.e., 87 (42.2%), were from age group 38-47 followed by 79 (38.3%), from age group of 28-37, and 26 (12.6%), from age group 18-27 and 14 (6.8%), from age group 48 and above.

Table 11

Waste Collection Based on Education

		Able to						Total
		Illiterate	read and write	SLC or equivalent	10+2 or equivalent	Bachelor	Master	
store your household waste	Cardboard	1 (25.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	3 (75.0%)	0 (0.0%)	4
	Dustbin	14 (4.1%)	6 (1.7%)	36 (10.5%)	57 (16.6%)	162 (52.9%)	49 (14.2%)	344
	others		0 (0.0%)	1 (25.0%)	0 (0.0%)	3 (75.0%)	0 (0.0%)	4
aware of segregation of waste based on their nature	Plastic Bag	2 (4.7%)	0 (0.0%)	5 (11.6%)	8 (18.6%)	22 (51.2%)	6 (14.0%)	43
	No	0 (0.0%)	0 (0.0%)	4 (19.0%)	4 (19.0%)	12 (57.1%)	1 (4.8%)	21
	Yes	17 (4.5%)	6 (1.6%)	38 (10.2%)	61 (16.3%)	190 (52.9%)	54 (14.4%)	374
If YES, are you segregating waste at your home	No	0 (0.0%)	0 (0.0%)	8 (18.2%)	7 (21.2%)	18 (57.6%)	1 (3.0%)	31
	Yes	16 (4.7%)	6 (1.7%)	34 (9.8%)	55 (16.0%)	181 (52.5%)	51 (14.8%)	343
have separate bins at home for biodegradable and non-biodegradable waste	No	1 (2.6%)	0 (0.0%)	4 (10.3%)	6 (15.4%)	26 (66.7%)	2 (5.1%)	39
	Yes	16 (4.5%)	6 (1.7%)	38 (10.7%)	59 (16.6%)	184 (51.7%)	53 (14.9%)	366
door-to-door waste collection system	No	1 (5.9%)	0 (0.0%)	2 (11.8%)	2 (11.8%)	11 (64.7%)	1 (5.9%)	17
	Yes	16 (4.2%)	6 (1.6%)	40 (10.6%)	63 (16.7%)	199 (52.6%)	54 (14.3%)	378
how often do they collect	Daily	1 (5.0%)	0 (0.0%)	1 (5.0%)	2 (10.0%)	12 (60.0%)	4 (20.0%)	20
	In a week	0 (0.0%)	0 (0.0%)	2 (5.7%)	3 (8.6%)	30 (85.7%)	0 (0.0%)	35
	Once in three days	2 (1.8%)	1 (0.9%)	14 (12.5%)	19 (17.0%)	57 (50.9%)	19 (17.0%)	112
	Once in two days	14 (6.1%)	5 (2.2%)	25 (11.0%)	41 (18.0%)	111 (48.7%)	32 (14.0%)	228
extent you satisfied with the current waste collection service	Very satisfied	0 (0.0%)	0 (0.0%)	3 (14.3%)	6 (28.6%)	10 (47.6%)	2 (9.5%)	21
	Satisfied	11 (5.3%)	4 (1.9%)	21 (10.2%)	36 (17.5%)	98 (47.6%)	36 (17.5%)	206
	Neutral	6 (3.7%)	2 (1.2%)	17 (10.5%)	22 (13.6%)	98 (60.5%)	17 (10.5%)	162
	Dissatisfied	0 (0.0%)	0 (0.0%)	1 (20.0%)	1 (20.0%)	3 (60.0%)	0 (0.0%)	5
	Very dissatisfied	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	1
Total		17	6	42	65	210	55	395

Table 4.11 reveals that out of 395 total respondents, 344 across all education level stated that they store household waste in dustbin, 43 across all education level stated that they store household waste on in plastic bag, 4 respondents across all education level

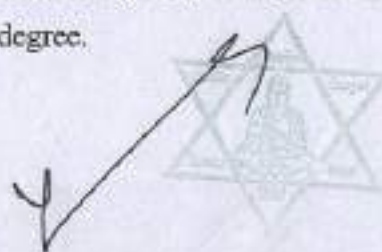
revealed that they store household waste on cardboard and 4 respondents stated others. Out of 344 (100%) respondents who stated that they store household on dustbin, majority of respondents i.e., 182 (52.9%), had bachelor's degree followed by 57 (16.6%) had 10+2 or equivalent and 49 (14.42%) with Master's degree.

Additionally, when asked about whether respondents were aware of segregation of waste based on their nature, out of 395 total respondents, 374 respondents replied YES that they are aware about segregation while 21 respondents stated that they are not aware of segregation of waste based on their nature. Furthermore, out of 374 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 198 (52.9%), had bachelor's degree followed by 61 (16.3%) who had 10+2 or equivalent degree and 54 (14.4%) with Master's degree.

Furthermore, when asked about whether respondents were segregating waste based on their nature, out of 374 total respondents, 343 respondents revealed that they segregate while 31 respondents stated that they do not segregate waste on their house. Furthermore, out of 343 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of respondents i.e., 181 (52.8%), followed by 55 (16%) who had 10+2 or equivalent degree and 51 (14.9%) with Master's degree.

Out of 395 total respondents, 356 across all education level stated that they have separate bins for bio-degradable and non-biodegradable waste, 39 across all education level stated that they do not have separate bins for bio-degradable and non-biodegradable waste at home. Furthermore, out of 356 (100%) respondents across all education level stated that they have separate bins for bio-degradable and non-biodegradable waste, majority of respondents i.e., 184 (51.7%) had Bachelor's degree, followed by 59 (16.6%) who had 10+2 or equivalent degree and 53 (14.9%) with Master's degree.

Out of 395 total respondents, 378 across all education level stated that there is door-to door waste collection system, and 17 across all education level stated that have there is no door-to door waste collection system. Furthermore, out of 378 (100%) respondents across all education level who stated that there is door-to door waste collection, majority of respondents i.e., 199 (52.6%) had Bachelor's degree, followed by 63 (16.7%) who had 10+2 or equivalent degree and 54 (14.3%) with Master's degree.



On the statement about how often the waste is collected, out of 395 total respondents, 228, across all education level stated that once in a two days waste is collected, 112 across all education level stated that stated that once-in-a-three days, 35 stated that it is collected once in week, and 20 stated waste was collected. Furthermore, out of 228, (100%) respondents across all education level who stated once in a two days waste is collected, majority of respondents i.e., 111 (48.7%) had Bachelor's degree, followed by 41 (18%) who had 10+2 or equivalent degree and 32 (14%) with Master's degree.

When asked, "to what extent you satisfied with the current waste collection service", out of 395 total respondents, 206, across all education level stated that they are satisfied with collection system, 162, respondent stated that they have neutral feeling 21 respondent stated that they are very satisfied once, 5, respondent stated they are dissatisfied and, 1 respondent stated he/she is very dissatisfied.

Furthermore, out of 206, (100%) respondents across all education level who stated that they are satisfied with collection service, majority of respondents i.e., 98 (47.6%) had Bachelor's degree, followed by 36 (17.5%) who had 10+2 or equivalent degree and 36 (17.5%) with Master's degree.

Table 12

Waste Collection Based on Occupation

		Business	Entrepreneur	Others	Service Holder	Total
store your household waste	Cardboard	2 (50.0%)	1 (25.0%)	1 (25.0%)	0 (0.0%)	4
	Dustbin	94 (27.3%)	13 (3.8%)	168 (48.8%)	68 (20.1%)	344
	Others	1 (25.0%)	0 (0.0%)	0 (0.0%)	3 (75.0%)	4
aware of segregation of waste based on their nature	Plastic Bag	8 (18.8%)	5 (11.6%)	23 (53.5%)	7 (16.3%)	43
	No	5 (23.8%)	4 (19.0%)	6 (28.6%)	6 (28.6%)	21
	Yes	100 (26.7%)	15 (4.0%)	166 (48.7%)	73 (19.5%)	374
If YES, are you segregating waste at your home	No	7 (21.2%)	4 (12.1%)	13 (45.5%)	7 (21.2%)	31
	Yes	93 (27.1%)	14 (4.1%)	168 (48.9%)	68 (19.8%)	343
have separate bins at home for biodegradable and non-biodegradable waste	No	4 (10.3%)	4 (10.3%)	21 (53.8%)	10 (25.6%)	39
	Yes	101 (28.4%)	15 (4.2%)	171 (48.0%)	69 (19.4%)	356
door-to-door waste collection system	No	4 (23.5%)	2 (11.8%)	5 (28.4%)	6 (35.3%)	17
	Yes	101 (26.7%)	17 (4.5%)	187 (48.5%)	73 (19.3%)	378

how often do they collect	Daily	5 (25.0%)	3 (15.0%)	7 (35.0%)	5 (25.0%)	20
	In a week	4 (11.4%)	4 (11.4%)	26 (74.3%)	1 (2.9%)	35
	Once in three days	28 (25.9%)	3 (2.7%)	53 (47.3%)	27 (24.1%)	112
	Once in two days	67 (29.4%)	9 (3.9%)	106 (46.5%)	46 (20.2%)	228
extent you satisfied with the current waste collection service	Very satisfied	5 (23.8%)	1 (4.8%)	12 (57.1%)	3 (14.3%)	21
	Satisfied	53 (25.7%)	6 (2.9%)	101 (48.0%)	46 (22.3%)	206
	Neutral	47 (29.0%)	12 (7.4%)	76 (46.9%)	27 (16.7%)	162
	Dissatisfied	0 (0.0%)	0 (0.0%)	3 (60.0%)	2 (40.0%)	5
	Very dissatisfied	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	1
Total		105	19	192	79	395

Table 4.12 reveals that out of 395 total respondents, 344 across all occupations stated that they store household waste in dustbin, 43 across all occupations stated that they store household waste on in plastic bag, 4 respondents across all occupations revealed that they store household waste on cardboard and 4 respondents stated others. Out of 344 (100%) respondents who stated that they store household on dustbin, majority of respondents i.e., 168 (48.4%), had other occupations followed by 94 (27.3%) were involved in business and 69 (20.1%) were involved in services.

Additionally, when asked about whether respondents were aware of segregation of waste based on their nature, out of 395 total respondents, 374 respondents replied YES that they are aware about segregation while 21 respondents stated that they are not aware of segregation of waste based on their nature. Furthermore, out of 374 (100%) respondents who stated that they are aware of segregation of waste based on their nature, majority of i.e., 186 (49.7%), had other occupations followed by 100 (26.7%) were involved in business and 73 (19.5%) were involved in services.

Furthermore, when asked about whether respondents were segregating waste based on their nature, out of 374 total respondents, 343 respondents revealed that they segregate while 31 respondents stated that they do not segregate waste on their house. Furthermore, out of 343 (100%) respondents who stated that they are aware of segregation of waste



based on their nature, majority of respondents i.e., 168 (48.4%), had other occupations followed by 93 (27.1%) were involved in business and 68 (19.9%) were involved in services.

Out of 395 total respondents, 356 across all occupations stated that they have separate bins for bio-degradable and non-biodegradable waste, 39 across all occupations stated that they do not have separate bins for bio-degradable and non-biodegradable waste at home. Furthermore, out of 356 (100%) respondents across all occupations stated that they have separate bins for bio-degradable and non-biodegradable waste, majority of respondents i.e., 171 (48%), had other occupations followed by 101 (28.4%) were involved in business and 69 (19.4%) were involved in services.

Out of 395 total respondents, 378 across all occupations stated that there is door-to-door waste collection system, and 17 across all occupations stated that have there is no door-to-door waste collection system. Furthermore, out of 378 (100%) respondents across all occupations who stated that there is door-to-door waste collection, majority of respondents i.e., 187 (49.5%), had other occupations followed by 101 (26.7%) were involved in business and 73 (19.3%) were involved in services.

On the statement about how often the waste is collected, out of 395 total respondents, 228, across all occupations stated that once in a two days waste is collected, 112 across all occupations stated that stated that once-in-a-three days, 35 stated that it is collected once in week, and 20 stated waste was collected. Furthermore, out of 228, (100%) respondents across all occupations who stated once in a two days waste is collected, majority of respondents i.e., 106 (46.5%), had other occupations followed by 67 (29.4%) were involved in business and 46 (20.2%) were involved in services.



When asked, "to what extent you satisfied with the current waste collection service", out of 395 total respondents, 206, across all occupations stated that they are satisfied with collection system, 162, respondent stated that they have neutral feeling 21 respondent stated that they are very satisfied once, 5, respondent stated they are dissatisfied and, 1 respondent stated he/she is very dissatisfied.

Furthermore, out of 206, (100%) respondents across all occupations who stated that they are satisfied with collection service, majority of respondents i.e., 101 (49%), had other occupations followed by 53 (25.7%) were involved in business and 46 (22.3%) were involved in services.

Waste Transportation:

Table 13

Waste Transportation Based on Ward

		3	8	11	Total
the primary mode of transport used for collecting solid waste generated in your municipality	Bicycle or tricycle carts	2 (40.0%)		2 (40.0%)	5
	Garbage truck	5 (26.3%)	4 (21.1%)	10 (52.6%)	19
	Hand Carts or Push Carts	1 (25.0%)	3 (75.0%)	0 (0.0%)	4
	Tractor	101 (27.5%)	115 (31.3%)	151 (41.1%)	367
the prevailing structure of the mode of transport used for collecting solid waste in your locality	Both open and covered	6 (30.0%)	4 (20.0%)	10 (50.0%)	20
	Covered	4 (20.0%)	9 (45.0%)	7 (35.0%)	20
	Not sure	1 (7.7%)	12 (92.3%)	0 (0.0%)	13
	Open	98 (28.7%)	98 (28.7%)	146 (42.7%)	342
process of collecting waste on a basis of health	Hygienic	10 (27.0%)	13 (35.1%)	14 (37.8%)	37
	Unhygienic	99 (27.7%)	110 (30.7%)	149 (41.6%)	358
Solid waste collection vehicles in the locality	Donot spread foul smell.	10 (21.3%)	21 (44.7%)	16 (34.0%)	47
	Spread foul smell	99 (28.4%)	102 (29.3%)	147 (42.2%)	348
complaint to the concerned authority's vehicle does not come	No	68 (32.5%)	70 (33.5%)	71 (34.0%)	209

for the waste pickup at the right time.	Yes	41 (22.0%)	53 (28.5%)	92 (49.5%)	186
	Burn it	18 (34.6%)	14 (26.9%)	20 (38.5%)	52
If the municipality vehicle does not come at the right schedule and temporary storage is full	Dump it into the river or open space	10 (47.6%)	8 (38.1%)	3 (14.3%)	21
	Keep the waste at home	80 (24.9%)	101 (31.5%)	140 (43.6%)	321
	Recycle as handicraft	1 (100.0%)	0 (0.0%)	0 (0.0%)	1
Is the vehicle currently in usage is enough to dispose of solid waste in the city	No	28 (24.3%)	32 (29.9%)	49 (45.8%)	107
	No idea	37 (29.4%)	45 (35.7%)	44 (34.9%)	126
	Yes	45 (28.4%)	46 (28.4%)	70 (43.2%)	162
Total		109	123	163	395

Table 4.13 reveals that out of 395 total respondents, 367 across all ward stated the primary mode of transportation used for collecting waste is tractor, 19 across all ward stated primary mode of transportation used for collecting waste is garbage truck, 5 respondents stated bicycle or tricycle and 4 respondents stated hand carts or push carts. Out of 367 (100%) respondents who stated that the primary mode of transportation used for collecting waste is tractor majority of respondents i.e., 151 (41.1%), were from Ward 11 followed by 115 (31.3%) from Ward 8, and 101 (27.5%) from Ward 3.

Additionally, when respondents were asked about prevailing structure of vehicles used in waste collection, out of 395 total respondents 342 stated open structure, 20 stated covered, 20 stated both covered and open and 13 stated that they are not sure about the structure. Furthermore, out of 342 (100%) respondents who stated that prevailing structure of vehicles used in waste collection is open structure majority of respondents i.e., 146 (42.7%), were from Ward 11 followed by 98 (28.7%) from Ward 8, and 98 (28.7%) from Ward 3.

Furthermore, when asked about the process of collecting waste on the basis of health factor out of 395 total respondents 358 stated unhygienic and 37 stated hygienic. Similarly, out of 358 (100%) respondents across all Wards about the process of collecting waste on the basis of health they stated that collection system is unhygienic i.e., 149 (41.6%) from Ward 11 followed by 10 (29.3.9%), from Ward 18, and 99 (28.4%) from Ward 3.



Out of 395 total respondents, 348 across all Wards stated that vehicle used in collection of solid waste spread foul smell, and 47 across Wards stated that vehicle used in collection of solid waste do not spread foul smell. Furthermore, out of 348 (100%) respondents across all Wards who stated that vehicles used in collection of solid waste spread foul, 147 (42.4%), were from Ward 11 followed by 102 (29.3%), from Ward 8, and 99 (28.4%), from Ward 3.

On the statement about compelling to the concerned authority when vehicle does not come on time to pick up the waste at right time out of 395 total respondents across Wards, 209 respondents replied YES and 186 replied 'NO' to the concerned authority when vehicles does not come on time to pick up the waste at right time. Furthermore, out of 209, (100%) respondents across all Wards who stated, NO they do not complain to the concerned authority when vehicle does not come on time to pick up the waste at right time majority of respondents i.e., 92(49.5%), were from Ward 11 followed by 53 (28.5%) from Ward 8, and 41 (22.0%), from Ward 3.

When asked, if the municipality vehicle does not come at the right schedule and temporary storage is full, out of 395 total respondents across Wards, 321 respondents replied they keep waste at home, 52 replied they burn the waste, 21 replied they dumped it into the rivers or open spaces and 1 replied they recycled as handicraft. Furthermore, out of 321, (100%) respondents across all Wards who stated, respondents replied they keep waste at home, majority of respondents i.e., 140 (43.6%), were from Ward 11 followed by 101 (31.5%) from Ward 8, and 80 (24.9%), from Ward 3.

Finally, when asked about whether the vehicle currently in usage is enough to dispose of solid waste in the city, across all wards the out of 395 respondents, majority of respondents i.e. 162 agreed that the vehicle currently in usage is enough to dispose of solid waste in the city followed by no idea with 126 response and 107 with negative response to the question. Furthermore, out of 162 respondents who agreed that the vehicle currently in usage is enough to dispose of solid waste in the city across all wards, majority of respondents i.e., 70 (43.2%), were from Ward 11 followed by 46 (28.4%) from Ward 8, and 46 (28.4%), from Ward 3.



Table 14*Waste Transportation Based on Gender*

		Female	Male	Total
the primary mode of transport used for collecting solid waste generated in your municipality	Bicycle or tricycle carts	1 (20.0%)	4 (80.0%)	5
	Garbage truck	14 (73.7%)	5 (26.3%)	19
	Hand Carts or Push Carts			4
	Tractor	2 (50.0%)	2 (50.0%)	367
the prevailing structure of the mode of transport used for collecting solid waste in your locality	Both open and covered	268 (73.0%)	99 (27.0%)	20
	Covered	15 (75.0%)	5 (25.0%)	20
	Not sure	6 (30.0%)	14 (70.0%)	13
	Open	13 (100.0%)	0 (0.0%)	342
process of collecting waste on a basis of health	Hygienic	251 (73.4%)	91 (26.6%)	37
	Unhygienic	24 (64.9%)	13 (35.1%)	356
Solid waste collection vehicles in the locality	Do not spread foul smell	261 (72.9%)	97 (27.1%)	47
	Spread foul smell	35 (74.5%)	12 (25.5%)	348
complaint to the concerned authority's vehicle does not come for the waste pickup at the right time.	No	250 (71.8%)	98 (28.2%)	209
	Yes	152 (72.7%)	57 (27.3%)	186
If the municipality vehicle does not come at the right schedule and temporary storage is full	Burn it	133 (71.5%)	53 (28.5%)	52
	Dump it into the river or open space	35 (67.3%)	17 (32.7%)	21
	Keep the waste at home	12 (57.1%)	9 (42.9%)	321
is the vehicle currently in usage is enough to dispose of solid waste in the city	Recycle as handcraft	237 (73.8%)	84 (26.2%)	1
	No	1 (100.0%)	0 (0.0%)	107
	No idea	82 (76.6%)	25 (23.4%)	126
	Yes	89 (70.8%)	37 (29.4%)	162
Total		285	110	395

Table 14 reveals that out of 395 total respondents, 367 across all gender stated the primary mode of transportation used for collecting waste is tractor, 19 across all gender stated primary mode of transportation used for collecting waste is garbage truck, 5 respondents stated bicycle or tricycle and 4 respondents stated hand carts or push carts Out of 367 (100%) respondents who stated that stated the primary mode of transportation used

for collecting waste is tractor majority of respondents i.e., 268 (73%), were female followed by 99 (27%) were male.

Additionally, when respondents were asked about prevailing structure of vehicles used in waste collection, out of 395 total respondents 342 stated open structure, 20 stated covered, 20 stated both covered and open and 13 stated that they are not sure about the structure. Furthermore, out of 342 (100%) respondents who stated that prevailing structure of vehicles used in waste collection is open structure, majority of respondents i.e., 251 (73.3%), were female followed by 91 (26.6%) were male.

Furthermore, when asked about the process of collecting waste on the basis of health factor out of 395 total respondents 358 stated unhygienic and 37 stated hygienic. Similarly, out of 358 (100%) respondents across all gender about the process of collecting waste on the basis of health they stated that collection system is unhygienic, majority of respondents i.e., 261 (72.9%), were female followed by 97 (27.1%) were male.

Out of 395 total respondents, 348 across all gender stated that vehicle used in collection of solid waste spread foul smell, and 47 across Wards stated that vehicle used in collection of solid waste do not spread foul smell. Furthermore, out of 348 (100%) respondents across all Wards who stated that vehicles used in collection of solid waste spread foul, majority of respondents i.e., 250 (71.8%), were female followed by 98 (28.2%) were male.

On the statement about compelling to the concerned authority when vehicle does not come on time to pick up the waste at right time out of 395 total respondents across gender, 209 respondents replied YES and 186 replied 'NO' to the concerned authority when vehicles does not come on time to pick up the waste at right time. Furthermore, out of 209, (100%) respondents across all Wards who stated, NO they do not complain to the concerned authority when vehicle does not come on time to pick up the waste at right time majority of respondents i.e., 152 (72.7%), were female followed by 57 (27.3%) were male.

When asked, if the municipality vehicle does not come at the right schedule and temporary storage is full, out of 395 total respondents across gender, 321 respondents replied they keep waste at home, 52 replied they burn the waste, 21 replied they dumped it into the rivers or open spaces and 1 replied they recycled as handicraft. Furthermore, out

A handwritten signature in black ink is written over a faint, circular official stamp. The signature is a stylized, cursive 'V' or 'P' followed by a flourish. The stamp is partially visible behind the signature.

of 321, (100%) respondents across gender who stated, respondents replied they keep waste at home, majority of respondents i.e., 237 (73.8%), were female followed by 84 (26.2%) were male.

Finally, when asked about whether the vehicle currently in usage is enough to dispose of solid waste in the city, across gender the out of 395 respondents, majority of respondents i.e. 162 agreed that the vehicle currently in usage is enough to dispose of solid waste in the city followed by no idea with 126 response and 107 with negative response to the question. Furthermore, out of 162 respondents who agreed that the vehicle currently in usage is enough to dispose of solid waste in the city across all wards, majority of respondents i.e., 114 (70%), were female followed by 48 (29.6%) were male.

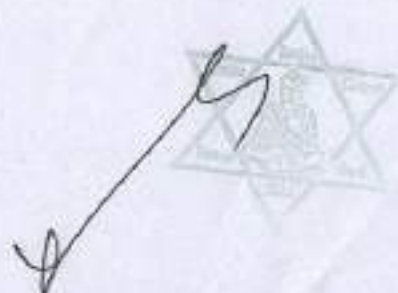
A handwritten signature in black ink is located in the bottom right corner of the page. To the right of the signature is a faint, light-colored star-shaped stamp or watermark.

Table 15
Waste Transportation Based on Age

		18- 27	28- 37	38- 47	48 and above	Total
The primary mode of transport used for collecting solid waste generated in your municipality	Bicycle or tricycle carts	2 (40.0%)	2 (40.0%)	1 (20.0%)	0 (0.0%)	5
	Garbage truck	14 (73.7%)	3 (15.8%)	2 (10.5%)	0 (0.0%)	19
	Hand Carts or Push Carts	0 (0.0%)	2 (50.0%)	2 (50.0%)	0 (0.0%)	4
	Tractor	64 (17.4%)	112 (30.5%)	166 (45.2%)	25 (6.8%)	367
the prevailing structure of the mode of transport used for collecting solid waste in your locality	Both open and covered	16 (80.0%)	2 (10.0%)	2 (10.0%)	0 (0.0%)	20
	Covered	11 (55.0%)	6 (30.0%)	3 (15.0%)	0 (0.0%)	20
	Not sure	13 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	13
	Open	40 (11.7%)	111 (32.8%)	166 (48.5%)	25 (7.3%)	342
process of collecting waste on a basis of health	Hygienic	26 (70.3%)	7 (18.9%)	4 (10.8%)	0 (0.0%)	37
	Unhygienic	54 (15.1%)	112 (31.3%)	167 (46.6%)	25 (7.0%)	358
Solid waste collection vehicles in the locality	Do not spread foul smell.	31 (86.0%)	9 (19.1%)	6 (12.8%)	1 (2.1%)	47
	Spread foul smell	49 (14.1%)	110 (31.6%)	165 (47.4%)	24 (6.9%)	348
complaint to the concerned authorities vehicle does not come for the waste pickup at the right time.	No	43 (20.6%)	64 (30.6%)	86 (41.1%)	16 (7.7%)	209
	Yes	37 (19.9%)	55 (29.8%)	85 (45.7%)	9 (4.8%)	186
if the municipality vehicle does not come at the right schedule and temporary storage is full	Burn it	23 (44.2%)	14 (26.9%)	13 (25.0%)	2 (3.8%)	52
	Dump it into the river or open space	5 (23.8%)	9 (42.9%)	5 (23.8%)	2 (9.5%)	21
	Keep the waste at home	51 (15.9%)	96 (29.9%)	153 (47.7%)	21 (6.5%)	321
	Recycle as handicraft	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1
Is the vehicle currently in usage is enough to dispose of solid waste in the city	No	31 (29.0%)	24 (22.4%)	46 (43.0%)	6 (5.8%)	107
	No idea	18 (14.3%)	41 (32.5%)	58 (46.0%)	9 (7.1%)	126
	Yes	31 (19.1%)	54 (33.3%)	67 (41.4%)	10 (6.2%)	162
Total		80	119	171	25	395

Table 4.15 reveals that out of 395 total respondents, 367 across all age groups stated the primary mode of transportation used for collecting waste is tractor, 19 across all age groups stated primary mode of transportation used for collecting waste is garbage truck, 5 respondents stated bicycle or tricycle and 4 respondents stated hand carts or push carts. Out

of 367 (100%) respondents who stated that the primary mode of transportation used for collecting waste is tractor majority of respondents i.e., 166 (45.2%), belonged to age group 38-47 followed by 112 (30.5%) with age group 28-37 years and 64 (17.4%) with age group 18-27 years.

Additionally, when respondents were asked about prevailing structure of vehicles used in waste collection, out of 395 total respondents 342 stated open structure, 20 stated covered, 20 stated both covered and open and 13 stated that they are not sure about the structure. Furthermore, out of 342 (100%) respondents who stated that prevailing structure of vehicles used in waste collection is open structure, majority of respondents i.e., 166 (48.5%), belonged to age group 38-47 followed by 111 (32.5%) with age group 28-37 years and 40 (11.7%) with age group 18-27 years.

Furthermore, when asked about the process of collecting waste on the basis of health factor out of 395 total respondents 358 stated unhygienic and 37 stated hygienic. Similarly, out of 358 (100%) respondents across all age group about the process of collecting waste on the basis of health they stated that collection system is unhygienic, majority of respondents i.e., 167 (46.6%), belonged to age group 38-47 followed by 112 (31.6%) with age group 28-37 years and 54 (15.1%) with age group 18-27 years.

Out of 395 total respondents, 348 across all age groups stated that vehicle used in collection of solid waste spread foul smell, and 47 across Wards stated that vehicle used in collection of solid waste do not spread foul smell. Furthermore, out of 348 (100%) respondents across all age groups who stated that vehicles used in collection of solid waste spread foul, majority of respondents i.e., 165 (47.4%), belonged to age group 38-47 followed by 110 (31.6%) with age group 28-37 years and 49 (14.1%) with age group 18-27 years.

On the statement about compelling to the concerned authority when vehicle does not come on time to pick up the waste at right time out of 395 total respondents across age groups, 209 respondents replied YES and 186 replied 'NO' to the concerned authority when vehicles does not come on time to pick up the waste at right time. Furthermore, out of 209, (100%) respondents across all age groups who stated, NO they do not complain to the concerned authority when vehicle does not come on time to pick up the waste at right



time majority of respondents i.e., 86 (41.1%), belonged to age group 38-47 followed by 64 (30.6%) with age group 28-37 years and 43 (20.6%) with age group 18-27 years.

When asked, if the municipality vehicle does not come at the right schedule and temporary storage is full, out of 395 total respondents across age group, 321 respondents replied they keep waste at home, 52 replied they burn the waste, 21 replied they dumped it into the rivers or open spaces and 1 replied they recycled as handicraft. Furthermore, out of 321, (100%) respondents across age group who stated, respondents replied they keep waste at home, majority of respondents i.e., 153 (47.7%), belonged to age group 38-47 followed by 96 (29.9%) with age group 28-37 years and 51 (15.9%) with age group 18-27 years.

Finally, when asked about whether the vehicle currently in usage is enough to dispose of solid waste in the city, across age groups the out of 395 respondents, majority of respondents i.e. 162 agreed that the vehicle currently in usage is enough to dispose of solid waste in the city followed by no idea with 126 response and 107 with negative response to the question. Furthermore, out of 162 (100%) respondents who agreed that the vehicle currently in usage is enough to dispose of solid waste in the city across all wards, majority of respondents i.e., 67 (41.4%), belonged to age group 38-47 followed by 54 (33.3%) with age group 28-37 years and 31 (19.1%) with age group 18-27 year

A handwritten signature in black ink is written over a faint, circular official stamp. The stamp contains a central emblem, possibly a temple gopuram, surrounded by text in a circular border. The signature is a stylized, cursive script.

Table 16

Waste Transportation Based on Education

		Illiterate	Able to read and write	SLC or equivalent	10+2 or equivalent	Bachelor	Master	Total
the primary mode of transport used for collecting solid waste generated in your municipality	Bicycle or tricycle carts	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	3 (60.0%)	0 (0.0%)	5
	Garbage truck	1 (5.3%)	1 (5.3%)	1 (5.3%)	2 (10.5%)	13 (68.4%)	1 (5.3%)	19
	Hand Carts or Push Carts	0 (0.0%)	0 (0.0%)	2 (50.0%)	0 (0.0%)	2 (50.0%)	0 (0.0%)	4
	Tractor	16 (4.4%)	5 (1.4%)	39 (10.6%)	61 (16.6%)	192 (52.3%)	54 (14.7%)	367
the prevailing structure of the mode of transport used for collecting solid waste in your locality	Both open and covered	0 (0.0%)	0 (0.0%)	1 (5.0%)	3 (15.0%)	15 (75.0%)	1 (5.0%)	20
	Covered	1 (5.0%)	0 (0.0%)	3 (15.0%)	0 (0.0%)	13 (65.0%)	3 (15.0%)	20
	Not sure	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	13 (100.0%)	0 (0.0%)	13
	Open	16 (4.7%)	6 (1.8%)	38 (11.1%)	62 (18.1%)	169 (49.4%)	51 (14.9%)	342
process of collecting waste on a basis of health	Hygienic	0 (0.0%)	0 (0.0%)	4 (10.8%)	8 (21.6%)	23 (62.2%)	2 (5.4%)	37
	Unhygienic	17 (4.7%)	6 (1.7%)	38 (10.6%)	57 (15.9%)	187 (52.2%)	53 (14.8%)	358
Solid waste collection vehicles in the locality	Do not spread foul smell.	1 (2.1%)	0 (0.0%)	3 (6.4%)	8 (17.0%)	31 (66.0%)	4 (8.5%)	47
	Spread foul smell	16 (4.6%)	6 (1.7%)	39 (11.2%)	57 (16.4%)	179 (51.4%)	51 (14.7%)	348
complaint to the concerned authority's vehicle does not come for the waste pickup at the right time.	No	8 (3.8%)	2 (1.0%)	23 (11.0%)	44 (21.1%)	105 (50.2%)	27 (12.9%)	209
	Yes	9 (4.8%)	4 (2.2%)	19 (10.2%)	21 (11.3%)	105 (56.5%)	28 (15.1%)	186
If the municipality vehicle does not come at the right schedule and temporary storage is full	Burn it	0 (0.0%)	0 (0.0%)	5 (9.6%)	11 (21.2%)	34 (65.4%)	2 (3.8%)	52
	Dump it into the river or open space	0 (0.0%)	1 (4.8%)	7 (33.3%)	6 (28.6%)	7 (33.3%)	0 (0.0%)	21
	Keep the waste at home	17 (5.3%)	5 (1.6%)	30 (9.3%)	48 (15.0%)	168 (52.3%)	53 (16.6%)	321
	Recycle as handicraft	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	1
Is the vehicle currently in usage is enough to dispose of solid waste in the city	No	3 (2.8%)	1 (0.9%)	10 (9.3%)	13 (12.1%)	63 (58.9%)	17 (15.9%)	107
	No idea	8 (6.3%)	3 (2.4%)	19 (15.1%)	23 (18.3%)	54 (42.9%)	19 (15.1%)	126
	Yes	6 (3.7%)	2 (1.2%)	13 (8.0%)	29 (17.9%)	93 (57.4%)	19 (11.7%)	162
Total		17	6	42	65	210	55	395

Table 4.16 reveals that out of 395 total respondents, 367 across all education levels stated the primary mode of transportation used for collecting waste is tractor, 19 across all education levels stated primary mode of transportation used for collecting waste is garbage

truck, 5 respondents stated bicycle or tricycle and 4 respondents stated hand carts or push carts. Out of 367 (100%) respondents who stated that the primary mode of transportation used for collecting waste is tractor majority of respondents i.e., 192 (52.3%), had Bachelor's degree followed by 61 (16.6%) with 10+2 or equivalent degree and 54 (14.7%) with Master's degree respectively.

Additionally, when respondents were asked about prevailing structure of vehicles used in waste collection, out of 395 total respondents 342 stated open structure, 20 stated covered, 20 stated both covered and open and 13 stated that they are not sure about the structure. Furthermore, out of 342 (100%) respondents who stated that prevailing structure of vehicles used in waste collection is open structure, majority of respondents i.e., 169 (49.4%), had Bachelor's degree followed by 62 (18.1%) with 10+2 or equivalent degree and 51 (14.9%) with Master's degree respectively.

Furthermore, when asked about the process of collecting waste on the basis of health factor out of 395 total respondents 358 stated unhygienic and 37 stated hygienic. Similarly, out of 358 (100%) respondents across all education levels about the process of collecting waste on the basis of health they stated that collection system is unhygienic, majority of respondents i.e., 187 (52.2%), had Bachelor's degree followed by 57 (15.9%) with 10+2 or equivalent degree and 53 (14.8%) with Master's degree respectively.

Out of 395 total respondents, 348 across all education levels stated that vehicle used in collection of solid waste spread foul smell, and 47 across Wards stated that vehicle used in collection of solid waste do not spread foul smell. Furthermore, out of 348 (100%) respondents across all education levels who stated that vehicles used in collection of solid waste spread foul, majority of respondents i.e., 179 (51.4%), had Bachelor's degree



followed by 57 (16.4%) with 10+2 or equivalent degree and 51 (14.7%) with Master's degree respectively.

On the statement about compelling to the concerned authority when vehicle does not come on time to pick up the waste at right time out of 395 total respondents across education levels, 209 respondents replied YES and 186 replied 'NO' to the concerned authority when vehicles does not come on time to pick up the waste at right time. Furthermore, out of 209, (100%) respondents across all education levels who stated, NO they do not complain to the concerned authority when vehicle does not come on time to pick up the waste at right time majority of respondents i.e., 105 (50.2%), had Bachelor's degree followed by 44 (21.1%) with 10+2 or equivalent degree and 27 (12.9%) with Master's degree respectively.

When asked, if the municipality vehicle does not come at the right schedule and temporary storage is full, out of 395 total respondents across education levels, 321 respondents replied they keep waste at home, 52 replied they burn the waste, 21 replied they dumped it into the rivers or open spaces and 1 replied they recycled as handicraft. Furthermore, out of 321, (100%) respondents across education levels who stated, respondents replied they keep waste at home, majority of respondents i.e., 168 (52.3%), had Bachelor's degree followed by 48 (15%) with 10+2 or equivalent degree and 53 (16.5%) with Master's degree respectively.

Finally, when asked about whether the vehicle currently in usage is enough to dispose of solid waste in the city, across education levels the out of 395 respondents, majority of respondents i.e. 162 agreed that the vehicle currently in usage is enough to dispose of solid waste in the city followed by no idea with 126 response and 107 with negative response to the question. Furthermore, out of 162 (100%) respondents who agreed that the vehicle currently in usage is enough to dispose of solid waste in the city



across all wards, majority of respondents i.e., 93 (57.4%), had Bachelor's degree followed by 29 (17.9%) with 10+2 or equivalent degree and 19 (11.7%) with Master's degree respectively.

Table 17
Waste Transportation Based on Occupation

		Business	Entrepreneur	Others	Service Holder	Total
the primary mode of transport used for collecting solid waste generated in your municipality	Bicycle or tricycle carts	3 (60.0%)	0 (0.0%)	0 (0.0%)	2 (40.0%)	5
	Garbage truck	3 (15.8%)	3 (15.8%)	11 (57.9%)	2 (10.5%)	19
	Hand Carts or Push Carts					4
	Tractor	1 (25.0%)	0 (0.0%)	1 (25.0%)	2 (50.0%)	
the prevailing structure of the mode of transport used for collecting solid waste in your locality	Both open and covered	98 (26.7%)	16 (4.4%)	180 (49.0%)	73 (19.9%)	367
	Covered	3 (15.0%)	2 (10.0%)	13 (65.0%)	2 (10.0%)	20
	Not sure	7 (35.0%)	2 (10.0%)	8 (40.0%)	3 (15.0%)	20
	Open	0 (0.0%)	0 (0.0%)	13 (100.0%)	0 (0.0%)	13
process of collecting waste on a basis of health	Hygienic	95 (27.8%)	15 (4.4%)	158 (46.2%)	74 (21.8%)	342
	Unhygienic	6 (16.2%)	3 (8.1%)	23 (62.2%)	5 (13.5%)	37
Solid waste collection vehicles in the locality	Do not spread foul smell.	99 (27.7%)	16 (4.5%)	169 (47.2%)	74 (20.7%)	358
	Spread foul smell	6 (12.8%)	4 (8.5%)	31 (66.0%)	6 (12.8%)	47
complaint to the concerned authority's vehicle does not come for the waste pickup at the right time.	No	99 (28.4%)	15 (4.3%)	161 (46.3%)	73 (21.0%)	348
	Yes	44 (21.1%)	8 (3.8%)	113 (54.1%)	44 (21.1%)	209
If the municipality vehicle does not come at the right schedule and temporary storage is full	Burn it	51 (32.8%)	11 (5.9%)	79 (42.5%)	35 (18.8%)	166
	Dump it into the river or open space	9 (17.3%)	1 (1.9%)	32 (61.5%)	10 (19.2%)	52
	Keep the waste at home	4 (19.0%)	4 (19.0%)	10 (47.8%)	3 (14.3%)	21
	Recycle as handicraft	52 (28.7%)	14 (4.4%)	149 (46.4%)	66 (20.6%)	321
Is the vehicle currently in usage is enough to dispose of solid waste in the city	No	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	1
	No idea	37 (34.6%)	8 (7.5%)	46 (43.0%)	16 (15.0%)	107
	Yes	26 (20.6%)	6 (4.8%)	66 (52.4%)	28 (22.2%)	126
Total		42 (25.9%)	5 (3.1%)	80 (49.4%)	35 (21.6%)	162
Total		105	19	192	78	395

Table 4.17 reveals that out of 395 total respondents, 367 across all occupation stated the primary mode of transportation used for collecting waste is tractor, 19 across all occupation stated primary mode of transportation used for collecting waste is garbage truck, 5 respondents stated bicycle or tricycle and 4 respondents stated hand carts or push carts. Out of 367 (100%) respondents who stated that the primary mode of transportation used for collecting waste is tractor majority of respondents i.e., 180 (49%), were involved in other occupation followed by 98 (26.7%) involved in business and 73 (19.9%) engaged as service holder respectively.

Additionally, when respondents were asked about prevailing structure of vehicles used in waste collection, out of 395 total respondents 342 stated open structure, 20 stated covered, 20 stated both covered and open and 13 stated that they are not sure about the structure. Furthermore, out of 342 (100%) respondents who stated that prevailing structure of vehicles used in waste collection is open structure, majority of respondents i.e., 158 (46.2%), were involved in other occupation followed by 95 (27.8%) involved in business and 74 (21.6%) engaged as service holder respectively.

Furthermore, when asked about the process of collecting waste on the basis of health factor out of 395 total respondents 358 stated unhygienic and 37 stated hygienic. Similarly, out of 358 (100%) respondents across all occupation about the process of collecting waste on the basis of health they stated that collection system is unhygienic, majority of respondents i.e., 169 (47.2%), were involved in other occupation followed by 99 (27.7%) involved in business and 74 (20.7%) engaged as service holder respectively.

Out of 395 total respondents, 348 across all occupation stated that vehicle used in collection of solid waste spread foul smell, and 47 across occupation stated that vehicle used in collection of solid waste do not spread foul smell. Furthermore, out of 348 (100%) respondents across all occupation who stated that vehicles used in collection of solid waste spread foul, majority of respondents i.e., 161 (46.3%), were involved in other occupation followed by 99 (28.4%) involved in business and 73 (21%) engaged as service holder respectively.

On the statement about compelling to the concerned authority when vehicle does not come on time to pick up the waste at right time out of 395 total respondents across occupation, 209 respondents replied YES and 186 replied 'NO' to the concerned authority

when vehicles does not come on time to pick up the waste at right time. Furthermore, out of 209, (100%) respondents across all occupation who stated, NO they do not complain to the concerned authority when vehicle does not come on time to pick up the waste at right time majority of respondents i.e., 113 (54.1%), were involved in other occupation followed by 44 (21.1%) involved in business and 44 (21.1%) engaged as service holder respectively. On the other hand, data reveals that 61 (32.8%) respondents who were involved in business agreed that they would complaint tot the concerned authorities when vehicle does not come for the waste pick up at the right time against 44 (21.1%) of the same group who disagreed to complaint.

When asked, if the municipality vehicle does not come at the right schedule and temporary storage is full, out of 395 total respondents across education levels, 321 respondents replied they keep waste at home, 52 replied they burn the waste, 21 replied they dumped it into the rivers or open spaces and 1 replied they recycled as handicraft. Furthermore, out of 321, (100%) respondents across occupation who stated, respondents replied they keep waste at home, majority of respondents i.e., 149 (46.4%), were involved in other occupation followed by 92 (28.7%) involved in business and 66 (20.6%) engaged as service holder respectively.

Finally, when asked about whether the vehicle currently in usage is enough to dispose of solid waste in the city, across occupation the out of 395 respondents, majority of respondents i.e. 162 agreed that the vehicle currently in usage is enough to dispose of solid waste in the city followed by no idea with 126 response and 107 with negative response to the question. Furthermore, out of 162 (100%) respondents who agreed that the vehicle currently in usage is enough to dispose of solid waste in the city across all wards, majority of respondents i.e., 80 (49.4%), were involved in other occupation followed by 42 (25.9%) involved in business and 35 (21.6%) engaged as service holder respectively.



Table 18
Descriptive Statistics of Waste Management

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Special care and caution have been given in handling waste.	Frequency	4	32	53	32	6	126
	Percent	1.6	26.0	43.1	26.2	4.1	100.0
Municipality has adopted scientific disposal/processing of waste.	Frequency	6	46	38	32	2	126
	Percent	4.1	24.8	42.1	26.4	2.5	100.0
Disposal of waste never create any environmental problem to the citizen.	Frequency	6	48	36	30	4	126
	Percent	4.9	39.3	29	24.6	2	100.0
There are sufficient clearance centers for effective disposal mechanism.	Frequency	4	48	48	24	1	126
	Percent	3.3	39.7	37.2	19.8	0.8	100.0
method of disposal of waste by Sub-Metro is satisfactory.	Frequency	2	340	68	15	0	126
	Percent	1.6	30.9	55.3	12.2	0.0	100.0

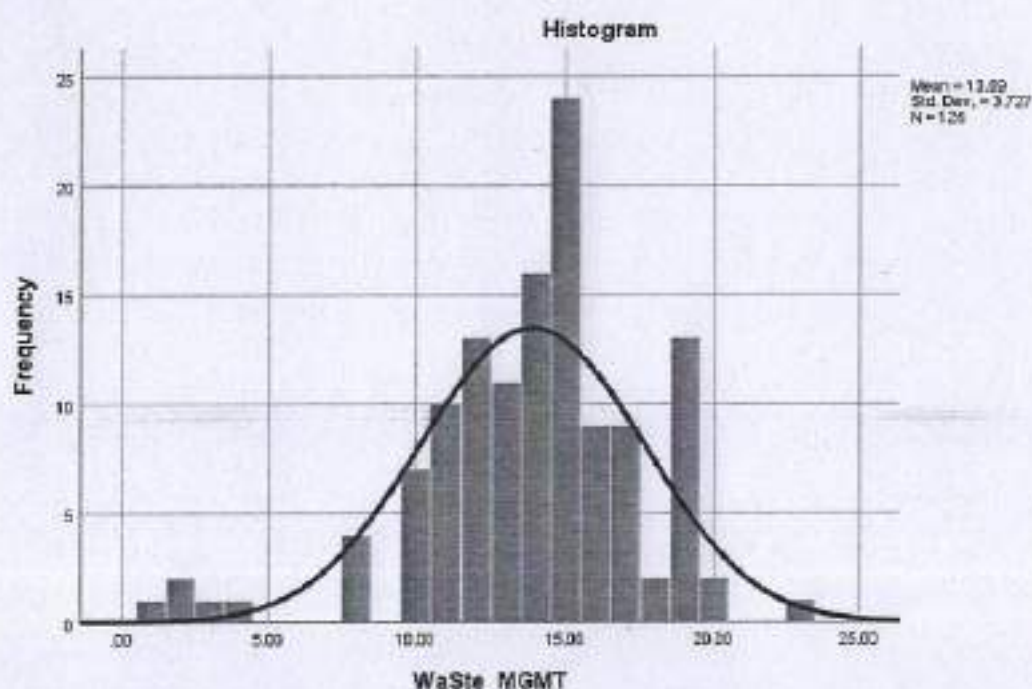
The table 4.18 shows the descriptive statistics of waste management practices. The questionnaire was formed in Likert Scale ranging from 1 as strongly disagree to 7 and strongly agree. The respondents were asked five questions related to waste management viz-a-viz special care and caution, scientific disposal, environmental problem from waste, clearance center for waste disposal and method of disposal. The majority of respondent stated were either neutral or did not agree with fair waste management practice

Table 19
Reliability Analysis

Cronbach's Alpha	Cronbach's Alpha Based on	
	Standardized Items	N of Items
.745	.737	5

The above table 4.19 shows the reliability statistics of all variables of solid waste management. It can be seen that the value of Cronbach's alpha is more than 0.70 i.e. 0.737 which means that the data is reliable to conclude further findings.

Figure 2
Normality Test



The above figure 2 illustrates the histogram of regression residual which is bell-shaped. So, it can be concluded the data taken for analysis are normally distributed. Further, the normality of the data is tested using P-P plots of regression residuals. The result of P-P plots of regression residuals is demonstrated in figure no. 2.

[Handwritten signature]

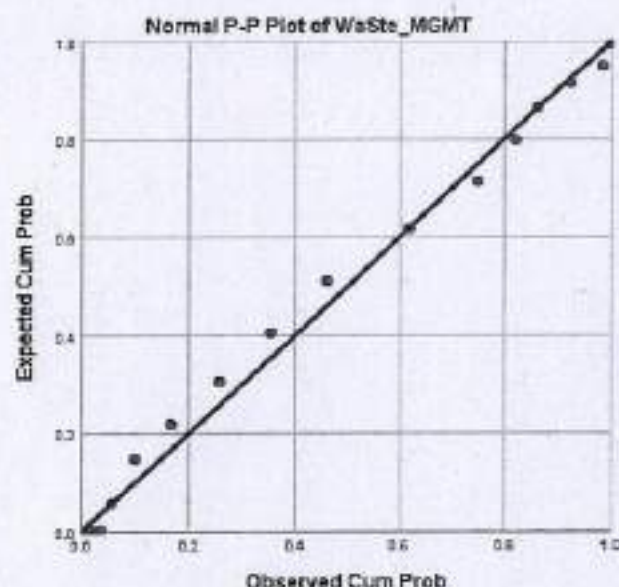
Figure 3*Normality p-p plot*

Figure 3 exhibits, Normality test from P-P plots of regression standardized residuals. A P-P plot compares the empirical cumulative distribution function (ECDF) of a variable with a specified theoretical cumulative distribution function. Figure No. 2 exhibits that expected cumulative probability and observed cumulative probability are around the mean line which confirms data are normally distributed. Confirmation of normality permits the parametric tests for further analysis of the data.

Table 20*One Way Anova Based on Age Group*

Age Group	N	Mean	Std. Deviation	F	Sig.
18- 27	62	15.0161	3.38508	5.271	.002
28- 37	24	12.8333	4.26988		
38- 47	32	12.2500	3.57410		
48 and above	8	14.8750	1.80772		
Total	128	13.8889	3.72714		

Table20 shows whether the Waste Management Practices have significant relationship with the age group who have seen dumping site or worked in the sector. The

p

ANOVA test show that those variables were found to be significant with .002, which means null hypothesis is rejected and alternative hypothesis that there is significant relationship between age group and waste management practices.

Furthermore, the majority of respondents were found to be from age 18-27 years with highest mean value of 15.01, followed by age group 30-47 years with frequency 32 and mean 12.25 and age group 28-37 with frequency 24 and mean 12.833. The mean for each age group was derived by calculating the total response from all the five relevant questions of waste management practices. The mean data show that the respondents were not very satisfied with the waste management practices as the mean data lies on par or below average.

4.2. Discussion

This chapter looks at the results and findings. The findings are structured according to the purpose of the study. The findings of this study are based on the responses from the questionnaires filled and information gathered from the research questions. This chapter will look at the researcher's discussion on the findings of the research as compared to a literature review in chapter two that was based on the purpose of the study. The summary of the findings, conclusion implication and recommendations of the researcher are presented as further

The demographic result showed that the majority of the respondents are Female (72.2%) and 27.8% respondent are male.

- The demographic result showed that the majority of the respondents are of 38-47 years accounted for 43.3% of the total surveyed. the lower distribution of respondents of the age of 48 and above.
- The majority of respondents, 53.2 % hold a bachelor's degree, of their educational background. Only 1.5% able to read and write" had the lowest representation. The majority of respondents, 48.6% of the total, the "Others" group has the most representation. 4.8% had an entrepreneurial background has lowest.
- Table 4.1 exhibits the waste generation first rank categories. Out of 395 (100%) total respondents, 144 (36.5%) marked that their houses generated more organic waste than

other waste categories followed by Rubber and Leather with 121 (30.6%) and Paper and Paper Products with 47 (11.9%). Furthermore, out of the 121 (100%) respondents from Ward 11 ranked Rubber and Leather products as top waste category in terms of number i.e. 63 (52.1%).

- Out of 395 total respondents, 292 (73.9%) agreed that their houses generated more biodegradable waste than 103(26.1%) non-biodegradable waste.
- Finding reveals that out of 395 total respondents, 201(50.88%) respondents revealed that they didn't make household waste as compost compared to 194(49.1%) respondents who make household waste as compost. it seems that there is no major difference in response.
- Out of 395 total respondents, 337(85.31%) respondents agreed that waste generation can be reduced at household level than, 12(3.03%) respondents revealed that waste generation cannot be reduced at household level while, 46(11.66%) respondents unsure about it.
- Out of 395 total respondents, 192 (48.6%) stated that 1kg of waste is generated in their household per day while, 113(28.60%) respondents stated that 3kg of waste is generated in their household per day while, 67(16.96%) respondents stated that 0.5kg of waste is generated in their household per day similarly 23(5.88%) respondents stated that 5kg of waste is generated in their household per day.
- The majority of respondents, 344(87%) stated that they store household waste in dustbin, 43(11%) respondents stated that they store household waste on in plastic bag, 4(1%) respondents revealed that they store household waste on cardboard and 4 (1%) respondents stated others.
- Additionally, when asked about whether respondents were aware of segregation of waste based on their nature, out of 395 total respondents, The majority of respondents, 374 (95%) replied YES while 21(5%) respondents stated that they are not aware of segregation of waste based on their nature.

- Furthermore, when asked about whether respondents were segregating waste based on their nature, out of 374(100%) total respondents, 343(92%) respondents revealed that they segregate while 31(8%) respondents stated that they do not segregate waste on their house.
- The majority of respondents, 356(90%) respondents stated that they have separate bins for bio-degradable and non-biodegradable waste, 39 (10%) respondents stated that they do not have separate bins for bio-degradable and non-biodegradable waste at house.
- The majority of respondents, 378(96%) respondents stated that there is door-to door waste collection system, and 17(4%) respondents stated that there is no door-to door waste collection system.
- On the statement about how often the waste is collected, out of 395 total respondents, 228(58%), respondents stated that once in a two days waste is collected, 112(28%) respondents stated that stated that once-in-a-three days, 35(9%) stated once in week, and 20(5%) stated daily.
- When asked, "to what extent you are satisfied with the current waste collection service", out of 395 total respondents, The majority of respondents, 206(52%), respondents stated that they are satisfied with collection system, 162(41%), respondent stated that they have neutral feeling 21(5%) respondent stated that they are very satisfied, 5(1%) respondents stated they are dissatisfied and, 1 respondent stated he/she is very dissatisfied.
- The majority of respondents, 367 (93%) stated the primary mode of transportation used for collecting waste is tractor, 19 (5%) a stated garbage truck, 5 (1%) respondents stated bicycle or tricycle and 4 (1%) respondents stated hand carts or push carts
- Additionally, when respondents were asked about prevailing structure of vehicles used in waste collection, out of 395 total respondents 342 (87%) stated open structure, 20 (5%) stated covered, 20(5%) stated both covered and open and 13(3%) stated that they are not sure about the structure.



- Similarly, when asked about the process of collecting waste on the basis of health factor out of 395 total respondents 358 (91%) stated unhygienic and 37(9%) stated hygienic.
- Out of 395 total respondents, 348(88%) stated that vehicle used in collection of solid waste spread foul smell, and 47(12%) stated do not spread foul smell.
- On the statement about compelling to the concerned authority when vehicle does not come on time to pick up the waste at right time out of 395 total respondents across Wards, 209(53%) respondents replied 'NO' and 186(47%) replied. YES
- When asked, if the municipality vehicle does not come at the right schedule and temporary storage is full, out of 395 total respondents across Wards, 321(81%) respondents replied they keep waste at home, 52(13%) replied they burn the waste, 21 (5%) replied they dumped it into the rivers or open spaces and 1 replied they recycled as handcraft.
- When asked about whether the vehicle currently in usage is enough to dispose of solid waste in the city, across all wards the out of 395 respondents, majority of respondents i.e. 162(41%) agreed that the vehicle currently in usage is enough to dispose of solid waste in the city followed by no idea with 126(32%) response and 107(27%) with negative response to the question.
- The respondents were asked five questions related to waste management viz-a-viz special care and caution, scientific disposal, environmental problem from waste, clearance center for waste disposal and method of disposal. The majority of respondent stated were either neutral or did not agree with fair waste management practices.
- The majority of respondents were found to be from age 18-27 years with highest mean value of 15.01, followed by age group 30-47 years with frequency 32 and mean 12.25 and age group 28-37 with frequency 24 and mean 12.833. The mean for each age group was derived by calculating the total response from all the five relevant questions of waste management practices. The mean data show that the respondents were not very satisfied with the waste management practices as the mean data lies on par or below average.



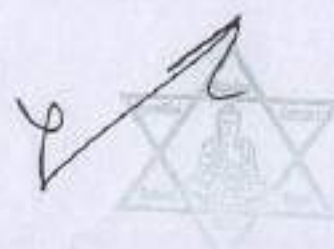
- The finding of the paper is consistent with, (Muthuraman, 2015), (Maharjan & Lohani, 2019), (Pokhrel & Viraraghavan, 2005), (Mani & Singh, 2016), (Deshmukh, 2015).

4.3. Conclusions

The research aimed to examine the Waste Management Practices of Butwal-sub metropolitan city i.e. Waste composition, waste generation, waste collection, transportation and waste management practices exploratory studies was conducted. The primary data were collected, coded and analyzed between dependent and independent variables. Similarly, age group of respondents make significance difference in Waste Management Practices of Butwal-sub metropolitan city. Respondents were not very satisfied with the waste management practices as the mean data lies on par or below average. It can be concluded that local government has to play a major role in making policies make Solid waste management practice more effective.

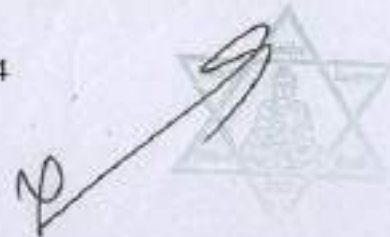
4.4 Implications

- This research helps government to promote waste management education programs that are accessible to all people, not just those with college degrees. More people will be able to contribute to maintaining a clean environment in this way.
- Waste segregation appears to be something that not everyone does, even if they are aware of it. Government should ensure that learning is translated into action.
- Avoiding contamination of the air, water, and soil that may arise from incorrect disposal, good solid waste management techniques are crucial for protecting the environment.
- Encouraging material recycling and reuse, effective waste management helps to conserve resources by lowering the need for extracting new raw materials from the environment.

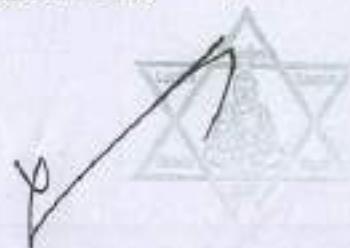


References

- Afful, B. E. B., Addaney, M., Anaafo, D., Akudugu, J. A., Borkor, F. K., Yeboah, E. O., & Sampana, J. (2023). Public-private partnership in municipal solid waste management in the Sunyani municipality of Ghana. *Journal of Property, Planning and Environmental Law, ahead-of-print*(ahead-of-print)<https://doi.org/10.1108/JPPEL-04-2023-0012>
- Afroz, R., Hanaki, K., & Hasegawa-Kurisu, K. (2009). Willingness to pay for waste management improvement in Dhaka city, Bangladesh. *Journal of Environmental Management*, 90(1), 492-503.
- Aich, A. (2017). Study on technological and economic viability of municipal solid waste management system in India and other SAARC countries an approach for sustainability *University*.
<https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/356864>
- Alam, R., Chowdhury, M. A. I., Hasan, G. M. J., Karanjit, B., & Shrestha, L. R. (2008). Generation, storage, collection, and transportation of municipal solid waste - A case study in the city of Kathmandu, capital of Nepal. *Waste Management*, 28(6), 1088-1097. <https://doi.org/10.1016/j.wasman.2006.12.024>
- Aleluia, J., & Ferrão, P. (2016). Characterization of urban waste management practices in developing Asian countries: A new analytical framework based on waste characteristics and urban dimension. *Waste Management*, 58, 415-429. <https://doi.org/10.1016/j.wasman.2016.05.008>
- Al-Khatib, I. A., Arafat, H. A., Basheer, T., Shawahneh, H., Salahat, A., Eid, J., & Ali, W. (2007). Trends and problems of solid waste management in developing countries: A case study in seven Palestinian districts. *Waste Management*, 27(12), 1910-1919. <https://doi.org/10.1016/j.wasman.2006.11.006>
- Amoah, S. T., & Kosoe, E. A. (2014). *Solid waste management in urban areas of Ghana: Issues and experiences from Wa*.
<http://www.udsspace.uds.edu.gh/handle/123456789/204>



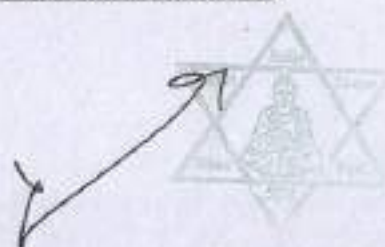
- Banar, M., Cokaygil, Z., & Ozkan, A. (2009). Life cycle assessment of solid waste management options for Eskisehir, Turkey. *Waste Management*, 29(1), 54-62. <https://doi.org/10.1016/j.wasman.2007.12.006>
- Bandara, N. J., Hettiaratchi, J. P. A., Wirasinghe, S. C., & Pilapiiya, S. (2007). Relation of waste generation and composition to socio-economic factors: A case study. *Environmental Monitoring and Assessment*, 135, 31-39.
- Bhattarai, K. (2017). An analysis of households' demand for improved solid waste management in Birendranagar municipality, Nepal. In *An analysis of households' demand for improved solid waste management in Birendranagar municipality, Nepal: Bhattarai, Kumar*.
- Bhattarai, K. (2015). Households' willingness to pay for improved solid waste management in Banepa municipality, Nepal. *Environment and Natural Resources Journal*, 13(2), 14-25.
- Bhatt, M. (2023). Process Development for Conversion of Municipal Solid Waste to ValueAddedProducts.University. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/465217>
- Björklund, A., Dalemo, M., & Sonesson, U. (1999). Evaluating a municipal waste management plan using software. *Journal of Cleaner Production*, 7(4), 271-280. [https://doi.org/10.1016/S0959-6526\(99\)00086-4](https://doi.org/10.1016/S0959-6526(99)00086-4)
- Demirbas, A. (2011). Waste management, waste resource facilities and waste conversion processes. *Energy Conversion and Management*, 52(2), 1280-1287. <https://doi.org/10.1016/j.enconman.2010.09.025>
- Deshmukh, V. P. (2015). A Study Of Solid Waste Management Practices Adopted By Selected Municipalities In Satara Solapur And Kolhapur Districts. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/149973>



- de S. Pereira, T., & Fernandino, G. (2019). Evaluation of solid waste management sustainability of a coastal municipality from northeastern Brazil. *Ocean & Coastal Management*, 179, 104839. <https://doi.org/10.1016/j.ocecoaman.2019.104839>
- Deus, R. M., Battistelle, R. A. G., & Silva, G. H. R. (2017). Current and future environmental impact of household solid waste management scenarios for a region of Brazil: Carbon dioxide and energy analysis. *Journal of Cleaner Production*, 155, 218-228. <https://doi.org/10.1016/j.jclepro.2016.05.158>
- Edodi, S. (2023). Managing the environment: Issues and priority actions for sustainable waste management in Uganda. *African Geographical Review*, 42(3), 342-356.
- Elmo, S., & Ogato, G. S. (2023). Towards integrated, and sustainable municipal solid waste management system in Shashemane city administration, Ethiopia. *Heliyon*, 9, e21865. <https://doi.org/10.1016/j.heliyon.2023.e21865>
- Eriksson, O., Carlsson Reich, M., Frostell, B., Björklund, A., Assefa, G., Sundqvist, J.-O., Granath, J., Baky, A., & Thyselius, L. (2005). Municipal solid waste management from a systems perspective. *Journal of Cleaner Production*, 13(3), 241-252. <https://doi.org/10.1016/j.jclepro.2004.02.018>
- Fernando, R. L. S. (2019). Solid waste management of local governments in the Western Province of Sri Lanka: An implementation analysis. *Waste Management*, 84, 194-203. <https://doi.org/10.1016/j.wasman.2018.11.030>
- Guerrero, L. A., Maas, G., & Hogland, W. (2013). Solid waste management challenges for cities in developing countries. *Waste Management*, 33(1), 220-232.
- Gupta, V. (2018). Knowledge attitude and practices among eco club students in Delhi schools towards solid waste management. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/405911>
- Hemalatha, B. N. (2008). Problems of solid waste management: A study of Hassan city. *INFLIBNET*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/15847>



- Henry, R. K., Yongsheng, Z., & Jun, D. (2006). Municipal solid waste management challenges in developing countries - Kenyan case study. *Waste Management*, 26(1), 92-100. <https://doi.org/10.1016/j.wasman.2005.03.007>
- Jain, A., & Singhal, M. K. (2014). Waste minimization. *Environmental Sustainability: Concepts, Principles, Evidence and Innovations*, 11.
- Kashyap, A. (2012). An investigation on solid waste management in greater Guwahati. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/116155>
- Khan, D., Kumar, A., & Samadder, S. R. (2016). Impact of socioeconomic status on municipal solid waste generation rate. *Waste Management*, 49, 15-25. <https://doi.org/10.1016/j.wasman.2016.01.019>
- Khan, S., Anjum, R., Raza, S. T., Ahmed Bazai, N., & Ihtisham, M. (2022). Technologies for municipal solid waste management: Current status, challenges, and future perspectives. *Chemosphere*, 288, 132403. <https://doi.org/10.1016/j.chemosphere.2021.132403>
- Kundariya, N., Mohanty, S. S., Varjani, S., Hao Ngo, H., W. C. Wong, J., Taherzadeh, M. J., Chang, J.-S., Yong Ng, H., Kim, S.-H., & Bui, X.-T. (2021). A review on integrated approaches for municipal solid waste for environmental and economical relevance: Monitoring tools, technologies, and strategic innovations. *Bioresour Technol*, 342, 125982. <https://doi.org/10.1016/j.biortech.2021.125982>
- Li, N., & Chen, Y. (2023). Municipal solid waste classification and real-time detection using deep learning methods. *Urban Climate*, 49, 101462. <https://doi.org/10.1016/j.uclim.2023.101462>
- M, A. (2020). A Study on Municipal Solid Waste Management in Namakkal Municipality. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/35106>



- Ma, J., & Hipel, K. W. (2016). Exploring social dimensions of municipal solid waste management around the globe - A systematic literature review. *Waste Management*, 56, 3-12. <https://doi.org/10.1016/j.wasman.2016.06.041>
- Mahar, A., Malik, R. N., Qadir, A., Ahmed, T., Khan, Z., & Khan, M. A. (2007). Review and analysis of current solid waste management situation in urban areas of Pakistan. *Proceedings of the International Conference on Sustainable Solid Waste Management*, 8, 36. <https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=5ecf91e730e586d189db7bac980540bale17e480>
- Maharjan, M. K., & Lohani, S. (2019). Municipal solid waste management in Nepal: Opportunities and challenges. *Journal of the Institute of Engineering*, 15(3), 222-226.
- Mani, S., & Singh, S. (2016). Sustainable Municipal Solid Waste Management in India: A Policy Agenda. *Procedia Environmental Sciences*, 35, 150-157. <https://doi.org/10.1016/j.proenv.2016.07.064>
- Mawthoh, J. (2007). A study of the perception and practices of adults on solid waste management in Shillong. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/60516>
- Muthuraman, L. (2015). Solid waste management by the residents of Chinnalapatti town panchayat in Dindigul district Tamil Nadu. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/218039>
- <https://doi.org/10.1016/j.scs.2014.07.004>
- Otoniel, B. D., Liliana, M.-B., & Francelia, P. G. (2008). Consumption patterns and household hazardous solid waste generation in an urban settlement in México. *Waste Management*, 28, S2-S6. <https://doi.org/10.1016/j.wasman.2008.03.019>
- Rada, E. C., Istrate, I. A., & Ragazzi, M. (2009). Trends in the management of residual municipal solid waste. *Environmental Technology*, 30(7), 651-661. <https://doi.org/10.1080/09593330902852768>

- Rahman, M. M., & Bohara, A. K. (2023). Assessing the preference and spatial dependence of a solid waste management system in Nepal: A choice experiment approach. *Journal of Environmental Management*, 327, 116805. <https://doi.org/10.1016/j.jenvman.2022.116805>
- Rai, R. K., Nepal, M., Khadayat, M. S., & Bhardwaj, B. (2019). Improving Municipal Solid Waste Collection Services in Developing Countries: A Case of Bharatpur Metropolitan City, Nepal. *Sustainability*, 11(11), Article 11. <https://doi.org/10.3390/su11113010>
- Rathi, S. (2006). Alternative approaches for better municipal solid waste management in Mumbai, India. *Waste Management*, 26(10), 1192-1200. <https://doi.org/10.1016/j.wasman.2005.09.006>
- Sakai, S., Sawell, S. E., Chandler, A. J., Eighmy, T. T., Kosson, D. S., Vehlouw, J., Van der Sloot, H. A., Hartlen, J., & Hjelm, O. (1996). World trends in municipal solid waste management. *Waste Management*, 16(5-6), 341-350.
- Samdani, P. (2021). Development of an Efficient Solid Waste Management System for Chittorgarh City. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/455526>
- Satya Sagar, M. (2017). The law and policy relating to municipal solid waste management international and national perspectives with special reference to Visakhapatnam. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/381230>
- Shekdar, A. V. (2009). Sustainable solid waste management: An integrated approach for Asian countries. *Waste Management*, 29(4), 1438-1448. <https://doi.org/10.1016/j.wasman.2008.08.025>
- Silva, A., Rosano, M., Stocker, L., & Gorissen, L. (2017). From waste to sustainable materials management: Three case studies of the transition journey. *Waste Management*, 61, 547-557. <https://doi.org/10.1016/j.wasman.2016.11.038>

- Suthar, S., & Singh, P. (2015). Household solid waste generation and composition in different family size and socio-economic groups: A case study. *Sustainable Cities and Society*, 14, 56-63. <https://doi.org/10.1016/j.scs.2014.07.004>
- Tong, Y. D., Huynh, T. D. X., & Khong, T. D. (2021). Understanding the role of informal sector for sustainable development of municipal solid waste management system: A case study in Vietnam. *Waste Management*, 124, 118-127. <https://doi.org/10.1016/j.wasman.2021.01.033>
- Udhaya Banu, D. (2020). Evaluation And Assessment Of Municipal Solid Waste Management Practices In Erode City Tamilnadu. *University*. <https://shodhganga.inflibnet.ac.in:8443/jspui/handle/10603/392429>
- (United States Environmental Protection Agency. (n.d.). Waste management. <https://www.epa.gov/waste>)
- van Nickerk, S., & Wegmann, V. (n.d.). *Municipal Solid Waste Management Services in Africa*.



Appendices:

Questionnaire for Solid Waste Management Practice of Butwal Sub-Metropolitan City.

Respected sir/madam,

I am Sanju Gaire, an Assistant Professor in the Faculty of Management at Lumbini Banijya Campus and I am really very exstated to provide an update on our research efforts. We are investigating the waste situation in the Butwal sub-metropolitan area with my fellow students, Kriti Pandey and Aakriti Khanal and we began this study by applying management principles. We have obtained necessary permissions from both Lumbini Banijya Campus and the local ward, and I will keep you informed about our progress. To ensure the success of our investigation, we kindly request your participation in completing the attached form. Your contribution is greatly appreciated. Thank you very much in advance.

Demographic Profile:

1. Ward Number:

2. Gender:

a. Male

b. Female

3. Age:

a. 18-28

b. 28-38

c. 38-48

d. 48 and above

4. Education:

a. Illiterate



- b. School
- c. High School
- d. Bachelor
- e. Masters
- f. Mphil/PhD

5. Occupation:

- a. Entrepreneur
- b. Service Holder
- c. Business
- d. others

Collection:

1. Where do you store your household waste?

- a. Plastic Bag
- b. Dustbin
- c. Cardboard
- d. Others Specify.....

2. Are you aware of the segregation of waste based on its nature?

- a. Yes
- b. No

3. If YES, are you segregating waste at your home?

- a. Yes



b. No

4. Do you have separate bins at home for biodegradable and non-biodegradable waste?

a. Yes

b. No

5. Is there a door-to-door collection system?

a. Yes

b. No

6. If door to door collection, then how often do they collect?

a. Daily

b. Once in two days

c. Once in three days

d. In a week

7. To what extent are you satisfied with the current waste collection service?

a. Very Poor

b. Poor

c. Good

d. Very Good

e. Excellent

Transportation:

1. What is the primary mode of transport used for collecting solid waste generated in your municipality?



- a. Garbage truck
- b. Tractor
- c. Hand Carts or Push Carts
- d. Bicycle or tricycle carts
- e. Others

2. What is the prevailing structure of the mode of transport used for collecting solid waste in your locality?

- a. Open
- b. Covered
- c. Both open and covered
- d. Not sure

3. Loading waste into vehicle is?

- a. Unhygienic
- b. Hygienic

4. Solid waste collection vehicles in the locality gives foul smell.

- a. Yes
- b. No

5. Have you ever complaint to the municipality or concerned authorities when municipality vehicle does not come for the waste pickup at the right time.

- a. Yes
- b. No



6. What do you do with the solid waste generated by your household if the municipality vehicle does not come at the right schedule and your temporary storage is full?

- a. Keep the waste at home
- b. Burn it
- c. Dump it into the river or open space
- d. Dump it into the sewage
- e. State if others.....

7. Is the vehicle currently in usage is enough to dispose off solid waste in the city?

- a. Yes
- b. No

Disposal

1. Special care and caution have been given in handling waste

- a. Strongly Disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree

2. Municipality has adopted scientific disposal/processing of waste

- a. Strongly Disagree
- b. Disagree
- c. Neutral



d. Agree

e. Strongly Agree

3. Disposal of waste never create any environmental problem to the citizen

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree

4. There are sufficient clearance centers for effective disposal mechanism

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree

5. The method of disposal of waste by Sub-Metro is satisfactory

a. Strongly Disagree

b. Disagree

c. Neutral

d. Agree

e. Strongly Agree



Composition

Please rank the following waste categories in order of how frequently you believe they are generated in household with 1 being the most frequent and 8 being the least frequent

Textile

Plastic

Paper and Paper Product

Rubber and Leather.....

Organic Waste

Glass

Others

Waste Generation

1. Which of the following waste is generated more in terms of quantity?

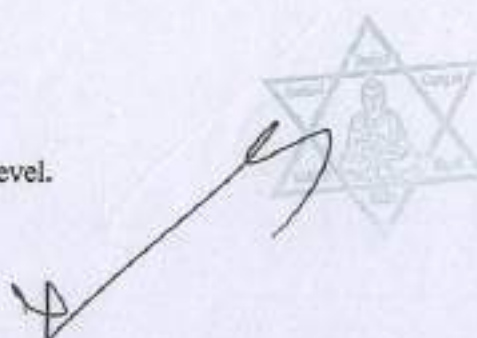
- a. Bio degradable
- b. Non-biodegradable

2. Do you make your household waste as compost?

- a. Yes
- b. No

3. Generation of waste can be reduced at household level.

- a. Yes
- b. No



महोदय,

म लुम्बिनी वाणिज्य क्याम्पसको व्यवस्थापन संकायमा सहायक प्राध्यापक सञ्जु गैरे हुँ र आगामी अनुसन्धान प्रयासका बारेमा जानकारी गराउन पाउँदा म उत्साहित छु । मेरा सहयोगी विद्यार्थीहरू कृति पाण्डे र आकृति खनालसँग मिलेर हामी बुटवल उपमहानगरपालिकाको फोहरमैला व्यवस्थापनको अभ्यासमा केन्द्रित रहेर विस्तृत अध्ययन गर्न लागेका छौं । यो अनुसन्धानका लागि हामीले लुम्बिनी वाणिज्य क्याम्पस र स्थानीय वडा दुवैबाट आवश्यक अनुमति प्राप्त गरेको जानकारी गराउँछौं । हाम्रो सोधपत्रको सफलता सुनिश्चित गर्न कृपया संलग्न फारम भरिदिनुहुन अनुरोध गर्दछौं । तपाईंको सहभागिताको लागि अग्रिम धन्यवाद।

आफुलाई ठिक लाग्ने उत्तरमा बक्सामित्र टिक लगाउनुहोस्;

जनसांख्यिक प्रोफाइल

१. वडा नं

२. लिंग :

क. पुरुष

ख. महिला

ग. अन्य

३. उमेर:

क. १८-२८



ख. २८ - ३८

ग. ३८ - ४८

घ. ४८ र सो भन्दा माथि

४. शिक्षा:

क. सामान्य लेखपढ गर्ने

ख. एस एल सी वा सो सरह

ग. १०+२ वा सो सरह

घ. स्नातक

ङ स्नातकोत्तर

च. दर्शनाचार्य वा विद्यावारिधि

५. व्यवसाय:

क. उद्यमी

ख. सेवा धारक

ग. व्यवसाय

घ. अन्य

आफुलाई ठिक लाग्ने उत्तरमा बक्सामित्र टिक लगाउनुहोस्;

फोहोरको प्रकारान्तर विवरण:

कृपया निम्न फोहोरका प्रकारहरूलाई १ सबैभन्दा धेरै र ८ सबैभन्दा कम ईङ्गित गरी श्रेणी गर्नुहोस्



४. सरदरमा यहाँको घरबाट प्रत्येक दिन कति के.जी. फोहोर उत्पादन हुन्छ ?

क. १ केजी

ख. ३ केजी

ग. ५ केजी

घ. ८ केजी

आफुलाई ठिक लाग्ने उत्तरमा बक्सामित्र टिक लगाउनुहोस्;

फोहोर संकलन:

१. तपाईं आफ्नो घरको फोहर कहाँ भण्डारण गर्नुहुन्छ?

क. प्लास्टिक झोला

ख. डस्टबिन

ग. कार्डबोर्ड

घ. अरु भए लेख्नुहोस्

२. के तपाईं फोहरलाई प्रकृतिको आधारमा छुट्याउने बारे जानकारी हुनुहुन्छ?

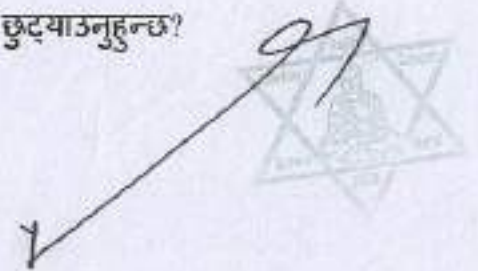
क. छु

ख. छैन

३. यदि जानकारी हुनुहुन्छ भने, के तपाईं आफ्नो घरको फोहर छुट्याउनुहुन्छ?

क. छुट्याउछु

ख. छुट्याउदिन



४. के तपाईसँग कुहिने र नकुहिने फोहोरको लागि घरमा छुट्टै भाडा छ?

क. छ

ख. छैन

५. के तपाईको घर-घर फोहोर संकलन गर्न आउने प्रणाली छ?

क. छ

ख. छैन

६. यदि घर-घर संकलन प्रणाली छ भने, कति पटक सङ्कलन हुन्छ?

क. दैनिक

ख. दुई दिनमा एक पटक

ग. तीन दिनमा एक पटक

घ. एक हप्तामा

७. हालको फोहोर संकलन सेवाबाट तपाई कतिको सन्तुष्ट हुनुहुन्छ ?

क. अति असन्तुष्ट

ख. असन्तुष्ट

ग. ठिकै

घ. राम्रो

ङ. धेरै राम्रो



आफुलाई ठिक लाग्ने उत्तरमा बक्सामित्र टिक लगाउनुहोस्;

यातायात:

१. तपाईंको नगरपालिकामा उत्पन्न ठोस फोहोर सङ्कलन गर्न प्रयोग गरिने यातायातको प्राथमिक

मोड के हो?

क. फोहोर ट्रक

ख. ट्रयाक्टर

ग. हाते कार्ट वा पुश कार्ट

घ. साइकल वा ट्राइसाइकल कार्ट

ड. अन्य

२. आफ्नो इलाकामा फोहोर मैला संकलन गर्न प्रयोग गरिने यातायातको साधनको प्रचलित संरचना के हो ?

क. खुला

ख. आवरण

ग. खुला र ढाकिएको दुवै



३. गाडीमा फोहोर लोड गर्नु _____ हो ।

क. अस्वस्थकर

ख. स्वस्थकर

४. फोहोर ढुवानी गर्ने साधनले

क. दुर्गन्ध प्रवाह गर्छ ।

ख. दुर्गन्ध प्रवाह गर्दैन ।

५. सही समयमा फोहर उठाउनका लागि नगरपालिकाको गाडी नआउँदा नगरपालिका वा सम्बन्धित निकायमा कहिल्यै गुनासो गर्नुभएको छ ?

क. गरेको छु

ख. गरेको छैन

६. यदि नगरपालिकाको गाडी सही समयमा आएन र तपाईंको अस्थायी भण्डारण भरिएको छ भने तपाईंको घरले उत्पन्न गरेको ठोस फोहोरको साथ तपाईं के गर्नुहुन्छ?

क. फोहोर घरमै राख्छु

ख. जलाउँछु

ग. नदी वा कुलोमा फ्याक्छु

घ. अन्य भए लेख्नुहोस्

७. के हाल प्रयोगमा रहेको गाडी शहरमा ठोस फोहोर फ्याँक्न पर्याप्त छ?

क. छ

ख. छैन

केवल फोहोर संकलन गर्ने व्यक्ति र संकलन समितिका पदाधिकारीहरूकालागि मात्र:

आफुलाई ठिक लाग्ने उत्तरमा बक्सामित्र टिक लगाउनुहोस्

विसर्जन:



१. फोहरमैला व्यवस्थापनमा विशेष सावधानी र सावधानी अपनाइएको छ ।

क. दृढतापूर्वक असहमत

ख. असहमत

ग. तटस्थ

घ. सहमत

ड. दृढतापूर्वक सहमत

२. नगरपालिकाले फोहरमैलाको वैज्ञानिक व्यवस्थापन/प्रशोधन गरेको छ ।

क. दृढतापूर्वक असहमत

ख. असहमत

ग. तटस्थ

घ. सहमत

ड. दृढतापूर्वक सहमत

३. फोहरमैलाको व्यवस्थापनले नागरिकलाई कुनै पनि वातावरणीय समस्या सिर्जना गर्दैन ।

क. दृढतापूर्वक असहमत

ख. असहमत

ग. तटस्थ

घ. सहमत

ड. दृढतापूर्वक सहमत



4. प्रभावकारी निपटान तंत्रको लागि पर्याप्त निकासी केन्द्रहरू छन्

क. दृढतापूर्वक असहमत

ख. असहमत

ग. तटस्थ

घ. सहमत

ङ. दृढतापूर्वक सहमत

५. उप-महानगरद्वारा गरिने फोहोर विसर्जन प्रणाली प्रति सन्तुष्ट छुः

क. दृढतापूर्वक असहमत

ख. असहमत

ग. तटस्थ

घ. सहमत

ङ. दृढतापूर्वक सहमत







SOLID WASTE MANAGEMENT PRACTICES OF BUTWAL SUB ...

By: SANJU GAIRE / KRITI PANDEY / AAKRITI ...

As of: Apr 1, 2024 12:10:24 PM
22,692 words - 6 matches - 1 source

Similarity Index

1%

Mode: Summary Report

sources:

132 words / 1% - from 29-Jun-2023 12:00AM
www.nepjol.info

paper text:

SOLID WASTE MANAGEMENT PRACTICES OF BUTWAL SUB-METROPOLITAN CITY By ASST-LECTURER SANJU GAIRE KRITI PANDEY AAKRITI KHANAL LUMBINI BANIJYA CAMPUS, BUTWAL-11, DEVINAGAR RESERARCH COMMITTEE Falgun, 2080 CHAPTER - I INTRODUCTION 1.1. Background An increasing number of people are suffering from the unhygienic environmental conditions that are becoming worse every year. Consideration of all factors directly or indirectly related to solid waste and its management is part of the broad range of problems related to solid waste management. The rapid rate of urbanization, the structure and density of urban areas, the physical planning and regulation of development, the physical makeup and density of waste, the influences of temperature and precipitation, the activity of trash collectors to separate recyclable materials, and the ability, sufficiency, and constraints of individual municipalities to manage solid waste, including storage, collection, transportation, and disposal, are some examples of these aspects (Mahar et al., 2007). According to a United Nations Development Programme In survey of 151 city mayors, the worst issue people are facing, after unemployment, is poor solid waste management. The remaining 60% of waste is disposed of directly in streets and drains, causing blockages, the growth of flies and rats, flooding, and the spread of disease. Only 40% of waste is collected. The collected waste is dumped straight into an open, unscientific disposal site. These sites produce leachate, which contaminates the quality of groundwater. These landfill sites also release greenhouse gases that contribute to global warming, primarily methane and carbon dioxide (Jain & Singhal, 2014). The problem of waste management exists everywhere. Currently, waste generation is an activity that is difficult to control. Solid waste produced by business, industrial, and residential activities is frequently disposed of carelessly. When such wastes are managed carelessly, major environmental issues occur. Since the amount of waste being generated exceeds the capacity of disposal facilities, the situation is already dangerous in many cities and towns. The use of unhygienic methods to dispose of solid waste poses a major risk to public health. Increased health issues across all regions are linked to inadequate solid waste management

टेक्सटाइल

प्लास्टिक

कागज र कागज उत्पादन

रबर और चमड़ा.....

जैविक अपशिष्ट

ग्लास

अन्य

आफुलाई ठिक लाग्ने उत्तरमा बक्सामित्र टिक लगाउनुहोस्;

फोहर मैला उत्पादन

१. मात्राको हिसाबले निम्नमध्ये कुन फोहर बढी उत्पन्न हुन्छ ?

क. कुहिने

ख. नकुहिने

२. के तपाईं आफ्नो घरको फोहरलाई कम्पोस्ट बनाउनुहुन्छ?

क. बनाउछु

ख. बनाउदिन

३. घरायसी स्तरमा फोहर मैला उत्पादन कम गर्न सकिन्छ ।

क. सकिन्छ

ख. सकिदैन

