HOUSEHOLD AND SOCIOECONOMIC FACTORS INFLUENCING SANITATION TECHNOLOGY CHOICE IN KAPSERET SUB-COUNTY, KENYA

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A Thesis Submitted in Partial Fulfilment of Requirements for Conferment of the Degree of Master of Science in Sanitation of Meru University of Science and Technology

2025

DECLARATION

This thesis is my original work and has not been presented for award of a degree in any other institution

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ACKNOWLEDMENT

I would like to express my heartfelt gratitude to my Almighty Father for his presence and guidance throughout my studies. I would like to express my sincere gratitude to the many people who supported me throughout this journey and made this thesis possible.

I am incredibly grateful to my husband, Brian Kimitei. His unwavering support, both moral and financial, was instrumental in my success.

I am deeply grateful to my parents, Mr. and Mrs. Jonathan Sirwanei, and my siblings, Marion Cherono, Leonard Kimutai, Isaac Kipruto, and Emmanuel Sirwanei. Special thanks to my brother, Leonard. He not only offered his own support but also went above and beyond by recruiting his friends to assist with data collection. Their contribution significantly reduced the workload and made the data collection process much smoother.

I would also like to thank my fellow comrade, Eng. Philomena Atibu. Her invaluable assistance during the brainstorming phase of this project helped me refine my research question and set a clear direction for my thesis.

My deepest appreciation goes to my supervisors, Dr. Patrick Kubai (PhD) and Dr. Grace Gakii Muthuri (PhD). Their constant guidance, training, mentorship, and support were invaluable throughout the research process. Their expertise and insights significantly improved the quality of my work.

Finally, I would like to thank IHE Delft Institute for Water Education for sponsoring the MSc Sanitation program at Meru University of Science and Technology. This scholarship opportunity has been instrumental in allowing me to pursue this program, alleviating the burden of tuition fees, enabling me to fully dedicate myself to my academic journey and the research presented here.

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ABBREVIATIONS

ECO-SAN	Ecological Sanitation
FAO	Food and Agriculture Organization
GPD	Gross Domestic Product
JMP	Joint Monitoring Programme
KNBS	Kenya National Bureau of Statistics
MoH	Ministry of Health
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nation Development Program
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
USD	United States Dollar
VIP	Ventilated Improved Pit
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Sanitation ladder	is a conceptual framework for describing and evaluating the evolution of sanitation services from the most basic to the most modern and properly managed. It assists policymakers, practitioners, and communities in understanding access levels and identifying opportunities for sanitation improvement.
Sanitation service chain	refers to the sequential flow of human waste from its point of origin (collecting site) to its final treatment and safe reuse or disposal. It aids in the development and management of sustainable sanitation systems by identifying critical stages at which interventions are required to safeguard both health and the environment.
Sanitation technology	refers to the systems, techniques, and procedures utilised to handle human waste. These technologies are intended to contain, transport, process, and dispose of waste in order to avoid contamination and safeguard public health.
Sanitation	is the provision of facilities and services for the safe disposal of human waste, including urine and faeces. It entails the collection, storage, treatment, and disposal of waste materials. Sanitation promotes hygiene, good health, and preventing diseases.

ABSTRACT

Sanitation is a fundamental determinant of public health, economic development, and social well-being. Despite various interventions in Kenya, many households in semi-urban and rural areas continue to face challenges in accessing and adopting appropriate sanitation technologies. In Kapseret Sub-County, limited sanitation infrastructure, coupled with socio-economic and cultural barriers, has led to persistent reliance on inadequate facilities. This situation presents a critical public health concern, raising the question of how household characteristics, socio-economic status, and social factors influence the adoption of sanitation technologies. The study sought to address this problem by examining the influence of social, economic, and demographic characteristics on sanitation technology choices in Kapseret Sub-County. Specifically, the objectives were: (i) to determine the socio-economic factors that influence sanitation technology choices, (ii) to establish the role of social and cultural perceptions in sanitation decision-making, and (iii) to assess the relationship between household characteristics and the adoption of sanitation technologies. By doing so, the study aimed to generate insights that could inform policies and interventions tailored to improve public health outcomes in the region. Guided by the Theory of Planned Behaviour, which highlights the role of attitudes, social norms, and perceived behavioural control in shaping decisions, the study adopted a descriptive research design. A sample of 475 households was drawn from a total population of 59,746 using Mugenda and Mugenda's (2003) formula. Data were analysed using SPSS version 26 through descriptive statistics, correlation, regression, and ANOVA tests. Findings revealed a concerning sanitation situation in Kapseret Sub-County, where over half of households (53.7%) lacked access to reliable sanitation facilities. Household income levels and the cost of installation and maintenance were the most influential factors in technology choice. Social norms, particularly community perceptions (mean = 3.16), traditional customs, and gender roles, significantly shaped adoption decisions, while education (mean = 3.12) exerted a more moderate influence. ANOVA results confirmed a statistically significant relationship between socio-economic characteristics and sanitation choices ($F = 10.666$, $p = 0.001$). The study concludes that sanitation interventions must be culturally sensitive, socially inclusive, and education-driven. It recommends a multifaceted approach that integrates financial support, targeted education, and environmentally sustainable solutions to accelerate the adoption of sanitation technologies. Such strategies are essential to enhance public health and promote sustainable community development in Kapseret Sub-County and similar contexts.

CHAPTER ONE: INTRODUCTION

1.0 Introduction

Sanitation is a fundamental human right that promotes dignity, health, and long-term development. Human well-being depends on having access to sanitation facilities that provide privacy, safety, physical accessibility, and affordability. Globally, sanitation serves as a public good, benefiting not only individuals but entire communities by lowering illness burdens, promoting economic development, and improving social equity. Proper sanitation is essential for public health because it helps prevent the spread of dangerous diseases like cholera, dysentery, and typhoid. Lack of appropriate sanitation increases child mortality, contributes to hunger and stunting, and pollutes the environment (UNICEF & WHO, 2020).

Despite progress, an estimated 2 billion people worldwide still lack basic sanitation services, with 673 million using open defecation (WHO, 2019). Only 45% of the world's population now has access to safely managed sanitation. Countries such as China and Bangladesh demonstrate how socioeconomic determinants like GDP, literacy rates, and infrastructure investment have a direct impact on sanitation results (Huang, 2021; Ali & Ferdos, 2024). Rural China, for example, has seen higher sanitation rates as a result of programs aimed at education, income levels, and water access. However, widespread illiteracy and poverty continue to impede improvement (Li *et al*., 2024).

Sanitation access remains a serious concern throughout Sub-Saharan Africa. According to the WHO (2019), a large proportion of Africans continue to practise open defecation. Cultural, economic, and educational variables frequently cause sanitation choices in rural Tanzania to disagree with expert advice (Obeng *et al*., 2022). Sustainable solutions such as

SanPlat and pour flush toilets are gaining popularity, but water scarcity, cost, and pollution remain significant issues (Fida, 2023).

In East Africa, many of these broader tendencies are mirrored. In Kenya, sanitation coverage is only under 50%, with an estimated 6 million people defecating in the open (UNICEF, 2015; WHO, 2019). Inadequate sanitation is particularly problematic in rural areas, where poverty rates are higher and infrastructural development is slow. Rural communities frequently rely on dangerous and unsanitary practices, with some households missing sanitation facilities entirely (Birasa *et al*., 2024). The implications include environmental deterioration, lower productivity, and an increase in illness incidence.

The relationship between socioeconomic characteristics and sanitation is clear: income, education, occupation, and social class all have a substantial impact on a household's access to and selection of sanitation technology. Many Kenyan homes struggle to afford modern sanitation facilities due to high levels of poverty (Omina *et al*., 2022). Education has a transforming effect; persons with higher education levels are more likely to comprehend and prioritise hygiene, invest in improved technology, and transmit these behaviours along to future generations.

Cultural attitudes and social conventions also influence technological adoption. Taboos surrounding faeces and toilet use influence community acceptability of sanitation programs (Eliud *et al*., 2022). Furthermore, the design, cost, and maintenance requirements of many technologies discourage adoption. Current methods in Kenya, while effective in some urban areas, are frequently costly, time-consuming to construct, and risk groundwater contamination (Thomas *et al*., 2022).

To solve these issues, a number of sanitation technologies, including composting toilets, dehydration toilets, biogas digesters, and streamlined sewerage systems, have been introduced worldwide. However, successful adoption is dependent not only on technology, but also on community participation, affordability, and local context suitability (Carrard *et al*., 2021). In Kenya, low prioritization, inadequate money, and a lack of proper infrastructure have hampered growth in many counties (Williams *et al*., 2022). Poor sanitation and hygiene are predicted to cost 27 billion Kenya Shillings per year (Legge *et al*., 2021), emphasizing the need for long-term solutions.

Subsequently sanitation is more than just infrastructure; it is an important enabler of health, fairness, and environmental stewardship. To address sanitation access challenges, particularly in rural Kenyan communities, integrated efforts must take into account socioeconomic realities, cultural attitudes, and technology fit.

1.1 Sanitation in Uasin Gishu County

Kapseret, situated in Kenya, is one of the six constituencies within Uasin Gishu County. Uasin Gishu County's headquarters is Eldoret, a prominent town in the Rift Valley region of Kenya. Historically, this town was known as Farm 64 to white settlers and referred to as 'Sisibo' by locals. According to the 2019 Kenya Population and Housing Census, Eldoret is the fifth most populous urban area in the country, following Nairobi, Mombasa, Nakuru, and Ruiru. It lies to the south of the Cherangani Hills, with elevations ranging from approximately 2,100 meters (6,900 feet) at the airport to over 2,700 meters (8,900 feet) in nearby areas. In 2009, the population was 289,380, but it has since grown rapidly, with

475,716 people according to the 2019 National Census. Although Eldoret was poised to become Kenya's fourth city, it was surpassed by Nakuru in 2021.

Poor sanitation costs Uasin Gishu County a significant amount, totalling to 533 million Kenyan Shillings annually this is according to a desk study carried out by the Water and Sanitation Program (WSP), 2014. These costs encompass factors such as time spent accessing sanitation facilities, premature deaths, healthcare expenses, and reduced productivity. It's important to note that this estimate does not include certain potentially substantial costs, like water pollution and the impact on tourism, and thus likely underestimates the true expense of inadequate sanitation.

Achieving universal access to improved sanitation offers extensive benefits in terms of health, social well-being, and economic development. Regarding water resources, the region relies on dams, rivers, boreholes, shallow wells, and springs. The area includes 250 dams and pans constructed during the colonial era, many of which have silted up. Additionally, there are five major rivers: Moiben, Sergoit, Kipkarren, Chepkoilel, and Sosiani.

In towns and urban centers, waste disposal remains a considerable challenge despite efforts made by the County. This situation contributes to environmental degradation and pollution. The absence of a proper sewer system in these areas, along with issues related to solid waste management, presents significant sanitation challenges. Addressing these challenges necessitates improvements in waste disposal, including the provision of sewerage systems, solid waste disposal sites, waste storage systems, and the establishment of a recycling plant at the Kipkenyo dumpsite, among other interventions.

In 2014, in the rural Uasin Gishu district, the sanitation situation was as follows: 36.1% of households utilized shared latrines, 19.6% relied on unimproved facilities, 42.5% had access to improved toilets, and 1.8% resorted to open defecation. It is advisable to conduct an assessment to gauge the effects of water and sanitation initiatives on the health status of the population.

Table 1. 1

Uasin Gishu County Sanitation coverage

Type of Sanitation coverage	Percentage
Improved	42.5%
Unimproved	19.6%
Shared	36.1%
Open Defecation	1.8%

Source: County Government of Uasin Gishu (2015)

1.2 Problem Statement

Despite Kenya's robust legal and policy frameworks supporting access to adequate sanitation—such as the Constitution, the Public Health Act, and the Kenya Environmental Sanitation and Hygiene Policy—significant gaps persist in sanitation coverage. Only 29% of Kenyans have access to basic sanitation, and over 5 million still practice open defecation, posing serious public health risks. While the adoption of improved sanitation technologies is critical to realizing national health and development goals, uptake remains low due to complex socioeconomic and household-level factors. Existing studies have largely taken a national or regional lens, with limited focus on localized contexts such as Kapseret Sub-County in Uasin Gishu County. This study seeks to fill this gap by examining the household and socioeconomic determinants influencing sanitation technology choices in this specific

locality, thereby contributing context-specific insights to inform more effective sanitation interventions.

1.3 Justification

The study is critical in addressing several challenges. First, it holds significant implications for public health. Understanding the factors that influence the choice of sanitation technologies in this specific region, Kapseret Sub County, shall provide insights into interventions that can reduce the prevalence of waterborne diseases and improve community health. The study shall help determine whether households are adopting eco-friendly sanitation technologies, such as composting toilets or wastewater treatment systems. Findings can be used by government agencies, non-governmental organizations, and community leaders to design targeted sanitation programs and allocate resources efficiently. By filling gaps in the existing literature, this study contributes valuable knowledge about sanitation practices and the socio-economic factors affecting them in this specific region of Kenya. It also serves educational and awareness purposes for the community, empowering residents to make informed decisions about sanitation technologies and practices, while also serving as a resource for future researchers and policymakers.

1.4 Objectives

1.4.1 General objective

To investigate the socio-economic factors influencing households' selection of sanitation technologies in Kapseret Sub county, Uasin Gishu county, Kenya.

1.4.2 Specific objectives

The objectives of this study were:

i. To examine households' characteristics that influence the status of sanitation in Kapseret Sub-County, Uasin Gishu County.
ii. To examine the social factors influencing adoption of sanitation technologies and practices in Kapseret Sub-County, Uasin Gishu County.
iii. To determine the economic factors influencing households' adoption of sanitation technologies in Kapseret Sub-County, Uasin Gishu County.

1.5 Research question

i. What households' characteristics influence the choice of sanitation technologies in Kapseret Sub County?
ii. What social factors influence the sanitation practices employed in Kapseret Sub County, Uasin Gishu County?
iii. What are the economic factors that influence household choices of sanitation technologies and practices in Kapseret Sub County, Uasin Gishu County?

1.6 Significance of the Study

Numerous individuals residing in rural areas confront significant sanitation challenges, making this research crucial for disseminating vital insights to empower them in combatting a range of diseases such as cholera, diarrhoea, and other contagious illnesses. These sanitation issues not only affect the health and well-being of rural populations but also have broader implications for public health and economic stability in these regions. Furthermore, this study holds significant value for scholars and practitioners alike, offering a deeper and more comprehensive understanding of the multifaceted sanitation issues prevalent in rural communities. By providing detailed analysis and evidence-based recommendations, it will

aid policymakers in formulating and implementing effective policies to tackle the pervasive issue of inadequate sanitation. Additionally, the study will emphasize the importance of sustainability in these initiatives, ensuring that solutions are not only effective in the short term but also maintainable in the long run. This holistic approach will contribute to the development of robust sanitation systems that can adapt to changing conditions and continue to protect public health in rural areas over time.

1.7 Limitations of the Study

The analysis of sanitation goes beyond just defining the proper disposal of human waste and constructing latrines. This study also considers various other aspects, including water supply, wastewater and solid waste management, community hygiene and health, and environmental conditions. However, it's important to note that this research doesn't make specific technology recommendations for the residents of Uasin Gishu County, as it does not include in-depth economic analysis or institutional requirements. Instead, the study focuses on the initial stages of the selection process, identifying problems related to environmental, technical, social, cultural, and health aspects within the community. It centers on the selection process and issues relevant to providing sanitation systems for the community. It's essential to remember that the specific findings in this case study may not be directly applicable to other communities. The recommendations offered are more general in nature and intended for a broader context.

1.8 Delimitation of the Study

The study was carried out in Kapseret Sub County in Uasin Gishu County and was limited to finding out the economic and cultural factors influencing the selection of sanitation

technologies. The study was conducted with limited amount of financial resources and timeframe.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter provides an overview of the relevant literature pertaining to the topics under investigation. This encompasses studies on sanitation practices and the socio-economic factors associated with sanitation. Additionally, the chapter introduces a conceptual framework that will serve as a guiding structure for the research.

2.1 Overview of Households and Status of Sanitation System and Services

Research in various contexts suggests that households' characteristics play a significant role in determining their sanitation status. For instance, a comprehensive study by Donacho *et al*. (2022) found that several key factors, including household size, education level of household members, and income levels, are crucial determinants of sanitation practices. These factors influence not only the availability and use of sanitation facilities but also the overall hygiene behaviors within households.

Similarly, a study by Mushi *et al*. (2019) highlighted the importance of demographic factors such as household size, composition, and socio-economic status in shaping sanitation behavior. This study demonstrated that larger households often face greater challenges in maintaining adequate sanitation due to increased demand and resource constraints. Additionally, socio-economic status influences access to sanitation facilities and the ability to invest in proper sanitation infrastructure. These findings underscore the need for targeted interventions that consider the diverse characteristics of households to effectively improve sanitation outcomes. By understanding and addressing these factors, policymakers and

practitioners can develop more tailored and effective strategies to enhance sanitation practices across different communities.

Understanding the characteristics of households utilizing sanitation services is integral to addressing access disparities. Research conducted by the World Health Organization (WHO) and UNICEF reveals that approximately 2.3 billion people globally lack basic sanitation services. Factors such as income, education, and household size are often associated with access to improved sanitation facilities. Moreover, employment status, especially the type and stability of employment, plays a significant role in determining a household's capacity to invest in sanitation technology (UNICEF & WHO, 2021).

According to the World Bank report (2022), about 3.5 billion people across the world lacks access to properly managed sanitation. Nearly a half of these (1.7B) lack basic sanitation services, with 580 million people sharing improved sanitation facilities with other households while 616 million people embracing unimproved sanitation facilities. Wide disparities exist with majority of such population (over two thirds) lacking basic facilities live in the rural. Out of these, about a half live in Sub-Saharan Africa (World Bank, 2023).

Majority of Rural dwellers are poor hence cannot invest in improved sanitation facilities. The World Bank (2018) reported that open defecation was more prevalent in the rural Pakistan, coupled with no treatment of water, thereby exposing the people to high health risks. The WHO/UNICEF Joint Monitoring Programme (JMP, 2018) reported that 18 million people practiced open defecation in Latin America and Caribbean, with 46% of the people in Bolivia, Latin America, practicing open defecation, followed by Haiti (35%) and Venezuela (29%).

A study conducted in 9 selected countries by their income status to examine the factors affecting their sanitation coverage and potential to meet the SDG 6.2 revealed that all the countries have made progress except those of low-income countries. They attribute it to high population, high socioeconomic inequalities and political instabilities (Bankole *et al*., 2023).

A study in India concluded that the selection of sanitation technology is contingent upon demographic, socio-economic, landownership, cultural, and local sanitation context factors (Tiwari *et al*. 2022). A study in India by Kumar *et al*. (2024) found that households with higher income and education levels were more inclined to use improved sanitation facilities. Similarly, research in sub-Saharan Africa by Jenkins *et al*. (2019) noted that urban households often have better access to improved sanitation services than rural households. A research in Nigeria has shown that households with higher incomes are more likely to have access to improved sanitation facilities, since they can afford.

These factors not only influence sanitation behaviors but also have a bearing on the prevalence of diseases. A study of household heads in 1 peri-urban settlement of Lusaka, Zambia observed that having a regular income, private toilet facility, and improved drinking water and handwashing facility influences the owner to install an improved toilet facility (Nyambe *et al*., 2020). In Kenya, high levels of unemployment in the area may impact households' ability to invest in improved sanitation technologies (Kenya National Bureau of Statistics, 2019). Low income leads coupled with higher household size leads to poor sanitation practices in the rural areas since households struggle to provide basic needs to their members.

The Kenya Household Population survey (2019) revealed that Uasin Gishu County had a population of 1,152,671 people with 304,943 households and an average household size of 3.8. Kenya Demographic and Health Survey (2022) revealed that 79% of household population in Uasin Gishu County had access to at least basic drinking water service, against the 68% of the national average. Similar data revealed that 50% of household population had at least basic sanitation service against the national average of 41%. The survey observed that 1% of Women aged 15-49 had no formal education in Uasin Gishu county, against the national rate of 6%. On the other hand, less than 1% of their male counterparts had no formal education against the 3% national average. This study uncovered the household demographics and other characteristics that influence the choice of the available sanitation technologies.

Grace *et al*. (2023) observed that age and gender of the household heads and the availability of open spaces near households influenced the chances of open defecation. In their study in Nzaui location in Kitui, Kenya, they noted that households headed by people 18-33 years old and availability of open spaces near households increased chances for open defecation. They also observed that financially stable households, and majority of the households headed by females adopted improved sanitation services.

2.2 Principle and Concept of Sanitation technologies

The sanitation conditions in Africa, particularly in Sub-Saharan Africa, remain distressing, with approximately 20% of the population still engaging in open defecation (Belay *et al*., 2022). The consequences of inadequate sanitation systems encompass adverse effects on the quality of natural resources, including water, and pose significant health risks to the affected

populations. Increased global awareness of the environmental issues associated with inadequate sanitation practices has led to the development of various sanitation systems based on different technologies (Mor & Ravindra, 2023). The sustainable utilization of sanitation technologies hinges on essential factors such as cost-effectiveness, social acceptance, user-friendliness, ease of operation and maintenance, as well as health and hygiene safety (Kumar *et al*., 2023).

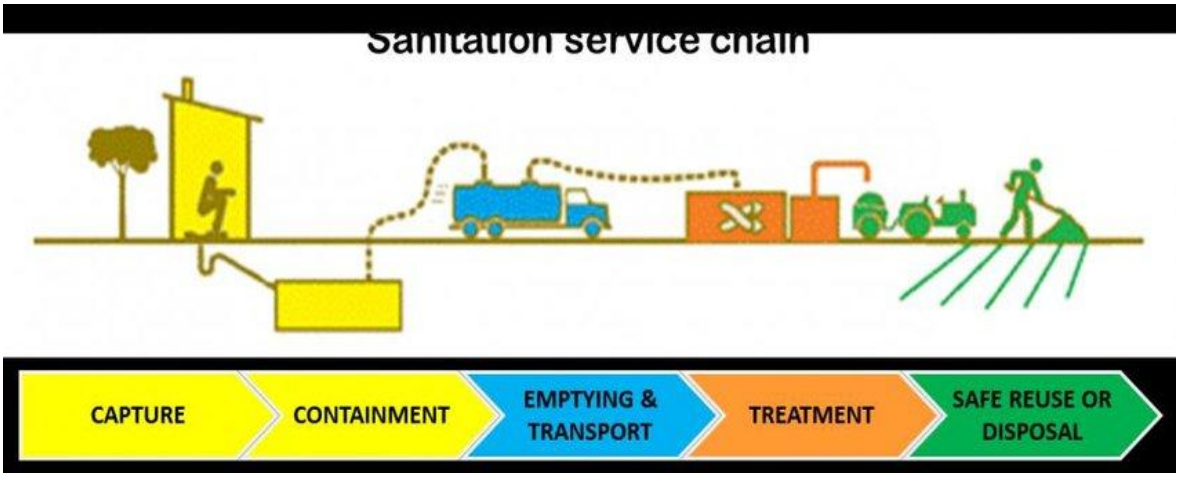
The WHO (2018) guidelines on sanitation and health put forward a series of recommendations to support the achievement of Sustainable Development Goal 6.2, which is to ensure access to sanitation for all. These recommendations include: universal access to safe toilets: prioritizing universal access to safe toilets and the elimination of open defecation as a primary goal for governments; balancing demand and supply: addressing the demand and supply aspects of sanitation facilities and services simultaneously. This involves ensuring not only the availability of toilets but also promoting their adoption and sustained use; community-wide coverage: ensuring that sanitation interventions extend to entire communities, providing safe toilets that can effectively contain excreta. This helps in creating a comprehensive and effective sanitation system; addressing barriers: identifying and addressing both technological and behavioural barriers that may prevent people from using safe toilets; promoting a shared and public toilets: promoting shared and public toilet facilities as an interim solution when individual household facilities are not feasible or practical; safe toilets in key locations: ensuring that safe toilets are available in critical locations such as schools, healthcare facilities, workplaces, and public places, as a minimum requirement for facilities that can safely contain excreta.

Secondly, the WHO (2018) recommends a universal access to safe systems along the entire sanitation service chain. Sanitation systems should address containment, emptying, conveyance, treatment and end use or disposal of excreta, to achieve safe sanitation. This recommendation emphasizes the importance of selecting sanitation systems and services that are tailored to the specific conditions of the local context. It also underscores the significance of making investments and managing the sanitation system based on risk assessments conducted at the local level along the entire sanitation chain. There is no universally ideal sanitation system that suits all environments. Sanitation systems need to be adapted to the specific context, taking into account factors like population density, hydrological conditions (including the risk of groundwater contamination), life cycle costs, available financing options, installation capabilities, operational and maintenance capacity, as well as possibilities for disposal or reuse. These systems should be flexible and evolve over time to meet the changing needs and conditions of the area they serve.

A study in Tanzania by Malima *et al*. (2022) showed that households are incentivized to adopt better sanitation and hygiene habits because of factors like increased comfort, the desire for an elevated social standing, and the need for personal safety and privacy. Additional motivations include the fear of facing penalties or fines and concerns about disease outbreaks. Conversely, obstacles to these improvements encompass challenges like limited water availability and access, environmental conditions, property rights, cultural considerations, financial limitations, and individual attitudes.

Figure 2. 1

Sanitation Service Chain Sanitation Service Chain



Source: WHO (2018)

The diverse requirements of both individual households and the broader community within the underserved population exhibit significant disparities, along with variations in the financial and institutional capabilities for delivering sanitation services (Acheampong *et al*., 2024). Consequently, a broad spectrum of adaptable technologies is essential to address the specific needs in each unique circumstance. Sanitation technology should be chosen based on the specific social, economic, and environmental factors within the local context, with a primary focus on promoting sustainability (Firmansyah *et al*., 2021). The selection of appropriate sanitation technologies is a critical component of addressing public health and environmental sustainability.

In their study, Khan *et al*. (2023) emphasized a particular approach and identified six distinct technologies, which are grouped into three depending on the waste resource discoverability. They include: 1) unimproved, no resource recovery (excavation and burial method, bucket latrine, ventilated improved pit [VIP] latrine), 2) improved, no resource

recovery sanitation technologies including double-vault composting latrine, urine-diverting composting latrine, and 3) improved, resource recovery pour-flush toilet linked to a septic tank and a connected sewer system toilet.

Understanding the prevalent sanitation options is vital in determining the baseline from which improvements and interventions can be made (MacLeod *et al*., 2025). About 29% of people in Kenya have access to improved sanitation facilities, UNIFEC certified 1,765 villages as open defecation free by the year 2020 (UNICEF, 2023).

The Kenya Population and Housing Census (KPHC, 2019) revealed that 61.3% owns their main dwelling unit while 38.7% occupy rented/provided dwelling units. Majority (93.9%) of the owned dwelling units were constructed, only 3.35 were inherited and 2.8% were purchased. Majority of the households (80.3%) occupied iron sheet roofed dwelling units. More than a third (34.2%) of the households relied on piped water as the main source of drinking water. Majority of the households (51.2%) of households' use covered pit latrine as a sanitation facility.

2.2.1 Sanitation ladder

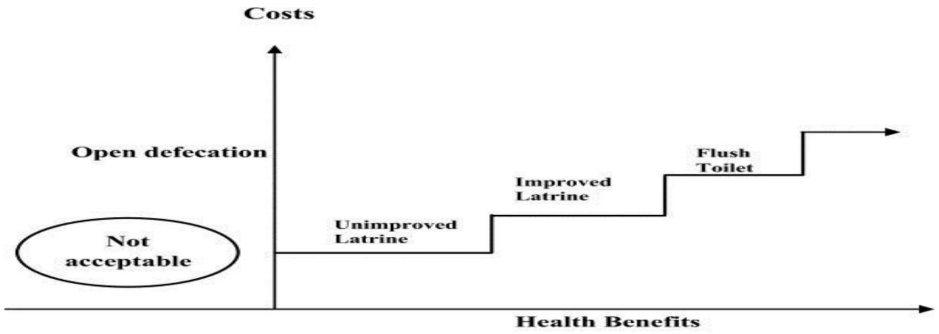
The sanitation ladder serves as a valuable tool for the analyst in assessing potential enhancements to sanitation in various communities. The WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) came up with a new sanitation ladder to track progress towards SDG 6 (WHO & UNICEF, 2021). At the bottom of the ladder is open defecation. This is disposal of human faeces in fields, forests, bushes, and open bodies of water, beaches and other open spaces or with solid waste. Next is unimproved sanitation which is the use of pit latrines without a slab or hanging latrines or bucket latrines. Next on

the ladder is limited sanitation. This denotes use of improved facilities shared between two or more households. Improved facilities are those which hygienically separate excreta from human contact. These include various forms of flush toilets, pit latrines with slab and composting toilets. Next is basic sanitation which denotes use of improved facilities which are not shared with other households. At the top of the ladder is safely managed sanitation. This denotes use of non-shared improved facilities where excreta is safely disposed on site or treated off site. For countries to progress up the sanitation ladder, it is imperative that they ensure no household is at the open defecation stage.

As depicted in Figure 2.1 below, at the lowest tier of sanitation, households resort to defecating in natural surroundings such as bushes, fields, forests, water bodies, or open spaces, or they dispose of human feces along with solid waste. Moving up the ladder, the next level involves unimproved sanitation technologies that fail to provide proper separation of human excreta from human contact. Unimproved facilities encompass pit latrines lacking a slab or platform, hanging latrines, and bucket latrines.

Figure 2. 2

Sanitation ladder



Adapted from WHO (1998)

The subsequent level on the sanitation ladder involves improved facilities, which encompass the usage of well-ventilated improved pit (VIP) latrines, households equipped with pit latrines featuring slabs, and those employing composting toilets like ecological sanitation (EcoSan) toilets. The highest rung of the ladder entails the utilization of septic/flush toilets, ensuring the sanitary separation of human excreta from human contact. This category includes piped sewer technology, flush or pour-flush toilet/latrine systems, and the utilization of septic tank technology (Juliet, 2022). The sanitation ladder concept underscores the step-by-step nature of improvements. It emphasizes that households can make changes gradually and at a pace that suits their circumstances. Some options are equally effective.

When households are afforded opportunities to enhance their income sources, it empowers them to transition from older, less advanced sanitation technologies to improved ones. As households ascend the sanitation ladder, they also ascend other developmental paths. This encompasses progress on the finance ial inclusion ladder, with increased access to financial services, advancements on the health ladder, marked by reduced health issues, the adoption of superior sanitation technologies, heightened access to basic nutrition, and movement on the education ladder, with more children pursuing higher education and professional careers (Peletz *et al.*, 2021).

Enhanced income for households can have a significant positive impact on residents, as it alleviates many households from poverty (Zhang *et al*., 2020). This, in turn, allows counties and countries to contemplate more substantial, long-term investments in their residents and their land. Furthermore, as households ascend the ladder, they can embrace new sanitation

methods that align with their improved living standards, resulting in a host of associated lifestyle preferences. Ultimately, the upward movement on the sanitation ladder is primarily determined by income levels, with the poorest and most rural communities typically adopting the least improved, dirtiest, most hazardous, and least acceptable sanitation practices.

Machete and Marques (2021) observed that costs and financing play pivotal roles in sanitation scheme planning and technology selection. Cost considerations pose significant challenges, especially for end users in rural settings. Lebu *et al*. (2024) identified factors like longevity and durability, local material availability, comfort, privacy, maintainability, scalability, social acceptability, and health concerns as crucial factors in sanitation planning. Other scholars have highlighted poverty as a barrier to good hygiene, leading to health hazards (Leal Filho *et al.*, 2024). Despite Kenya's commitment to ensuring sanitation for all, challenges have arisen in the choice of sanitation technology, influenced by the beliefs of certain communities and the general design of toilets in Kenya.

2.2.2 Impacts of poor sanitation

Poor sanitation exacts a profound toll on individuals, communities, and societies, reverberating across public health, economic prosperity, environmental sustainability, and social well-being.

Poor sanitation fosters a breeding ground for disease, paving the way for the relentless spread of infectious pathogens. Contaminated water sources, inadequate waste disposal, and lack of sanitation facilities give rise to a myriad of waterborne illnesses such as cholera, typhoid fever, and diarrheal diseases (Ellwanger & Chies, 2023). These ailments strike

indiscriminately, claiming the lives of millions, particularly among vulnerable populations such as children and the elderly.

The burden of poor sanitation extends far beyond the realm of health, casting a long shadow over economic development and prosperity. In communities plagued by inadequate sanitation, productivity wanes as individuals fall prey to illness and absenteeism mounts in schools and workplaces (Andrés *et al*., 2021). The economic costs of treating preventable diseases and lost labor hours exact a heavy toll, siphoning resources away from essential services and perpetuating cycles of poverty.

Moreover, poor sanitation inflicts irreversible harm on the environment, polluting water sources, degrading ecosystems, and exacerbating the impacts of climate change (Duncker, 2019). Improper waste disposal contaminates rivers, lakes, and oceans, endangering aquatic life and compromising biodiversity. The proliferation of pollutants in soil and air poses a grave threat to public health and ecological balance, further eroding the fragile equilibrium of our planet.

In the social sphere, poor sanitation perpetuates inequities, exacerbating disparities along lines of gender, income, and geography. Women and girls bear the disproportionate burden of inadequate sanitation, facing heightened risks of violence, exploitation, and discrimination (Kayser *et al*., 2019). The studies show that women and girls also have a larger role relative to men in water, sanitation and hygiene activities, including in agriculture and domestic labour (Assefa *et al*., 2021). Access to sanitation facilities becomes a marker of privilege, widening the gap between the haves and the have-nots and perpetuating cycles of marginalization and exclusion.

In essence, the impacts of poor sanitation are manifold and far-reaching, undermining the very foundations of human dignity, health, and prosperity. Addressing this global crisis demands a concerted effort, grounded in collaboration, innovation, and solidarity. By prioritizing investments in sanitation infrastructure, promoting hygiene education, and fostering inclusive policies, we can pave the way for a future where access to clean water and sanitation is recognized as a fundamental human right, not a distant dream.

2.3 Social Factors

2.3.1 Socio-economic factors influencing households' sanitation practices and technologies

Households' decisions regarding sanitation technologies are often influenced by various socio-economic factors. Existing literature highlights the significant role of economic factors such as the cost of sanitation technologies, income level of households, access to financial support, and expected gains in investing in a particular sanitation technology and their influence on households' sanitation practices. The income level of the household, availability of resources, and knowledge about sanitation technologies all play a pivotal role.

In developed countries, such as those in North America, Europe, and parts of Asia, access to improved sanitation facilities is nearly universal (Kanyangarara, 2021). Modern sewage systems, flush toilets, and wastewater treatment plants are standard features of urban and rural landscapes, ensuring safe disposal of human waste and minimizing environmental contamination. Comprehensive regulations, robust governance structures, and substantial investments in infrastructure maintenance and upgrades underpin the high standards of sanitation enjoyed by the population. Conversely, in many developing countries across

Africa, Asia, and Latin America, access to adequate sanitation remains a formidable challenge for millions of people. Basic sanitation facilities, such as pit latrines or shared latrines, are often inaccessible or insufficient, particularly in rural and peri-urban areas. Open defecation, lack of hygiene education, and limited access to clean water exacerbate the risks of waterborne diseases and environmental degradation, posing significant threats to public health and well-being.

The disparity in sanitation between developed and developing countries is further exacerbated by broader socio-economic factors, including poverty, inequality, and inadequate governance. In many developing countries, limited financial resources, competing priorities, and weak institutional capacity hamper efforts to expand and improve sanitation infrastructure (Irianti & Prasetyoputra, 2021). Marginalized communities, including women, children, and those living in informal settlements, bear the brunt of inadequate sanitation, facing heightened risks of illness, malnutrition, and social exclusion.

In their study to investigate the factors that impact sanitation coverage among nine developing countries, and assessed the potential of selected countries across various income levels (Low-Income, Lower-Middle, and Upper-Middle Income Countries) to achieve Sustainable Development Goal 6.2, Bankole *et al*. (2023) noted that all the countries examined have made notable progress and currently maintain commendable sanitation levels, except for Ethiopia, Rwanda, and Nigeria. Nigeria, in particular, stands out with the highest open defecation coverage and faces challenges in meeting the 2030 target. The results reveal that Turkey, Ukraine, and China exhibit outstanding sanitation coverage. However, Nigeria, Rwanda, and Ethiopia recorded unsatisfactory progress. The most prominent factors

contributing to poor coverage include large population sizes, significant socioeconomic disparities, and socio-political obstacle.

The Bankole *et al*., (2023) study presents broad generalizations about sanitation coverage across nine developing countries without providing different insights into the unique contextual factors influencing sanitation outcomes in each country. It overlooks the diversity of socioeconomic, cultural, and political contexts within and across the countries studied. There's a wide disparity on sanitation facilities and systems employed between developed and developing countries. The United Nations designates 45 nations as Least Developed Countries (LDCs) consisting of 33 in African, 8 in Asia, 1 Caribbean and 3 Asia-Pacific countries. A random sampling of 1 country per region (Gambia, Afghanistan, Haiti and Solomon Islands) provide insightful patterns in the sanitation status among the LDCs compared to the developed nations such as the US, Germany and China.

Data from WHO/UNICEF JMP (2022) report shows that basic sanitation access for the rural population in US is 98.5% (n= 56,381,269) while the unimproved sanitation accounted for 1.5% (n= 843,847) of the same population. The urban population of the US, on the other hand, recorded 97.2% (n= 273,215,326) using safely managed sanitation, 2.6% (n= 7,447,028) using basic sanitation while only 0.1% (n= 402,382) used unimproved sanitation facilities. Capone *et al*. (2020) observed that the little sanitation challenges in US is experienced among the homeless settlers. The WHO/UNICEF JMP rely on government reports to publish their data.

According to the WHO/UNICEF JMP data (2022), in China, 84.7% (n=780,608,381) of the urban population use safely managed sanitation services followed by 12.9% (n=

118,923,622) and the rest account for 2.4%. In the rural Chinese, 56.7% (n=296,759,372) use basic sanitation services followed by 36.7% (n=193,937,610) using improved sanitation services while 4.7% (n=25,074,268) use unimproved sanitation as the last 2.4% (n=12,528,871) use limited sanitation services. Despite China being the most populated country in the world, there is zero open defecation even in the rural Chinese settlement.

Like other developed nations, majority of the Germans residing in urban areas, 98.5% (n=63,745,906) have access to safely managed sanitation services while only 0.8% and 0.7% use basic and unimproved sanitation services (WHO/UNICEF JMP, 2022). Similarly, there is zero open defecation and zero unimproved sanitation.

In 2022, the urban majority of Afghanistan population, 70.4% (n= 7,705,716), have at least basic sanitation services whereas 22.6% (n=2,479,016) have limited sanitation services and 7.0% (n=762,102) use unimproved services. Majority of their counter parts in rural areas of Afghanistan, 50.7% (n= 15,306,629) have access at least basic sanitation, 29.0% (n=8,763,988) unimproved sanitation while the rest employ open defecation and limited sanitation at 12.0% and 8.2% respectively.

In Haiti, the WHO/UNICEF JMP report (2022) reveals that majority (45.9%, n=3,127,489) of the urban dwellers have at least basic sanitation services, 37.0% (n=2,518,159) have limited sanitation, 9.0% and 8.1% live in regions with unimproved sanitation and open defecation respectively. Conversely, majority of the rural inhabitants, 31.5% (n=1,500,638) employs open defecation while 25.9% (n=1,236,231) inhabitants live in areas with unimproved sanitation. About 25.4% (n=1,214,090) of the rural dwellers have at least a basic sanitation. The rest, 17.2% (n=819,743) have access to limited sanitation.

In Solomon Island, one of the poor countries in the world with 100% rural dwelling (UNCTAD, 2022), the WHO/UNICEF JMP (2022) report reveals that majority of the country's population, 77.4% (n=417,202) use unimproved sanitation services followed by 20.6% (n=111,156) with at least basic sanitation services while only 2% (n=10,617) dwell in areas with limited sanitation services. Interestingly, there is no open defecation in the country.

In Ethiopia, majority of the urban dwellers, 45.9% (n=12,837,169) use unimproved sanitation services, followed by those with limited sanitation services at 28.5% (n=7,978,369). About 3.3% (n=917,420) resort to open defecation. On the other hand, majority (70.0%, n=66,793,303) of the rural dwelling Ethiopians use unimproved sanitation services with a significant number, 21.8% (n=20,840,820), practicing open defecation (WHO/UNICEF JMP, 2022). Research by Tumwebaze *et al*. (2023) in Uganda found that households with higher incomes were more likely to invest in improved sanitation facilities.

Poverty is a determinant of ill health. Poor people may be predisposed to infectious diseases as they tend to live in more polluted environments characterized by lack of clean water and adequate sanitation (Sokolow *et al*., 2020). Poverty has been shown to be associated with open defecation (Njuguna, 2019). Poor households which have exited the open defecation stage are more likely to slip back to the open defecation stage. This is because most of them construct simple rudimentary latrines which fill up quickly and are prone to collapse e.g. when subjected to heavy rains or floods. One study found that not being in the richest quintile was significantly associated with poor sanitation and lower living standard.

Kenya's rural economy is largely agro-based and subject to the vagaries of weather. When the weather is favourable, farmers harvest bumper harvests and their animals increase. This may cause them to exit poverty. If the reverse occurs, they may slip back into poverty. On the other hand, there are households that don't exit poverty throughout their entire life. In Kenyan urban population, approximately 27.9% (n=4,376,956) enjoy safely improved sanitation facilities, around 11.9% (n=1,864,984) has basic sanitation services available, 14.4% (n=2,256,774) reside in areas with unimproved sanitation conditions. The largest percentage, 44.9% (n=7,034,782 inhabitants), experiences limited access to sanitation facilities, which might compromise hygiene standards. A minimal percentage of 0.9% (135,554 people) still resort to open defecation due to the absence of proper sanitation facilities in their urban settlement vicinities.

Conversely, the majority, 40.2% (n=15,405,225) of the rural dwellers in Kenya live in areas marked by unimproved sanitation facilities, lacking basic standards of safety and hygiene. About 33.0% (n=12,641,109 individuals) reside in regions where sanitation is safely managed and improved. A meagre 2.2% (852,499 people) have access to only basic sanitation services while 15.9% (6,110,289 inhabitants) encounter limitations in their sanitation services, hindering optimal hygiene conditions. Moreover, a notable 8.7% (3,349,314 people) still practice open defecation due to inadequate or absent sanitation infrastructure.

Table 2. 1

Sanitation status in Kenya

Type of Residence	Sanitation Service Level	% Coverage	Population
Urban	Limited	44.9	7,034,782
	Safely (improved)	27.9	4,376,956
	Unimproved	14.4	2,256,774
	Basic	11.9	1,864,984
	Open defecation	0.9	135,554
Rural	Safely managed	33.0	12,641,109
	Basic service	2.2	852,499
	Limited	15.9	6,110,289
	Unimproved	40.2	15,405,225
	Open defecation	8.7	3,349,314

Source: WHO/UNICEF JMP (2022)

The WHO/UNICEF JMP (2022) report suggests varying levels of access to basic sanitation services, with a significant population lacking adequate hand washing facilities, particularly in rural areas. The report reveals that both category of dwellers have basic and limited access to water service as shown in the table below.

The disparities between urban and rural areas underscore the urgent need for targeted interventions and investments in sanitation infrastructure and services across Kenya. Safely managed sanitation services are a crucial priority to prevent contamination of water sources and the environment. Addressing these challenges requires holistic approaches, encompassing infrastructure development, behaviour change initiatives, policy reforms, and community engagement. Sustainable progress hinges on collaborative efforts involving governments, NGOs, community leaders, and other stakeholders committed to promoting health, environmental sustainability, and social equity nationwide.

Table 2. 2

Hygiene status in Kenya

Type of Residence	Hygiene Level	% Coverage	Population
Urban	Basic	44.8	7,023,929
	Limited	31.3	4,897,663
	No hand washing facility	23.9	3,747,458
Rural	No hand washing facility	38.0	14,560,920
	Basic	34.6	13,289,994
	Limited	27.4	10,507,522

Source: WHO/UNICEF JMP (2022)

A study conducted in Wajir observed that majority use bucket latrines due to its affordability. Majority of the households in Wajir County are low and middle level income earners (below 50,000/= per month). Those earning higher income embraced either EcoSan or flush toilets (Abdi, 2019). These findings confirm that economic status determines the choice of sanitation technology of a household. Illiteracy levels also played a role in the choice of sanitation, since some households were ignorant of existence of other options.

The absence of open defecation in developed nations while it remains prevalent in many developing nations can be attributed to a combination of factors related to infrastructure, education, and socio-economic development. Developed nations typically have well-established sanitation infrastructure, including widespread access to flush toilets, sewage systems, and wastewater treatment facilities, which provide convenient and hygienic alternatives to open defecation. Additionally, developed countries often prioritize public health initiatives and invest in comprehensive sanitation programs, which promote awareness, behaviour change, and proper waste management practices within communities. Moreover, higher levels of education and socio-economic development in developed nations

contribute to greater awareness of the health risks associated with open defecation and foster a culture of sanitation and hygiene. In contrast, many developing nations face challenges such as inadequate infrastructure, limited access to clean water and sanitation services, poverty, and lack of education, which perpetuate the practice of open defecation and hinder progress towards achieving universal access to improved sanitation facilities.

2.3.2 Socio-cultural factors affecting households' choices of sanitation technologies

Socio-cultural factors, including beliefs, traditions, and community norms, significantly impact household sanitation choices. Cultural preferences, taboos, traditions, norms, and hygiene practices play a crucial role in determining whether a household adopts particular sanitation technologies. For example, certain cultural beliefs may discourage the use of latrines due to taboos associated with human waste, while other traditions might prioritize specific methods of waste disposal that are seen as more respectful or cleaner. Community norms can influence collective behaviour, encouraging or dissuading the adoption of improved sanitation practices based on what is commonly accepted or expected within the community. Hygiene practices, often passed down through generations, can further dictate how sanitation is managed at the household level. Understanding these socio-cultural dynamics is essential for developing effective sanitation interventions that are culturally sensitive and more likely to be accepted and sustained by the communities they aim to serve. By addressing these factors, policymakers and practitioners can ensure that sanitation initiatives are not only technically sound but also socially and culturally appropriate, leading to greater adoption and long-term success.

Some purification rituals and practices by Hindus population hinders construction of latrines close to the homesteads. This increases chances of open defecation in South Asian countries such as in Bangladesh, India and Nepal (Vyas & Spears, 2018). Similarly, Biswas *et al*. (2024) confirmed this practice in Bangladesh, highlighting how community norms and acceptability were critical factors in the adoption of sanitation technologies. Psychosocial elements, including community norms relating to the acceptance of sanitation, can influence and either encourage or hinder the initial adoption of sanitation practices. Areas with higher female literacy adopt better and improved sanitation technologies. These studies overlook other critical factors such as poverty, lack of infrastructure, inadequate government policies, and sanitation-related taboos that may contribute to open defecation practices in these regions.

A similar trend is observed in Sub-Saharan Africa. A study conducted in some Sub-Saharan African countries unearthed varied disparities on the sanitation practices among women. The studies reveal that in areas with limited and insufficient sanitation facilities, the experience of women, fear of violence, and the risks to which they get exposed when accessing distant sanitation facilities in informal and rural settlements make them to resort to other poor sanitation practices such as use of polythene bags and buckets (Nunbogu & Elliott, 2022). In absence of proper sanitation facilities, Ross *et al*. (2021) identified three forms of insecurities associated with sanitation including the stigma of lacking sanitation facilities, the risk of reverting to open defecation, and the unsafe public facilities.

For instance, in a study in Nigeria, Eze *et al*. (2019) demonstrated how cultural practices can hinder the adoption of improved sanitation technologies. Additionally, economic disparities

and the urban-rural divide are key factors influencing sanitation technology selection in Africa (Atangana & Oberholster, 2023). The results of the study suggest that the choice of sanitation facility within a household is influenced by factors such as the gender of the household head, the educational attainment of the household head, and the household's income level (Nyamusi, 2021). Based on these findings, the study recommends that efforts to develop and implement sanitation policies should focus on empowering individuals with knowledge and skills while also working to enhance household income to enable investment in improved sanitation facilities.

Access to sanitation varies across Kenya, with 83% of the households practicing open defecation live in Arid and Semi-Arid lands (ASAL) in 15 counties out of the 47 counties (Ministry of Health [MoH], 2022). Most of these communities are also nomadic pastoralists, whose nature of lifestyle don’t make them maintain permanent abodes. A study conducted in Busia County, Kenya, revealed that some cultural practices and norms influence the choice and level utilization of sanitation facilities. The study observed that in some communities, visitors, children, and chronically people do not share the facilities with the rest (Adams *et al*., 2021).

In conclusion, socio-economic factors are paramount in influencing households' choices of sanitation technologies. The availability, affordability, and acceptability of different sanitation options are closely tied to the economic conditions of the region. Understanding these factors is essential for designing targeted interventions and policies that can improve sanitation access and public health in the area. Households' choices of sanitation

technologies are influenced not only by economic factors but also by socio-cultural dynamics.

Most of the existing literature focuses on vulnerable areas that would show a particular pattern in the sanitation practices such as in urban areas and informal settlements. Since there's little or no studies that have been conducted in the region in this topic, this research shall determine the socio-cultural factors that influence the choice of sanitation technologies in Kapseret constituency, Uasin Gishu County. The findings shall inform the policy makers and all stakeholders on targeting approach to improve sanitation in the region.

2.4 Theories and Models

The study applied the Theory of Planned Behaviour, proposed by Icek Ajzen (1991). It is a well-established theoretical framework in social psychology that explains human behaviour in terms of attitudes, subjective norms, and perceived behavioural control. The theory posits that human behaviour results from intentions or motives which are driven by attitudes, subjective norms, and the individual's perceived control of behaviour.

The theory posits that attitudes toward a behaviour significantly influence the likelihood of engaging in that behaviour. In the context of household sanitation technologies, attitudes may encompass perceptions of cleanliness, health benefits, ease of use, and cultural acceptability of various sanitation options. Subjective norms refer to perceptions of social pressure to perform or not perform a behaviour. In the case of sanitation technologies, subjective norms could include the influence of family members, neighbours, community leaders, and societal expectations regarding the adoption of specific sanitation practices. Perceived behavioural control reflects an individual's belief in their ability to perform a

behaviour successfully. In the context of household sanitation, it may involve factors such as access to resources, technical knowledge, affordability of sanitation technologies, and the availability of support services.

By applying the Theory of Planned Behaviour in the research, it would involve examining how household characteristics, social dynamics, and economic factors influence attitudes, subjective norms, and perceived behavioural control related to the selection of sanitation technologies in Kapsaret Sub County.

The relationship between the choice of sanitation technology and socio-economic factors is influenced by a mix of motivating and demotivating factors. The socio-economic factors driving the adoption of sanitation practices are multifaceted and diverse (Manisha & Madhavi, 2024). Social elements contributing to the selection of sanitation practices involve learning different approaches (Kokko & Fischer, 2021). These factors encompass social and religious customs, demographic characteristics, income status, and educational background (Hoque, 2025). Additionally, environmental factors like water availability, climate, and physiographic conditions play a significant role (Abrams *et al*., 2021).

Economic factors primarily revolve around income availability and are considered a key motivating force in the choice of sanitation technologies. Furthermore, the provision of affordable sanitation products and services, with equitable distribution to reach lower-income groups and enhance access and demand, is deemed crucial (Bankole, 2023). Unemployment, low incomes, subpar living conditions, limited literacy levels, and the absence of recreational facilities are seen as discouraging factors in adopting sanitation practices (Manisha & Madhavi, 2024).

Cultural beliefs related to hygiene, apprehensions, and perceptions regarding sanitation practices also wield significant influence over technology choices. Religious affiliations can likewise shape communal life and impact these choices. Ineffective promotion, low public awareness, people's lack of knowledge, insufficient capacity building, absence of hygiene education and training, and neglect are cited as disincentives for adopting sanitation practices (Tseole *et al*., 2022).

Educational background and exposure can empower households to participate fully in all phases of sanitation technologies, including conception, design, implementation, monitoring, and evaluation of sanitation programs (Dickin *et al*., 2021). This contributes to elevating living standards and providing essential needs for citizens. Educational factors encompass training, advocacy, capacity building, social mobilization, access to information, and information exchange.

The availability of water to households can serve as a demotivating factor (Habtu *et al*., 2025). Even though the lowest-income families can typically afford potable water since it is delivered, providing indoor connections close to homes can become financially burdensome due to associated costs not factored into sanitation feasibility studies (Sarango *et al*., 2025).

It's imperative that sanitation technologies uphold the integrity of the natural environment. Inadequate and mismanaged resources are seen as discouraging factors (Ntoyapi, 2021). Properly maintained water sources and well-managed excreta disposal sources serve as motivating factors for the adoption of sanitation practices. Sanitation must not contribute to water resource contamination or create health hazards (Wolf *et al*., 2023).

2.5 Summary of Empirical Literature Review

In a study conducted by Tamene and Afework (2021) indicated inadequate maintenance, gender-related issues, location, and financial constraints played a role in determining the use of communal facilities. The recommendation was for future research to focus on these factors in sanitation interventions. While the study concentrated on determinants of usage patterns, the current study focuses on the motivation behind selection of sanitation technology. Like many other studies that focus in shanty settlements, Simiyu's study was conducted in the informal settlements in Kisumu city, a specialized population, the informal settlement. Another study by Kariuki *et al*. (2023) aimed to identify the factors influencing sanitation practices in urban informal settlements within Nairobi County. The study found that most households sourced water from local vendors and used public latrines in Kibera slum, where they had to pay for services. While Kariuki *et al*.'s research confined his study in the slums and informal settlements, they cannot give a true reflection in the general population of Kapseret Sub County, Uasin Gishu County.

Othoo (2021) conducted a qualitative study on community dialogue involving the EcoSan toilet in Kisumu town. The findings showed that EcoSan technology was a viable and safe option for managing excreta for some households, providing tangible benefits such as enabling residents to engage in agricultural activities and generate income. Mbeche's study specifically focused on the design of one technology (EcoSan), ignoring the motive behind the choice of EcoSan technology whereas the current study shall unravel the intricacies involved in the selection of all available sanitation technologies in Kapseret Sub County, Uasin Gishu County.

Aaron (2024) conducted research on social-cultural factors influence on management of shared sanitation, in Nakuru Town West Slums, Kenya. The study employed systematic sampling to select ninety respondents and used qualitative data collection methods, including observation, photography, and questionnaires. The findings revealed that most households shared available sanitation facilities, and the type of sanitation facility significantly contributed to the diseases experienced in the slum.

Wasonga *et al*. (2021) conducted a study on sociocultural determinants affecting the adoption of safe water, sanitation, and hygiene practices in Nyakach Town, Kisumu County, Kenya, using qualitative methods such as focus group discussions and homestead observations. The findings indicated that sanitation and hygiene practices were influenced by rituals and taboos, and the construction of latrines was mainly done by men, with sharing prohibited.

Dongzagla (2022) conducted research on socioeconomic factors affecting households' sanitation preferences in Ghana, using quantitative approaches and random sampling. The study found that socio-economic factors, except for the gender of the household, significantly influenced the type of sanitation facilities used. Nancy *et al.* (2024) explored socio-cultural and behavioral factors hindering latrine adoption in India, using exploratory qualitative research methods, including observations and interviews. The findings revealed that government-sponsored latrines remained incomplete, and male heads showed more interest in latrine design compared to their female counterparts. Ferreira *et al*. (2021) conducted a study on the economic aspects of sanitation in developing countries through

desk research and literature review. The results highlighted substantial economic expenditures related to poor sanitation in developing countries.

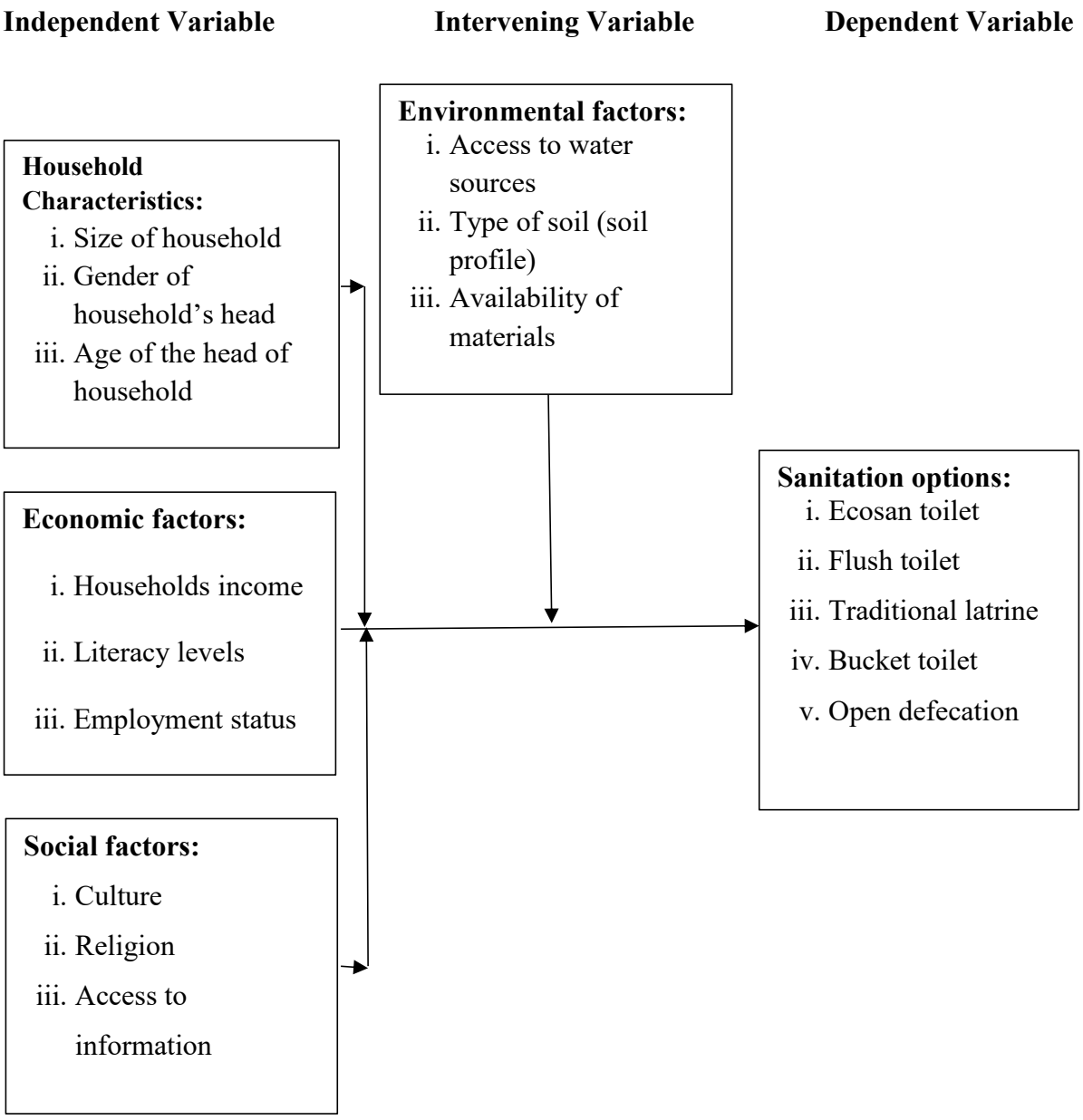
The current study aims to establish the relationship between the selection of sanitation technologies and socio-economic factors in Uasin Gishu County, Kapseret Sub County. This was based on five categories of factors: environmental, psycho-sociological, economic, educational, and cultural, as outlined in the conceptual framework (Figure 2.2).

2.6 Conceptual Framework

Based on the literature review, the following conceptual framework has been developed as indicated in figure 2.3 below.

Figure 2. 3

Conceptual framework



Source: Researcher (2023)

In this study, the independent variables encompass socio-economic factors, which was assessed through household income, representing the affordability of various sanitation

options, literacy levels, employment status, and cultural factors. The dependent variable in this study pertains to the type of sanitation option available, such as EcoSan toilets, traditional latrines, bucket toilets, and open defecation. Households in Kapseret Sub-County may prioritize the sustainability and proper utilization of a specific sanitation option. For instance, the adoption of EcoSan toilets may occur when they are socially accepted, incorporate user-friendly technology, are easy to operate and maintain, utilize urine, and include health and hygiene safety measures. Additionally, the moderating variables in this study involve environmental factors, including access to clean water, soil type (soil profile), and the availability of materials for constructing the various sanitation technologies.

For example, a socio-economic factor like household income can influence the selection of a sanitation technology used by a specific household due to its affordability. As household income increases, the likelihood of transitioning from poor to improved sanitation methods also rises. For instance, individuals with higher incomes tend to improve their overall lifestyle, which includes upgrading their sanitation facilities from bucket toilets to flush toilets or septic tanks. Education is another factor likely to impact the choice of sanitation technology within a household. Well-informed individuals are more inclined to adopt best sanitation practices once they are aware of them. Additionally, cultural norms can dictate the selection of sanitation technology, as people within the same community often emulate one another's behaviours. Some communities in Uasin Gishu County, Kapseret Sub-County, may strongly adhere to their customs, religions, taboos, and other cultural aspects, which can influence the choice of sanitation practices in their households.

Environmental considerations also play a vital role in the selection of a particular sanitation practice, with a focus on factors such as accessibility to water sources, the availability of suitable sanitation facilities, distance from urban centres, and soil type (soil profile). The proximity to the nearest water sources can influence the selection and usage of a sanitation technology. Additionally, the accessibility and availability of the aforementioned sanitation practices are crucial factors. Soil type and water table levels are key determinants in the selection of sanitation technology, as certain soil profiles may not support the excavation of pit latrines.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 Introduction

This section outlines the steps and approaches that was be used to investigate the determinants affecting the choice of sanitation technologies in Uasin Gishu County, Kapseret Sub-County. More precisely, this chapter encompasses aspects such as the research design, the population under study, details about the sample and how it was selected, an overview of data collection methods, and an explanation of the data analysis techniques that was employed.

3.1 Research Design

This study employs a descriptive research design, which serves the purpose of gathering factual information about the studied situation. This type of research design allows the researcher to collect quantitative data necessary for achieving the research objectives. This is crucial for assessing the socio-economic factors that influence the selection of sanitation technologies in Uasin Gishu County, specifically in Kapseret Sub-County. According to Kothari (2017), this approach is highly effective due to its applicability on a wide scale. This design is well-suited because it facilitates the collection of a diverse range of data, as noted by (Saunders *et al.*, 2016). This data is instrumental in describing the patterns of the variables being investigated.

3.2 Study Population

The target population is defined as the complete set of items from which information is being sought comprisinsg of both rural and urban areas. In this study, the focus is on households located in Kapsaret sub-county, Uasin Gishu, which is a town situated in the

western region of Kenya. The population of Kapseret Sub County was 198,499 with a total of 59,746 households and an average household size of 3.3 as per the Kenya National Bureau of Statistics (KNBS, 2019) population census.

The majority of the population in Kapseret sub-counties primarily engage in farming activities. The economy of this region is predominantly dependent on extensive grain farming, dairy farming, and horticultural agriculture.

3.2.1 Inclusion criteria

To qualify for inclusion in the study, a household must meet the following criteria: In the proposed study, it is essential to establish specific criteria for household participation to ensure the integrity and reliability of the findings. Firstly, only households where the heads voluntarily consent to take part will be included. This voluntary consent is crucial as it ensures that participants are willing to engage with the study, which in turn increases the likelihood of obtaining honest and accurate responses. When participants are motivated by their own choice rather than coercion, their input tends to be more genuine and reflective of their true experiences and opinions.

Secondly, the study will focus exclusively on households with residents who are either permanent or semi-permanent residents of Kapseret Sub County. This geographical and residency criterion is fundamental for the reliability of the findings. Permanent or semi-permanent residents are more likely to have a consistent and comprehensive understanding of the local context, which is vital for drawing accurate and relevant conclusions about the community's sanitation practices and needs.

Additionally, households that have adopted various sanitation technologies, including but not limited to flush toilets, pit latrines, composting toilets, and other relevant technologies, will be part of the study. This inclusion criterion is designed to understand the impact of different sanitation technologies on the community. By examining households with diverse sanitation solutions, the study can provide a nuanced analysis of how each technology affects health, hygiene, and overall quality of life.

Lastly, to ensure the study captures a wide range of perspectives and experiences, households from various socio-economic backgrounds—such as low-income, middle-income, and high-income—will be included. This diversity is crucial as it allows the study to reflect the different challenges and advantages that households from different economic strata face. By including a socio-economically diverse sample, the findings can offer more comprehensive insights into how socio-economic status influences sanitation practices and outcomes.

3.2.2 Exclusion criteria

A household bearing the following characteristics were excluded: In designing the study, it is equally important to establish criteria for excluding certain households to maintain the integrity and reliability of the data. Firstly, households with temporary or transient residents who do not consider Kapseret Sub County their primary place of residence will be excluded. This criterion is necessary to ensure consistent data about long-term sanitation practices. Transient residents might not have a comprehensive understanding or experience of the local sanitation issues, leading to inconsistencies in the data.

Households without any sanitation facilities or those using traditional/open defecation practices will not be included in the study. The focus of the research was on understanding the impact of various sanitation technologies. Including households that do not use any sanitation facilities or rely on open defecation would not provide relevant data for this objective and could skew the results.

Homes for which socio-economic data, particularly those related to income, employment status, and education, were incomplete or unavailable, were excluded. Accurate socio-economic data is crucial for ensuring the integrity and reliability of the findings. Without complete socio-economic information, it would be challenging to draw meaningful correlations and conclusions about how socio-economic factors influence sanitation practices and outcomes.

Lastly, households that do not consent to participate in the study or failed to provide accurate and necessary information were excluded. Obtaining voluntary consent was essential to uphold ethical standards and ensure the validity of the research. Inaccurate or incomplete information from participants could compromise the study's findings, making it imperative to exclude such households to maintain the overall quality and reliability of the research.

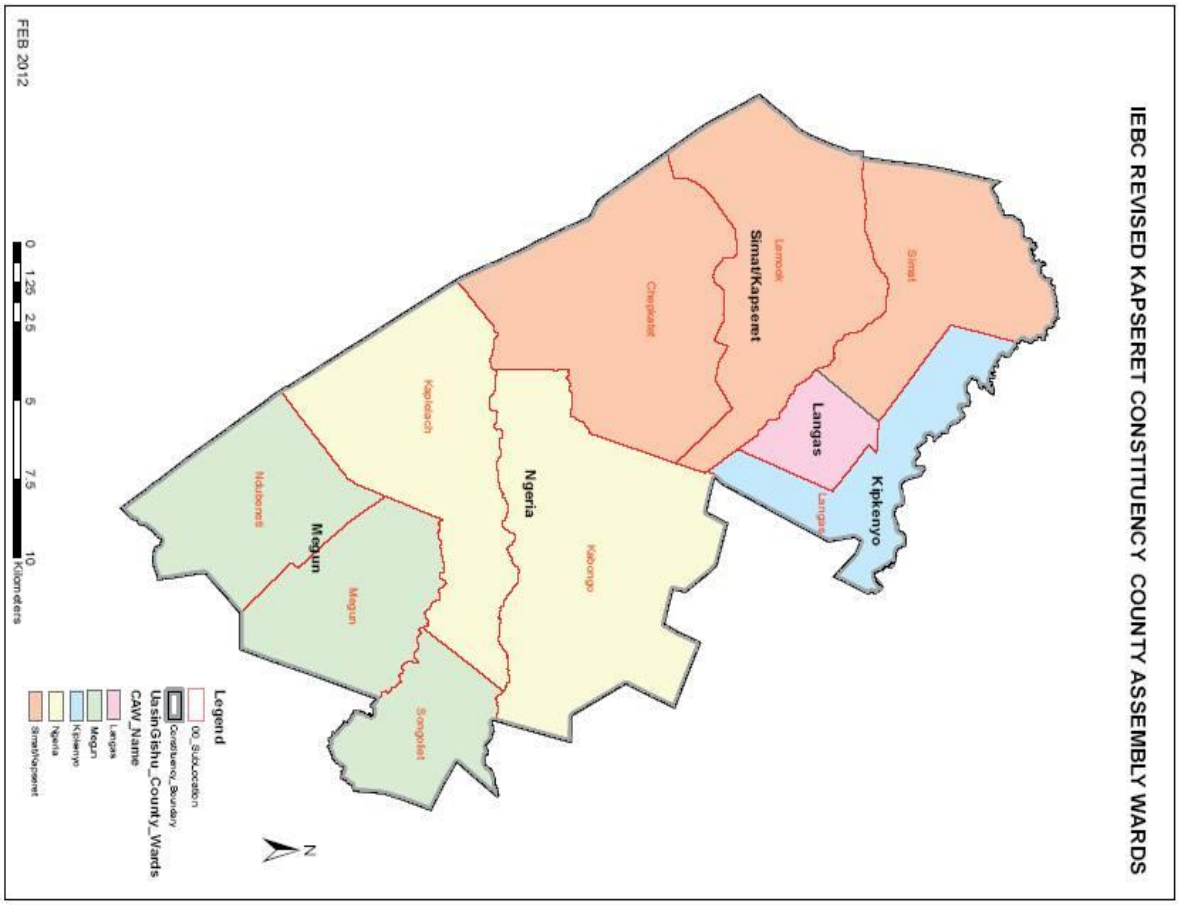
3.3 Variables

In this study, the dependent variable refers to the choices of sanitation methods utilized by the population, such as Ecosan toilets, flush toilets, traditional latrines, bucket toilets, or open defecation. On the other hand, the independent variables influencing the selection of sanitation options encompass socio-economic factors, including household income

(affordability), literacy level, employment status, cultural factors, and design considerations. The research was conducted in Uasin Gishu County, Kenya, specifically in Kapsaret sub-county, as indicated on the map below.

Figure 3. 1

Map of Kapseret Sub County wards, as per the above IEBC map



Source: IEBC (2012)

3.4 Sampling Technique

This study employed the stratified sampling technique to select household respondents from four (4) locations in Kapseret sub County, namely: Kapseret, Pioneer, Ngeria, and Simat. Each location was treated as a stratum. This sample was appropriate as it provided feedback

on the research questionnaire. The sampling technique was considered representative as it helped to ensure that the identified groups or subjects also have the information required for data analysis, as suggested by Shieh (2010).

3.5 Sample Size Determination

Sampling is the process of reducing a large population into a smaller, more manageable size that can be used to draw conclusions and make recommendations (Shieh, 2010). To determine the sample size, the study utilized Yamane's formula (1967).

For a population which is more than 10,000, such as this case, Mugenda and Mugenda (2003) suggested the following formula in determining a sample size:

$$n= \frac{z^2pq}{d^2} \quad (1)$$

Where,

n=desired sample size

z=standard normal deviation at the required confidence level

p=the proportion of the population with the desired characteristics

q=1-p

d= margin of error (4.5%).

Using a confidence level of 95.5%,

$$= \frac{(1.96)^2*0.5*0.5}{(0.045)^2}$$

=475 households.

Sample strata calculation:

= (No. of Households in a location/No. of Households in the Sub county) * Total Sample size

The sample size of 475 is adequate to ensure the study achieves a balance between representativeness, statistical accuracy, and practical feasibility. This size is enough to detect significant effects with high confidence and provide comprehensive population coverage. This rigorous approach is very valid and reliable for the study's findings.

Table 3. 1

Sample distribution of households per location

Location	Population	No. of Households	Sample	%
Pioneer	127,167	42,798	340	71.6
Kapseret	28,575	6,805	54	11.4
Ngeria	25,213	6,035	48	10.1
Simat	17,544	4,108	33	6.9
Total	198,499	59,746	475	100.0

Source: KNBS (2019)

3.6 Data Management

This section covers the data collection, analysis and presentation.

3.6.1 Data collection

In order to investigate the research objectives, the data collection instrument was utilized to obtain respondents' responses according to Saunders *et al.* (2016) research. Social science typically employs standard tools to gather data which include questionnaires, interview schedules, standardized tests, and observational forms as noted by Zikmund *et al.* (2013). For this reason, this study used questionnaires and interview guides to collect both qualitative and quantitative data. These methods were effective in obtaining respondents'

opinions. The appointed data collectors presented the questionnaires to the sampled household heads.

3.6.2 Data analysis

The information gathered from the field underwent a transformation from raw data to useful insights by utilizing both quantitative and qualitative descriptors. Quantitative data was analysed using SPSS (version 26) in order to determine the extent of the variables that are being studied, as well as through content analysis. The data was analysed by using correlations, regression and ANOVA test. Correlation analysis determines the association between variables (Curtis *et al*. 2016). The study involved determining how the identified factors such as the household characteristics, social, and economic factors influence the sanitation practices and choices in Kapseret Sub-County.

The study also employed descriptive statistics such as measure of central tendencies such as mean, mode, median and standard deviations helped to summarize the distribution patterns of the phenomena. The regression analysis helped in identifying significant predictors of sanitation technology selection while controlling for confounding variables. The analysed data and findings shall provide valuable insights for policymakers, practitioners, and researchers seeking to promote sustainable sanitation solutions and improve public health outcomes.

Qualitative data was analysed by presenting key themes and quotes that capture the socio-economic and cultural factors influencing household choices regarding sanitation technologies. For instance, themes related to perceptions of sanitation, cultural beliefs, affordability, and access to resources may be explored and presented in narrative form.

3.6.3 Data presentation

The resulting data was displayed through frequency percentage tables, means, standard deviations, and graphs. The study employed graphical representations, such as bar charts or pie charts, to illustrate the prevalence of different sanitation technologies adopted by households in the study area. These provided insights into the distribution of sanitation facilities such as pit latrines, flush toilets, or other sanitation technologies, and highlight any disparities in access.

3.7 Ethical Considerations

The researcher sought approval from the relevant parties including the respondents consent before engaging them in data collection. This involved clearly explaining the purpose, procedures, risks, and benefits of the research in a language and manner understandable to participants. The researchers respected the autonomy of participants and ensure that they have the freedom to participate or withdraw from the study without coercion or undue influence. The researcher shall also safeguard sensitive information shared by participants and ensuring that data is anonymised by use of random codes and stored securely.

Before data collection, the researcher sought ethical clearance from the Meru University of Science and Technology (MUST) Institutional Research Ethics Review Committee (MIRERC) which issued a letter authorizing the next stage of data collection. The research further sought the permit from the National Commission for Science, Technology and Innovation (NACOSTI) and the County Government of Uasin Gishu, department of health.

CHAPTER FOUR: RESEARCH RESULTS

4.1 Introduction

This chapter serves as an exploration into the intricate landscape of sanitation facilities and practices, presenting a comprehensive analysis of our study findings. Through a detailed examination, the study aims to unravel the multi-layered dynamics surrounding sanitation, shedding light on key aspects such as respondent demographics, the array of sanitation facilities available, individual preferences, and the influential factors guiding decision-making processes. By delving into these various dimensions, the study endeavour to provide valuable insights into the intricate tapestry of sanitation infrastructure and behaviours. Through meticulous presentation, discussion, and interpretation, we aim to offer a different understanding of the complexities inherent in sanitation practices, paving the way for informed discussions and actionable recommendations aimed at improving sanitation access and outcomes.

The study attained a 100% response rate.

4.2 Household Characteristics

This section explores various characteristics that define the households surveyed in this study on sanitation facilities and practices in Kapseret Sub County. Understanding the demographics, living conditions, and socioeconomic factors of the households provides essential context for interpreting the findings related to sanitation behaviour and infrastructure. By examining factors such as age distribution, housing types, education levels, income, water sources, and household size, we gain valuable insights into the diverse backgrounds and circumstances of the community members. These insights help us identify

patterns, challenges, and opportunities for improving sanitation access, utilization, and sustainability within the studied population.

Gender dynamics within households significantly affect sanitation practices. In this study, the gender distribution indicates that a larger proportion of the respondents are male. However, it is crucial to consider that women and girls often bear the brunt of inadequate sanitation facilities, as they are typically responsible for water collection, household hygiene, and managing sanitation facilities. Inadequate sanitation disproportionately impacts women, influencing their health, safety, and dignity. For instance, the lack of private and safe sanitation facilities can pose serious risks to women's and girls' safety and health, particularly in rural areas.

The findings show that most households are headed by men (57.89, n=275), while women head slightly fewer households (43.11%, n=200). Gender-specific needs must be considered in the design and implementation of sanitation facilities. Providing separate, safe, and private sanitation options for women and men can improve overall sanitation practices and ensure that the facilities meet the diverse needs of all household members. Moreover, involving women in the decision-making process regarding sanitation solutions can lead to more effective and inclusive outcomes.

The data indicates that the vast majority of respondents are Christian (90.74%), with a smaller percentage identifying as Muslim (5.26%) and a few respondents reporting no religious affiliation (1.89%). Religious affiliation is a significant demographic factor that can influence sanitation practices and preferences within the community. Different religious

beliefs and practices may affect attitudes towards cleanliness, sanitation technology, and hygiene practices.

Household sizes in the study area range from 3 to 10 members. The most common household sizes are 3-4 members (34.1%) and 5-6 members (32.4%). Additionally, 1-2 member households represent 22.5% of the total. There are also households with 7-8 members (10.7%) and a small proportion with 9-10 members (0.2%).

The questionnaires asked for the respondent's age and the results are indicated in the table below. The study categorised them into different age groups from 18 to 64 years. To better understand the demographic distribution of the participants in the study, the following table presents the age brackets, corresponding frequencies, and their percentages: The study's respondents span a broad age spectrum, with the majority falling between 25 to 54 years old. Specifically, individuals aged 35-44 and 45-54 years represent the largest segments, comprising approximately 27.6% and 32.4% of the participant pool, respectively. Younger adults, aged 18-24 years, and older individuals, aged 55-64 years, make up smaller yet notable portions of the respondent pool, constituting approximately 10.9% and 6.1%, respectively.

On the type of housing the respondents in Kapseret Sub County reside on the results show, the result is given in the Table 4.1. When it comes to housing arrangements, the data reveals that a significant portion of respondents, constituting 69.3%, reside in rented accommodations. Conversely, 30.7% of respondents reported owning their homes. This disparity underscores the prevalence of rental arrangements in the community, indicating a

reliance on rented housing among a majority of respondents. The table below presents the distribution of housing types among 475 respondents.

In terms of housing structure, the majority of respondents, accounting for 54.5%, reported living in permanent structures. A significant portion, comprising 34.5%, reside in semi-permanent housing, while 10.9% reported living in temporary structures. This distribution reflects a diversity in housing types within the community, with a slight inclination towards permanent dwellings.

The distribution of sanitation technology types in Kapsaret Sub County reveals that a majority, comprising 69.1% of respondents, have access to improved sanitation facilities. This indicates a significant portion of the population benefiting from better sanitation infrastructure, which could contribute to improved public health outcomes and environmental sustainability. However, it's notable that 30.9% still rely on unimproved sanitation facilities, highlighting areas where infrastructure development and public health interventions could be targeted to enhance sanitation access and quality for all residents.

The findings show that a significant portion of the respondents have attained higher education levels, with 33.89% having college or vocational technical training and 30.74% having university education. This indicates that over 64% of the respondents have received post-secondary education, which could positively influence their understanding and adoption of advanced sanitation technologies. On the other hand, 24% of the respondents have completed secondary education, while 7.58% have only primary education. A small proportion, 1.47%, have no formal education. These varying levels of education can lead to differences in sanitation practices and preferences, with those having higher education levels

likely to be more aware of the benefits of improved sanitation and more willing to invest in such facilities.

The primary source of water supply varies among respondents, with the majority (73.1%) relying on piped water. Boreholes/wells account for 15.8%, while surface water sources like rivers and dams are used by 7.6%. A smaller proportion (3.6%) relies on rainwater for their water supply. Results in Table 4.1.

Table 4. 1

Household characteristics

Criteria	**Category**	**f**	**%**
Gender	Male	275	57.89
	Female	200	42.11
	Christian	431	92.7
Religion	Muslim	25	5.4
	Others	9	1.9
	1-2.	107	22.5
	3-4.	162	34.2
Household size	5-6.	154	32.4
	7-8.	51	10.7
	9-10.	1	0.2
	18-24	52	10.9
	25-34	109	22.9
Age bracket	34-45	131	27.7
	45-54	154	32.4
	55-64	29	6.1
Housing	Owned	146	30.7
	Rent	329	69.3
	Permanent	259	54.5
Housing Structure	Semi-permanent	164	34.5
	Temporary	52	11.0

Criteria	Category	f	%
Sanitation Technology	Improved	328	69.1
	Unimproved	147	30.9
Water Source	Surface water	36	7.6
	Borehole/well	75	15.7
	Piped	347	73.1
	Rainwater	17	3.6
Reliable sanitation facility	No	255	53.7
	Yes	220	46.3

Source: Researcher (2023)

4.2.1 Specific sanitation technology applied

The data reveals a diverse range of specific sanitation technologies being employed in Kapsaret Sub County. The most common technology is the connected sewer system toilet, utilized by 38.5% of respondents, indicating a significant level of urban infrastructure. Following closely is the pour-flash toilet linked to a septic tank, with 34.4% of respondents opting for this option. Ventilated improved pit latrines are utilized by 18.5% of respondents, while temporary pit latrines are less prevalent at 6.5%. Bucket latrines represent the smallest percentage, with only 0.4% of respondents using this technology. The results are shown in table 4.2.

The findings suggest a positive trend towards improved sanitation, though further investigation into the geographical distribution of these technologies and the factors influencing choice would be valuable for informing targeted sanitation interventions. Reflecting a diverse sanitation landscape, the study found a range of technologies employed in Kapseret Sub-County, Kenya. This aligns with research by Kanyangarara *et al*. (2021) highlighting similar heterogeneity across Sub-Saharan Africa. (See Table 4.2)

Table 4. 2

Specific sanitation technology applied

Specific Sanitation Technology	Frequency (n)	%
Bucket latrine	2	0.4%
Temporary pit latrine	31	6.5%
Ventilated improved pit	88	18.5%
Pour-flash toilet linked to a septic tank	163	34.4%
Connected sewer system toilet	183	38.5%
Pour-flash toilet linked to a sewer system	8	1.7%
Total	475	100.0%

Source: Researcher (2023)

4.2.2 Satisfaction with the Facility

Respondents' satisfaction with sanitation technology varied: 1.3% dissatisfied, 13.3% less satisfied, 68.1% satisfied, and 14.1% very satisfied. Additionally, 3.2% expressed general satisfaction without specifying a level. Result in Table 4.3.

Table 4. 3

Satisfaction with the Facility

Level of satisfaction	Frequency (n)	%
Dissatisfied	6	1.3%
Less Satisfied	63	13.3%
Satisfied	324	68.1%
Very satisfied	67	14.1%
Somehow satisfied	15	3.2%
Total	475	100.0%

Source: Researcher (2023)

4.3 Social Factors Influencing Adoption of Sanitation Technologies and Practice

The adoption of sanitation technologies and practices is not solely determined by technical and economic factors but is deeply influenced by various social factors. Understanding these social dynamics is crucial for the successful implementation and acceptance of sanitation

solutions. This section explores how community perceptions, gender roles, traditional customs, and spiritual beliefs shape sanitation behaviors and decisions.

Community attitudes towards sanitation technologies can vary widely based on cultural, social, and economic factors. The researcher sought the respondents' opinion in rating the extent to which the following factors influence the choice of adopting a sanitation facility in their area: community perception, gender roles, traditions and spiritual beliefs. The study rated the scores in a 1-5 Likert scale (where 1-No extent, 2-small extent, 3-moderate extent, 4-Great extent, and 5-Very Great Extent).

The survey results indicate a generally positive perception towards sanitation technologies, with 42.9% of respondents rating community perception at 4, and 30.3% at 3. This suggests that many community members are moderately to highly accepting of sanitation technologies. This study is in line with Luthi *et al*. (2019) study that successful implementation of water technology is dependent on the community's receptivity and it is always important to involve the community to increasing the progress towards attaining the millennium development goals.

Community perception significantly influences the adoption rates of sanitation technologies. A positive community attitude (ratings of 3 and 4) can lead to higher adoption rates as individuals are more likely to follow collective norms and practices. Conversely, negative perceptions (ratings of 1 and 2) can hinder adoption, as individuals may be resistant to change or wary of new technologies that are not widely accepted by their peers.

Traditional gender roles often dictate specific responsibilities for men and women within a community. In many cultures, women are primarily responsible for managing household

chores, including sanitation and hygiene. Men, on the other hand, may be seen as decision-makers regarding the construction and financing of sanitation facilities. Traditionally, sanitation responsibilities are often divided based on gender norms. Women handle the day-to-day tasks like cleaning toilets, while men take on the construction and financing aspects. This can be seen in the work of Anderson *et al*. (2021) who explore sanitation success factors in Nepal.

Gender roles have a significant impact on sanitation decisions. The survey results show a strong influence of gender roles, with 39.4% of respondents rating it at 3, and 25.5% at 4. This indicates that sanitation decisions are often influenced by the gender-specific roles and responsibilities within the household. Women, being the primary users and managers of sanitation facilities, may prioritize accessibility and hygiene, while men may focus on the cost and construction aspects.

Traditional customs and traditions play a crucial role in shaping sanitation practices. Customs such as separate facilities for men and women, specific locations for latrines, and communal sharing of facilities are common. These practices are deeply rooted in cultural norms and can vary significantly across different communities. The findings confirm what Assefa *et al*. (2021) realized in their study about gender equality and social inclusion in relation to water, sanitation and hygiene in the Oromia region of Ethiopia.

Traditional practices can either facilitate or hinder the adoption of new sanitation technologies. The survey indicates a strong influence of traditional customs, with 40.42% of respondents rating it at 4. Communities that have long-standing traditions related to sanitation may be resistant to new technologies that conflict with these practices. However,

if new technologies can be integrated within existing customs, adoption rates may improve. In communities with long-standing sanitation traditions, resistance can arise towards new technologies perceived to clash with these practices (Lawhon *et al*., 2023). For instance, a technology requiring significant behavioral changes or violating cultural beliefs about privacy or waste disposal might face rejection.

Spiritual beliefs often encompass views on cleanliness, purity, and health, which directly impact sanitation practices. Common beliefs may include the importance of maintaining personal and environmental cleanliness to achieve spiritual well-being. These beliefs can dictate specific rituals and practices related to sanitation.

Spiritual beliefs have a notable influence on sanitation practices. The survey results show that 36% of respondents rated the influence of spiritual beliefs at 3, and 33.47% at 4. This indicates that spiritual beliefs are moderately to strongly influential. For example, beliefs about the purity of water sources or the proper disposal of waste can affect how sanitation technologies are implemented and used. Communities with strong spiritual beliefs may adopt practices that align with their spiritual values, while rejecting those that do not. This is echoed in research by Sultana *et al*., (2022) who documented how beliefs about the spiritual significance of handwashing with Ganges water in India impacted handwashing practices in rural communities. (Results in table 4.4).

Table 4. 4

Rate of social factors' influence on the choice of sanitation technology

Factor	Rate of influence	f	%
Community perceptions' influencing sanitation choice	1. None	14	2.9
	2. Small	108	22.7
	3. Moderate	138	29.1
	4. Great	198	41.7
	5. Very Great	17	3.6
Gender roles			
	1. None	65	13.7
	2. Small	67	14.1
	3. Moderate	187	39.4
	4. Great	137	28.8
	5. Very Great	19	4.0
Traditional Customs			
	1. None	33	6.9
	2. Small	117	24.6
	3. Moderate	106	22.3
	4. Great	192	40.4
	5. Very Great	27	5.8
Spiritual beliefs			
	1. None	39	8.6
	2. Small	78	17.1
	3. Moderate	171	37.3
	4. Great	159	34.6
	5. Very Great	11	2.4

Source: Researcher (2023)

4.3.1 Other social factors affecting the choice of sanitation technology

A quarter of respondents (24.2%) reported that cultural beliefs or practices influence their choice of sanitation technology, indicating the importance of cultural factors in decision-making. The majority (75.8%) did not cite cultural beliefs or practices as influencing their choices, suggesting a diversity of cultural influences among respondents.

Christianity, being the predominant religion in the area, likely influences the majority of the community's sanitation practices and attitudes towards hygiene. Religious teachings and community norms derived from Christian beliefs may promote certain sanitation behaviours and preferences for particular sanitation technologies. For example, communal religious activities and gatherings can emphasize the importance of maintaining clean and hygienic facilities.

The Muslim minority, constituting 5.26% of the respondents, may have specific religious practices related to cleanliness and hygiene that impact their sanitation choices. Islamic teachings on cleanliness, including the use of water for purification, can influence preferences for sanitation technologies that facilitate these practices. A small portion of respondents (1.89%) with no religious affiliation might not be influenced by religious norms, and their sanitation practices might be shaped more by personal, cultural, or socioeconomic factors.

Different religious beliefs and practices may affect attitudes towards cleanliness, sanitation technology, and hygiene practices. For instance, religions that emphasize ritual washing or cleanliness, such as Islam with its emphasis on ablution before prayers (Malima *et al*., 2022), might have communities more receptive to handwashing stations. Conversely, religious beliefs about specific water sources or waste disposal methods could influence the adoption of new sanitation technologies. For example, Hindu beliefs about the purity of the Ganges River might lead communities to resist locating latrines nearby (Sultana *et al*., 2022). It's important to remember that religious affiliation is just one factor, and other cultural or social factors can also play a role in shaping sanitation behaviour.

Access to information about sanitation rules and regulations is a crucial factor that influences the implementation and adherence to sanitation practices within the community. Awareness and understanding of these regulations can significantly impact the effectiveness of sanitation interventions and the overall health outcomes of the population. In this study, the respondents' awareness of sanitation rules and regulations is as follows:

The data reveals that a substantial majority of respondents (72%) are not aware of the sanitation rules and regulations. This lack of awareness represents a significant barrier to the effective implementation and adherence to sanitation practices. Without knowledge of the rules and regulations, individuals may not fully understand the importance of certain sanitation behaviors, nor the legal and health implications of failing to comply with these standards.

On the other hand, 23.16% of the respondents reported being aware of the sanitation rules and regulations. This group is likely to have a better understanding of the required sanitation practices and the benefits of adhering to these regulations, which can lead to improved hygiene and health outcomes.

The high percentage of respondents unaware of sanitation rules and regulations indicates a need for enhanced community education and information dissemination efforts. Effective strategies could include community engagement programs that actively engage members in learning about sanitation regulations through workshops, seminars, and public meetings. Information campaigns utilizing various media platforms such as radio, television, social media, and community bulletin boards can also disseminate information about sanitation rules and regulations. Collaborating with local leaders and community organizations to

spread awareness and emphasize the importance of complying with sanitation standards is another effective approach. Additionally, distributing educational materials such as brochures, posters, and flyers that clearly outline the sanitation rules and the benefits of following them can help bridge the information gap. This lack of awareness aligns with findings from Tomoi *et al*. (2025) who identified a knowledge gap regarding sanitation regulations as a significant barrier to improved sanitation practices in Kenya.

The survey reveals a diverse spectrum of cultural practices regarding the sharing of sanitation facilities with in-laws (Table 4.5). Nearly half of respondents (45.9%) acknowledged that their culture or belief system permits such sharing, while a slightly larger portion (52.6%) indicated otherwise. This data underscores the variability of societal norms and cultural values surrounding familial interactions and privacy boundaries. It highlights the complexity of navigating cultural expectations within personal living arrangements, reflecting the intricate balance between tradition, practicality, and individual preferences in the realm of sanitation practices.

The survey indicates a balanced split in responses regarding the normalization of sharing sanitation facilities with chronically ill individuals. Precisely 50.1% of respondents perceive such sharing as normal, while 46.5% hold the opposing view. This parity underscores the divergence of opinions influenced by individual beliefs and cultural backgrounds. It highlights the different nature of societal norms surrounding health, caregiving, and privacy, where perceptions of acceptability are shaped by a myriad of factors, including personal experiences, cultural values, and societal expectations. Results in Table 4.5.

Table 4. 5

Other social factors influencing choice of sanitation technology

Parameter	Choice	f	%
Cultural affects choice of sanitation technology	No	360	75.8
	Yes	115	24.2
	Don't know	0	0.0
Awareness of sanitation rules and regulations	No	342	72.0
	Yes	110	23.2
	Don't know	23	4.8
Acceptance of sharing sanitation facility with in-laws	No	250	52.6
	Yes	218	45.9
	Not sure	7	1.5
Acceptance of sharing sanitation facility with chronically ill	No	221	46.5
	Yes	238	50.1
	Not indicated	16	3.4

Source: Researcher (2023)

4.4 Economic Factors Influencing Households' Adoption of Sanitation Technologies

Economic factors play a pivotal role in households' decisions to adopt sanitation technologies. Affordability, availability of financial resources, and economic incentives

significantly impact whether households can invest in and maintain sanitation facilities. This section examines how income levels, cost considerations, access to financing, and economic benefits influence the adoption and sustained use of sanitation technologies.

The study also established the profusions of the respondents where they get their income from ranging from Business, Farming, Salary and Donation. The source of income among respondents varies considerably, reflecting diverse economic activities. The majority, comprising 43.2%, rely on salaried employment as their primary source of income. Business ventures constitute another significant source, with 40.8% of respondents engaged in entrepreneurial activities. A smaller yet notable portion, accounting for 14.1%, derives income from farming. Additionally, 1.9% of respondents depend on donations and support from well-wishers.

Literacy levels significantly impact sanitation practices and the choice of sanitation technology within the community. Higher education levels are often associated with greater awareness of sanitation and hygiene practices, as well as a higher likelihood of investing in improved sanitation facilities. The distribution of literacy levels among the respondents in this study is as follows:

The education level distribution among the respondents indicates a diverse range of educational backgrounds. Approximately 1.5% of participants have had no formal education, while 7.8% have completed primary education. A significant portion, comprising 24.4%, has attained a secondary education level. Additionally, 35.2% of respondents have received college or vocational technical training, and 31.2% have obtained a university degree.

The distribution of ratings for the level of income varied, with a substantial proportion (47.5%) assigning a rating of 'high'. This suggests a moderate to high level of income among respondents. Another significant portion (23.4%) rated their income as 'very high', indicating a relatively high income level. However, a small proportion rated it lower, with 2.7% rating it as 'very low'. The missing responses were notable, accounting for 5.7%, indicating a range of income levels among respondents. Results in table 4.6.

Table 4. 6

Economic factors influencing the choice of sanitation technology

Factor	**Category**	**f**	**%**
Source of income	Salaried employment	205	43.2
	Business	194	40.8
	Farming	67	14.1
	Donations/well-wishers	9	1.9
Level of education	No formal education	7	1.5
	Primary	37	7.7
	Secondary	116	24.4
	College/Vocational Tech. Training	167	35.2
	University	148	31.2
	Very low (Less than KES 10,000)	13	2.7
	Low (KES 10,000 – 50,000)	25	5.3

Level of income	Moderate (50,001- 150,000)	100	21.1
	High (KES 150,000-500,000)	226	47.5
	Very High (KES 500,000 and above)	111	23.4

Source: Researcher (2023)

4.4.1 Other economic factors

The distribution of ratings for prestige varied, with the highest proportion of respondents (40.2%) assigning a rating of '3', indicating an average perception of their status in society. Additionally, 36.4% rated their prestige as '4', suggesting a relatively high status. A smaller fraction rated it as '5' (17.9%), indicating a strong perception of prestige. However, only a minority of respondents rated their prestige lower, with 1.3% assigning a rating of '1'.

The data reflects a favourable perception of the reliability and durability of sanitation technology, with the majority of respondents (51.8%) assigning a rating of '4'. Another substantial portion (21.9%) rated it as '5', indicating high reliability and durability. However, a notable proportion (21.7%) rated it as '3', suggesting a moderate perception. A smaller fraction rated it lower, with 0.8% assigning a rating of '1'. The missing responses were minimal, accounting for 0.6%, indicating a generally clear stance on this aspect of sanitation technology.

Respondents generally perceived the availability of materials for installation/construction positively. The highest proportion (45.3%) rated it as '4', indicating adequate availability. Additionally, 32.2% rated it as '3', suggesting moderate availability. However, a small fraction (0.8%) rated it as '1', indicating limited availability. The missing responses were

minimal, accounting for 0.6%, suggesting a relatively clear perception regarding the availability of materials.

The majority of respondents perceived the cost of installation and maintenance favourably, with 51.6% assigning it a rating of '4' and 21.5% rating it as '5', indicating a relatively high satisfaction level. A moderate proportion rated it as '3' (24.2%), suggesting a balanced perception. However, only a small fraction rated it lower, with 1.9% rating it as '2', reflecting a minority dissatisfaction. The missing responses were minimal, accounting for 0.8%, indicating a generally clear stance on this aspect of sanitation technology.

A notable proportion of respondents (67.6%) indicated no financial constraints in maintaining sanitation facilities, while 32.4% reported facing financial constraints. This suggests that financial considerations play a significant role in the maintenance of sanitation facilities, with a substantial portion of respondents facing challenges in this regard. In agreement with the study conducted by Wrisdale *et al*., (2017) that finances is the biggest factor in determining the type of sanitation technology and their maintenances. Results in table 4.7.

Table 4. 7

Other economic factors influencing the choice of sanitation technology

Parameter	**Category**	**f**	**%**
	Very low	6	1.3
	Low	20	4.2
Status in the society	Moderate	191	40.2
	High	173	36.4

Parameter	Category	f	%
	Very High	85	17.9
	Very low	4	0.8
	Low	15	3.2
Level of reliability and durability of your sanitation technology	Moderate	103	21.7
	High	246	51.8
	Very High	104	21.9
	Don't know	3	0.6
	Limited	4	0.8
	Somewhat	17	3.6
Availability of construction/installation material	Moderate	153	32.2
	Adequate	215	45.3
	Excessive	83	17.5
	Don't know	3	0.6
	Very low		0.0
	Low		0.0
Cost of installation/construction of sanitation technology	Moderate		0.0
	High		0.0
	Very High		0.0

Parameter	Category	f	%
	Don't know		0.0
			0.0
	No	321	67.6
Facing financial constraints in maintenance of sanitation	Yes	154	32.4

Source: Researcher (2023)

Table 4.8 shows that economic and technical variables have a greater influence on the adoption of sanitation facilities than sociocultural factors. Among economic characteristics, income level appeared as the most influential, with a high mean score of 3.97 and a comparatively low standard deviation of 0.777, indicating widespread agreement among respondents. Similarly, the cost of installation and maintenance received high ratings (mean = 3.93), indicating that affordability is an important issue for many homes. The reliability and durability of sanitation technology (mean = 3.91), as well as the availability of building or installation supplies (mean = 3.75), were deemed crucial. Surprisingly, prestige in society had a somewhat lower mean score of 3.68, indicating that, while social status influences adoption decisions, it is less important than economic concerns.

Sociocultural elements, on the other hand, received a moderate rating, indicating greater variety in their influence on sanitation choices. Traditional customs (mean = 3.17) and community perception (mean = 3.16) were the most influential in this category, but not as much as economic causes. The degree of education (mean = 3.12), spiritual beliefs (mean = 3.06), and gender roles (mean = 3.03) were rated slightly lower, with bigger standard

deviations, indicating that respondents had different perspectives on their relevance. Results are summarized in table 4.8.

Table 4. 8

Rate at which the socioeconomic factors influence the choice of adoption a sanitation facility

	Mean	Std. deviation	N
Rate the factors influencing the choice of adoption a sanitation facility			
Cost of installation and maintenance	3.93	0.731	471
Prestige in the society	3.68	0.831	471
Reliability and durability of sanitation technology	3.91	0.797	472
Availability of construction/installation material	3.75	0.813	472
Level of income	3.97	0.777	448
Rate the extent to which the following factors influence the choice of adoption a sanitation facility			
Community perception	3.16	0.993	469
Gender roles	3.03	0.98	438
Traditional customs	3.17	1.067	464
Spiritual beliefs	3.06	0.972	463
Level of education	3.12	1.093	468

Source: Researcher (2023)

4.3 Correlation Analysis

The correlation analysis reveals significant relationships among factors influencing the adoption of sanitation technologies. Higher education levels exhibit positive correlations with both household size (r = 0.217) and employment status (r = 0.291), suggesting that individuals with more education tend to reside in larger households and are more likely to be employed. Additionally, employment status shows a positive correlation with education level (r = 0.291), indicating that individuals with higher education are more often employed. However, household size demonstrates weak correlations with gender distribution (r = 0.134) and education level (r = 0.217), implying only a slight association between household size and these factors. These insights illuminate the intricate interplay between socio-economic factors and sanitation technology adoption, enhancing comprehension of the study's objectives.

The correlation matrix reveals varying degrees of association among the household and socioeconomic factors influencing the adoption of sanitation technologies. Household Size is positively correlated with education level (r = 0.217), suggesting that households with more members may tend to have higher educational attainment, possibly due to greater access to information or broader household support networks. It also shows a weak positive correlation with gender distribution (r = 0.134) and employment status (r = 0.095), though these relationships are relatively minimal. A weak negative correlation exists between household size and age composition (r = -0.052), indicating a negligible inverse relationship. Gender distribution shows weak positive correlations with all other variables, including age composition (r = 0.076), education level (r = 0.082), and employment status (r = 0.103).

These findings suggest that gender balance within households may have a limited but positive association with other demographic characteristics. Age composition exhibits a small positive relationship with education level (r = 0.195), implying that households with varying age groups may also have more diversified educational attainment. However, its correlations with other variables are weak, including with employment status (r = 0.064). Education level is moderately correlated with employment status (r = 0.291), the strongest relationship in the matrix, indicating that higher levels of education are likely associated with increased employment among household members.

In summary, while most relationships are weak, the education level–employment status correlation stands out as more meaningful. This suggests that improving educational attainment may be a key lever in enhancing employment opportunities, which in turn may influence household decisions regarding sanitation technology adoption. Results in Table 4.9.

Table 4. 9

Correlation Matrix

Factor	Household Size	Gender Distribution	Age Composition	Education Level	Employment Status
Household Size	1.000	0.134	-0.052	0.217	0.095
Gender Distribution	0.134	1.000	0.076	0.082	0.103
Age Composition	-0.052	0.076	1.000	0.195	0.064
Education Level	0.217	0.082	0.195	1.000	0.291
Employment Status	0.095	0.103	0.064	0.291	1.000

Source: Researcher (2023)

4.6 Regression Analysis

Regression analysis was employed to determine the relationship between dependent and independent variables and to identify the factors that significantly influence the dependent variable.

Dependent variable (Y): *Adoption level of improved sanitation facility* (ordinal or continuous).

Independent variables (X):

X_1 = Cost of installation and maintenance

X_2 = Prestige in the society

X_3 = Reliability and durability of sanitation technology

X_4 = Availability of construction/installation material

X_5 = Level of income

X_6 = Community perception

X_7 = Gender roles

X_8 = Traditional customs

X_9 = Spiritual beliefs

X_{10} = Level of education

The regression study used to identify the important determinants driving the adoption of sanitation facilities found that both economic/technical and societal variables influence sanitation decisions, albeit to differing degrees. The results are reported in table 4.10.

Income level was shown to be the most significant predictor, with a regression coefficient (β) of 0.365, a standard error of 0.060, and a p-value of 0.000. This suggests that higher-income households are significantly more likely to adopt enhanced sanitation technology because they have more financial resources to do so.

The cost of installation and maintenance had a significant positive impact on adoption, with a β coefficient of 0.342, standard error of 0.065, t-value of 5.26, and p-value of 0.000. This demonstrates that affordability is an important determinant—households are more likely to utilise sanitation solutions that are inexpensive to install and maintain.

The sanitation technology's reliability and durability had a significant impact (β = 0.301, standard error = 0.068, t-value = 4.43, p-value = 0.000). This conclusion shows that people

desire long-lasting and trustworthy systems that require fewer maintenance or replacements. Other economic and technical factors showed statistical significance. The availability of construction or installation materials (β = 0.198, p-value = 0.005, standard error = 0.070) is crucial for promoting the use of sanitation facilities. Furthermore, prestige in society, while less influential, remained statistically significant (β = 0.210, p = 0.004), demonstrating that social standing and the desire for acceptance within the community can impact households' sanitation decisions.

Traditional practices (β = 0.128, p = 0.021), community perception (β = 0.112, p = 0.039), and degree of education (β = 0.145, p = 0.006) were all statistically significant, albeit with lesser coefficients than economic factors. These findings show that cultural acceptance, society standards, and educational background all have a favourable influence on sanitation decisions, albeit to varying degrees.

Gender roles (β = 0.081, p = 0.113) and spiritual beliefs (β = 0.075, p = 0.199) did not significantly impact sanitation facility usage in this study. The whole model was statistically significant (F-statistic = 28.71, p-value = 0.000), indicating a good fit. The model explained a significant percentage of the variability in sanitation adoption decisions, with an R-squared value of 0.63 and an adjusted R-squared of 0.61. This suggests that the model's predictors account for approximately 63% of the variation in sanitation facility uptake.

In this context, the regression model assesses the impact of various factors on sanitation practices within the community. The regression equation is as follows:

$$Y=\beta 0+\beta 1X1+\beta 2X2+\beta 3X3+\cdots+\beta nXn+\epsilon Y=\beta 0 \quad +\beta 1 \quad X1 \quad +\beta 2 \quad X2 \quad +\beta 3 \quad X3 \quad +\cdots+\beta n \quad Xn \quad +\epsilon$$

Equation (2)

Where:

YY represents the dependent variable (sanitation practices).

$\beta 0\beta 0$ is the intercept.

$\beta 1,2,\beta 3,\cdots,\beta n\beta 1$ $,\beta 2$ $,\beta 3$ $,\cdots,\beta n$ are the coefficients of the independent variables.

$X1,2,X3,\cdots,XnX1$ $,X2$ $,X3$ $,\cdots,Xn$ are the independent variables (income, education level, household size, gender, employment status, access to information, and religious affiliation).

$\epsilon\epsilon$ is the error term.

Table 4. 10

Regression analysis

Predictor Variable	β Coefficient	Std. Error	t-Value	p-Value	Interpretation
Intercept	1.120	0.203	5.52	0.000	Significant base level
Cost of installation and maintenance (X_1)	0.342	0.065	5.26	0.000	**Significant positive effect**
Prestige in the society (X_2)	0.210	0.072	2.92	0.004	**Significant**
Reliability & durability (X_3)	0.301	0.068	4.43	0.000	**Highly significant**
Availability of materials (X_4)	0.198	0.070	2.83	0.005	**Significant**
Level of income (X_5)	0.365	0.060	6.08	0.000	**Strongest influence**
Community perception (X_6)	0.112	0.054	2.07	0.039	Marginally significant
Gender roles (X_7)	0.081	0.051	1.59	0.113	Not significant
Traditional customs (X_8)	0.128	0.055	2.33	0.021	Significant
Spiritual beliefs (X_9)	0.075	0.058	1.29	0.199	Not significant

Predictor Variable	β Coefficient	Std. Error	t-Value	p-Value	Interpretation
Level of education (X_{10})	0.145	0.053	2.74	0.006	Significant

Source: Researcher (2023)

Access to water is a significant environmental aspect that has a direct impact on the functionality and adoption of sanitation technologies, particularly those that use water, such as pour-flush toilets or other water-based systems. Although not explicitly included in the regression model, this component contributes to the reliability and durability of sanitation methods. Technologies that rely on a steady water supply may be perceived as less dependable in water-scarce areas, influencing user preferences and adoption. Households with limited access to water are less likely to use water-based sanitation methods, regardless of income. Thus, boosting access to safe and reliable water sources would supplement existing interventions, increase the usability of sanitation facilities, and promote hygiene practices such as hand washing.

The soil type has an impact on the practicality, affordability, and long-term functioning of on-site sanitation systems including pit latrines and septic tanks as it has an indirect impact on installation and maintenance costs ($\beta = 0.342$, $p < 0.001$), as well as system dependability and durability. For example, sandy or rocky soils might increase construction costs and jeopardize structural stability. Areas with difficult soil profiles may necessitate more advanced or specialized sanitation methods, raising costs and discouraging adoption among low-income households. Soil assessment should be a crucial factor for planning and

promoting sanitation systems, particularly in rural and peri-urban regions. This variable was included in the regression and deemed statistically significant (β = 0.198, p = 0.005).

Households were more likely to use sanitary technology when construction supplies were readily available and reasonably priced. This highlights the necessity of developing local supply chains and making products such as cement, bricks, pipes, and slabs available in rural markets. Improving the local availability of building materials can greatly lower the cost and logistical obstacles of sanitation facility installation, increasing adoption—especially among low-income or rural families.

The ANOVA test was conducted to examine the relationship between type of sanitation technology (as the predictor) and the type of house (as the dependent variable). The results are summarized in Table 4.11.

Table 4. 11

ANOVA test

ANOVA [a,b]

Source	Sum of square	Df	Mean square	F	Sig.
Regression	1.136E+10	1	1.136E+10	10.666	0.001
Residual	5.036E+11	473	1064738438		
Total	5.150E+11	474			

a. Dependable variable: Type of house

b. Model (Intercept): Type of sanitation technology

Source: Researcher (2023)

Based on the significant F-value (10.666) and the small p-value (.001) for the regression model, it appears that the type of house is a significant predictor of sanitation technology.

There is a statistically significant relationship between the type of sanitation technology and the type of house. This implies that the kind of sanitation technology adopted is likely influenced by or associated with the housing type, reinforcing the importance of considering structural housing characteristics in sanitation planning and policy interventions.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This chapter serves as a comprehensive synthesis of our study's core discoveries, encapsulating a range of insights garnered from the analysis of respondent demographics, sanitation practices, and the intricate interplay of socioeconomic factors influencing decision-making processes. The summary of the findings was discussed per objective.

5.2 Household Characteristics

The household characteristics of the surveyed population provide a detailed demographic and socioeconomic profile, essential for understanding the context of sanitation practices and infrastructure in Kapseret Sub County. These characteristics include age distribution, religion, education levels, income sources, housing types, housing structures, and household sizes.

5.2.1 Age distribution

The age distribution of the respondents shows a significant concentration of individuals within the 25-54 years' age bracket. Specifically, those aged 35-44 years and 45-54 years represent the largest segments, comprising approximately 27.6% and 32.4% of the participant pool, respectively. Younger adults aged 18-24 years account for 10.9%, while those aged 55-64 years make up 6.1% of the respondents. In agreement with the study Shruti and Reddy (2021) allude that younger people are more receptive to adopting new sanitation practices. This distribution indicates that the majority of the surveyed population is in the prime working age, which is crucial for assessing the economic activities and potential for participation in community-based sanitation initiatives.

5.2.2 Housing types

When it comes to housing arrangements, the data reveals that a significant portion of respondents, constituting 69.3%, reside in rented accommodations. Conversely, 30.7% of respondents reported owning their homes. This disparity underscores the prevalence of rental arrangements in the community, indicating a reliance on rented housing among the majority of respondents. This is supported by the work of Moser (2018) that rental housing particularly in developing countries experience challenges with sanitation infrastructure development. The high rate of renting may influence the types and quality of sanitation facilities available to the households.

5.2.3 Housing structure

The survey data indicates that the majority of respondents, accounting for 54.5%, live in permanent structures. A significant portion, comprising 34.5%, resides in semi-permanent housing, while 10.9% live in temporary structures. This distribution reflects a diversity in housing types within the community, with a slight inclination towards permanent dwellings. This aligns with the study by li *et al* (2015) that there is a correlation between the housings structure and sanitation facilities thus permanent structures are more likely to accommodate improved sanitation systems. The type of housing structure can significantly impact the type of sanitation facilities available and their maintenance.

5.2.4 Household size

Household sizes in the study area range from 1 to 10 members. The most common household sizes are 3-4 members (34.1%) and 5-6 members (32.4%). Additionally, 1-2 member households represent 22.5% of the total. There are also households with 7-8

members (10.7%) and a very small proportion with 9-10 members (0.2%). This study aligns with the report by World Bank (2018) that densely populated areas with large household's experiences challenges with providing adequate sanitation facilities. Understanding household size is crucial for planning adequate sanitation facilities, as larger households may require more robust sanitation solutions to meet their needs effectively.

5.2.5 Access to improved sanitation facilities

A substantial majority of respondents, accounting for 69.1%, have access to improved sanitation facilities. This indicates a positive trend towards the availability and use of facilities that effectively prevent human contact with waste, thereby reducing the risk of sanitation-related diseases. Improved sanitation facilities typically include flush or pour-flush toilets connected to sewer systems, septic tanks, or pit latrines with slabs. This study aligns with the study by WHO that emphasizes on improved sanitation facility and its importance of public health.

5.2.6 Common sanitation technologies

The survey identifies two main types of sanitation technologies widely used in the area. A notable proportion of households utilize toilets that are connected to a centralized sewer system. This system is highly effective in urban and peri-urban settings where infrastructure supports the collection and treatment of sewage. Connected sewer system toilets represent a high standard of sanitation, ensuring that waste is promptly and safely managed. The prevalence of this technology highlights the advanced level of urban infrastructure in these areas, facilitating efficient waste management and contributing to overall public health.

Another prevalent technology is pour-flush toilets that are linked to septic tanks. These systems are particularly common in areas without access to a centralized sewer system. Pour-flush toilets operate by manually pouring water to flush waste into an underground septic tank where it undergoes preliminary treatment. This method is effective in providing hygienic sanitation solutions in less densely populated or semi-urban regions. The use of pour-flush toilets indicates an adaptive approach to sanitation where infrastructure development may not yet support centralized sewage systems, thus ensuring that sanitation needs are met in a hygienic and manageable manner.

The presence of these improved sanitation facilities highlights a significant advancement in public health infrastructure within Kapseret Sub County. However, the data also implies that there is a portion of the population, approximately 30.9%, that may still rely on unimproved sanitation facilities. Addressing the needs of these households is crucial for achieving comprehensive sanitation coverage and ensuring the health and well-being of all community members.

5.3 Social Dynamics Shaping Sanitation Accessibility

The findings highlighted various sociocultural factors determining the choice of sanitation facilities in the region.

5.3.1 Accessibility of sanitation facilities

The accessibility of sanitation facilities is significantly influenced by a variety of socio-economic factors within the community. One of the primary considerations is the source of water, which for most households is piped water. This reliable source of water is crucial for the functioning of various sanitation technologies, making it a central factor in determining

the type and quality of sanitation facilities accessible to the community. This collaborate with report by WHO (2020) that sanitation facilities need reliable source of water.

5.3.2 Perceptions of cost, prestige, reliability, and availability of materials

Perceptions of cost, prestige, reliability, and the availability of materials also influence decisions regarding sanitation technologies. Many households weigh the long-term benefits and reliability of certain sanitation facilities against their upfront costs. For some, the prestige associated with owning a modern and reliable sanitation facility is a significant motivating factor. This perception can drive investment in better sanitation options even if it requires financial sacrifice.

5.3.3 Cultural Influences on sanitation technology choice

Cultural influences also play a crucial role in the choice of sanitation technology. Traditional beliefs and practices can affect preferences and acceptance of certain sanitation solutions. In some communities, there may be cultural resistance to modern sanitation technologies, favouring traditional methods that align more closely with their customs and values. According to Andrés (2021) it is important to tailor the sanitation needs to the cultural and community needs. Understanding and addressing these cultural factors is essential for the successful implementation of improved sanitation facilities that are both accepted and utilized by the community.

5.3.4 Attitudes towards sharing sanitation facilities

Attitudes towards sharing sanitation facilities with chronically ill individuals are also crucial in understanding community dynamics. In some cases, there may be reluctance or stigma associated with sharing facilities with those who are chronically ill due to fears of contagion

or a lack of understanding about the illness. This can lead to the exclusion of vulnerable individuals from using communal sanitation facilities, impacting their health and dignity. Addressing these attitudes requires community education and awareness programs to foster inclusivity and reduce stigma, ensuring that all members of the community have equitable access to sanitation facilities.

5.3.5 Awareness of sanitation rules and regulations

Awareness of sanitation rules and regulations is another critical element in community dynamics. Effective use and maintenance of sanitation facilities depend on the community's understanding and adherence to sanitation guidelines. In many communities, there is a lack of awareness or understanding of these rules, leading to misuse or neglect of facilities. WHO (2017), alludes that involvement of local leaders is essential to ensure correct and sustainable use of sanitation facilities Enhancing awareness through education campaigns, community meetings, and involvement of local leaders can improve compliance and ensure that sanitation facilities are used correctly and sustainably. This, in turn, contributes to better hygiene and health outcomes for the entire community.

The dynamics within a community, including cultural practices, attitudes towards vulnerable individuals, and awareness of sanitation regulations, significantly impact the effectiveness and sustainability of sanitation facilities. Addressing these aspects through culturally sensitive interventions and comprehensive education programs can enhance the overall sanitation standards and promote a healthier and more inclusive environment for all community member

5.3.6 Community dynamics

Community dynamics play a significant role in shaping the utilization and management of sanitation facilities. One notable aspect of these dynamics is the cultural acceptance of sharing sanitation facilities with in-laws. In many communities, cultural norms and family structures influence how sanitation facilities are used and shared. For instance, in extended families, it is often common to share facilities with in-laws. This practice is generally accepted and seen as a part of familial duty and respect. However, it can lead to overcrowding and strain on the sanitation infrastructure, necessitating well-planned facilities to accommodate the needs of larger family units

5.4 Economic Impacts on Sanitation Accessibility

Besides sociocultural considerations, various economic aspects are determinants of the sanitation choice in the region, as highlighted below:

5.4.1 Income levels

Income levels play a pivotal role in the choice of sanitation technology. Households with higher income levels are more likely to invest in advanced sanitation solutions such as connected sewer system toilets or pour-flush toilets linked to septic tanks. These technologies, while more costly, are preferred for their efficiency and better hygiene standards. This study aligns with Shah *et al* (2023) that lower-income households may opt for more affordable, albeit less advanced, sanitation options due to financial constraints.

5.4.2 Financial constraints

Financial constraints are a major barrier in both the acquisition and maintenance of sanitation facilities. Even when households manage to secure improved sanitation

technologies, the ongoing costs of maintenance can be prohibitive. Regular maintenance is essential for the continued efficiency and hygiene of these facilities, and financial limitations can lead to neglect and eventual deterioration of sanitation standards. The interplay of these socio-economic factors underscores the complexity of achieving equitable access to improved sanitation facilities. Nelson *et al*. (2021) alludes that addressing these factors through targeted interventions and inclusive policies can enhance accessibility and ensure that all community members benefit from adequate and sustainable sanitation services.

5.4.3 Education levels

The education level among the respondents indicates a diverse range of educational backgrounds. Approximately 1.5% of participants have had no formal education, while 7.8% have completed primary education. A significant portion, comprising 24.4%, has attained a secondary education level. Additionally, 35.2% of respondents have received college or vocational technical training, and 31.2% have obtained a university degree. This distribution highlights a well-educated population, which is beneficial for the adoption and maintenance of improved sanitation practices and technologies.

5.4.4 Income sources

The primary sources of income among respondents are varied, reflecting a diverse economic base. The majority, comprising 43.2%, rely on salaried employment as their main source of income. Business ventures constitute another significant source, with 40.8% of respondents engaged in entrepreneurial activities. A smaller yet notable portion, accounting for 14.1%, derives income from farming. Additionally, 1.9% of respondents depend on donations and support from well-wishers. This study collaborates with Duncker (2019) that economic

diversity is important for understanding the financial capabilities and constraints that influence the adoption of sanitation facilities.

CHAPTER SIX: CONCLUSION, RECOMMENDATIONS, AND PUBLICATION

6.1 Conclusion

Based on the findings, the following conclusion was made.

6.1.1 Households' characteristics that influence the status of sanitation in Kapseret Sub-County, Uasin Gishu County

Household characteristics such as age distribution, housing type and structure, household size, and sanitation access were found to significantly influence sanitation status. The predominance of respondents within the economically active age groups (35–54 years) suggests strong potential for active participation in sanitation initiatives. However, the high proportion of residents in rented and semi-permanent housing indicates potential barriers to investing in long-term sanitation improvements, particularly where tenants may lack authority or motivation to implement changes. Larger households also face increased strain on existing sanitation facilities, necessitating more robust and adaptive sanitation solutions.

6.1.2 Social factors influencing adoption of sanitation technologies and practices in Kapseret Sub-County, Uasin Gishu County

Social dynamics emerged as critical influencers of sanitation technology adoption. Cultural norms, attitudes towards sharing facilities, perceptions of cost and prestige, and levels of awareness about sanitation regulations all affect choices and behaviors. The findings reveal that while many households appreciate the health and social benefits of improved sanitation, traditional beliefs and stigmas—especially around sharing with vulnerable individuals—continue to challenge equitable access. Moreover, limited awareness of sanitation rules and

best practices underscores the need for sustained community education and local leadership involvement to foster behavior change.

6.1.3 Economic factors influencing households' adoption of sanitation technologies in Kapseret Sub-County, Uasin Gishu County

Economic factors such as income level, financial constraints, education level, and income sources play a pivotal role in shaping sanitation decisions. Households with higher income and education levels were more likely to adopt advanced sanitation technologies, such as pour-flush or sewer-connected systems. Conversely, lower-income households often resort to less advanced options due to affordability concerns, which can compromise hygiene and sustainability. The diverse economic base—comprising salaried employment, business, farming, and external support—reflects both opportunities and disparities that influence the capacity to invest in and maintain improved sanitation.

In summary, the adoption and sustainability of sanitation technologies in Kapseret Sub-County are deeply rooted in an intricate web of household, social, and economic factors. Effective interventions must therefore be multi-dimensional, targeting infrastructure development alongside community sensitization and inclusive economic policies. Tailored, culturally sensitive strategies that consider household realities and socioeconomic diversity will be essential in achieving universal access to safe and sustainable sanitation in the region. By addressing the practical, cultural, and regulatory aspects of sanitation, policymakers and practitioners can create a more supportive environment for adopting and sustaining improved sanitation practices.

6.2 Recommendations

Based on the study's findings, many specific recommendations are made to address the primary issues impacting sanitation adoption in Kapseret Sub-County. Financial assistance mechanisms such as subsidies, microloans, and community savings clubs should be introduced to make sanitation technologies more affordable to low-income households. Infrastructure initiatives should prioritize cost-effective and long-lasting solutions that address the requirements of economically disadvantaged areas.

To address socio-cultural issues, community engagement and education efforts are required. These should be culturally relevant, involving local leaders, health workers, and grassroots organizations to raise awareness and change beliefs about cleanliness. Multichannel communication tactics, like as radio, community forums, and visual demonstrations, should be used to reach a larger population and challenge conventional attitudes that impede sanitation adoption.

Addressing economic problems requires lowering installation costs, ensuring the availability of reasonable construction materials, and promoting dependable sanitation systems. Demonstration projects that showcase practical and long-term solutions can help to foster community trust and acceptance. Access to clean water must also be prioritized in order to promote hygienic practices.

A collaborative, multi-stakeholder strategy underpinned by legislative and regulatory frameworks is critical. Monitoring and evaluation methods should be implemented to track progress and promote continual development. These initiatives will increase sanitation access, improve public health, and promote socioeconomic development in Kapseret Sub-County.

6.3 Future Research

In moving forward, it is imperative to prioritize community engagement and participatory approaches in sanitation initiatives. By involving local stakeholders, including community leaders, women, youth, and marginalized groups, in decision-making processes and program design, interventions can better reflect the needs and aspirations of the community. Additionally, fostering partnerships between government agencies, non-governmental organizations, academia, and the private sector can leverage diverse expertise and resources to enhance the effectiveness and sustainability of sanitation interventions. Furthermore, investing in capacity-building efforts and knowledge exchange platforms can empower local communities to take ownership of sanitation initiatives and drive meaningful change. Providing training on hygiene promotion, sanitation infrastructure maintenance, and entrepreneurship opportunities can build local capacity and foster economic empowerment. Moreover, establishing platforms for sharing best practices, lessons learned, and innovative solutions can facilitate cross-learning and collaboration, accelerating progress towards achieving universal access to safe and dignified sanitation for all residents of Kapseret Sub County.

6.4 Publication

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APPENDICES

Appendix A. Informed Consent

Greetings! My name is Mercy Jebet, a MSc. Sanitation student of Meru University of Science and Technology. I am here today to conduct a research on "*Household and Socioeconomic Factors Influencing Sanitation Technology Choice in Kapseret Sub-County, Kenya*."

Your household has been randomly selected for this survey among other households. If you are interested to participate in this survey, I would ask you some questions on your households, its members and characteristics, and the socio-economic and cultural factors that influenced your choice of the sanitation technology you currently employ.

The interview would take approximately 30 minutes. The information you will provide will be confidential between you and the researcher involved in this study and it shall only be used for the purpose of this research. To ensure your anonymity, you're not required to disclose your name. Your participation is absolutely voluntary and you can withdraw from the survey any time you want.

There are no charges, risks or any financial or material compensation associated with your participation in the study. Even though you will not directly benefit from this survey, the information that you will provide us will give some important information to the policy makers to improve the overall sanitation and hygiene condition of sub-county, which consequently will cascade to your household.

Do you want to participate in this survey? YES……

NO……

Participant's signature _____

In case of further enquiries, kindly contact the researcher via email: jebetmercy40@gmail.com or phone: +254-726616038.

Appendix B. Questionnaire for Household Heads

Aim: To investigate the socio economic factors influencing households' selection of sanitation technologies in Kapseret sub county, Uasin Gishu County, Kenya.

Objectives:

1. To examine households' characteristics that influence the status of sanitation in Kapseret Sub-County, Uasin Gishu County.
2. To examine the social factors influencing adoption of sanitation technologies and practices in Kapseret Sub-County, Uasin Gishu County.
3. To determine the economic factors influencing households' adoption of sanitation technologies in Kapseret Sub-County, Uasin Gishu County.

INSTRUCTIONS:

This questionnaire consists of 5 sections. Section A-E, each section focuses on a specific aspect. Answer ALL questions objectively.

SECTION A: **Household Characteristics**

1. What is your gender? (Tick where appropriate) Male ☐ Female ☐
2. In which age bracket do you fall? (Select the range)
   18-24 years ☐
   25-34 years ☐
   35-44 years ☐
   45-54 years ☐
   55-64 years ☐
   65 and above ☐
3. How many people do you live with in your household? (Tick one)
   1-2 ☐
   3-4 ☐
   5-6 ☐
   7-8 ☐
   9-10 ☐
   11 and above ☐
4. In which type of house do you live?
   Rent ☐ Owned ☐

5. In what kind of housing structure do you live?
   Temporary ☐ Semi-permanent ☐ Permanent ☐
6. Are you a permanent (or plan to be a permanent) resident of Kapseret Sub-county?
   YES_____ NO_____

SECTION B: Sanitations Technologies

7. Do you have access to a sanitation facility in your household? YES _____ NO_____
   If yes, proceed with the interview. Else, hand over the questionnaire.
8. What is the ownership of the sanitation facility you use in your household?
   Private ☐ Government-owned (public) ☐ Community-owned ☐ others ☐
9. What type of sanitation technology do you use in your household?
   Open Defecation ☐
   Unimproved ☐
   Improved ☐
10. Specify the sanitation technology you use in your household.
    A. Open Defecation ☐
    B. Dig and burry ☐
    C. Bucket latrine ☐
    D. Temporary Pit latrine ☐
    E. Ventilated Improved Pit ☐
    F. Pour-flash toilet linked to a septic tank ☐
    G. Connected sewer system toilet ☐
11. In a scale of 1-4, to what extent are you satisfied with your current sanitation facility?
    A. 1-Dissatisfied
    B. 2-Less Satisfied
    C. 3-Satisfied
    D. 4-Very Satisfied
12. Fill the table below with the number of your household members that fall in the listed age brackets.

Age bracket (years)	**Frequency**
0-5	
6-17	
18-35	
36- 65	
Above 65	

13. Do you have access to a reliable sewage system in your area?
    Yes ☐ No ☐
14. How many households share the same sanitation facility as yours?

    _____

15. Are there any sanitation facilities available for public use in your community?
    Yes ☐ No ☐
16. If yes, please specify the type and condition.

_____

_____

17. Do you pay for sanitation services or maintenance?

Yes ☐ No ☐

SECTION C: Socio-economic factors influencing the choice of the Sanitation facility

18. What is your primary (main) source of income? (Choose one)
    A. Salaried employment ☐
    B. Business ☐
    C. Farming ☐
    D. Donations and well-wishers ☐
19. What is your highest level of formal education? (Select one)
    A. No formal education ☐
    B. Primary ☐
    C. Secondary ☐
    D. College or Vocational Technical training ☐
    E. University ☐
20. What is the approximate monthly income of your household? (in KES)

    _____
21. (a) Do financial constraints influence your choice of sanitation technology?

    Yes ☐ No ☐

    (b) If yes, please specify how financial constraints affect your choice of sanitation technology: ……

    ……

    ……

    ……
22. How far is your nearest sanitation facility (in metres)?
    A. 0-100m ☐
    B. 101-200m ☐
    C. 201-500m ☐
    D. More than 500m ☐
23. What is the primary source of water supply for your household's domestic use?
    A. Surface water e.g. river, dams etc. ☐
    B. Borehole/Well ☐
    C. Piped ☐

D. Rainwater ☐
E. Others (specify)…….

24. Is the source selected in (No. 19) above reliable (there's no shortage of water throughout the year)?

Yes ☐ No ☐

25. In your opinion, rate the extent to which the following factors influence the choice of adopting a sanitation facility in your area? (Use a 1-5 Likert scale, where 1-No extent, 2-small extent, 3-moderate extent, 4-Great extent, and 5-Very Great Extent.)

Choice Factor influencing your adoption of sanitation	**1**	**2**	**3**	**4**	**5**
Cost (installation and maintenance)					
Prestige (your status in the society)					
Reliability and Durability (of the sanitation technology)					
Availability of materials for installation/construction					
Level of income					

26. Do you face any financial constraints in maintaining or upgrading your sanitation facilities?

Yes ☐ No ☐

If yes, please specify.

_____

_____

SECTION C, PART II: Socio-cultural factors influencing the choice of sanitation

27. What is your religion?

Christian ☐ Muslim ☐ Hindu ☐ Atheist ☐ None ☐

28. (a) Are there cultural beliefs or practices that affect your choice of sanitation technology?

Yes ☐ No ☐

(b) If yes, please specify some of the beliefs and practices ……

……

……

……

29. (a) Do you consider the opinions of your community or neighbors when choosing a sanitation technology?

Yes ☐ No ☐

(b) If yes, please explain how these societal norms influence your choice of sanitation. ……

……

……

……

30. Does your culture/belief/custom allow you to share the sanitation facility with your mother/father in-law?

Yes ☐ No ☐

31. Do you find it normal to share a sanitation facility with a chronically ill person, whether within n your household or a visitor?

Yes ☐ No ☐

32. In your opinion, rate the extent to which the following factors influence the choice of adopting a sanitation facility in your area.? (Use a 1-5 Likert scale, where 1-No extent, 2-small extent, 3-moderate extent, 4-Great extent, and 5-Very Great Extent.)

Choice Factor influencing your adoption of sanitation	**1**	**2**	**3**	**4**	**5**
Community perception					
Gender roles					
Traditional customs					
Spiritual beliefs					
Level of education					

33. Are you aware of the sanitation rules and regulations?

Yes ☐ No ☐

34. If your answer in no. (33) above is YES, mention the regulation.

……

……

……

35. Does the Public Health Officers regularly inspect your sanitation facility?
    Yes ☐ No ☐
36. Do you experience any challenges with water availability for sanitation purposes?
    Yes ☐ No ☐
    If your answer in no. (36) above is YES, state the challenge.
    ……
    ……
    ……
37. Are there any community initiatives or programs aimed at improving sanitation in your area?
    Yes ☐ No ☐
    If your answer in no. (37) above is YES, please describe your involvement.
    ……
    ……
    ……

Thank you for your time and valuable insights.

END.

Appendix C. Interview Guide

Section 1: Household Demographics and Employment Status

1. Can you tell me a bit about your household, such as the number of family members and any specific challenges you face related to sanitation?

2. Can you describe the employment status of the head of your household?

3. How has the employment status of the household head influenced your access to sanitation facilities or services?

Section 2: Sanitation Options

4. Could you describe the sanitation facility used by your household?
5. How do you find the accessibility and reliability of your current sanitation facility?
6. Are there any challenges or inconveniences associated with your sanitation facility?
7. How many households share the same sanitation facility with yours, and how does this arrangement work?
8. Do you have access to a sewage system in your area, and how is it managed?
9. If you pay for sanitation services or maintenance, could you describe the associated costs and how they impact your household's finances?

Section 3: Social factors

10. What is the approximate monthly income of your household, and how does this income influence your choices regarding sanitation technology?
11. Can you tell me about the education level of the head of your household? How might education influence sanitation-related decisions?
12. How knowledgeable do you feel about proper sanitation and hygiene practices?
13. Have you or any household members received training or information related to proper sanitation practices?
14. Have financial constraints played a role in your choice of sanitation technology?
15. If so, could you provide examples of how financial limitations have affected your decisions?
16. Are there cultural beliefs or practices that influence your selection of sanitation technology?
17. Can you provide specific examples of how cultural factors impact your choices?

18. Do you consider the opinions and behaviors of your community or neighbors when making decisions about sanitation technology?
19. Is there anything else you'd like to add or any other insights you think are important for us to know about sanitation in your community?

Thank you for your time and valuable insights.

-END-

Appendix D. MIRERC Letter of Introduction

MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY
P.O. Box 972-60200 – Meru-Kenya.
Cell phone: +254 712 524293, +254 799 529958, +254 799 529959
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SCHOOL OF ENGINEERING AND ARCHITECTURE
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

TO: Whom It may concern DATE: 4th April, 2024

Dear Sir/Madam,

RE: INTRODUCTORY LETTER FOR MERCY JEBET, REG NO. EG407/201599/21

The above-named, is a student in the Department of Civil and Environmental Engineering at Meru University of Science and Technology, pursuing a Master's degree in Sanitation. She has been approved to conduct research on "**Assessing household characteristics, social and economic factors influencing household's selection of sanitation technologies in Kapseret Sub County, Uasin Gishu County, Kenya**" aimed at completing her studies. This is therefore, to request that you grant her any assistance needed to enable her meet the program requirements for her graduation.

Kindly contact us for any further enquiries.

Thank you

Mirara Simon W.
Chair of Department, Civil and Environmental Engineering
Meru University of Science and Technology

Email: CODcivilengineeing@must.ac.ke
Smirara@must.ac.ke

Appendix E. NACOSTI Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 496410

Date of Issue: 17/April/2024

RESEARCH LICENSE

This is to Certify that Ms.. MERCY JEBET JEBET of Meru University of Science and Technology, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Uasin-Gishu on the topic: "Assessing household characteristics, social and economic factors influencing household's selection of sanitation technologies in Kapseret Sub County, Uasin Gishu County, Kenya" for the period ending : 17/April/2025.

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See overleaf for conditions

Appendix F. Journal Article

Volume 10, Issue 7, July – 2025 International Journal of Innovative Science and Research Technology
ISSN No: 2456-2165 https://doi.org/10.38124/ijisrt/25jul1243

Socio-Economic Determinants of Sanitation Technology Adoption in Kapseret Sub County, Uasin Gishu County, Kenya

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[1]Meru University of Science and Technology, School of Engineering and Architecture;
[2]Meru University of Science and Technology, School of Health Sciences
[3]Meru University of Science and Technology, School of Mathematics

Corresponding Author: Mercy Jebet*

Publication Date: 2025/08/12

Abstract: In many rural areas of developing nations, access to improved sanitation is still a major public health and development concern. This study examines how households in Kapseret Sub-County, Uasin Gishu County, Kenya, utilize sanitation technology in relation to socioeconomic parameters. Data was obtained from 475 families selected by stratified random sampling in four different regions using a descriptive research method. Descriptive statistics, correlations, regression, and ANOVA tests were used to evaluate both qualitative and quantitative data using SPSS (version 26).

According to the results, 30.9% of respondents used unimproved sanitation methods, whereas 69.1% of respondents had access to improved options, such as pour-flush toilets that were connected to septic tanks or sewage systems. The choice and sustainability of sanitation systems were greatly impacted by socioeconomic characteristics, including household income, education level, employment status, dwelling structure, and access to building materials. 32.4% of households reported having financial difficulties, which suggests that maintaining current amenities is difficult. Analysis of regression and association highlighted how education and income influence sanitation adoption and behavior.

The study concludes that effective sanitation interventions must address multiple interrelated socio-economic challenges. It recommends a collaborative, community-based approach integrating education, financial support, and infrastructure development to enhance sanitation access and sustainability in the region.

Keywords: *Sanitation Technologies, Household Characteristics, Socio-Economic Factors, Community Attitudes, and Cultural Norms.*

How to Cite: Mercy Jebet; Patrick Kubai; Grace Gakii (2025). Socio-Economic Determinants of Sanitation Technology Adoption in Kapseret Sub County, Uasin Gishu County, Kenya. *International Journal of Innovative Science and Research Technology*, 10(7), 3510-3519. https://doi.org/10.38124/ijisrt/25jul1243

I. INTRODUCTION

Sanitation is a public good that benefits society by improving health, economic development, and social well-being. Proper sanitation forms the sturdy threads that weave health, dignity, and prosperity together. It leads to prevention of disease, acting as a formidable barrier against the spread of pathogens that lurk in contaminated water and inadequate waste disposal. Inadequate sanitation can lead to various health issues, particularly affecting children, including diarrhoea, worm infections, and stunting. According to the UNICEF/WHO (2015) report, Insufficient sanitation affects more than one billion people globally and thus harms entire communities due to environmental pollution. Socioeconomic factors form the warp and weft that shape the fabric of our lives. From the cradle to the grave, they exert a profound influence on our well-being, determining our access to resources, opportunities, and essential services. The socioeconomic status encompasses a myriad of interconnected elements, including income, education, occupation, and social class. These factors serve as the compass that navigates our journey through life, shaping the landscape of our experiences and shaping the contours of our aspirations. The household's income status, for example, dictates the purchasing power and economic security. It determines the ability to afford basic necessities such as food, shelter, and healthcare, laying the foundation for a life of stability.

Appendix G. Plagiarism Report

DrillBit

The Report is Generated by DrillBit Plagiarism Detection Software

Submission Information

Author Name	Mercy Jebet
Title	HOUSEHOLD AND SOCIOECONOMIC FACTORS INFLUENCING SANITATION TECHNOLOGY CHOICE IN KAPSERET SUB-COUNTY, KENYA
Paper/Submission ID	4351545
Submitted by	library@must.ac.ke
Submission Date	2025-09-11 16:46:56
Total Pages, Total Words	142, 26333
Document type	Thesis

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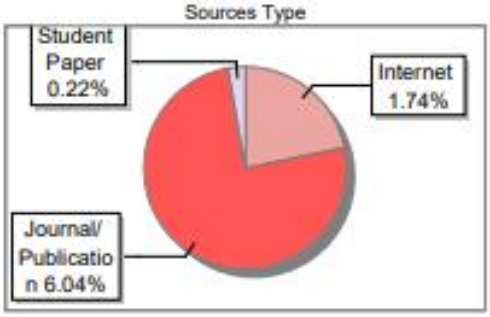

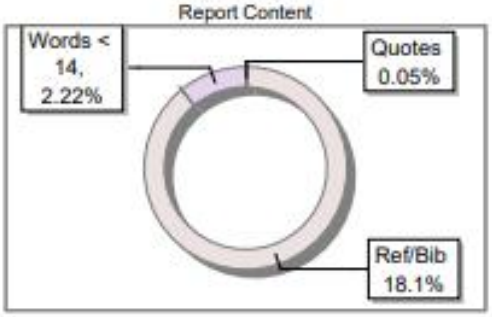

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