TRIBHUVAN UNIVERSITY

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THESIS NO: 079/MSURP/010

Towards Inclusive Urban Spaces: Public Toilet Accessibility for Women in Kathmandu and Lalitpur Metropolitan City

by

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A THESIS

SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTER OF SCIENCE IN URBAN PLANNING

DEPARTMENT OF ARCHITECTURE

LALITPUR, NEPAL

APRIL, 2025

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The undersigned certify that they have read, and recommended to the Institute of Engineering for acceptance, a thesis entitled "Towards Inclusive Urban Spaces: Public Toilet Accessibility for Women in Kathmandu and Lalitpur Metropolitan City" submitted by Prajeeb Raj Kandel in partial fulfillment of the requirements for the degree of Master of Science in Urban Planning.

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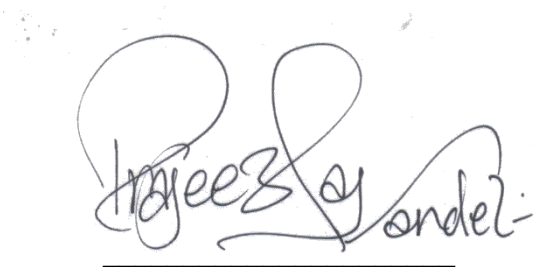
DECLARATION

I hereby declare that the thesis entitled "Towards Inclusive Urban Spaces: Public Toilet Accessibility for Women in Kathmandu and Lalitpur Metropolitan City", submitted to the Department of Architecture in partial fulfillment of the requirement for the degree of Master of Science in Urban Planning, is a record of an original work done under the guidance of Dr. Ajay Chandra Lal, Institute of Engineering, Pulchowk Campus. Except for the material consulted, which has been properly referenced and acknowledged, all of the work in this thesis was done by me.



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ABSTRACT

Urban spaces are home to diverse populations, yet urban planning often prioritizes efficiency over inclusivity, resulting in environments that fail to accommodate women's needs. Public toilets, a fundamental aspect of urban infrastructure, are particularly neglected, disproportionately affecting women due to biological, social, and safety concerns. In Nepal, the inadequacy of public toilets marked by poor accessibility, affordability issues, and lack of inclusivity significantly limits women's mobility and participation in public life. This study examines the challenges women face in accessing public toilets in Nepal, with a focus on the cities of Kathmandu and Lalitpur. Through a mixed method approach, combining quantitative surveys with 168 women and qualitative stakeholder interviews, the research explores issues related to accessibility and inclusivity. The study also investigates the gaps in existing policies that contribute to the inadequate provision of sanitation facilities for women. Findings reveal significant barriers that hinder equitable access to public toilets, reinforcing the need for policy reforms, inclusive design, and improved management. This research provides valuable evidence for urban planners and policymakers to guide the development of gender-sensitive, accessible, and inclusive public toilets. Addressing these challenges is essential for promoting gender equality, public health, and sustainable urban development, as well as fostering inclusive urban spaces for all.

ACKNOWLEDGEMENT

I can't remain still without acknowledging all the concerned who in one way or another provided their valuable time and assistance and without whom the accomplishment of this study wouldn't have been possible.

I extend my immense appreciation and deepest gratitude to my supervisor, Dr. Ajay Chandra Lal for his professional guidance, constructive suggestion, valuable support, constant inspiration and enthusiastic encouragement throughout the entire research process. The willingness to give his valuable time so generously and providing me the opportunity to learn at my own pace has been very much appreciable.

I would also like to pay my special regards to Prof. Dr. Sangeeta Singh, Prof. Dr. Sudha Shrestha, Assistant. Prof. Dr. Inu Pradhan Salike and all the faculties of Department of Architecture for their firm guidance throughout my academic journey of M.Sc. Urban Planning for instilling within me a keen interest in research work.

I whole-heartedly appreciate the support from Aerosan Sustainable Sanitation for providing me information. Furthermore, I would like to offer my profound gratefulness to all the supportive officials and staffs of Kathmandu Metropolitan City and Lalitpur Metropolitan city for my study. Also, I am thankful to various government and national international non-government agencies providing valuable information for research.

I am extremely grateful to my beloved parents and my sister who are the greatest inspiration and motivation of my life. Special thanks to my sister Preju Kandel for her invaluable assistance in data collection and analysis. Last, but not least my sincere gratitude towards all the participants who consented to participate in this study including attendants and care takers of various public toilets.

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ACRONYMS AND ABBREVIATIONS

ANOVA	Analysis of Variance
CEDAW	Convention on the Elimination of All Forms of Discrimination against Women
CPC	City Planning Commission
DUDBC	Department of Urban Development and Building Construction
DWSS	Department of Water Supply and Sanitation
GEDSI	Gender Equality Disability and Social Inclusion
GoN	Government of Nepal
KII	Key Informant Interview
KMC	Kathmandu Metropolitan City
KTM	Kathmandu
LGOA	Local Government Operation Act
LMC	Lalitpur Metropolitan City
M&E	Monitoring and Evaluation
NIMBY	Not in My Back Yard
PAT	Publicly Accessible Toilets
PPP	Public Private Partnership
PT	Public Toilet
SDG	Sustainable Development Goals
UN	United Nations
UNGA	United Nations General Assembly
VC	Vice Chairman
WC	Water Closet
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Urban spaces are home to diverse populations, with women and girls accounting for approximately half of the urban demographic. Yet urban planning often focuses on efficiency and functionality, but it usually takes a male-centered approach and overlooks gender sensitivity(Massey, 1994). This exclusion has resulted in cities that lack inclusivity and equity, with systemic inadequacies that hinder women's participation in public life (UN-Habitat, Gender Issue Guide).

Public space, according to the New Urban Agenda, ideally provide multifunctional areas for social interaction and inclusion, human health, and well-being (UN, 2016). While public spaces play a crucial role in fostering social interaction, economic activity, and cultural expression, they frequently fail to address the diverse needs of all users, particularly women (UN-Habitat, Gender Issue Guide). Women and men experience urban life differently, both in perception and use of public spaces (UN Women/Safe Cities Global Program, 2009).

Public toilets, a critical component of urban infrastructure are not merely functional but essential for public health, freedom of movement, and fostering inclusivity in urban life. Despite their greater significance for women due to biological and social factors, public toilets are often marginal, poorly maintained, and a last-resort option for women, compromising their comfort, dignity, and participation in public life(Anthony & Dufresne, 2007).

Global disparities in sanitation access, particularly in urban areas, disproportionately affect women, exacerbated by safety concerns and societal norms (UNICEF and WHO, 2019). These issues highlight the urgent need for gender-sensitive sanitation planning, underscored by the Sustainable Development Goals (SDGs), including SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities).

In 2015, the United Nations released the 2030 Agenda with the Sustainable Development Goals (SDGs), which established goals to be achieved by the year 2030, including universal access to water and sanitation (Goal 6.2) and universal provision of accessible, safe, and inclusive public spaces, especially for women, girls, the elderly and people with disabilities (Goal 11.7) (UN, 2015).

Access to sanitation is a basic human right, vital for preventing diseases like cholera and diarrhea, and reducing social inequality (UN, 2015). However, public toilet facilities often fail to meet women's needs, which are amplified by biological factors like menstruation and increased susceptibility to urinary infections, as well as sociocultural barriers to open discussions about sanitation. Historically, women's sanitation needs have been overlooked, with adequate public toilet provisions achieved only through civil campaigns in countries such as Canada, New Zealand, Australia, and the UK (MARGARET W. ANDREWS, 1990).

Public toilet issues are common throughout Nepal, especially on highways and in urban areas like the Kathmandu Valley, where these challenges are more severe. Around 60 public toilets serve over one million residents, often lacking basic amenities like running water, soap, or sanitary product disposal systems, making them unwelcoming and unsafe for women.

This research contextualizes these issues, exploring barriers faced by women in accessing public toilets and offering actionable insights for gender-sensitive urban planning. Addressing these challenges is crucial to achieving gender equity, enhancing public health, creating inclusive urban spaces and fostering sustainable urban future.

1.2 PROBLEM STATEMENT

Urbanization drives economic growth and cultural development, but it also tends to deepen socio-economic inequalities and social exclusion (UN Women/Safe Cities Global Program/2009). While cities offer opportunities, uneven access to resources and services often leaves marginalized groups behind, exacerbating disparities within urban populations. The lack of gender-sensitive, inclusive policies and weak governance has led to exclusion, particularly for women and marginalized groups, limiting their access to vital urban resources.

Historically, the design and planning of public toilets have been male-dominated, with little input from women regarding their specific needs as most of the engineers, architects and decision-makers were men, and they had very little concern with women's needs. As a result, women's unique needs have often been overlooked, leading to facilities that are uncomfortable, unsafe, and inadequate. Women have fewer facilities than men, yet their needs are greater, particularly in terms of privacy, cleanliness, and safety (Anthony & Dufresne, 2007). This oversight has led to the

exclusion of women from fully participating in public life, with some arguing that inadequate toilet provision was even a means of controlling women's access to the city, keeping them at home and away from the public realm, but as more women worked outside the home, the need became greater(Penner, 2013).

Despite being a natural bodily function, the act of urination has become a challenge for women due to inadequate public toilet facilities. It is extremely difficult for women to find public toilets when they are needed, and even when they do, they are unsanitary to use due to non-functioning flush and tap, unsafe doors and lock system, a lack of soap, and a lack of a space to dispose sanitary napkins. There is also concern about infection and assault. Inadequate public toilet facilities also have significant health implications. Studies have shown that women reported restricting fluids at work and when away from home in order to avoid or to delay the need to urinate due to poor facilities, which can lead to unhealthy bladder habits and urinary dysfunction(Hartigan et al., 2020). Furthermore, the lack of privacy and safety concerns in many public toilets further deter women from using these spaces, perpetuating social exclusion.

Biological differences, such as a smaller bladder capacity in women and factors like pregnancy, menstruation, menopause, and a higher prevalence of incontinence among aging women lead to more frequent and prolonged toilet visits. Women tend to be more active during daytime hours, relying on public transportation more frequently than men. They also often travel with children or elderly family members. Women also require cubicles to urinate, must manage more clothing, and often spend longer in restrooms as a result(Kira, 1977). Studies show women take nearly twice as long as men in restrooms(Rawls, 1988), yet public toilet facilities are often inequitable, with men typically provided double the urinal provisions in the same floor space(Penner, 2013). This imbalance forces women to face long queues or hold their bladder, underscoring a significant yet underrecognized public health and gender equity issue. 80% female do not use public toilets when they are in their menstrual periods inside Kathmandu. (WaterAid)

In Nepal, there is a severe scarcity of well-functioning public toilets. Kathmandu Valley has a total of 65 public toilets (excluding hospitals, public offices, parks, and petrol pumps) that serves one million inhabitants. This limited number of toilets provides sanitation facilities to the mobile and seasonal population thronging inside the Valley. Furthermore, it is estimated that one public toilet serves 3,000 people daily in the

Kathmandu Valley. This is against the standard set by the World Health Organization which maintains that there needs to be one toilet per 50 people and a toilet at every 500m distance(Pathak, 2019).

68 public toilets in Kathmandu valley, serving at least 300 persons per day. Public toilet in Pasupati and Ratnapark serves 1000 person a day.KMC public toilets are run by vendors in Bhotahiti- based public toilet at Rs. 412,500 . KMC generates nepali rupees five million per year from 29 public toilets of Kathmandu. Vendors operating public toilets for profit makes toilets in KMC in a "sorry state". (AEROSAN)

Figure 1 Toilet at Kalimati

Figure 2 Toilet at Swayambhu

1.3 RATIONALE OF RESEARCH

1.3.1 Need

Although ‘planning is for people’ (Broady, 1968), in both urban planning and architecture, there has been little awareness of the physical and biological characteristics of different groups in society (Bichard, 2015). The accessibility, safety, hygiene, and privacy of public toilets have been consistently overlooked in conventional urban design frameworks(Greed, 2016).

The toilet problem is not ‘just’ a women’s issue but one that affects all urban residents, as it has far-reaching implications for public health, safety and inclusion. Addressing these issues is crucial for developing urban infrastructure that promotes gender equity. The literature highlights that unequal and insufficient provision of public toilets poses a significant barrier to creating sustainable, healthy, and inclusive urban environments(Hanson et al., 2004)**.** When public toilet facilities are inadequate, they restrict people’s ability to fully participate in urban life, limiting access to work, education, and social activities (Michael et al., 2006). Research has demonstrated that public toilet provision constitutes a vital missing link that would enable the creation of more sustainable, accessible, healthy, equitable and inclusive cities (Hanson et al., 2007).

Existing research points to a strong link between inadequate public toilet facilities and reduced mobility for women(Michael et al., 2006). While many studies underscore the importance of safe, accessible, and clean public toilets, they often lack comprehensive, user-centered perspectives. The existing research on public sanitation has often addressed general hygiene and accessibility issues but rarely delves into gender-specific challenges.

Research on public toilet provision highlights that access and equality are not merely issues of spatial configuration and design but are deeply rooted in political and social contexts(Greed, 2009). Traditional approaches to studying this subject fall short, as (Penner, 2005)argues, emphasizing the need for sociocultural perspectives. Existing building codes focus on technical standards, such as fixture type and design, but fail to consider how social patterns influence and interact with these standards(Kitchin & Law, 2001; Molotch & Norén, 2010).

This gap underscores the necessity of research that explores public toilet provision comprehensively, incorporating user perspectives and sociocultural factors. There is a critical need for research that incorporates user perspectives and sociocultural contexts to create a comprehensive understanding of public toilet provision.

In Nepal, studies on public toilets are sparse, and those focusing on women's unique needs are even scarcer. To fill the gaps in current research, this study seeks to examine how social and physical factors of public toilet provision interact, focusing on users' experiences in a less-studied area such as Nepal.

Global examples highlight the importance of prioritizing public toilet provision. For instance, Thailand's public toilets meet the HAS (Health, Accessibility, and Safety) standard in over 71% of cases (Govt flushed with pride on loo standards, 2018), while Singapore's Restroom Association has advocated for clean, safe, and accessible facilities since 1988 (Restroom Association Singapore, n.d.). Similarly, the World Toilet Organization and its sister organizations in Japan, Taiwan, China, Malaysia, and Singapore have driven significant progress by framing toilet provision as a marker of modernity and civic pride. These governments have invested heavily in infrastructure, often adopting female-to-male toilet ratios of 2:1 (or even 3:1 in Japanese tourist areas) to address inequities (Miyanishi, 1996; WTO, 2015). In Europe, cities like Zurich and Vienna have integrated public toilet planning into urban development frameworks, emphasizing gender mainstreaming(Doris Damyanovic et al., 2013).

However, Nepal lacks similar standards or frameworks for public toilet planning and operation. The absence of government regulation and gender-sensitive policies further exacerbates the problem, making it crucial to explore how public toilets can be planned, designed and operated to meet the unique needs of women in urban areas like Kathmandu Valley.

There are multiple perspectives of users, implementing/operating parties, policy makers and planners that needs to be un folded to solve the challenges and problems of public toilets in KMC. (Public Toilets in KMC)

1.3.2 Importance

This study emphasizes the importance of prioritizing women's sanitation needs to promote gender-sensitive and inclusive urban spaces, aligning with the Gender Mainstreaming Strategy. As *UN-Habitat* notes "Cities for women are cities for all".

Inadequate public toilet provision limits participation in urban life, while well-designed streets and accessible public toilets can foster safer environments, encourage walking and cycling, and enhance women's well-being (Michael et al., 2006).

Addressing women's public sanitation supports global efforts to create inclusive urban spaces and ensures urban planning frameworks cater to diverse user needs (Watson, 2006). Moreover, accessible and hygienic public toilets are vital for women's health and well-being, and this study aims to identify sanitation gaps and contribute to public health improvements (UNICEF & WHO, 2019).

This study will provide evidence-based insights to guide policymakers and urban planners in designing gender-sensitive public sanitation infrastructure, emphasizing its critical role in shaping sustainable urban development (Greed, 2016). It advocates for adequate, well-equipped, and accessible facilities that cater to women, children, people with disabilities, and other marginalized groups. By raising awareness among decision-makers, the findings aim to address barriers women face in accessing sanitation and inspire future studies on the needs of other underrepresented communities, such as non-binary individuals. The research will also offer actionable recommendations for improving the design, maintenance, and governance of public sanitation infrastructure, with a focus on urban areas like Kathmandu Valley.

1.4 RESEARCH PURPOSE

1.4.1 General Objective

To study the challenges and needs of women in public toilets in urban areas to inform the creation of inclusive urban spaces.

1.4.2 Specific Objectives

The specific objectives of research are:

1. To assess perspectives of women in accessing and using public toilets in urban spaces
2. To explore stakeholders' understanding of inclusiveness and challenges in public toilets in urban spaces
3. To develop evidence-based strategies for creating inclusive public toilets and urban spaces

CHAPTER TWO: LITERATURE REVIEW

2.1 INCLUSION

(Zallio & Clarkson, 2021) define inclusion in its expanded form, that is, it includes understanding how people behave, socialize, live, and access the place. It goes beyond simply creating designs or technologies that are functional for persons with disabilities. If inclusion is understood to be the end goal, then accessibility may be understood as an attribute or trait of any product, space, or technology, which nudges it towards the end goal. Accessibility and inclusion in the context of public toilets have various wide-ranging interpretations like availability, usability, affordability, safety, hygiene, etc.

2.2 SOCIAL INCLUSION

Social inclusion involves creating conditions that provide everyone with equal access to opportunities and services. It is a comprehensive process that supports the full and active involvement of all individuals in various areas of life, including social, economic, political, and civic activities, as well as in decision-making. Promoting equality and social inclusion helps ensure that all people can participate with dignity and have the same chances to succeed.

2.3 ACCESSIBILITY

Article 9 of the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) is about accessibility and defines its purpose as one that ensures access of persons with disabilities on an equal basis with everyone across the aspects of the physical environment, information & communication along with all services and facilities available to the public (UNCRPD, 2007).

2.4 URBAN SPACE:

Urban space encompasses interconnected urban areas and multiple municipalities that together form a continuous region. It is defined by various features such as its size, shape, density, land use patterns, types of buildings, arrangement of city blocks, and the presence of green areas. Common examples of urban spaces include markets, city plazas, parks, public buildings, sidewalks, streets, and transportation centers like bus stations.

2.5 PUBLIC

The term "public" refers to the collection of people who form a state, nation or community; their ethnicity, race, gender, and various characteristics of the human

population, while the term "public space" is used to describe areas or places that are accessible and used by individuals.

2.6 PUBLIC SPACE

The definition of public space was first made in 1962 by the German philosopher, sociologist and political scientist Jürgen Habermas. According to Habermas, it is the public domain that "private individuals exert their wisdom around a common issue that concerns them, engage in rational discussion, and thereby define the common position of the subject, the means, processes, and spaces in which they form the public". **Habermas (2000)** defined that, "Public space is the concept used in modern society theories to refer to the common social activity in which thought, rhetoric and actions were produced and developed to determine the common good of society" (Kemal Kocaili & Hersek, 2023)(Yayınları et al., 1997).

Public spaces are areas open to everyone, where people can freely participate in various activities. These spaces play a vital role in enhancing quality of life by supporting health, economic benefits, and social connections. However, many metropolitan areas worldwide face challenges such as rapid urban changes and decreasing usability of these spaces. According to Carr, public spaces serve as communal centers where people engage in daily routines and community rituals that strengthen social bonds.

The Oxford Dictionary defines "public" as something open to or shared by all people, "open" as not closed or obstructed, allowing access, and "space" as an area or interval between objects. Public spaces often reflect a city’s socioeconomic conditions and showcase its local culture. When designing public areas intended for community use, several key factors should be considered to ensure their success. These include easy accessibility and visibility, aesthetic appeal, cost-effective maintenance, and safety. (Marcus & Francis, 1990) To promote security and social cohesion, public spaces should serve as common areas that accommodate people from diverse income levels, educational backgrounds, and cultures, fostering networks of relationships within the urban environment.

2.7 SANITATION

Sanitation is defined as access to and use of facilities and services for the safe disposal of human urine and faeces. A **safe sanitation system** is a system designed and used to

separate human excreta from human contact at all steps of the sanitation service chain from toilet capture and containment through emptying, transport, treatment (in-situ or off-site) and final disposal or end use. Safe sanitation systems must meet these requirements in a manner consistent with human rights, while also addressing co-disposal of greywater, associated hygiene practices and essential services required for the functioning of technologies.

2.8 TOILETS

The toilet is the place where the drain is provided by sewage system. Toilette, "toilette", is a French word and is used in Turkish as the name of both the action and the name of the space. The acronym "WC" was also recognized as an abbreviation for toilet places around the world. As a global icon, many redirect sign designs use WC letters directly. The abbreviation WC stands for the initials "Water Closet" in English. In medieval times, European toilet spaces were designed to be resolved in built-in cabinets in space, a name that has been inherited from that period.

2.9 PUBLIC TOILET DEFINITION

As to definitions, public toilets in the UK (indeed, in much of the West) are seen to comprise both traditional ‘on-street’ local authority public toilets and ‘off-street’ toilets to which the public has right of access – for example, in restaurants or department stores. Together, these have usefully been defined by the British Toilet Association (BTA) as ‘away from home’ toilets(BTA, 2001). The BTA subsequently defined them as ‘Publicly Available Toilets’ (PATs) (KEMP, 2010).
This definition is problematic, as it suggests that the public are a unitary group with equal access for all, when clearly there are many gender, class, appearance and disability factors which determine a person’s chances of using a particular toilet. Thus, the phrase ‘Publicly Accessible Toilets’ is seen to be more realistic(Knight & Bichard, 2011).

2.10 KEY CONCEPTS

Sex describes the biological characteristics that distinguish males and females. While some individuals are born with intersex traits, for most people, biological sex is assigned at birth and can only be altered through medical procedures.

Gender, on the other hand, relates to the social and cultural meanings, roles, and expectations associated with being male or female. These gender roles are shaped and reinforced by various social institutions such as family, community, education, media, religion, and cultural practices. Gender reflects the social relationships between men and women and serves as a framework for understanding these interactions. Unlike biological sex, gender is socially constructed, varies across cultures, and can evolve over time.

Diversity commonly refers to the variety of cultural and ethnic backgrounds present within a group or society. Recognizing this diversity is essential in research, policy, and planning because culture and ethnicity shape individuals' values, beliefs, and behaviors, influencing how people identify and live as women, men, both, or neither. Valuing cultural and ethnic diversity is also crucial in combating prejudice and discrimination. Beyond culture and ethnicity, diversity encompasses many social factors and relationships that define human societies, including sex, race, caste, socioeconomic status, ability, geographic location, and sexual identity or orientation. These multiple dimensions of diversity contribute to the rich complexity of human communities and must be acknowledged to promote inclusion and equity.

Discrimination against women, as defined by the UN Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), refers to any distinction, exclusion, or restriction based on sex that aims to or results in limiting women's ability to fully enjoy their human rights and fundamental freedoms on an equal basis with men. This applies regardless of a woman's marital status and covers all areas of life, including political, economic, social, cultural, and civil fields (CEDAW, Article 1).

Gender equality means that women and men receive equal treatment and have the same rights and opportunities. It ensures that both genders have equal conditions to fully exercise their human rights and to participate in and benefit from political, economic, social, and cultural development. The concept of equality outlined by CEDAW encompasses the principles of non-discrimination, the responsibility of the state to uphold these rights, and the pursuit of substantive equality, which focuses on achieving equal outcomes.

Intersectionality is an analytical framework used in advocacy and policy-making to address various forms of discrimination. It helps to understand how overlapping

identities influence individuals' access to rights and opportunities. This approach acknowledges that women may face discrimination and human rights violations not only because of their gender but also due to other intersecting factors such as race, age, ethnicity, social class, culture, caste, disability, sexual orientation or identity, religion, and whether they belong to indigenous communities, among others.

Gender mainstreaming involves evaluating the potential effects of any planned action—such as laws, policies, or programs—on both women and men across all sectors and levels. This approach aims to integrate the perspectives and experiences of all genders into the development, execution, and assessment of policies and initiatives. The goal is to ensure that gender considerations are embedded in every political, economic, and social sphere, promoting equal benefits for women and men and preventing the continuation of inequality. Ultimately, gender mainstreaming seeks to achieve gender equality by transforming the core structures and processes of society (United Nations Economic and Social Council Agreed Conclusions, 1997/2).

2.11 GENDER SENSITIVE PLANNING

Gender-sensitive planning ensures that issues and impacts identified through gender analysis are incorporated throughout the stages of planning, design, and implementation. This process involves setting clear goals for achieving gender equality and formulating strategies and actions to reach those objectives. The aim is to provide fair opportunities and achieve equal results for both women and men. Gender-sensitive planning employs targeted approaches and tools to enhance the participation of women and girls in development processes and to evaluate how planned activities affect both women and men.

2.12 RIGHT TO CITY FOR WOMEN:

According to French philosopher Henri Lefebvre, the "right to the city" involves not only living in the city but also having access to and the ability to shape urban spaces as part of everyday life. However, ongoing issues such as gender wage gaps, the concentration of women in low-paying service jobs, widespread sexual harassment, and restricted mobility highlight that women have yet to fully claim this right. To change this, women must unite to assert their collective entitlement to urban life. Achieving this requires a fundamental shift in policymaking and civic education processes to enable women to fully engage with and benefit from the city's public resources and services (Nelischer Kate, 2022).

Indicator is a measurable variable, either quantitative or qualitative, that offers a straightforward way to assess inputs, outputs, or outcomes. It helps establish goals to be reached, describes the current status, and tracks progress over time, allowing for evaluation of success.

2.13 GENDER SENSITIVE INDICATORS:

Gender-sensitive indicators play an important role in achieving gender equality. Gender sensitive indicators are indicators disaggregated by sex, age and socio-economic background. They are designed to demonstrate changes in relations between women and men in a given society over a period. The indicators are tools to assess the progress of a particular development intervention towards achieving gender equality. Sex-disaggregated data demonstrates whether both rural women and men are included in the programme or project as agents/project staff, and as beneficiaries at all levels. The approach allows for effective monitoring and evaluation.

Indicators

Based on existing seven principles of universal design and the five principles of universal design India, in addition to the four 'POUR principles' for accessible technologies defined by the World Wide Web Consortium (W3C) (Purkayastha & Raheja, 2022) are:

1. **Perceivable:** This indicator combines 'Perceptible Information' from the seven principles of universal design and P for 'Perceivable' from the POUR principles for ICTs. It indicates that the technology should be able to effectively communicate relevant information regarding its use, regardless of any ambient disturbances or diverse needs of the user.
2. **Equitable:** This indicator is common between two sets as 'Equitable Use' from the seven principles of universal design and 'Equitable' from the five universal design India principles. It indicates that the technology does not discriminate and is fair to all users with diverse needs.
3. **Operable & Flexible:** This indicator combines 'Flexibility in Use' from the seven principles of universal design, 'Usable' from the five universal design India principles and O for 'Operable' from the POUR principles for ICTs. It indicates that the technology is effectively and efficiently operable by

maximum number of different users and is accommodative of different preferences and abilities.

4. **Simple to Understand & Use:** This indicator combines 'Simple and Intuitive Use' from the seven principles of universal design and U for 'Understandable' from the POUR principles for ICTs. It indicates that the technology is easy to comprehend and use effectively, regardless of the prior level of education, knowledge, language, experience in a particular domain, or skills of the user.
5. **Tolerance for Error:** This indicator combines 'Tolerance for Error' from the seven principles of universal design and R for 'Robust' from the POUR principles for ICTs. It indicates that the technology is designed and implemented with sufficient alternative options for performing its function and minimizing negative consequences in the case the technology, or a part of it, fails.
6. **Optimized Physical or Tangible Features:** This indicator is derived from 'Size and Space for Approach and Use' from the seven principles of universal design. If the technology has a physical or a tangible form, features, or activity in its usage, it needs to be ensured that these features are optimized appropriately for use by maximum number of people with diverse needs.
7. **Culturally Appropriate:** This indicator is derived from 'Cultural' principle from the five universal design India principles. It indicates that the technology should fit the varied cultures and associated preferences of all the communities that would be interacting with it.
8. **Affordable:** This indicator is derived from 'Economy' principle from the five universal design India principles. It indicates that the technology is economically feasible and usable by people from all economic backgrounds.
9. **Aesthetics:** This indicator is derived from 'Aesthetic' principle from the five universal design India principles. It indicates that the 'look' and 'feel' of the technology is appealing to all users, while its various elements like form, color, texture, etc. also play a role in informing the user of its usability, safety, and other dimensions.

Indicators utilized by **Guthi** for assessing status of female friendly public toilet are divided into eight components and their variables. **Safety** is evaluated by considering the **location**, **visibility**, **accessibility**, **signage**, **lighting**, and whether floors are **non-**

slippery. The **operation, maintenance, and management** aspects focus on clearly defined **opening and closing times**, a scheduled **cleaning calendar**, regular **cleaning routines**, proper **waste disposal**, and transparent **management arrangements**. **Infrastructure** is assessed based on the availability of a consistent **water supply** and connection to **sewer** or **septic systems**. Factors affecting the performance of **operators** include the availability of essential **supplies** such as soap and toilet paper, **cleaning materials** like brushes and disinfectants, **protective equipment** for caretakers, access to **maintenance tools**, and the presence of personnel to handle issues like **clogged drains**. **Gender friendliness** is ensured by providing **privacy**, an adequate number of **female cubicles**, designated **female caretakers**, and **mirrors** positioned to maintain privacy at **hand-washing stations**. **Menstrual hygiene management** covers the availability of **sanitary products**, appropriate **disposal bins**, clean water with **buckets**, **hooks and ledges**, proper **menstrual waste disposal** by caretakers, **handwashing facilities**, and additional space for washing clothes or personal hygiene. **Accessibility for disabled users** is addressed by ensuring **door widths** and **cubicle sizes** accommodate wheelchairs, providing **raised toilet seats** and sturdy **handrails**, placing fixtures at suitable heights, and offering flat paths or **ramps with handrails**. Lastly, the **health, comfort, and financial well-being of operators** are considered through provisions for regular breaks, sick leave, seating arrangements, reasonable working hours, health insurance, protection from unruly users, fair wages, and timely salary payments. This comprehensive approach helps ensure that public toilets are safe, accessible, hygienic, and supportive of both users' and operators' needs.

2.14 INDICATORS UTILIZED IN RESEARCH IN TURKEY

The questions were organized into six categories based on **Burton and Mitchell's (2006)** (Burton E, 2006) streets-for-life principles: **familiarity, legibility, distinctiveness, accessibility, comfort, and safety**. This concept serves as a framework for promoting inclusive design at the neighborhood level, aiming to create outdoor environments that are as dementia-friendly as possible. Familiarity in urban settings helps reduce confusion and supports the independence of older adults, encouraging physical activity. Legibility enables individuals to understand their location and navigate to desired destinations. Distinctiveness in vibrant urban spaces attracts people, including those with dementia, and in relation to public toilets, it encourages usage by all. Accessibility refers to the degree to which all individuals,

regardless of ability, can safely and independently reach and use facilities. According **Imrie,** (Imrie, 2000) comfort in the built environment is closely linked to feelings of calmness and a welcoming atmosphere, which are particularly important for spaces such as public toilets. This sense of comfort helps users feel at ease and supported when using these facilities, contributing to their overall positive experience and accessibility. Safety involves the assurance that people can use urban spaces without fear of accidents or harm. These six principles align with concerns about public toilet access raised by other researchers, emphasizing the need to make such spaces more livable by moving beyond their symbolic and social complexities toward broader acceptance and enjoyment. (Burton E, 2006).

Safety refers to the extent to which people can use the urban environment without fear of falling, being attacked, or run over.

The six principles identified by Burton and Mitchell—familiarity, legibility, distinctiveness, accessibility, comfort, and safety—align closely with the challenges related to public toilet access discussed by Gershenson and Penner (Gender Eds O Gershenson, 2009) (Penner, 2005)**.** Their work emphasizes the need to transform toilet facilities beyond their traditional symbolic, social, and material roles, aiming to make these spaces more welcoming and livable. This approach encourages a shift toward greater acceptance and even enjoyment of public toilets, recognizing them as essential urban amenities that support inclusive participation in public life. By addressing these multifaceted issues, designers and policymakers can create toilet environments that better serve diverse populations and enhance overall urban accessibility and comfort.

The normative content of the human right to sanitation is defined by:

1. **Availability**: A sufficient number of sanitation facilities must be available for all individuals.

2. **Accessibility**: Sanitation services must be accessible to everyone within, or in the immediate vicinity, of household, health and educational institution, public institutions and places and workplace. Physical security must not be threatened when accessing facilities.

3. **Quality**: Sanitation facilities must be hygienically and technically safe to use. To ensure good hygiene, access to water for cleansing and handwashing at critical times is essential.

4. **Affordability**: The price of sanitation and services must be affordable for all without compromising the ability to pay for other essential necessities guaranteed by human rights such as water, food, housing and health care.

5. **Acceptability**: Services, in particular sanitation facilities, have to be culturally acceptable. This will often require gender-specific facilities, constructed to ensure privacy and dignity.

2.15 CASE STUDIES

2.15.1 Sulabh Public Toilets in India

Provision of the Sulabh public toilet complexes in public places and slums on 'pay-and-use basis has been an important landmark in the field of community health, hygiene and environmental sanitation.

Sulabh International Social Service Organization, founded in 1970 by Dr. Bindeshwor Pathak, has played a transformative role in improving rural sanitation in India. The organization introduced affordable twin-pit pour-flush toilets, which have become a sustainable model for low-cost sanitation. Sulabh also focuses on biogas generation and waste water treatment using innovative methods like duckweed. These initiatives address both environmental concerns and public health challenges, especially in underdeveloped areas.

Beyond sanitation, Sulabh has contributed significantly to the social and economic empowerment of marginalized communities. It has created employment opportunities for over 60,000 people, including former manual scavengers and women, thus helping them regain dignity and financial independence. Today, more than 6,000 Sulabh toilets serve around 20 million users daily—a scale matched globally only by the Indian Railways. Landmark contributions like the Sulabh Gram, the Sulabh International Museum of Toilets, and the world's largest toilet complex in Maharashtra, with 2,858 seats, reflect the organization's wide-ranging impact. As per the information in the website of Sulabh International.(Sulabh International – Social Service Organization, 2025)

2.16 NATIONAL POLICY REVIEW

2.16.1 Constitution of Nepal

In the Constitution, the concurrent federation (federal government) and state (provinces) are granted powers for water supply and sanitation (Schedule-7) whereas

"basic health and sanitation" is assigned to local level power (Schedule8). Nepal is a signatory of the 2010 United Nations Resolution on the Human Right to Water and Sanitation (UNGA 2010). As such, the Constitution clearly recognizes citizens' rights to "access to clean drinking water and sanitation" as laid out in Article 35 (4). In addition, Article 30 recognizes that "every person shall have the right to live in a healthy and clean environment," (GoN 2015b). This clause is interpreted as including the management of wastewater and waste to ensure these rights.

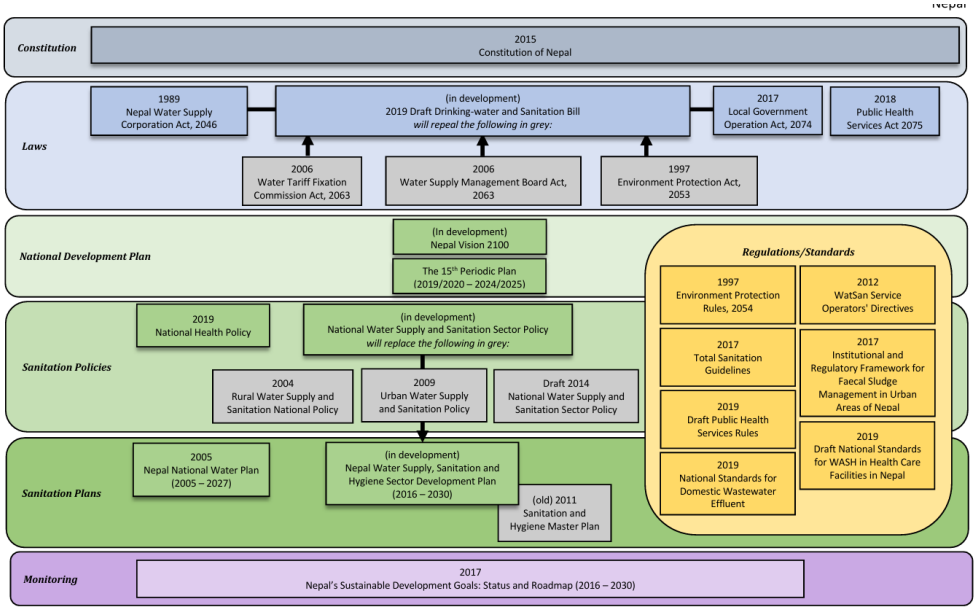


Figure 3 Nepal Sanitation Policy and Planning Framework Case Study for Discussion

2.16.2 National Water Supply and Sanitation Policy 2014

Urban Sanitation

Towns and cities gravely lack toilet facilities at public places and most existing facilities lack adequate water supply and proper upkeep. The poorly managed public toilets set bad example among the people and de-motivates them to have such facilities in their neighborhood.

Public toilet facilities on public transport stops along roads and highways are scarce.

Gender Equity and Social Inclusion

Public toilet facilities are not user friendly to women, children and physically challenged people.

School toilets are not user friendly to girls and physically challenged students.

2.16.3 National Urban Policy 2064

The Policy highlights the historical imbalances and haphazard nature of urban development in Nepal. It views urban centers as catalysts for economic development linked to north-south and east-west access corridors and flags poor sanitation, environmental degradation and lack of services by the urban poor as requiring urgent attention. Urban Policy proposes building the capacity of Municipalities to plan and manage integrated local development activities including the preparation of urban master plans to be moderated by central and regional authorities. Private sector involvement in the sector, particularly investment in infrastructure development, is specifically sought.

2.16.4 Water Supply and Sanitation Act, 2022

Whereas it is expedient to provide clean and quality water supply and sanitation services easily by respecting, protecting and fulfilling the fundamental rights of citizens to receive clean and quality water supply and sanitation services and to make necessary provisions regarding waste-water and sewerage management.

"Sanitation Service" means the act of maintaining environmental cleanliness through sewerage and waste-water management and this term also refers to the act of construction, development, operation and promotion of sewerage systems, waste-water treatment systems and public toilets to protect the water resources.

2.16.5 Local Government Operation Act 2074

More specifically related to sanitation is the Local Government Operation Act, 2074 (GoN 2017b). In 2017, the Local Government Operation Act, 2074 replaced the 1999 Local Self Governance Act. In line with the new Constitution, the Act assigns exclusive powers for "Basic health and sanitation" to the municipalities and extends powers to local government for implementation, monitoring, and formulation of policies, strategies and standards. Another responsibility of municipalities includes awareness raising and management of health care waste, including collection, re-use, treatment, and disposal. The Act identifies Wards as responsible for construction of and operation and maintenance for public toilets, as well as collecting household waste and managing surface water. The Act does not define sanitation. Clause 11, sub-clause 4, assigns concurrent rights over health, drinking-water, and other services to both the federal and municipal governments.

2.16.6 Public toilet Construction, Operation and Management Guideline, 2079 (KMC)

2.16.7 Public toilet Construction, Operation and Management Manual, 2079 (Butwal Sub-Metropolitan City)

2.16.8 Public toilet Construction, Operation and Management Procedure, 2081 (LMC)

Recently, Lalitpur Metropolitan City has developed a procedure for the construction, operation, and management of public toilets, finalized after committee reviews, and is awaiting approval from the municipal executive board.

Preamble

The procedure emphasizes the constitutional right of Nepali citizens to live in a clean and healthy environment and affirms the responsibility to ensure accessible, clean, and eco-friendly toilets for all groups, including women, children, senior citizens, differently-abled persons, and gender minorities. These facilities are envisioned in the preamble, with the procedure for their construction, operation, and sustainable management developed in accordance with Sections 12 and 102 of the Local Government Operation Act 2074.

Definition

There is clear distinction between public toilet and toilet for public use.

Public Toilet:

A public toilet refers to a toilet and its premises that are constructed or commissioned in public spaces by the metropolitan city and/or any type of private, governmental, or community institutions for public use or for use by service recipients and the general public.

Toilet for Public Use:

A toilet for public use refers to a toilet constructed within the office building or premises of the metropolitan city and/or any type of private, governmental, or community institution and made available for public use.

Operator

The term "operator" refers to an individual, institution, or company authorized under prevailing laws to undertake the construction, service operation, maintenance, and repair of public toilets within the metropolitan area. This term also includes individuals, institutions, or companies assigned to operate services for a specified period under the Build, Own, Operate, and Transfer (BOOT) or Build, Operate, and Transfer (BOT) models.

Objectives of the procedure

This procedure aims to achieve the following objectives:

a) Establish clarity on the construction and operation of public toilets.

b) Define standards and criteria for public toilets based on size and available facilities.

c) Improve public toilet services to provide basic sanitation for residents and visitors.

d) Ensure user-friendly facilities, ensuring easy access for women, gender and sexual minorities, children, senior citizens, and individuals with disabilities.

e) Expand public toilet services and ensure their sustainable operation.

Methods for Public Toilet Construction:

Within the legal framework, the metropolitan city may construct or commission the construction of public toilets using one or more of the following methods:

a) Through its own funding

b) Under a Public-Private Partnership (PPP) model as per prevailing laws

c) Based on bilateral agreements with donor agencies

d) Through bilateral or multilateral collaboration under a private institution’s Social Corporate Responsibility (CSR) Plan

Operation Methods:

Within the legal framework, the metropolitan city may manage or facilitate the management of its constructed or upcoming public toilets using one or more of the following methods:

a) Direct operation and management by the metropolitan city using its own resources, means, and capacity

b) Contracting management to an institution or company

c) Assigning to an institution or company under the Build, Own, Operate, and Transfer (BOOT) model

d) Assigning to an institution or company under the Build, Operate, and Transfer (BOT) model

e) Any other method deemed appropriate by the metropolitan city under prevailing laws

Based on an assessment of the necessity and suitability of technologies used as per Clause (1), the metropolitan city may provide up to a 50% concession on the service fee revenue payable by public toilet operators for a maximum period of three years as an incentive.

Additional Facilities in Public Toilets

3) Incentive for Operators:

- If operators provide at least five of these services, including luggage storage, laundry, sanitary disposal, and baby care, they may receive up to 25% revenue exemption for two years from the metropolitan authority.

Monitoring and Evaluation

Service Monitoring, Evaluation, and Recommendations

1. To ensure cleanliness, service quality, and sustainability of public toilets, a **five-member Public Toilet Monitoring and Evaluation Committee** will be formed, ensuring women's participation.
2. **Committee Composition:**
    - **Coordinator:** Metropolitan/Ward Representative (1)
    - **Member:** Metropolitan/Ward Representative (1)
    - **Operator's Representative** (2)
    - **Sanitation Expert** (1)

This committee will oversee operations, assess service standards, and provide necessary recommendations for improvement.

Situation Analysis of Existing Public Toilets

In the four municipalities of Kathmandu, public toilet facilities are distributed across various types of locations to serve the community's needs. There are a total of 62 public toilets available for general use. Religious sites provide access to 34 toilets, catering to visitors and worshippers. Government buildings, which are frequented by the public, have 15 toilets accessible to users. Public parks are equipped with 8 toilets to accommodate park-goers. Additionally, petrol stations offer a significant number of facilities, with 84 toilets located at various fuel stations throughout the municipalities. Commercial buildings and shopping malls contribute 22 toilets for shoppers and employees alike. Hospitals in these municipalities provide 17 toilets for patients, visitors, and staff. This diverse distribution reflects efforts to ensure that sanitation facilities are available across different public spaces in Kathmandu.

Table 1 Number of Public Toilets in KMC, LMC, Kirtipur and Madhyapur Thimi (Guthi Report 2019)

Number of Toilets								
Name of Municipality	Public Toilets	Toilets in Religious Places	Toilets in Government Building	Toilets in Parks	Petrol Pumps	Commercial Buildings/ Malls	Hospitals	Total Number of Possible Toilets
Kathmandu	37	22	5	5	56	17	9	151
Lalitpur	9	5	8	2	18	5	7	54
Kritipur	10	2	2	1	2	N/A	1	18
Madhyapur Thimi	6	5	N/A	N/A	8	N/A	N/A	19
Total	**62**	**34**	**15**	**8**	**84**	**22**	**17**	**242**

Figure 4 Map Showing Distribution of Public Toilets in KMC and LMC (Guthi 2019)

CHAPTER THREE:CONCEPTUAL FRAMEWORK AND METHODOLOGY

3.1 PHILOSOPHICAL FOUNDATION

For all research necessarily starts from a person's view of the world, which itself is shaped by the experience one brings to the research process. Not all social phenomena are directly observable, structures exist that cannot be observed and those that can may not present the social and political world as it actually is. Ontology is an assumption which is impossible to refute empirically. What a researcher thinks can be researched is their **ontological position** and how to go about acquiring it and their methodological approach is **epistemological assumptions**. Researcher's ontological and epistemological positions can lead to different views of the same phenomena(Grix, 2002).

3.2 PARADIGM DISCUSSION

Ontological assumption and epistemological position in this research

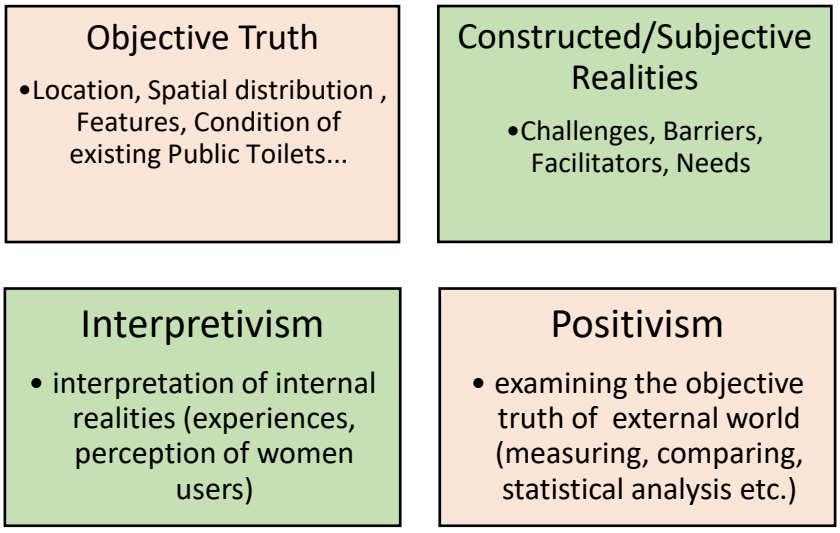


Figure 5 Ontological claim and epistemological basis of research

The researcher acknowledges multiple realities in this study, as it involves women's perceptions, making truth relative and varied. While recognizing relative truths, the researcher does not dismiss singular reality, adopting a case-based approach. Some objective observations, such as in-situ facts, remain unchanged.

Epistemologically, the study seeks to understand the worldview of those who have lived the experience, emphasizing context and subjective meaning. The researcher interprets

empirical observations to make sense of data, balancing objective analysis with subjective experiences. Universal standards and theories also contribute to knowledge, guiding the examination of physical states, spatial patterns, and geographical features.

This research aligns with a pragmatic worldview. Ontologically, pragmatism focuses on practical realities, such as the spatial distribution and usage of public toilets, while acknowledging individual experiences and interpretations. Epistemologically, knowledge is based on empirical evidence, with toilet distribution representing a singular reality, while perceptions and usage decisions remain subjective, influenced by psychological factors.

3.2.1 Pragmatist approach (Paradigm of this research)

Table 2 Showing sequential selection of methods (tools and techniques) after embracing certain paradigm, ontology, epistemology

Approach	**Ontological assumption**	**Epistemological Position**	**Study Design**	**Methods**	**Sources**
Pragmatism	Pluralism, Objectivism and Constructivism; Multifaceted realities and also Objective truths	Interpretivist with some practical on-site observation and some shared belief and experienced phenomena to be explained subjectively and knowledge is constructed	Mixed method	Survey; Observation; In-Depth Interviews	Survey data; Interview transcripts; in situ observation

Researcher viewed this research using pragmatic lens. Perspective in pragmatism is like bird's eye where world view is broad, inclusive and pluralistic.

Pragmatism doesn't adhere to a strict ontological position. Instead, it often adopts a pluralistic view that doesn't commit to a fixed reality. It focuses on the practical consequences of different ontological positions rather than the nature of reality itself. There's an emphasis on understanding reality as it pertains to problem-solving and

practical contexts. Reality is viewed as multifaceted and may differ based on perspectives and contexts.

A researcher's methodological approach, underpinned by and reflecting specific ontological and epistemological assumptions, represents a choice of approach and research methods adopted in a given study.

Pragmatism's epistemology focuses on the practicality and utility of knowledge. It prioritizes the process of inquiry and emphasizes the usefulness of knowledge rather than absolute truth. Knowledge is seen as an ongoing process, developed through experience, experimentation, and practical consequences. Pragmatists prioritize what works and what is useful in specific contexts rather than seeking absolute certainty or universal truths. There's a recognition that knowledge is subject to change, revision, and adaptation based on new experiences and outcomes. Pragmatists value empirical evidence and the outcomes of actions as crucial factors in determining the validity and usefulness of knowledge.

3.3 METHODOLOGY

Methodology is concerned with the logic of scientific inquiry; in particular with investigating the potentialities and limitations of particular techniques or procedures. The term pertains to science and study of methods and the assumptions about the ways in which knowledge is produced. Methodology is logically linked to, and very often confused with, the research methods employed in a project (Blaxter et al., 2010) Methodology is concerned with the logic, potentialities and limitations of research methods that the term is often confused and used interchangeably with the research methods themselves.

Methods are understood here as, quite simply, the 'techniques or procedures used to collate and analyze data'(Blakie, 2000). The research methods chosen for a research project are inextricably linked to the research questions posed and to the sources of data collected

3.3.1 Reasoning of Choice

In this study, qualitative and quantitative methods are applied at various steps. It will be multi method study design. In this research, an experimental study is difficult and may raise a lot of ethical issues in the selected study setting. So, an observational study type is selected. Conducting a longitudinal study require a huge number of resources

and a long time. In addition, in the selected issue, longitudinal study is not necessary. So, a cross-sectional study is done. The collected data will be described, compared, analyzed and inferences will be made. So. Both descriptive and analytical cross-sectional study is done.

3.3.2 Study design

Table 3 Showing different methods and study types used

Research method	Qualitative	Quantitative
	Yes	Yes
Study type	Observational	Experimental
	Yes	No
Type of observational study	Descriptive	Analytical
	Yes	Yes

3.3.3 Type of study

A multi-method study was conducted. Quantitative survey was conducted among 168 women in various public toilets of Lalitpur. An open-ended question was administered at the end asking about their experiences using public toilets and stakeholders were met to understand the status of policies and their implementation.

3.3.4 Study site

The study was conducted in Kathmandu and Lalitpur Metropolitan City. As suggested by officials in Kathmandu and Lalitpur Metropolitan City, the data was collected from the selected public toilets and their observation was also done.

3.3.5 Study duration

The literature review began in August 2024 and the data collection began in January 2025. The total study period was 7 months, from August 2024 till March 2025.

3.3.6 Sample size

According to a study done in Kathmandu Metropolitan City in 2022, it was found that 92% of women had used public toilets at least once whereas 8% women had never used public toilets. It was used as the sample size was calculated using Cochran's formula.

Standard Normal Variate (Z) = 1.96 at 95% Confidence Interval

The value of p (proportion of women in KMC who used public toilets) = 0.92

q = 1-0.92 = 0.08

Allowable error (e) = 5% = 0.05

Now, Sample size (n) =z2pq/e2

= (1.96)2 × 0.92 × 0.08 / (0.05)2 = 113.09 =114

Adding 10% non-response rate,

n= 114+ 10% of 114

= 114+11.4 = 125.4 ~126

The minimum sample size was calculated as 126. Total 168 responses were collected, as higher sample size would ensure higher statistical power.

3.3.7 Sampling technique

Purposive sampling was applied. The women around the public toilets of Lalitpur Metropolitan City were approached for the interview. Verbal consent was taken before the interview.

3.3.8 Study variables

The study explored the perception of women about accessibility of public toilets.

Dependent variables: Accessibility perception score

Independent variables: Age, Educational level, Occupation, frequency of use of public toilets, perception on inclusion

3.3.9 Inclusion and exclusion criteria

The women above 18 years of age who gave consent to participate in the survey were included.

3.3.10 Data collection tools and techniques

The data collection tools were prepared based on extensive literature review and the feedbacks of the research supervisor. The researcher was assisted by a qualified female enumerator during the data collection phase. Prior to fieldwork, she was thoroughly briefed and instructed to ensure accuracy and consistency in the data gathered. Face to face interviews were done among the women around the selected public toilets of

Lalitpur Metropolitan City. They were explained about the research properly and verbal consent was taken before beginning the interview.

3.3.11 Data processing and analysis

Data collection tools were prepared on kobo tool. The forms were filled in data collector's phone. The data was imported in excel sheet and was analyzed using EZR software. The files were safe in the researcher's computer. The data will be provided to the department after completion of the research.

3.3.12 Validity and reliability of tools

The data collection tools are prepared after extensive literature review and through the consultation of experienced faculty members. A pre-testing was done before beginning the research. The pre-tested data was also be analyzed. The data collection tools were modified based on the feedbacks.

3.3.13 Findings dissemination

The findings were disseminated through presentation among the department after the completion of the research. A report was also prepared and submitted. The research paper will be submitted to a relevant journal.

3.3.14 Ethical consideration

Sufficient information on study was provided to respondents to help them decide whether to participate in the study or not. Verbal consent was taken from each of the participant before beginning the data collection and they were provided the choice to leave the interview in case they were not comfortable. Their personal information has not been included in the study and confidentiality and anonymity has been maintained.

3.3.15 Method

A mixed of method of study will be applied. The mix of quantitative statistical analyses and qualitative thematic insights provides a comprehensive understanding of the factors influencing perceptions of public toilet accessibility.

Table 4 Methods employed as per the objectives

Research Objectives	Research Method
1. To assess perspectives of women in accessing and using public toilets in urban spaces	• Questionnaire Survey • In-depth Interviews
2. To explore stakeholders' understanding of inclusiveness and challenges in public toilets in urban spaces	• Key Informant Interview
3. To develop evidence-based strategies for creating inclusive public toilets and urban spaces	• Site Observation • Key Informant Interview

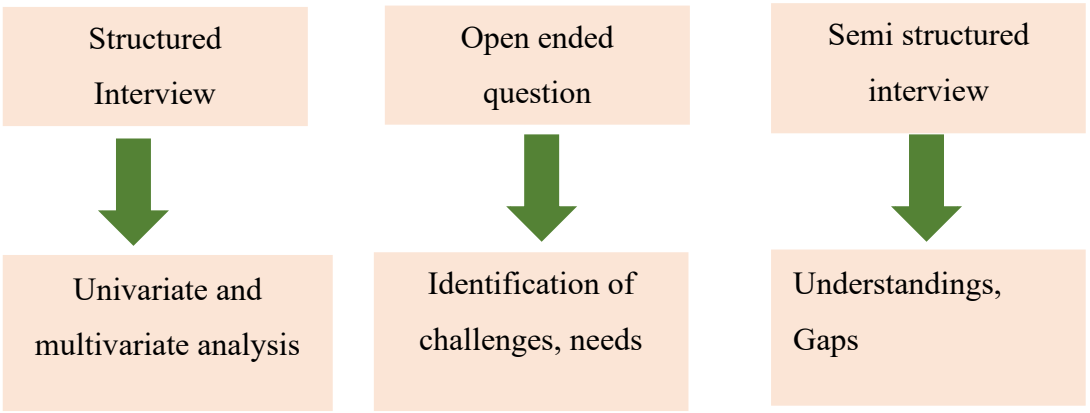


Figure 6 Flow Chart of tools ands and techniques used in the research

CHAPTER FOUR: RESEARCH ANALYSIS AND FINDINGS

4.1 SITE OBSERVATIONS

Most of the surveyed toilets were in safe locations and not too isolated. Guthi's study had found that the best-rated aspect was their convenient opening hours which is seen. However, many toilets were hard to find from the outside due to a lack of clear signs. Lighting was mixed, with some toilets having good lighting and others being poorly lit. Many toilets did not have proper locks, and overall cleanliness was not well maintained, even though they were open at convenient times.

Toilets for people with disabilities were very limited, and those available had only a few helpful features. Basic supplies like soap and toilet paper were missing in most places, along with cleaning and maintenance materials. Privacy for women was a concern, as most toilets did not have mirrors. There were also not enough female cubicles, and only one-fourth of the toilets had female attendants.

For good menstrual hygiene, public toilets should have disposal bins inside the cubicles and access to water and necessary supplies. However, these needs were only partly met. Lastly, the working conditions for toilet caretakers were poor. Many were not paid enough, had no proper place to sit, and rarely got breaks during work.

Figure 7 Public Toilet in Jawalakhel

Figure 8 Public Toilet in Mangalbazar

Figure 9 Public Toilet in Patan Dhoka

Figure 10 Public toilet with dedicated wheelchair friendly cubicle but inconsistent footpath

Figure 11 Public Toilets upstairs

Figure 12 Female PT below ground level

Figure 13 Public Tolet in Swoyambhu with some facilites closed

Figure 14 Public Toilet near Paropakar

Figure 15 Public Toilet in Swoyambhu

Figure 16 Public Toilet and tourist visitor

Figure 17 Public Toilet in Bhukikhel Ground

Figure 18 Public toilet with no signage and indications

Figure 19 Public toilet in locked state in midday

Figure 20 Public toilet in Bhagwan pau operating only two cubicles

4.2 QUANTITATIVE FINDINGS

4.2.1 Socio-demographic characteristics of respondents

4.2.1.1 Age of the respondents

The variable age is a continuous variable. It was not categorized into groups while collection of data. First, normality test of age variable was done. Kolmogorov-Smirnov test was done as the sample size was 126.

H0: Data follows normal distribution.

H1: Data doesn't follow normal distribution.

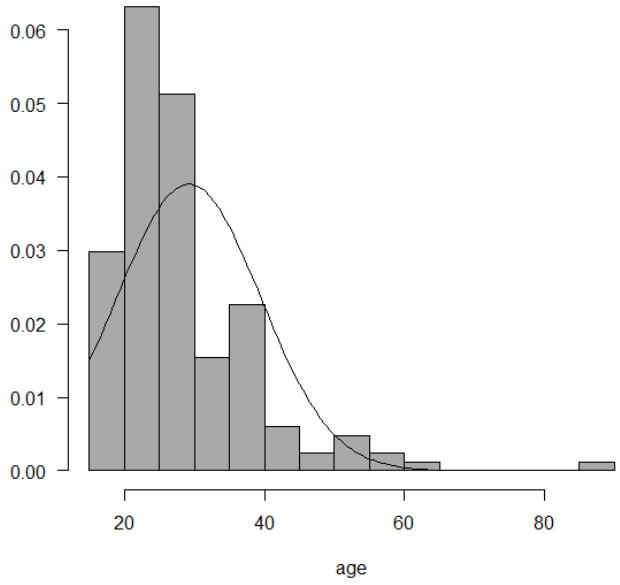


Chart 1 Graph showing age distribution of respondents

The figure was obtained which showed a skewed histogram, indicating that the data doesn't follow normal distribution.

The p-value was also less than 0.01. So, the null hypothesis was rejected, and it was found that the data did not follow normal distribution.

When numerical summaries were obtained, the median age of respondents was found to be 26 years. The minimum age was 18 years, and the maximum age was 90 years.

4.2.1.2 Level of education

Maximum number of participants had education of bachelors and above. Among the 168 respondents, 6 were illiterate, 14 had basic level education, that is, up to grade 8, 12 of the respondents had secondary level education and the remaining 136 respondents had education level of bachelors and above.

Table 5 Education level of respondents

Categories	Frequency	Percentage
Illiterate	6	3.57%
Basic level	14	8.33%
Secondary level	12	7.14%
Bachelors and above	136	80.95%

1.2.1.3 Marital status

The respondents were also asked their marital status and it was found that, out of 168 respondents, almost two-third were unmarried, including 104 respondents, followed by 61 married respondents, 2 widowed and 1 separated respondent. It is presented in the table below.

Table 6 Marital Status of Respondents

Categories	Frequency	Percentage
Unmarried	104	61.90%
Married	61	36.31%
Separated	1	0.60%
Widowed	2	1.19%

1.2.1.4 Occupation

The respondents' occupation was also categorized. The frequency distribution of occupation is given by the table below. Most of the respondents had chosen the option others. When asked to specify, they had mentioned themselves as students and a few specified freelancing as their occupation. Among the other respondents, 38.10% said

they were doing job, followed by 8.33% of homemakers, 4.17% agriculture, 3.57% business and 2.38% labor.

Table 7 Occupation of Respondents

Categories	Frequency	Percentage
Agriculture	7	4.17%
Homemaker	14	8.33%
Job	64	38.10%
Labor	4	2.38%
Business	6	3.57%
Others	73	43.45%

4.2.2 Frequency of use of public toilets

The respondents were asked how frequently they use public toilets. Out of the total respondents, almost three-fourth of them said that they use public toilets sometimes, which included 121 respondents, followed by 38 respondents who said that they use public toilets often. Nine respondents said they never use public toilets, representing 5.36%.

Table 8 Frequency of PT use of Respondents

Categories	Frequency	Percentage
Often	38	22.62%
Sometimes	121	72.02%
Never	9	5.36%

4.2.3 Inclusion

Women were asked their perception regarding inclusion. Eight questions were asked. The responses are presented in the table below.

Table 9 Inclusion Perception among Participants

Perception on public toilets:	**Options**	**Frequency**	**Percentage**
Availability of public toilets for people of all gender.	Yes	84	50%
	No	84	50%
Addressing the issues of every gender.	Yes	47	27.98%
	No	121	72.02%
Availability for the persons with disability.	Yes	33	19.64%
	No	135	80.36%
Addressing the issues of persons with disability.	Yes	25	14.88%
	No	143	80.12%
Addressing the needs of pregnant women.	Yes	25	14.88%
	No	143	85.12%
Public toilets are designed to be child friendly.	Yes	34	20.24%
	No	134	79.76%
Addressing the needs of women accompanied by children.	Yes	33	19.64%
	No	135	80.36%
Addressing the needs of women during menstruation.	Yes	34	20.24%
	No	134	79.76%

The findings on public perception of toilets reveal significant gaps in inclusivity and accessibility. While the availability of public toilets for all genders is evenly split (50% Yes, 50% No), only 27.98% believe that gender-specific issues are adequately addressed. The situation is even more concerning for persons with disabilities, with only 19.64% acknowledging availability and a mere 14.88% stating that their specific needs are addressed. Similarly, the needs of pregnant women remain largely unaddressed, with 85.12% of respondents expressing dissatisfaction. Child-friendly designs are lacking, as 79.76% believe public toilets do not cater to children's needs. Additionally, only 19.64% feel that facilities support women accompanied by children,

and just 20.24% think menstruation-related needs are considered. These findings highlight critical shortcomings in public toilet infrastructure, underscoring the need for inclusive and accessible sanitation solutions that cater to diverse user groups.

4.2.4 Women's perception on public toilets accessibility

The respondents were provided 16 statements and select the best option for each statement. Among the 16 statements, 4 statements each were asked for availability, accessibility, affordability and acceptability. The table below presents the percentage distribution of the responses on each of the statement.

Table 10 Accessibility Perception among respondents

SN	Statement	Agree	Neutral	Disagree
Availability				
1	Public toilets are strategically distributed across urban spaces.	14.29%	35.12%	50.60%
2	Public toilets are available during public events and gatherings.	33.33%	33.33%	33.33%
3	I get to use public toilets without waiting in queue when needed.	20.24%	36.31%	43.45%
4	Public toilets are always open when I need to use them.	27.98%	30.95%	41.07%
Accessibility				
5	Public toilets are located at visible locations.	27.98%	34.52%	37.50%
6	Public toilets are located at approachable locations.	33.93%	30.95%	35.12%
7	I can identify female toilets through the signages put there.	50%	32.14%	17.86%
8	Public toilets are designed to accommodate people with mobility challenges.	16.07%	26.79%	57.14%

Affordability				
9	I find the public toilets charges reasonable for daily use.	32.74%	34.52%	32.74%
10	I don't feel financially burdened by paying for public toilets	49.40%	32.14%	18.45%
11	There are free public toilets options available in certain places.	38.69%	33.33%	27.98%
12	Vulnerable groups of people are provided subsidized or free access in public toilets.	13.69%	35.71%	50.60%
Acceptability				
13	The design of public toilets meets my preferences.	10.71%	27.98%	61.31%
14	Separate female public toilets are available for use in urban spaces.	41.67%	29.76%	28.57%
15	Public toilets are located in socially acceptable, non-isolated areas.	35.12%	40.48%	24.40%
16	I am comfortable with the security system of public toilets.	20.83%	27.38%	51.79%

4.2.5 Accessibility perception score

All the sixteen statements were positive statements. The scores for disagree, neutral and agree were given as 0, 1 and 2 respectively. So, for the total 16 statements, the highest score was 32 and the lowest score was 0. A new variable accessibility was generated summing the responses to these 16 statements. When the summary of the score was obtained, it was found that the mean score was 14.547 and median score was 14. It means that among the respondents, half of the respondents' score was below 14 while the score of the remaining half was above 14. The lowest score was 0 and the highest score was 32.

The findings indicate significant concerns regarding the availability, accessibility, affordability, and acceptability of public toilets.

In terms of **availability**, only 14.29% of respondents agreed that public toilets are strategically distributed, while 50.60% disagreed. Similarly, opinions on the availability of toilets during public events were evenly split, with one-third agreeing, one-third neutral, and one-third disagreeing. Additionally, 43.45% reported facing queues, and 41.07% stated that toilets were not always open when needed.

Regarding **accessibility**, 37.50% found toilets not visible enough, while 35.12% believed they were not in approachable locations. Although half of the respondents (50%) found female toilet signages identifiable, 57.14% felt that public toilets were not designed for people with mobility challenges.

In terms of **affordability**, perceptions were mixed—while 49.40% did not feel financially burdened by toilet charges, only 13.69% believed vulnerable groups received subsidized access, with 50.60% disagreeing.

Concerning **acceptability,** a significant 61.31% found the design of public toilets unsatisfactory. While 41.67% agreed that separate female toilets were available, only 20.83% felt comfortable with the security measures, with 51.79% expressing dissatisfaction. Additionally, 35.12% agreed that public toilets were in socially acceptable, non-isolated locations, but 40.48% remained neutral. These findings highlight critical gaps in public toilet infrastructure, necessitating strategic improvements in their distribution, accessibility, affordability, security, and inclusivity.

4.2.6 Inferential statistics

To analyze the association of accessibility perception score with other independent variables, normality test of the variable accessibility was done, to decide whether to use parametric tests or non-parametric tests.

Like in case of age variable, normality test was done for accessibility variable as well. Kolmogorov Smirnov test was done.

H0: The data follows normal distribution.

H1: The data doesn’t follow normal distribution.

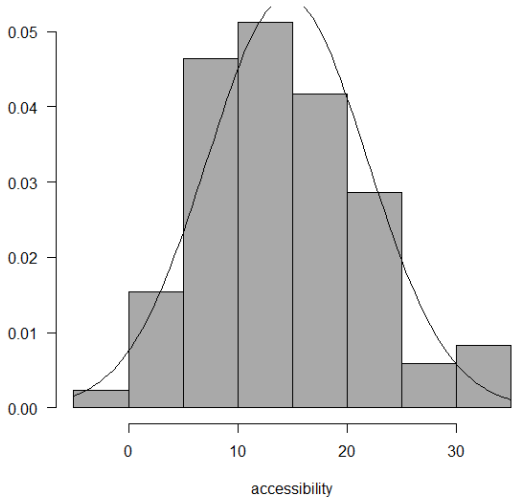


Chart 2 Normality test of Accessibility Perception Score

The obtained histogram showed a normal distribution. Similarly, the p-value was 0.02746, which is >0.01. Hence, the data follows a normal distribution. Because our dependent variable follows normal distribution, parametric tests can be applied.

4.2.6.1 Age and accessibility perception

The variables age and accessibility were both continuous variables. So, first a scatterplot was obtained to see if the relation is linear.

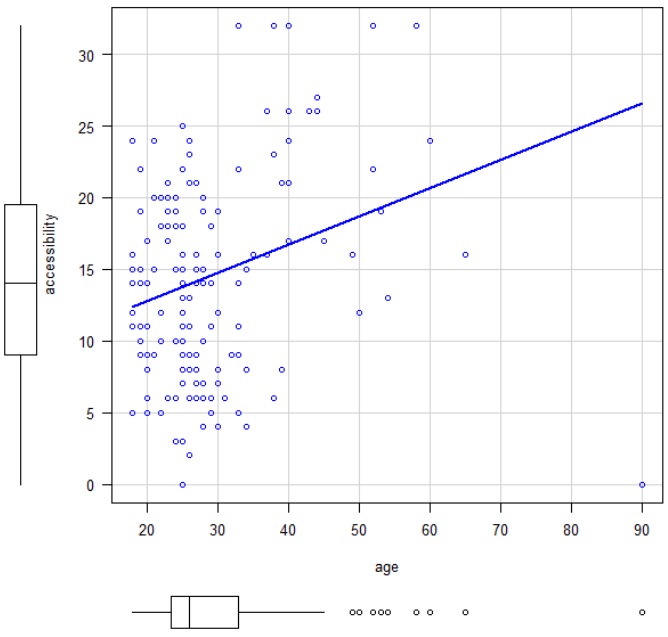


Chart 3 Scatterplot Age vs Accessibility Perception

The scatterplot showed a linear relationship between the variables age and accessibility perception. To confirm this, Pearson's correlation test was done.

The value of Pearson's correlation coefficient was found to be 0.275, with a statistically significant p-value, that was 0.000302. The Pearson's correlation coefficient suggests that there is a weak positive correlation among the variables age and accessibility perception score. It means that, with increase in age, the perception of accessibility also tends to increase.

4.2.6.2 Education and accessibility perception score

There are four categories in the variable education. So, ANOVA test is applied when there are three or more categories in the independent variable.

H0: There is no difference in accessibility perception score among any groups.

H1: There is difference in accessibility perception score in at least one group.

When ANOVA test was done, it was found that the p-value was found to be less than 0.05. It suggested the rejection of null hypothesis. So, at least one education group's mean score differs from the other. To identify which group differs, Tukey test was done. It was then found that, there was statistically significant difference among the scores of those with bachelor's level education and above.

Table 11 Post hoc test of Education vs Accessibility Perception

Categories	Difference	Confidence Interval	p-value
Basic level-Illiterate	3.2142	-5.06-11.48	0.744
Secondary level-Illiterate	-2.4869	-8.47-8.47	1.00
Bachelors and above-Illiterate	-7.066	-14.14-0.008	0.0503
Secondary level- Basic level	-3.214	-9.855-3.45	0.59
Bachelors and above-Basic level	-1.0280	-15.040- -5.52	**0.0000005**

Bachelors and above-Secondary level	-7.0661	-12.17-1.95	**0.0024**

4.2.6.3 Marital status and accessibility perception score

In the variable marital status, there were four categories. The categories were unmarried, married, separated and widowed. When ANOVA test was done, it was found that there were significant differences among at least two categories. On doing Tukey test, it was found that the significant difference was among the accessibility perception scores of married and unmarried women.

Table 12 Post hoc test on Marital status vs Accessibility Perception

Categories	Difference	Confidence Interval	p-value
Married-Unmarried	3.86822	0.93-6.799	**0.0042851**
Separated-Unmarried	-13.11	-31.38-5.14	0.2477636
Widowed-Unmarried	8.884	-4.09-21.86	0.2880592
Separated-Married	-16.983	-35.309-1.34	0.0800223
Widowed-Married	5.016	-8.046-18.07	0.7514520
Widowed-Separated	22.00	22.00- -0.26	0.0540716

4.2.6.4 Frequency of use of public toilets and accessibility perception score

ANOVA test showed no differences between the mean score among the women who never used public toilets, sometimes used public toilets and those who often used public toilets.

Table 13 Post hoc test Frequency of Use vs Accessibility Perception

Categories	Difference	Confidence Interval	p-value
Sometimes-Never	-0.5922	-6.570-5.385	0.97019
Often-Never	1.359	-5.05-7.773	0.8707
Often-Sometimes	1.9519	-1.265-5.16	0.325

4.3 QUALITATIVE ANALYSIS

The respondents were provided an open-ended question at the end of the survey tool, where they shared their experiences and opinions about public toilets. The responses were categorized into codes and the codes were organized into themes. The initial codes obtained were:

Table 14 Initial Codes

Exploring alternatives
Availability
Experiences
Inclusion
Hygiene and maintenance
Essential amenities
Context of need and usage
User charges and affordability

These eight codes were then categorized into three themes.

Table 15 Codes Categorized into themes

Themes	**Codes**
Current concern	Hygiene and maintenance
Lived experiences	Exploring alternatives, availability, experiences, context of need and usage
Proposed solutions	Inclusion, essential amenities, user charges and affordability

4.3.1 Theme 1: Current concern

For many respondents, the thought of using a public toilet brings an immediate sense of hesitation. They shared about their major concern with the cleanliness and hygiene of public toilets. “They are not clean and may cause health issues,” a woman remarked,

reflecting a widely shared sentiment. The lack of proper sanitation seemed to be a significant barrier. Another user bluntly stated, “Sanitation is not well maintained in public toilets of KTM.”

The experience of using these facilities is often worsened by foul odors and unhygienic conditions. “In Kathmandu, there's no need to search for a public toilet because you can smell it from a distance,” a respondent pointed out. Another described their experience as “uncleaned, wet surfaces, foul smell, and unemptied wastebins in female toilets.”

Many users admitted they would rather avoid public toilets altogether. “They are not clean and are smelly, causing most of us to rather hold than use it.” Another added, “I feel disgusted using public toilets as there is no hygiene maintained.”

Despite the concerns, there is a clear demand for improvement. “It would be better if those toilets are kept clean,” one person suggested. Others echoed this need: “Should maintain cleanliness.” and “Need more cleanliness.” These voices highlight an urgent call for better maintenance, ensuring public toilets are not just available but also hygienic and safe to use.

4.3.2 Theme 2: Lived experiences

The theme lived experiences includes the codes exploring alternatives, availability, experiences, context of need and usage. The theme covers the experiences of women while using public toilets, their experiences with seeking alternatives to not use public toilets and the times when they have no other options but to use public toilets.

The respondents shared their bad experiences with using public toilets. For many people in Kathmandu, finding and using a public toilet is a challenge filled with frustration and discomfort. Public toilets are often difficult to locate, leading many to wonder if they even exist. "I have not used any public toilets in Kathmandu... I am not even sure if there are public toilets in Kathmandu," shared one individual. Even when available, their condition discourages use.

Broken door locks, cramped stalls, and a lack of lighting create an unsafe environment, with one person stating, "The toilet stalls are extremely small, and when using them, my body touches the walls, which are very dirty. There's also no lighting inside the toilets, making it even more inconvenient."

The unhygienic conditions push many to find alternatives, such as malls, restaurants, and hospitals. "Every Friday I go to Chhetrapati area school. I don’t find it comfortable

to use the toilet there, so I use the toilet at Bir Hospital before and after visiting the school," explained one respondent. Others deliberately limit their water intake during travel to avoid needing public toilets altogether. Women face even greater struggles, particularly during menstruation, with one person noting, "On regular days, it's already hard to use them, but during menstruation, it’s nearly impossible." Despite these challenges, public toilets remain a necessity, especially in emergencies. Some resign themselves to using them when no other option is available, with one person stating, "Public toilets make people’s lives easier when needed. Some people have emergencies sometimes. When I use it, it's dirty, but I have to go when there is no option left." However, others prefer to endure discomfort rather than step into an unclean facility, simply stating, "Very bad. I don't like going to public toilets unless it is an emergency." The reality of public toilets in Kathmandu is one of inconvenience, poor maintenance, and a lack of accessibility, forcing people to make difficult choices in their daily lives.

4.3.3 Theme 3: Proposed solutions

This theme consisted of the codes Inclusion, essential amenities, and user charges and affordability. The respondents had suggested what would make the use of public toilets easier and better to them. They shared about the need of an inclusive public toilets that would address the needs of the persons with disability. Supporting this, one respondent said, “It should be available and accessible for disabled people. It should also meet the criteria for different genders.”

Public toilets in Kathmandu are not just scarce and poorly maintained—they are also inaccessible to many. One respondent emphasized the need for improvement, stating, "It should be available and accessible for disabled people. It should also meet the criteria for different genders." However, current conditions fail to meet these basic standards, as another respondent noted, "No hygiene, not very disability-friendly—except in malls, other public toilets are questionable."

Beyond accessibility, the lack of essential facilities inside toilets adds to the struggle. Many public restrooms lack soap, water, tissue, and proper disposal systems, making their use unhygienic and uncomfortable. "Availability of soap and water is a must. Pad disposal bins are also a must," shared one individual, while another pointed out, "There is no water, tissue, hand soap, sanitary pads, and dustbins. It is very dirty." Women, in particular, expressed the need for menstrual hygiene facilities, with one person

suggesting, "In women's toilets, especially, there should be a paid pad box that ladies can utilize in need."

The issue of user charges further complicates public toilet access. Many people expect a basic level of cleanliness if they are required to pay, yet this is rarely the case. "When we pay, I want them to keep the toilets clean, but they don't. That's all," expressed one frustrated user. Others questioned whether the money collected is even used for maintenance. "The fund collected for public toilets is not systematic. I don't think those fees are used for maintenance," one respondent remarked. This has led to growing demands for free and well-managed public toilet facilities, as one person simply put it, "Public toilets should be at appropriate locations with free of charges."

Improving public toilets requires a multi-faceted approach—ensuring accessibility for all, providing essential hygiene facilities, and making sure that user fees, if charged, translate into better maintenance. Without these changes, public toilets will continue to be an inconvenient and unreliable option for many.

4.4 KII

To contextualize and complement findings, key informant interviews (KIIs) were conducted with urban planners, municipal officials, sanitation operators, and civil society representatives involved in public toilet governance including AEROSAN Sustainable Sanitation (Program manager), City level pride project office (Engineer), Head of Public Private Partnership Section KMC, Former vice chairman city planning commission KMC and others. Participants were purposively selected based on their expertise and position or role in urban infrastructure planning. Semi-structured interviews explored stakeholders' perspectives on systemic barriers, policy gaps, and opportunities for inclusive design. This approach ensures that findings reflect both lived inequities and actionable institutional reform. All responses were noted, and the interviews were recorded with consent and securely stored by the researcher. The smaller parts of responses were categorized codes and then organized into themes while maintaining the confidentiality of the respondents.

4.4.1 Present Scenario and Challenges

Acknowledging the situation one of the respondents stated, "विगतको अवास्था हेर्दा हाम्रो public toilet भनेको वास्तवमा एउटा चर्पीको रुपमा मात्र त्यस्तो थियो। साधारण चर्पी। न पानि, न सरसफाई। दुर्गन्धित। त्यस्तो अवस्थाको public toilet हरु हामीले जहाँ पनि देख्न पाउँछौँ।"

In KMC dedicated public toilets are low in numbers. Generally public toilets can be seen as annex of the other complex, temple, park, facilities, ward office which makes the maintenance and operation easy and clear in case of organizational attachment, but the municipality should build standalone dedicated public toilet.

After the two fiscal year the number of collaborating partners in this initiative is insignificant. The even the banking partner bank of the KMC refused to support the initiative of free restroom. The branches except the head office is in the rental buildings and the other tenants and the owners does not agree to provide the free access to public.

And the petrol pumps were requested in these initiatives and were provided the cleaning materials, but after the toilets were not maintained and not being user friendly the supply of cleaning materials were discontinued.

But recently, KMC issued and circulated the notice stating that the all-public toilets must be of free access. Which made trouble for Aerosan toilet operators.

The study was done by the environment section of KMC on the status of public toilets. Its physical status, location and various information was there but the operator of the toilet or the group behind the fee collection could not be revealed.

One of the respondents said, "पैसा कसले उठाएको डाटा आएन, सबै पछाडीबाट हामीले डनहरु देख्यौं" elaborating the incident of surprise inspection in Bhadrakali temple premises public toilet.

There is not easy access for the common people in the restrooms. Those entering wearing slippers to those wearing boots everybody should be able to access the facility without hesitation. And those special provisions for differently abled should be there no doubt. But the aura should be too much accessible.

Earlier the problem would be to construct the public toilet even if the land was available the surrounding house owners and neighborhood would obstruct it because of the old concept of dirt and unhygienic conditions of public toilets and unnecessary illegal activities in the public toilets for e.g.: drugs. But those pilot project toilets set the examples that the public toilet can be maintained without any foul smell and hygienically. But still many people have doubt and concern regarding public toilets. We can still see the poor toilets around stadiums and public places.

But the present scenario is if someone needs toilet one needs to get coffee.

Major stakeholders of public toilets are local level, operators, managers, and big business houses.

There were city facility centers in Chabahil, Ratnapark which closed because of the lack of maintenance. Road expansion demolished in case of Chabahil. But in many cases for e.g. in Ratnapark public toilets are used as storage for hawkers which became more profitable for operators than from public toilet service charge.

4.4.2 Existing Policy

Recently LMC has developed the guideline for construction, operation, management of the public toilets. Soon to be endorsed by municipal executive. There is plan to present the initiative of public toilet by municipalities in program in Bangladesh. The LMC is currently developing new smart public toilets in collaboration with private sector as a city level pride project.

Guideline and procedure for operation of Toilets of Public Usage is being drafted as budget was allocated. PPP model.

The PPP model toilets were there with bathroom known as city service center one of those if of Ratna Park which is nonfunctional after demolition and is having issues in reconstruction.

The business collaborating with KMC gets cleaning material worth 27/28000 for providing public toilet for free yearly. The business are given tax exemption up to 40% deduction in tax.

The local government operation act 2074 has given full responsibility and authority to the local government to maintain sanitation and cleanliness of the local body. As per which the local governments can formulate the plans and policies to maintain the existing public toilets and construct and operate the new required public toilets.

4.4.3 New initiatives

Currently new development of the public toilet is ongoing and running under city level pride project office of LMC.

The new approach is to provide a public toilet in every 500m distance.

Another approach was the private establishment can provide the toilet inside their area. And the collaboration with private sector was to provide the cleaning materials. The

establishment should put the board of the public toilet throughout the year and need to provide access for free. Which became too much challenging.

Currently KMC is working with Aerosan in PPP model. Aerosan is exhibiting the good business model of public toilet.

Certain initiatives were taken in collaboration with another organization which developed toilets in Swoyambhu, Tripureshwor.

Supporting and providing incentives to the establishments those collaborating with KMC for providing free or paid toilet facilities. Which should be clearly stated in act. It can be done as CSR by private sectors also. This can be a movement but it should be institutionalized and planned and executed properly.

Cleaning expenses support, tax reduction, exemptions. But these kinds of provisions are voluntary. Enforcing mandatory provisions is difficult. But in case of certain category of establishment this provision can be made mandatory. For e.g. petrol pumps, grocery shops, shopping. By the nature of the service provided by the establishment they can be categorized and the business where public flow is there it can be made mandatory for them.

PPP model can be developed in case of big cities. Where private sector can develop big chains, whose primary motive should be public toilets and along with that their business can be run. Local government should provide space and land. The agreement can be done with certain conditions like the minimum design requirements, minimum area to be used as public toilet, maximum area that can be used for business activities and other fecal sludge managements.

There can be large project in PPP model for e.g. in case of Bharatpur Metropolitan City where local government can provide land. Large already renowned chain can invest in such project concept.

4.4.4 Policy Gaps

Aerosan tried to work with public toilets of petrol pump and they should mandatorily provide toilet access to public as per federal law of Nepal Oil Corporation but couldn't proceed due to various challenges. However, work is in progress with Kirtipur Municipality.

There is no such dedicated public toilet department which is overseen by environment section.

Although Aerosan is operating toilets in 6 places, its facilities are not being able to extend due to lack of policies and laws and lack of trust. The leadership is not in the side of giving properties in lease. The thinking towards the private sector is that they are only for profit making. But this concept is no cleared that with proper regulation the PPP model will work in the favor of people albeit the profit motive of the private sector.

Six overhead bridge toilets now closed; fee pay per use PPP model. But in that case also as per law KMC failed as there is stated the permission to run business in the agreement. In case of shanti batika also the same, constructed in the time of 062/63 movement by the political parties by funding. The recent notice to make all public toilets free of cost, the operator left the toilet now KMC is maintaining which is only satisfactory.

The plan is to develop service contract modality, but in case of the toilets that are in operation the managers and operators are unknown. The user committee couldn't operate the toilets.

Municipalities should conduct the study to find out the number of public toilets required in certain distance and certain densities. Five years back the KMC had conducted a study which focused on status of the existing public toilets from its physical status to the operation and maintenance status. There were recommendations also given in that report based on national and international commitments.

Federal government should make policies and laws regarding overall sanitation, health and hygiene. Guideline for number of public toilet as per the density, distance. Federal government can provide grant, conditional grants for construction of public toilets.

The design guideline and procedure individual few local levels area developing, such guideline if provided in national level. Every local government would adopt it. In case of different type of complex, campus, building like schools.

4.4.5 Modality of operation

Aerosan Sustainable Sanitation is a social enterprise that offers a design-build-operate smart public toilet management solution through a network of pay-per-use

It is working on the implementation of holistic sanitation services in the largest urban area of Nepal-the Kathmandu Valley

Aerosan works in a public private partnership model. Aerosan work closely with the local first, to acquire land where the toilet can be established, and second instill ownership and responsibility among the local authorities regarding the public toilet.

No matter the area or; the location, given the budget, the smart public toilet can be scaled as needed and can be adapted by any society.

Aerosan Smart Public toilets are focused on making a chain of public toilets. Since, the toilets are all operated under one umbrella, one flourishing will sustain another and take all the franchises together.

Previously the site was provided by the KMC but the model was not PPP. They themselves did the operation and management.

The organization which constructed is operating it. Certain number of toilets should be there which should be accessible, open from morning to evening, and it can be given in contract. The operation procedure and guideline was formulated.

The public toilet should generate minimum expense of the maintenance and operation. The sustainable model concept was initiated in Swoyanmbu and Tripureshwor. Which to certain extent helped to change the concept of the public toilet among public.

4.4.6 New Technologies

AEROSAN uses integrated waste-to-value-solution and evidence-based cleanliness protocol.

It focuses on waste management and water centric design. Its waste-to-value system protects the environment and contribute to climate change mitigation by producing renewable energy and organic fertilizer from human waste.

Aerosan Smart Public Toilets are all equipped with technology including non-touch auto-flush, non-touch soap dispenser, hand dryer, sensor lights and sensors water taps and air extractor all of which contribute to healthy environment. Also, the smart public toilet premises have a Wi-Fi connection and CCTV. The use of e-gate along with the token system helps maintain the flow of users and track and gain user data for research.

In LMC Beside public toilet, similar facility there is also a Unicsolar Shower Station with a photovoltaic roof a community bathroom handed over by Yunan province of

China. The Unicsolar Shower Station is equipped with a 4,000-litre hot water facility generated by solar energy and has three shower rooms each for males and females. The community bathroom will benefit at least 80-100 persons to take shower per day.

In addition, the rooftop photovoltaic project has an installed capacity of 36kw which could generate around 60,000kwh annually and provide green and free energy to the community.

The public toilet should consider recycling technologies, advanced fecal sludge management and treatment technologies,

There are three mobile toilets with LMC taken to the gathering and large public presence.

In case of public toilets, the cleanliness and hygiene must be maintained, there should be adequate water, sanitary pad vending machines. To save the water the taps must be censored. Another important factor is the water recycle technology should be used, in those toilets biodigesters are used and the gas are used to prepare tea in the toilets.

The waste management of the public toilet should be well treated. Which federal government can make the guideline. For e.g. in case of Tripureshwor where there is not much space however the treatment is managed on site. Fecal sludge management should be taken care properly. The collaboration in case of sewer and fecal sludge management can be or might need separate than public toilet operators.

4.4.7 Climate Change Mitigation and Water Saving

By preventing human waste from entering the environment, and instead, producing biogas and organic fertilizer, Aerosan waste to value system greatly contributes to climate change mitigation.

Aerosan Smart Public Toilets has also installed a rainwater harvesting system and reedbed water recycling system to optimize the use of water resources and waste water. The treated wastewater is then directed and collected for auto flush system use.

However, since incinerators are not environmentally friendly, Aerosan is exploring other eco-friendly alternatives.

4.4.8 Inclusiveness

gender, and disabled-inclusive, hygienic, and modern facilities (known as Aerosan Hub)

It goes beyond the toilets as much focus has been given to women-full sanitary, menstrual health and baby changing facilities,

Gender and disabled friendliness cannot be overlooked while developing toilets. Even gender-neutral toilets for third gender is today's need. Child friendly toilets are also must. There are examples in cinema chains where child friendly design can be seen. Breastfeeding area, diaper changing stations should be there.

4.4.9 Female-friendliness

In all Aerosan toilet premises, Aerosan have thought of the needs of women and added a few features. Starting with a simple hook to hang their bags, organization have added:

- A corner where menstruating females can get a pad from a pad vending machine/
- A pad disposal machine where they can dispose off the used pads without polluting the environment. Also, pedal-based dustbins are available in all the cubicles.
- A diaper changing station.
- Mothers get a dedicated space to attend to their babies and breastfeed them.

4.4.10 Sanitation Worker, Attendants

Aerosan Smart Public Toilets are operated by marginalized Dalit women whom Aerosan trains to manage the toilets, utilizing the evidence-based cleaning protocol designed by Aerosan.

Also, Aerosan has been able to provide dignified job opportunities to disabled women and encourage them to explore their differently-abled talents to manage and operate the smart public toilet through specialized trainings.

4.4.11 Probable Solutions

One of the respondents suggested that those buildings exceeding the area of 10000 sq feet, there should be certain mandatory provision in the time of the building permit. While in the time of building permit process the provision of the area for public toilet should be made. And the builder or the owner should be given other form of incentives who provides their premises for the public use. Even the private residential building if provided the toilet for public use following basic rules and regulations, they should be given certain incentives.

The provision of public toilet in big complex and the buildings of public use should be monitored and make sure for the availability, accessibility to the public and all groups of users.

And the available public toilets should be easily accessible and should be such that it can be used in the urgency this applies to all the toilets of public use not only public toilets. The clever ones and privileged ones can find thousand solutions but the main sufferers are general underprivileged public. The public toilet service should be provided visibly.

Also said that they are planning to have table talk with the big business house regarding their CSR activities and possibilities in the public toilets. For e.g. Baneshwor public toilet by Everest bank.

Guidelines and procedures should be there

And the old operators should be removed lawfully.

The existing toilets should be remodeled maintained. And new public toilets should be added. At least in the walking distance of 12/15 minutes.

Mobile toilets should be provided in the occasional gathering. The proper provisions and procedures should be developed to attract private sectors for providing such mobile toilets. It can be seen in pashupati which is not well managed.

The public toilet guideline and provision should be as per the footfall. So, accommodating changes in building codes and bylaws for public toilets should consider the locality and number of footfalls.

These all depends ono the budget and land area available. By providing excessive advanced facilities also maintenance can be hard. But the minimum facilities should be provided which should be stated in policies, laws, guidelines and design.

4.5 POLICY REVIEW

Some aspects for improvement were identified after reviewing the local legislation related to public toilets. But it should be complemented by additional relevant regulations because singular guideline is not capable of covering all the related issues and actors involved in public toilets comprehensively.

Public toilet construction, operation and management procedure, LMC

- The ratio of male to female restroom facilities and the floor area are not properly specified.
- The provision of safe drinking water facilities is not mentioned.
- There is no separate GEDSI section
- Locker facilities are not mentioned.
- The gender of the caretakers is not mentioned.
- There are no special child-friendly provisions and headings subheadings for it, as it is limited only to the preamble.
- There is no comprehensive monitoring and evaluation checklist with distinct sections.
- A separate guideline document, including designs and codes, may be necessary to support the minimum facilities and provisions listed in Clause 10.
- There is a provision for monitoring and evaluation every six months. Shorter internal assessments can be included between M&E periods, with mandatory report submission.

Guidelines for construction, operation and management, 2075 KMC, 2079 Butwal Sub-metropolitan City

- There is no distinction between public toilets and toilets intended for public use.
- There is no dedicated monitoring and evaluation committee, along with its structure, nor a mandatory timeframe for monitoring, evaluation, and report submission.
- A provision for a smoking zone can be made according to the KMC guidelines, although it is completely prohibited in the latest LMC guidelines.

4.6 DISCUSSION

The mean score of 14.547/32 underscores the overall dissatisfaction, aligning with qualitative critiques of poor hygiene, inaccessibility, and affordability. Low acceptability scores (e.g., 61.31% dissatisfied with design) mirror complains of *foul odors*, *unemptied wastebins*, and *filthy surfaces*. Respondents' avoidance of toilets unless "absolute necessary" aligns with low perception scores, illustrating how poor hygiene directly reduces usability.

The lack of strategic toilet distribution (50.60% disagreement) correlates with qualitative narratives of "searching for alternatives" (e.g., malls, hospitals).

Demands for *disability-friendly design*, *menstrual hygiene facilities*, and *free access* directly address quantitative gaps in accessibility (57.14% disagreement on disability accommodations) and affordability (50.60% disagreement on subsidies). Respondents' emphasis on accountability for user fees aligns with the polarized affordability perceptions (49.40% vs. 32.74%). Also, their desirability to pay in case of well-maintained and hygienic facilities can be inferred through qualitative discussion.

A weak positive correlation was observed between age and accessibility scores, indicating that older individuals perceive public toilets as marginally more accessible. This may reflect generational differences in expectations, where older adults prioritize basic availability over modern design or inclusivity. Alternatively, younger populations—more attuned to equity and inclusivity norms—may hold stricter standards, leading to lower satisfaction. Qualitative themes like *hygiene concerns* and *lack of menstrual facilities* resonate with younger users' critiques, who often demand higher standards of safety and cleanliness

Finding also suggested that higher education correlates with heightened critical awareness of accessibility gaps, such as inadequate disability accommodations or poor design. Educated individuals likely prioritize universal design and equity, amplifying their dissatisfaction. Qualitative critiques of *exclusionary infrastructure* (e.g., lack of disability-friendly features) support this, as educated respondents disproportionately emphasized inclusion and amenities.

Married respondents reported 3.87 points higher accessibility scores than unmarried individuals. This may reflect differing priorities: married individuals, often managing caregiving responsibilities, might value basic availability over advanced features.

Conversely, unmarried individuals—particularly younger, mobile populations—may prioritize safety, cleanliness, and menstrual hygiene, which are frequently lacking. Qualitative accounts of *avoiding toilets due to safety concerns* and *struggling during menstruation* align with this demographic's lower satisfaction.

While ANOVA indicated significant differences across occupational groups, specific contrasts were not detailed. However, qualitative themes highlight those informal workers or travelers—who rely heavily on public toilets—face compounded challenges due to inconsistent availability and poor maintenance. Conversely, infrequent users (e.g., those who "never" or "sometimes" use toilets) showed no score differences, suggesting that dissatisfaction is universal regardless of use frequency. This universality underscores systemic failures in infrastructure quality rather than isolated user experiences.

According to (Greed, 2009), public toilets are often considered low-priority areas in urban planning, primarily due to efforts to reduce expenses—a situation that is also evident in Nepal. The absence of a specialized department responsible for public toilets, along with the lack of federal regulations (as highlighted in key informant interviews), is linked to noticeable differences in accessibility levels, particularly when comparing various education groups.

One of the key challenges is the absence of established standards by both federal and local governments regarding the technical construction and ongoing operation of public toilets. Currently, the service agreements made with operators lack detailed specifications. Since there are no defined standards in place, it is challenging to require precise contract terms at this time (Guthi).

The Local Government Operation Act (2074) grants municipalities sanitation authority, yet inconsistent implementation persists. There are also no appropriate sanitation guidelines, standards, policies and acts that provide fundamental base for monitoring and evaluating public toilets.

The old agreement and tender process through which operators are operating do not abide them to properly repair and maintain them.

For example, KMC's recent mandate for free toilets disrupted Aerosan's pay-per-use model, highlighting tensions between equity and sustainability.

Equity based accessibility to all public toilet users of all gender and age groups is not only the sole responsibility of local government but also the responsibility of the agencies in federal government like Department of Road, Nepal Police, DWSS, DUDBC etc. Given the importance of public toilets, it is essential to reassess and modernize traditional planning approaches, ensuring that toilets are recognized as a fundamental element of urban planning. Government policies, along with the efforts of relevant departments, agencies, and professionals, should actively gather detailed input from users and include their representatives in the decision-making processes related to public toilet facilities (Greed, 2016).

Historical stigma around public toilets as "dirty" or hubs for illicit activity (noted in KIIs) exacerbates low acceptability scores (61.31% disliked designs). Aerosan's pilot projects (e.g., Swoyambhu, Tripureshwor) demonstrate that hygienic, well-maintained facilities can shift perceptions.

Qualitative themes like "lived experiences" emphasize the need for participatory design. Mobile toilets at gatherings and co-created facilities with user committees could change the perception and make them easy.

Despite Aerosan's successful PPP models in nine locations, policy barriers persist. While Aerosan's technologies are transformative, high costs and reliance on private sector profitability threaten scalability. Balancing advanced features with "minimum viable" standards (e.g., clean water, basic hygiene) is critical for low-income areas.

Discussion based on theoretical lens

The nexus of urban infrastructure, gender equity, and socio-spatial justice through the lens of public toilet accessibility is studied in Kathmandu and Lalitpur. Drawing on feminist urbanism, participatory design theory, and human rights frameworks, the findings reveal systemic failures that perpetuate exclusion, health risks, and gendered inequities.

Feminist urbanism critiques patriarchal urban planning that sidelines women's needs(Hayden Dolores, 1980).The study's findings also validate this critique. Spatial Marginalization is evident as only 14.29% of women agreed public toilets are strategically distributed, with 50.60% disputing their availability. This spatial neglect mirrors global patterns where women's mobility is constrained by caregiving roles (Hartigan et al., 2020). In Hyderabad, India, 46.6% of women avoid public toilets due

to distance(Raghunathan Meena, 2006) echoing Kathmandu's "search for alternatives" (malls, hospitals).

Likewise, Safety is not taken care of as 51.79% felt unsafe due to poor lighting, broken locks, and male attendants, reflecting feminist critiques of public spaces as sites of violence.(Vera-Gray, 2016) Qualitative accounts of harassment risks align with (Reddy et al., 2019)Reddy's finding that 36% of Indian women avoid toilets over security fears(Reddy et al., 2019). high demand for exclusive toilets for women with specific facilities and caretakers who collect money and keep the toilets clean, with particular need for women caretakers to add to the feeling of security(Reddy et al., 2019).

Only 20.24% agreed facilities address menstrual needs, with qualitative themes like "no disposal bins" and "filthy conditions" violating menstrual dignity. This perpetuates the "urban sanitation gap" (UN Water, 2019), limiting women's public participation(*UN World Water Development Report 2019 | UN-Water*, n.d.).

These findings underscore infrastructural violence (Rodgers & O'Neill Bruce, 2012), where poor design and policy inertia exclude women from urban life.

Participatory design theory emphasizes co-creating solutions with users, yet stakeholder policies and practices reveal disconnects. Neither there are any overarching federal laws and policy nor Local guidelines (e.g., KMC, 2079) lack enforceable standards for disability access, menstrual hygiene, or gender-neutral facilities, contravening Nepal's GEDSI commitments. For instance, 80.36% of women reported inadequate disability provisions, mirroring Kitchin and Law's (2001) critique of "poor design and vandalism" in disabled toilets(Kitchin & Law, 2001).

Technological Innovations like Aerosan's sensor-based toilets (CCTV, panic buttons) and waste-to-value systems (biogas, solar showers) exemplify participatory design, engaging marginalized Dalit women as operators. However, scalability is hindered by narrow perception towards private sector calling them profit-driven and policy inertia halting possibilities of further collaborations which is revealed by KII.

Women with disability and individuals belonging to gender minorities face compounded barriers, as few toilets adhere to universal design principles. Turkey's distinction between "micro" (disabled-specific) and "macro" (inclusive) provisioning (Afacan & Gurel, 2020) remains unrealized in Nepal(Afacan & Gurel, 2015).

These gaps highlight the need for just sustainability (Agyeman, 2012), where infrastructure harmonizes ecological resilience with social equity. Urban sociology posits that infrastructure reflects societal values. The study's findings reveal a culture of neglect,

Stigma and Avoidance: Qualitative themes like "disgust" and "holding it in" mirror global patterns where toilets are "last-resort" spaces(Anthony & Dufresne, 2007). In Kathmandu, historical stigma frames toilets as "dirty" or hubs for illicit activity, deterring usage despite emergency needs and not supporting to build on their neighborhood, The "NIMBY" syndrome (Not in My Backyard) (Brouwer & Trounstine, 2024).

Also, Lower-income women (**50%** earning <Rs.10,000) relied more on public toilets (Raghunathan Meena, 2006), yet **50.60%** reported no subsidies, violating the human right to water and sanitation (UN Resolution 64/292). Working women (33%) used toilets more than students (15%), reflecting occupational stratification. These trends mirror Bourdieu's (1984) concept of spatial habitus (Bourdieu, 2014), were socio-economic status dictates access to dignified infrastructure.

4.7 LIMITATION

The study revealed nuanced relationships between socio-demographic variables and accessibility perceptions, complemented by lived experiences, challenges and proposed solutions from users and stakeholders.

However, this study has some limitations, such as the restricted geographical scope, sample size and the context may affect the generalizability of the findings and applicability. Future studies could include larger samples with cross cultural comparisons to ensure reliability. Future research could explore longitudinal impacts of improved sanitation policies, inclusive redesigns, and pilot projects to provide a broader perspective.

4.8 CONCLUSION AND RECOMMENDATION

Public toilets in Nepal suffer from poor accessibility, affordability, and inclusivity due to the absence of standardized policies, management and inadequate infrastructure. Over half (50.60%) of respondents find toilets poorly distributed, while 57.14% report accessibility challenges for people with mobility issues. Affordability remains a concern—though 49.40% do not find charges burdensome. Additionally, 61.31% find toilet designs unsatisfactory, and 51.79% feel unsafe using them. Inclusion gap is huge with 80.36% citing a lack of disability-friendly facilities and over 79% noting inadequate provisions for menstruating women, pregnant women, and caregivers. Qualitative narratives of *avoidance*, *disgust*, and *emergency use* illustrates the daily toll of inadequate infrastructure. Addressing these issues is not merely about physical infrastructure but about reimagining public spaces as sites of equity, dignity, and social justice.

The absence of specific, cross tier legislation (federal, provincial, local) on public toilets has worsened systemic neglect, as seen in fragmented governance and inconsistent standards (80.36% reporting inadequate disability access). To address this Nepal must enact comprehensive federal umbrella policies, acts and guidelines for public toilet is essential which will guide the local levels for technical as well as inclusive principles broadly.

It is essential to develop gender-responsive, disability-inclusive (GEDSI) guidelines with minimum design standards, specific provisions and mandatory compliances on cubicle ratios, facilities, and accessibility features. Local governments should define and enforce technical and operational standards for public toilets. Additionally, Public toilet provisions can be integrated in building codes and byelaws.

Public toilets are currently peripheral under environmental departments, leading to underfunding and mismanagement (61.31% dissatisfaction with maintenance). Local governments should establish a dedicated municipal unit for planning, operation, and maintenance of public toilets with sanitary personnel and inspectors at the ward or area level.

Authorities should develop operation and maintenance manuals and provide training for caretakers and contractors. Public awareness campaigns and communication efforts should be strengthened. A result-based monitoring system must be implemented to

access toilet facilities, ensure proper maintenance, and enforce compliance with accessibility guidelines. Functional, inclusive facilities should be prioritized, with mandatory periodic reporting based on comprehensive checklists of key indicators.

To enhance safety and comfort for women, the presence of female caretakers should be ensured (51.79% feel unsafe using them). For instance, Aerosan's PPP model could serve as blueprint, ensuring accountability through transparent contracts and community oversights. Additionally, socially responsible public-private partnerships (PPPs) should be encouraged for toilet management. Supportive policies must be enacted to attract private sector investment in public toilet infrastructure.

For new facility development, public toilets should be increased in high-footfall areas and made accessible during public events. Women's exclusion from decision-making perpetuates infrastructural inequities, as 79% of respondents reported inadequate provisions for menstruation, pregnancy, and childcare. To address this, municipalities should institutionalize gender-sensitive participatory audits, involving women's groups in the co-design of facilities. Community participation in the design and implementation process will also enhance awareness and acceptability. New urbanism advocates walkable, inclusive cities(Calthorpe, 1993), yet Kathmandu's toilets fail this vision. This approach aligns with feminist urbanism principles, transforming public toilets from neglected spaces into hubs of dignity and safety.

Public toilets are not mere infrastructure but barometers of urban equity. For women in Kathmandu and Lalitpur, exclusionary toilets symbolize systemic neglect, violating rights to dignity and participation. Yet, the study illuminates pathways to inclusion: policies centering intersectionality, technologies bridging sustainability and safety, and communities reclaiming urban spaces.

Kathmandu's public toilet crisis reflects deeper inequities in urban governance, but also presents an opportunity for innovation. By integrating technologies with robust PPP frameworks, federal policies, and community-driven design, public toilets can evolve from neglected infrastructure and sites of marginalization into hubs of equity and sustainability.

New urbanism advocates walkable, inclusive cities (Calthorpe, 1993), yet Kathmandu's toilets fail this vision. To align with SDG 6 (clean water/sanitation) and SDG 11 (inclusive cities) following measures can be taken in the short term as immediate and medium and long term in well planned way.

Short term

1. Implement routine maintenance schedules and real-time cleanliness monitoring with proper Hygiene Protocols.
2. Upgrade safety by adding lights, cameras, and panic buttons, especially to protect women. Install CCTV and Wi-Fi to improve security, as unmarried women reported facing more accessibility issues.
3. Menstrual Health: Pad vending machines and disposal units should be provided as surveys and site observations showed that menstrual needs are often ignored. Install hooks and ledges to keep clothes and belongings.
4. Assure Readiness of the available provisions: Ensure all available facilities are usable. Observations showed that many, like disabled cubicles, ramps, and other basic facilities, were in poor condition. They should be kept up to date in good working condition.

Mid term

- Institutional Reform: Set up a dedicated public toilet unit to manage and maintain facilities efficiently. Employ female attendants in public toilets to ensure comfort and safety for female users. Ward wise or area wise sanitary inspector should be chosen for monitoring the status of public toilets. Train municipal staff in GEDSI principles, hygiene, technologies, sustainable practices etc.
- Existing Facility Improvement: Where possible add diaper-changing stations, breastfeeding areas, and unisex cubicles in existing public toilets to support users with caregiving responsibilities.
- Make in use the portable public toilets in gatherings and high demand areas to cater present demand.

Long term

- Federal umbrella legislation for public toilet covering various aspects from inclusion to waste management technologies such that provincial and local level governments can follow. Public toilets issues can be addressed through Nepal's Building Code. Ensure specification of facilities like sizes and ratio of number of cubicles etc. Mandate toilets every 500 meters.
- Formulate Periodical, mandatory mentioned, Result based monitoring mechanism for evaluating performance of individual public toilets and Objectively Verifiable Indicators (OVI).
- Amend local building byelaws to provide public toilets. Amend building permit procedure to provide public toilet facilities mandatorily in certain buildings (for e.g. buildings above 10000 square feet)
- Laws to mandatorily provide toilets for public use by certain categories of commercial establishments like departmental store, petrol pump with proper signage and minimum requirements.
- Connect Public Toilet with indicators of themes (Physical Infrastructures and GEDSI) under LISA (Local Government Institutional Capacity Self-Assessment)
- Encourage Public-Private Partnerships (PPPs) by offering tax exemptions for businesses that provide toilets, like KMC's 40% deduction model, and offering grants to municipalities. Explore new business models in PPP for public toilets.
- Involve the community in planning and designing phase of new public toilets. Get feedback from users to improve acceptance and engage women in co-designing toilets. (can refer to Her City tool of UN-Habitat Cities for Women) incorporating technologies like GIS mapping to find high-demand areas based on density and foot fall.
- Integrate technologies like recycling wastewater, harvesting rainwater, and using biodigesters for waste management supporting climate resilience and environmental protection.
- Research program to conduct longitudinal studies on innovative pilot models funding and competition for new ideas.

References

Afacan, Y., & Gurel, M. O. (2015). Public toilets: An exploratory study on the demands, needs, and expectations in turkey. *Environment and Planning B: Planning and Design*, *42*(2), 242–262. https://doi.org/10.1068/b130020p

Agyeman, J. (2012, September 21). *Just sustainabilities | Julian Agyeman*. https://julianagyeman.com/2012/09/21/just-sustainabilities/

Anthony, H. K., & Dufresne, M. (2007). Potty parity in perspective: Gender and family issues in planning and designing public restrooms. *Journal of Planning Literature*, *21*(3), 267–294. https://doi.org/10.1177/0885412206295846

Bichard, J.-A. (2015). *'Extending Architectural Affordance: The Case of Publicly Accessible Toilets'* [University College London]. https://www.researchgate.net/publication/280597694_%27Extending_Architectural_Affordance_The_Case_of_Publicly_Accessible_Toilets%27

Blakie, N. (2000). *Designing Social Research: The Logic of Anticipation*. https://books.google.com.np/books/about/Designing_Social_Research.html?id=i4fBQgAACAAJ&redir_esc=y

Blaxter, L., Hughes, C., & Tight, M. (2010). *How to Reseach*. https://books.google.com/books/about/How_To_Research.html?id=Ow7bYYBA14sC

Booth, M. L., Owen, N., Bauman, A., Clavisi, O., & Leslie, E. (2000). Social-cognitive and perceived environment influences associated with physical activity in older Australians. *Preventive Medicine*, *31*(1), 15–22. https://doi.org/10.1006/PMED.2000.0661

Bourdieu, P. (2014). The Habitus and the Space of Life-Styles : (1984). *The People, Place, and Space Reader*, 139–144. https://doi.org/10.4324/9781315816852-27

Broady, M. (1968). *Planning for People: Essays on the Social Context of Planning*. Bedford. https://books.google.com.np/books/about/Planning_for_People.html?id=31v1uQEACAAJ&redir_esc=y

Brouwer, N. R., & Trounstine, J. (2024). NIMBYs, YIMBYs, and the Politics of Land Use in American Cities. *Annual Review of Political Science*, *27*(1), 165–184.

https://doi.org/10.1146/ANNUREV-POLISCI-041322-041133/CITE/REFWORKS

BTA. (2001). *Better Public Toilets: A providers' guide to the provision and management of "away from home" toilets*.

Burton E, M. L. (2006). Inclusive Urban Design: Streets for Life . *Elsevier, Oxford*.

Calthorpe, P. (1993). *Next American Metropolis*. *4*, 1–175. https://books.google.com/books/about/The_Next_American_Metropolis.html?id=WtKU5L0ajA8C

Doris Damyanovic, Florian Reinwald, & Angela Weikmann. (2013). *Gender Mainstreaming in Urban Planning and Urban Development*.

Gender Eds O Gershenson, B. P. (2009). *Ladies and Gents: Public Toilets and Gender Eds*.

Greed, C. (2009). *The role of the public toilet in civic life*. https://philpapers.org/rec/GRETRO-20

Greed, C. (2016). Taking women's bodily functions into account in urban planning and policy: Public toilets and menstruation. *Town Planning Review*, *87*(5), 505–524. https://doi.org/10.3828/tpr.2016.35

Grix, J. (2002). Introducing Students to the Generic Terminology of Social Research. *Http://Dx.Doi.Org/10.1111/1467-9256.00173*, *22*(3), 175–186. https://doi.org/10.1111/1467-9256.00173

Hanson, J., Bichard, J., & Greed, C. (2004). *Access to the built environment: Barriers, chains and missing links: Initial review*.

Hanson, J., Bichard, J., & Greed, C. (2007). *The Accessible Toilet Resource*.

Hartigan, S. M., Bonnet, K., Chisholm, L., Kowalik, C., Dmochowski, R. R., Schlundt, D., & Reynolds, W. S. (2020). Why do women not use the bathroom? Women's attitudes and beliefs on using public restrooms. *International Journal of Environmental Research and Public Health*, *17*(6). https://doi.org/10.3390/ijerph17062053

Hayden Dolores. (1980). What Would a Non-Sexist City Be Like? Speculations on Housing, Urban Design, and Human Work. *JSTOR*, *vol.5, no.3*(Signs), 170–187. https://www.jstor.org/stable/3173814

Imrie, R. (2000). Disability and Discourses of Mobility and Movement. *Environment and Planning A*, *32*(9), 1641–1656. https://doi.org/10.1068/A331

Kemal Kocaili, E., & Hersek, M. (2023). Historical Evaluation of Public Toilets as Public Spaces. *Gazi University Journal of Science*, *11(1)*(Part B), 77–90. http://dergipark.gov.tr/gujsb

KEMP, G. (2010). *Publicly Available Toilets Problem Reduction Guide,*.

Kira Alexander Bantam. (1977). *The Bath Room*. https://www.ebay.com/itm/276392260532

Kitchin, R., & Law, R. (2001). The Socio-spatial Construction of (In)accessible Public Toilets. *Http://Dx.Doi.Org/10.1080/00420980124395*, *38*(2), 287–298. https://doi.org/10.1080/00420980124395

Knight, Gail., & Bichard, J.-Anne. (2011). *Publically accessible toilets : an inclusive design guide*. 39.

Marcus, C. C., & Francis, C. (1990). People places: design guidelines for urban open space. *People Places: Design Guidelines for Urban Open Space*.

MARGARET W. ANDREWS. (1990). Sanitary Conveniences and the Retreat of the Frontier: Vancouver, 1886-1926. *BC STUDIES*, *87,*.

Massey, D. B. . (1994). *Space, place, and gender*. 289.

Michael, Y. L., Green, M. K., & Farquhar, S. A. (2006). Neighborhood design and active aging. *Health & Place*, *12*(4), 734–740. https://doi.org/10.1016/J.HEALTHPLACE.2005.08.002

Molotch, H., & Norén, L. (2010). Toilet: Public restrooms and the politics of sharing. In *Toilet: Public Restrooms and the Politics of Sharing*. New York University Press. https://doi.org/10.5860/choice.48-6993

Nelischer Kate. (2022). *Women's Right to the City*.

Pathak, K. (2019). *There is a significant dearth of public toilets in Nepal*. https://kathmandupost.com/columns/2019/11/12/there-is-a-significant-dearth-of-public-toilets-in-nepal

Penner, B. (2005). *Researching Female Public Toilets: Gendered Spaces, Disciplinary Limits*. https://vc.bridgew.edu/jiws/vol6/iss2/6

Penner, Barbara. (2013). *Bathroom*. 335. https://books.google.com/books/about/Bathroom.html?id=oG2XAwAAQBAJ

Purkayastha, D., & Raheja, G. (2022). Interpreting Inclusion for Sanitation Perspectives from India: A Contextual Approach to Universal Design. *Studies in Health Technology and Informatics*, *297*, 315–322. https://doi.org/10.3233/SHTI220855

Raghunathan Meena. (2006). *Why Women Don't use Public Toilets A study with special reference to Twin cities of Hyderabad and Secunderabad*.

Rawls, S. K. (1988). *Restroom usage in selected public buildings and facilities : a comparison of females and males*.

Reddy, Y. M., Raghavan, S., & Vedala, S. C. (2019). A Narrative Exposition on Public Toilet Usage by Women: A Study from Warangal. *Indian Journal of Gender Studies*, *26*(1–2), 108–137. https://doi.org/10.1177/0971521518808100

Rodgers, D., & O'Neill Bruce. (2012). Introduction: Infrastructural violence: Introduction to the special issue. *JSTOR*, *Vol. 13, No. 4*, 401–412. https://www.jstor.org/stable/43497506

Sulabh International – Social Service Organisation. (2025). https://www.sulabhinternational.org/

UN World Water Development Report 2019 | UN-Water. (n.d.). Retrieved February 25, 2025, from https://www.unwater.org/publications/un-world-water-development-report-2019

Vera-Gray, F. (2016). Men's stranger intrusions: Rethinking street harassment. *Women's Studies International Forum*, *58*, 9–17. https://doi.org/10.1016/J.WSIF.2016.04.001

Yayınları, İ., Dizisi, P., KAPAK TASARIMI Utku Lomlu KAPAK Suat Aysu UYGULAMA Hasan Deniz, D., Meydanı Sokak, B., & Han, İ. (1997).

Strukturwandel der Öffentlichkeit. *İletişim Yayıncılık A. Ş. 1-13. BASKI*, *14*. www.iletisim.com.tr

Zallio, M., & Clarkson, P. J. (2021). Inclusion, diversity, equity and accessibility in the built environment: A study of architectural design practice. *Building and Environment*, *206*, 108352. https://doi.org/10.1016/J.BUILDENV.2021.108352

ANNEX I: Survey tool

Accessibility of public toilets among women in urban spaces

Namaste! I am an M.Sc. Urban Planning student at Pulchowk campus and I am conducting a study on women's accessibility of public toilets. I request you to fill this form based on your experience with using public toilets, as a woman. Your personal information will not be included in the study and your responses will remain anonymous. The obtained information will solely be used for research purpose only. Your participation in this research will neither pose any immediate benefit nor any harm to you, but it will be valuable for this research. If you have any query about the study, you can contact me at 079msurp010.prajeeb@pcampus.edu.np. Thank you for your time and support.

Do you agree to participate in this survey?

- ◯ Yes
- ◯ No

Age

in years

_____

Educational level

- ◯ Illiterate
- ◯ Basic level (Grade 1-8)
- ◯ Secondary level (Grade 9-12)
- ◯ Bachelors and above

Marital status

- ◯ Unmarried
- ◯ Married
- ◯ Separated
- ◯ Widowed

Occupation

What do you do for living?

- ☐ Agriculture
- ☐ Homemaker
- ☐ Job
- ☐ Labor
- ☐ Business
- ☐ Others

Specify others

_____

How frequently do you use public toilets?

- Often
- Sometimes
- Never

Do you think public toilets are equally available for people of all gender?

- Yes
- No

Do you think available public toiets in urban places equally address the issues of people of all gender?

- Yes
- No

Do you think public toilets are available for persons with disability?

- Yes
- No

Do you think public toilets in urban places equally address the issues of persons with disability?

- Yes
- No

Do you think public toilets in urban spaces address the needs of pregnant women?

- Yes
- No

Do you think public toilets are designed to be child friendly?

- Yes
- No

Do you think public toilets in urban spaces address the needs of women accompanied by children?

- Yes
- No

Do you think public toilets in urban spaces address the needs of women during menstruation?

- Yes
- No

Public toilets are strategically distributed across urban spaces.

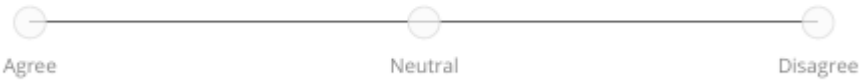
Agree — Neutral — Disagree

Public toilets are available during public events and gatherings.

I get to use public toilets without waiting in queue when needed.

Public toilets are always open when I need to use them.

Public toilets are located at visible locations.



Public toilets are located at approachable locations.

I can find female toilets through the signages put there.

Public toilets are designed to accommodate people with mobility challenges.

I find the public toilets charges reasonable for daily use.

I don't feel financially burdened by paying for public toilets.

There are free public toilets available in certain places of Kathmandu valley.

Open ended question:

1. How has gender norms affected the availability of public toilets for women?
2. Do you think women's needs are addressed while making spaces like public toilets?
3. Please explain the kinds of barriers you experience or see on daily basis while using public toilets. (Probe: Cultural, social, financial) different scenarios of public places not getting toilets, difficulties, easily found
4. Your recommendations on what can be done to make public toilets more inclusive.

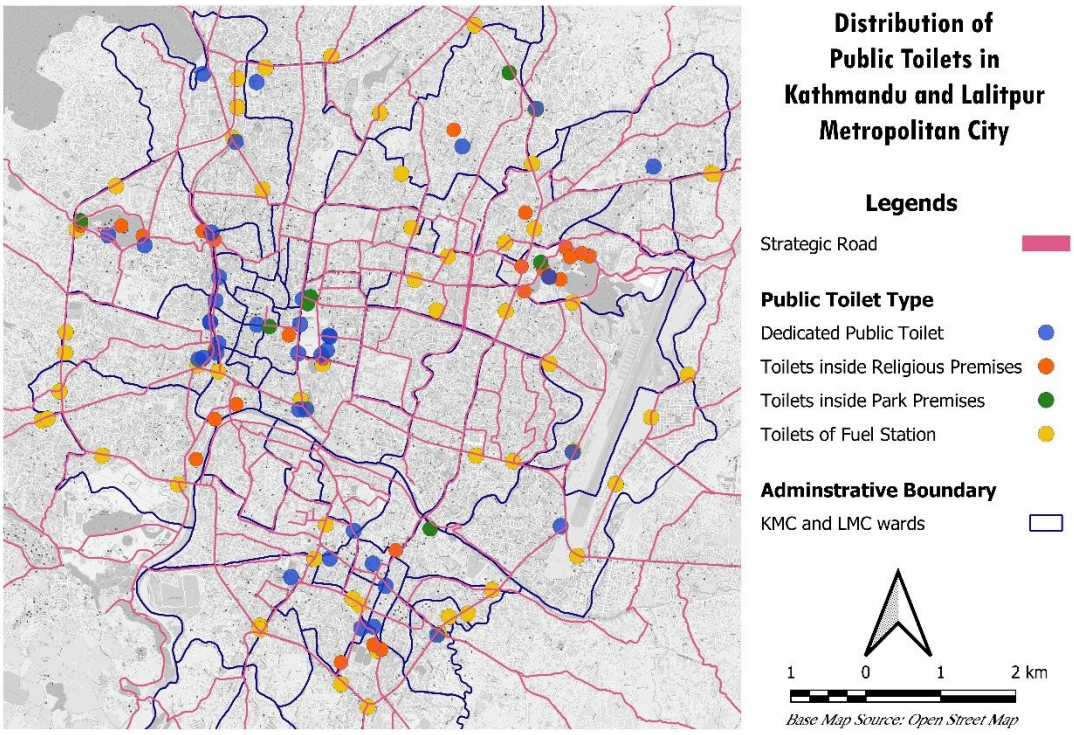
ANNEX II: List Major Public Toilets Visited

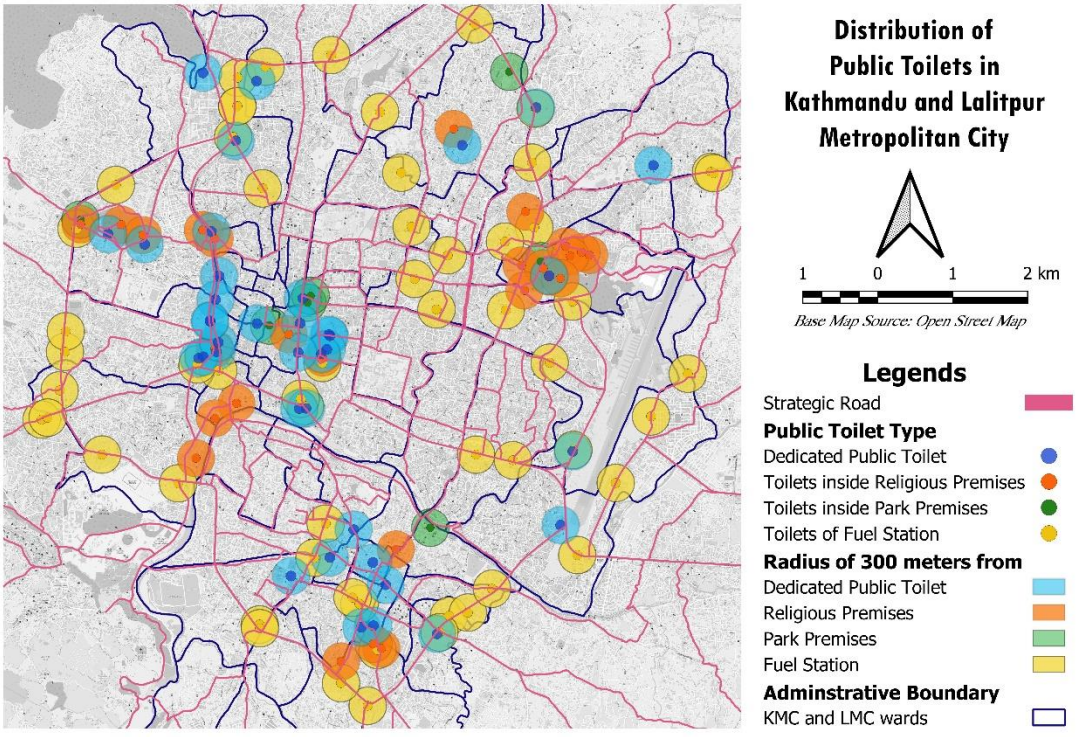
S.N.	Toilet	Location
1	Patan 1	Jawalakhel
2	Patan 2	Mangal bazar
3	Patan 3	Patan Dhoka
4	Swoyambhu 1	Buddha Park
5	Swoyambhu 2	Buddha Park
6	Swoyambhu 3	World Peace Pond
7	Swoyambhu 4	Swoyambhu Environment Park
8	Swoyambhu 5	Bhagwan Pau
9	Swoyambhu 6	Bhuikhel Ground
10	Swoyambhu 7	Buddhist Crematory Center
11	Paropakar	Paropakar Marg

Annex III: List of Institutional Key Informants

S. N.	Institute	Position
1	AEROSAN Sustainable Sanitation	Program Manager
2	AEROSAN Sustainable Sanitation	Logistics Manager
3	Kathmandu Metropolitan City	Member, CPC
4	Kathmandu Metropolitan City	Head, PPP Section
5	Kathmandu Metropolitan City	Senior Architect
6	Lalitpur Metropolitan City	Senior Engineer
7	Ministry of Water Supply	Joint Secretary
8	Ministry of Women, Children and Senior Citizen	Under Secretary

Annex IV: Maps





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Annex VI: Conference Paper

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Date: April 21, 2025

To Whom It May Concern:

This is to certify that the paper titled **"Towards Inclusive Urban Spaces: Public Toilet Accessibility for Women in Kathmandu and Lalitpur Metropolitan City" (Submission# 523)** submitted by **Prajeeb Raj Kandel** as the first author, which had been accepted for presentation after the peer-review process, has successfully been presented at the 16th IOE Graduate Conference held during April 18 - 20, 2025. Kindly note that the final revision of the papers and publication process of the conference proceedings is still underway and hence inclusion of the accepted manuscript in the conference proceedings is contingent upon timely response to further edits during the publication process.

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Towards Inclusive Urban Spaces: Public Toilet Accessibility for Women in Kathmandu and Lalitpur Metropolitan City

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Abstract

Urban spaces are home to diverse populations, yet urban planning often prioritizes efficiency over inclusivity, resulting in environments that fail to accommodate women's needs. Public toilets, an essential aspect of urban infrastructure, are particularly neglected, disproportionately affecting women due to biological, social, and safety concerns. In Nepal, the inadequacy of public toilets marked by poor accessibility, affordability problems, and lack of inclusivity significantly limits women's mobility and participation in public life. This study examines the challenges women face in accessing public toilets in Nepal, with a focus on the cities of Kathmandu and Lalitpur. Through a multi-method approach, combining quantitative surveys with 168 women and qualitative stakeholder interviews, the research explores issues related to accessibility and inclusivity. The study also investigates the gaps in existing policies that contribute to the inadequate provision of sanitation facilities for women. The findings reveal significant barriers that hinder equitable access to public toilets, reinforcing the need for policy reforms, inclusive design, and improved management. This research provides valuable evidence for urban planners and policy makers to guide the development of gender-sensitive, accessible, and inclusive public toilets. Addressing these challenges is essential for promoting gender equality, public health, and sustainable urban development, as well as fostering inclusive urban spaces for all.

Keywords

Accessibility, Public Toilets, Women

1. Introduction

Urban spaces are home to diverse populations, with women and girls accounting for approximately half of the urban demographic. Yet urban planning often focuses on efficiency and functionality, but it usually takes a male-centered approach and overlooks gender sensitivity. (Massey, 1994). This exclusion has resulted in cities that lack inclusivity and equity, with systemic inadequacies that hinder women's participation in public life.[1] Women and men experience urban life differently, both in perception and use of public spaces.[2]Public toilets, a critical component of urban infrastructure are not merely functional but essential for public health, freedom of movement, and fostering inclusivity in urban life. Despite their greater significance for women due to biological and social factors, public toilets are often marginal, poorly maintained, and a last-resort option for women, compromising their comfort, dignity, and participation in public life.[3]

Urban planning often neglects women's needs, reflecting broader patriarchal biases that lead to spatial marginalization[4]. Feminist urbanism advocates for inclusive design that emphasizes diversity and safety, challenging these biases[5]. Inadequate public toilets can perpetuate infrastructural violence, exacerbating social inequalities[6]. Achieving just sustainability involves ensuring equitable access to basic services like public toilets[7]. The concept of spatial habitus highlights how individuals' interactions with urban spaces are shaped by their social environments[8]. By prioritizing women's experiences and needs, urban planning can create more livable environments while mitigating infrastructural violence and fostering just sustainability.

Historically, women's sanitation needs have been overlooked, with adequate public toilet provisions achieved only through civil campaigns in countries such as Canada, New Zealand, Australia, and the UK[9]. This oversight has led to the exclusion of women from fully participating in public life, with some arguing that inadequate toilet provision was even a means of controlling women's access to the city, keeping them at home and away from the public realm, but as more women worked outside the home, the need became greater.

Existing building codes focus on technical standards, such as fixture type and design, but fail to consider how social patterns influence and interact with these standards.[10, 11]. There is a critical need for research that incorporates user perspectives and sociocultural contexts to create a comprehensive understanding of public toilet provision.

Public toilet issues are common throughout Nepal, especially on highways and in urban areas like the Kathmandu Valley, where these challenges are more severe. 68 public toilets in Kathmandu valley, serving at least 300 persons per day. Public toilet in Pasupati and Ratnapark serves 1000 person a day. KMC public toilets are run by vendors in Bhotahiti- based public toilet at Rs. 412,500. KMC generates nepali rupees five million per year from 29 public toilets of Kathmandu. Vendors operating public toilets for profit makes toilets in KMC in a "sorry state". (AEROSAN)

These issues highlight the urgent need for gender-sensitive sanitation planning, underscored by the Sustainable Development Goals (SDGs), including SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and

Communities). This study will provide evidence-based insights to guide policymakers and urban planners in designing gender-sensitive public sanitation infrastructure, emphasizing its critical role in shaping sustainable urban development.[12]

2. Research Objective

General objective is to study the challenges and needs of women in public toilets in urban areas to inform the creation of inclusive urban spaces.

The specific objectives of the research are:

1. To assess perspectives of women in accessing and using public toilets in urban spaces
2. To explore stakeholders' understanding of inclusiveness and challenges in public toilets in urban spaces
3. To recommend evidence-based strategies for creating inclusive public toilets and urban spaces

3. Philosophical Foundation

All research begins with a researcher's worldview, shaped by personal experience. Social phenomena are not always directly observable, and structures may exist beyond direct perception. Ontology is an assumption that cannot be empirically refuted, defining what a researcher considers researchable. Epistemology, in turn, guides how knowledge is acquired. These positions influence methodological choices and can lead to different interpretations of the same phenomena.[13] This study acknowledges multiple realities, recognizing women's perceptions as subjective while maintaining some objective truths, such as in-situ facts. A case-based approach balances empirical observations with contextual interpretation. Ontologically, the research follows pragmatism, emphasizing practical realities like the spatial distribution and usage of public toilets while considering individual experiences. Epistemologically, it integrates empirical evidence with subjective meanings, recognizing that while toilet distribution is an objective fact, perceptions and usage remain influenced by psychological factors. Pragmatism adopts a broad, pluralistic view, focusing on problem-solving rather than fixed realities. It values inquiry, practical utility, and adaptability, viewing knowledge as evolving through experience and empirical validation. The methodological approach reflects this, prioritizing what works over absolute truths. Researcher viewed this research using pragmatic lens. Perspective in pragmatism is like bird's eye where world view is broad, inclusive and pluralistic.

4. Methodology

In this study, qualitative and quantitative methods are applied at various steps. It will be multi method study design. Both descriptive and analytical cross-sectional study is done. Quantitative survey was conducted among 168 women above 18 years of age in various public toilets of Kathmandu and Lalitpur Metropolitan City based on normative content of human right to sanitation by UN [14], Availability, Accessibility, Affordability, Acceptability. An open-ended question was administered at the end asking about their experiences using public toilets and stakeholders were met to understand the status of policies and their implementation. The normative content of the human right to sanitation is defined by UN[14]:

1. Availability: A sufficient number of sanitation facilities must be available for all individuals.
2. Accessibility: Sanitation services must be accessible to everyone within, or in the immediate vicinity, of household, health and educational institution, public institutions and places and workplace. Physical security must not be threatened when accessing facilities.
3. Affordability: The price of sanitation and services must be affordable for all without compromising the ability to pay for other essential necessities guaranteed by human rights such as water, food, housing and health care.
4. Acceptability: Services, in particular sanitation facilities, have to be culturally acceptable. This will often require gender-specific facilities, constructed to ensure privacy and dignity.

4.1 Sample size and Sampling

According to a study done in Kathmandu Metropolitan City in 2022, it was found that 92% of women had used public toilets at least once whereas 8% women had never used public toilets. It was used as the sample size was calculated using Cochran's formula adding 10% non-response rate. The minimum sample size was calculated as 126. Total 168 responses were collected, as higher sample size would ensure higher statistical power. Purposive sampling was applied. The women around the public toilets of Lalitpur Metropolitan City were approached for the interview. Verbal consent was taken before the interview.

4.2 Study Variables

The study explored the perception of women about accessibility of public toilets. Dependent variables: Accessibility perception score Independent variables: Age, Educational level, Occupation, frequency of use of public toilets, perception on inclusion

4.3 Data processing and analysis

Data collection tools were prepared on kobo tool. The forms were filled in data collector's phone. The data was imported in excel sheet and was analyzed using EZR software.

5. Research Analysis and Findings

5.1 Site Observations

Most of the surveyed toilets were in safe locations and not too isolated. Guthi's study also had found that the best-rated

aspect was their convenient opening hours which is seen in this observation also.[15].However, many toilets were hard to find from the outside due to a lack of clear signs. Lighting was mixed, with some toilets having good lighting and others being poorly lit. Many toilets did not have proper locks, and overall cleanliness was not well maintained, even though they were open at convenient times. Toilets for people with disabilities were very limited, and those available had only a few helpful features. Even the separate cubicles for people with disables were used as store and other purpose. Even the toilet designed with the provisions for differently abled people the Readiness for the use of people with disabilities was not there. Basic supplies like soap and toilet paper were missing in most places, along with cleaning and maintenance materials. Privacy for women was a concern, as most toilets did not have mirrors. There were also not enough female cubicles, and only one-fourth of the toilets had female attendants. For good menstrual hygiene, public toilets should have disposal bins inside the cubicles and access to water and necessary supplies. However, these needs were only partly met. Lastly, the working conditions for toilet caretakers were poor.

Figure 1: Inaccessible footpath in the Public toilet with Inclusive feature

Figure 2: Female Restroom below ground level

5.2 Descriptive Statistics

5.2.1 Perception on Inclusion

Women were asked their perception regarding inclusion. Eight questions were asked. The responses are presented in the table below. The findings on public perception of toilets reveal significant gaps in inclusive and accessibility. While the availability of public toilets for all genders is evenly split (50% Yes, 50% No), only 27.98% believe that gender-specific issues are adequately addressed. The situation is even more concerning for persons with disabilities, with only 19.64% acknowledging availability and a mere 14.88% stating that their specific needs are addressed. Similarly, the needs of pregnant women remain largely unaddressed, with 85.12% of respondents expressing dissatisfaction. Child-friendly designs are lacking, as 79.76% believe public toilets do not cater to children's needs. Additionally, only 19.64% feel that facilities support women accompanied by children, and just 20.24% think menstruation-related needs are considered. These findings highlight critical shortcomings in public toilet infrastructure, underscoring the need for inclusive and accessible sanitation solutions that cater to diverse user groups.

5.2.2 Women's perception on public toilets accessibility

The respondents were provided 16 statements and select the best option for each statement. Among the 16 statements, 4 statements each were asked for availability, accessibility, affordability and acceptability.

Accessibility perception score All the sixteen statements were positive statements. The scores for disagree, neutral and agree were given as 0, 1 and 2 respectively. So, for the total 16 statements, the highest score was 32 and the lowest score was 0. A new variable accessibility was generated summing the responses to these 16 statements. When the summary of the score was obtained, it was found that the mean score was 14.547 and median score was 14. It means that among the respondents, half of the respondents' score was below 14 while the score of the remaining half was above 14. The lowest score was 0 and the highest score was 32.The findings indicate significant concerns regarding the availability, accessibility, affordability, and acceptability of public toilets.

In terms of availability, only 14.29% of respondents agreed that public toilets are strategically distributed, while 50.60% disagreed. Similarly, opinions on the availability of toilets during public events were evenly split, with one-third agreeing, one-third neutral, and one-third disagreeing. Additionally, 43.45% reported facing queues, and 41.07% stated that toilets were not always open when needed.

Regarding accessibility, 37.50% found toilets not visible enough, while 35.12% believed they were not in approachable locations. Although half of the respondents (50%) found female toilet signage identifiable, 57.14% felt that public toilets were not designed for people with mobility challenges.

In terms of affordability, perceptions were mixed—while 49.40% did not feel financially burdened by toilet charges, only

13.69% believed vulnerable groups received subsidized access, with 50.60% disagreeing.

Concerning acceptability, a significant 61.31% found the design of public toilets unsatisfactory. While 41.67% agreed that separate female toilets were available, only 20.83% felt comfortable with the security measures, with 51.79% expressing dissatisfaction. Additionally, 35.12% agreed that public toilets were in socially acceptable, non-isolated locations, but 40.48% remained neutral. These findings highlight critical gaps in public toilet infrastructure, necessitating strategic improvements in their distribution, accessibility, affordability, security, and inclusive.

5.3 Qualitative Analysis

The respondents were provided an open-ended question at the end of the survey tool, where they shared their experiences and opinions about public toilets. The responses were categorized into codes like exploring alternatives, availability, experiences, inclusion, hygiene and maintenance, essential amenities, context of need and usage etc. and the codes were organized into themes.

5.3.1 Theme 1: Current concern

For many respondents, the thought of using a public toilet brings an immediate sense of hesitation. They shared about their major concern with the cleanliness and hygiene of public toilets. "They are not clean and may cause health issues," a woman remarked, reflecting a widely shared sentiment. The lack of proper sanitation seemed to be a significant barrier. Another user bluntly stated, "Sanitation is not well maintained in public toilets of KTM." The experience of using these facilities is often worsened by foul odors and unhygienic conditions. "In Kathmandu, there's no need to search for a public toilet because you can smell it from a distance," a respondent pointed out. Another described their experience as "uncleaned, wet surfaces, foul smell, and unemptied waste bins in female toilets." Many users admitted they would rather avoid public toilets altogether. "They are not clean and are smelly, causing most of us to rather hold than use it." Another added, "I feel disgusted using public toilets as there is no hygiene maintained." Despite the concerns, there is a clear demand for improvement. "It would be better if those toilets are kept clean," one person suggested. Others echoed this need: "Should maintain cleanliness." and "Need more cleanliness." These voices highlight an urgent call for better maintenance, ensuring public toilets are not just available but also hygienic and safe to use.

5.3.2 Theme 2: Lived Experiences

The theme lived experiences includes the codes exploring alternatives, availability, experiences, context of need and usage. The theme covers the experiences of women while using public toilets, their experiences with seeking alternatives to not use public toilets and the times when they have no other options but to use public toilets. The respondents shared their bad experiences with using public toilets. For many people in Kathmandu, finding and using a public toilet is a challenge filled with frustration and discomfort. Public toilets are often difficult to locate, leading many to wonder if they even exist. "I have not used any public toilets in Kathmandu... I am not even sure if there are public toilets in Kathmandu," shared one individual. Even when available, their condition discourages use. Broken door locks, cramped stalls, and a lack of lighting create an unsafe environment, with one person stating, "The toilet stalls are extremely small, and when using them, my body touches the walls, which are very dirty. There's also no lighting inside the toilets, making it even more inconvenient." The unhygienic conditions push many to find alternatives, such as malls, restaurants, and hospitals. "Every Friday I go to Chhetrapati area school. I don't find it comfortable to use the toilet there, so I use the toilet at Bir Hospital before and after visiting the school," explained one respondent. Others deliberately limit their water intake during travel to avoid needing public toilets altogether. Women face even greater struggles, particularly during menstruation, with one person noting, "On regular days, it's already hard to use them, but during menstruation, it's nearly impossible." Despite these challenges, public toilets remain a necessity, especially in emergencies. Some resign themselves to using them when no other option is available, with one person stating, "Public toilets make people's lives easier when needed. Some people have emergencies sometimes. When I use it, it's dirty, but I have to go when there is no option left." However, others prefer to endure discomfort rather than step into an unclean facility, simply stating, "Very bad. I don't like going to public toilets unless it is an emergency." The reality of public toilets in Kathmandu is one of inconvenience, poor maintenance, and a lack of accessibility, forcing people to make difficult choices in their daily lives.

5.3.3 Theme 3: Proposed Solutions

This theme consisted of the codes Inclusion, essential amenities, and user charges and affordability. The respondents had suggested what would make the use of public toilets easier and better to them. They shared about the need of an inclusive public toilets that would address the needs of the persons with disability. Supporting this, one respondent said, "It should be available and accessible for disabled people. It should also meet the criteria for different genders." Public toilets in Kathmandu are not just scarce and poorly maintained—they are also inaccessible to many. One respondent emphasized the need for improvement, stating, "It should be available and accessible for disabled people. It should also meet the criteria for different genders." However, current conditions fail to meet these basic standards, as another respondent noted, "No hygiene, not very disability-friendly—except in malls, other public toilets are questionable." Beyond accessibility, the lack of essential facilities inside toilets adds to the struggle. Many public restrooms lack soap, water, tissue, and proper disposal systems, making their use unhygienic and uncomfortable. "Availability of soap and water is a must. Pad disposal bins are also a must," shared one individual, while another pointed out, "There is no water, tissue, hand soap, sanitary pads, and dustbins. It is very dirty." Women, in particular, expressed the need for menstrual hygiene facilities, with one person suggesting, "In women's toilets, especially, there should be a paid pad box that ladies can utilize in need." The issue of user

charges further complicates public toilet access. Many people expect a basic level of cleanliness if they are required to pay, yet this is rarely the case. "When we pay, I want them to keep the toilets clean, but they don't. That's all," expressed one frustrated user. Others questioned whether the money collected is even used for maintenance. "The fund collected for public toilets is not systematic. I don't think those fees are used for maintenance," one respondent remarked. This has led to growing demands for free and well-managed public toilet facilities, as one person simply put it, "Public toilets should be at appropriate locations with free of charges." Improving public toilets requires a multi-faceted approach—ensuring accessibility for all, providing essential hygiene facilities, and making sure that user fees, if charged, translate into better maintenance. Without these changes, public toilets will continue to be an inconvenient and unreliable option for many.

5.4 Inferential Statistics

Normality of Accessibility Perception Scores and Parametric Test Suitability The Kolmogorov-Smirnov test ($p = 0.027 > 0.01$) confirmed that the accessibility perception scores followed a normal distribution, validating the use of parametric tests. The mean score of 14.547/32 further underscores the overall dissatisfaction, aligning with qualitative critiques of poor hygiene, inaccessibility, and affordability.

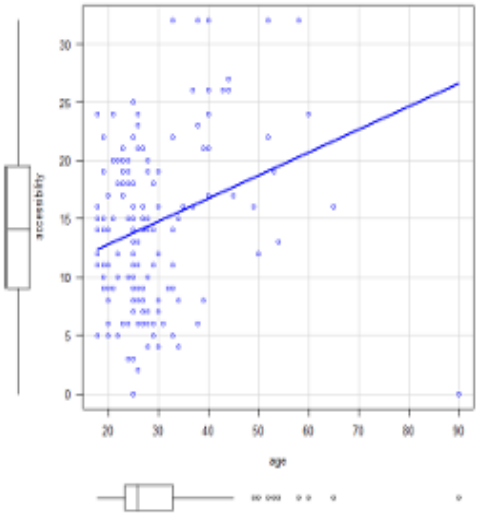

Figure 3: Age and accessibility

Age and Accessibility Perception A weak positive correlation ($r = 0.275$, $p < 0.001$) was observed between age and accessibility scores, indicating that older individuals perceive public toilets as marginally more accessible. This may reflect generational differences in expectations, where older adults prioritize basic availability over modern design or inclusivity. Alternatively, younger populations—more attuned to equity and inclusivity norms—may hold stricter standards, leading to lower satisfaction. Qualitative themes like hygiene concerns and lack of menstrual facilities resonate with younger users' critiques, who often demand higher standards of safety and cleanliness.

Categories	Difference	Confidence Interval	p-value
Basic level-Illiterate	3.2142	-5.06-11.48	0.744
Secondary level-Illiterate	-2.4869	-8.47-8.47	1.00
Bachelors and above-Illiterate	-7.066	-14.14-0.008	0.0503
Secondary level-Basic level	-3.214	-9.855-3.45	0.59
Bachelors and above-Basic level	-1.0280	-15.040--5.52	0.000005
Bachelors and above-Secondary level	-7.0661	-12.17-1.95	0.0024

Table 1: Comparison of Education Level

Education and Accessibility Perception ANOVA test revealed significant differences in accessibility scores across education levels ($p < 0.05$). Post-hoc Tukey tests highlighted stark contrasts: • Bachelor's-educated respondents mean score was 7.07 points lower than illiterate individuals. • Similarly, bachelor's-educated groups mean score was 15.04 points lower than those with basic education. This suggests that higher education correlates with heightened critical awareness of accessibility gaps, such as inadequate disability accommodations or poor design. Educated individuals likely prioritize universal design and equity, amplifying their dissatisfaction. Qualitative critiques of exclusionary infrastructure (e.g., lack of disability-friendly features) support this, as educated respondents disproportionately emphasized inclusion and amenities.

Categories	Difference	Confidence Interval	p-value
Married-Unmarried	3.86822	0.93-6.799	0.0042851
Separated-Unmarried	-13.11	-31.38-5.14	0.2477636
Widowed-Unmarried	8.884	-4.09-21.86	0.2880592
Separated-Married	-16.983	-35.309-1.34	0.0800223
Widowed-Married	5.016	-8.046-18.07	0.7514520
Widowed-Separated	22.00	22.00- -0.26	0.0540716

Table 2: Comparison of Marital Status

Marital Status Married respondents reported 3.87 points higher accessibility scores than unmarried individuals ($p =$

0.004). This may reflect differing priorities: married individuals, often managing caregiving responsibilities, might value basic availability over advanced features. Conversely, unmarried individuals—particularly younger, mobile populations—may prioritize safety, cleanliness, and menstrual hygiene, which are frequently lacking. Qualitative accounts of avoiding toilets due to safety concerns and struggling during menstruation align with this demographic's lower satisfaction.

Occupation and Frequency of Use While ANOVA indicated significant differences across occupational groups, specific contrasts were not detailed. However, qualitative themes highlight those informal workers or travelers—who rely heavily on public toilets—face compounded challenges due to inconsistent availability and poor maintenance. Conversely, infrequent users (e.g., those who "never" or "sometimes" use toilets) showed no score differences, suggesting that dissatisfaction is universal regardless of use frequency. This universality underscores systemic failures in infrastructure quality rather than isolated user experiences.

5.5 Key Informants Interview

The KIIs highlight policy gaps, current problems and challenges with some probable strategies to be adopted to improve public toilet accessibility in Kathmandu and Lalitpur with a focus on inclusivity, sustainability, and gender equity. There are no federal guidelines to ensure toilets are placed in standard distance and density and high footfall areas. Also, no enforceable mandatory universal design standards, local policies lack specificity on gender ratios, maintenance protocols or monitoring frameworks. Public- Private Partnership model in Kathmandu valley faces scalability barriers due to distrust of private sector motives and inconsistent municipal support. (For e.g. KMC's abrupt declaration to be all toilets free of cost access)[16]. Which discouraged private operators, there are no sustainable funding models .

Current toilets are often annexed to temples or parks, limiting standalone accessible facilities. Those existing facilities lack proper agreement for operation and maintenance. Even the operators are unknown. One informant said 'paisa kasle uthayeko data aayena, sabai pachhadi bata hamile donharu dekhyaun' (we couldn't find out who is collecting money, we saw it was handled by neighborhood mafias in the background). There is historical stigma which frames toilets as hubs for "illegal activities" and dirt which made the new construction and establishment of public toilet in the neighborhood difficult and low acceptability in community.

The Lalitpur metropolitan city is constructing new public toilets under the city level pride projects office however, there are no dedicated separate unit to oversee public toilets. The informants accepted the lack of accessibility to women in public toilet as one informant said, 'hamile saarwajanik sauchaalaya durgandhit, na sarasafai, na paani, euta saadharan charpi ko rupama maatra dekhna paauchaun, jun purushharuko laagi pishab ferne gari maatra prayog bhairaheko chha' (we can see dirty, poor conditioned, smelly public toilets with no water no cleanliness as a simple primitive latrin which is mostly used by male only for urinating purpose).

Some of the recommendation from the interviews are, addressing policy gap by mandating inclusive standards and guidelines from federal level. Also, the accessibility to all public toilet users of all gender and age groups is not only the sole responsibility of local government but also the responsibility of the agencies in federal government like Department of Road, Nepal Police, DWSS, DUDBC etc. Building codes can be revised providing special standards for restroom according to the building type. Building byelaws can be amended with tax incentives for compliance with public toilet facilities. One of the informants suggested the mandatory provisioning of public toilets above 10000 sq feet building. Also, additional incentives and concession for providing space for public usage.

Interview also concluded that the innovative approaches should be adopted to address the special needs and reduce the environmental impacts. For e.g.: waste water recycling, bio digestors, sensors, CCTV surveillance for safety etc. with participatory design approach involving women in co-creating public restrooms. Also, CSR partnerships can drive sustainable change. With new possibility for private sector to invest in PPP model can be created with regulation without compromising fundamental facilities (for e.g. minimum 50% area should be used for public facilities with mandatory standards met) and remaining for possible business providing land.

6. Discussion

This study interrogates the nexus of urban infrastructure, gender equity, and socio-spatial justice through the lens of public toilet accessibility in Kathmandu and Lalitpur. Drawing on feminist urbanism, participatory design theory, and human rights frameworks, the findings reveal systemic failures that perpetuate exclusion, health risks, and gendered inequities.

Quantitative low acceptability scores (e.g., 61.31% dissatisfied with design) mirror qualitative critiques of foul odors, unemptied wastebins, and filthy surfaces. Respondents' avoidance of toilets unless "absolute necessary" aligns with low perception scores, illustrating how poor hygiene directly reduces usability. The quantitative lack of strategic toilet distribution (50.60% disagreement) correlates with qualitative accounts of "searching for alternatives" (e.g., malls, hospitals). Demands for disability-friendly design, menstrual hygiene facilities, and free access directly address quantitative gaps in accessibility (57.14% disagreement on disability accommodations) and affordability (50.60% disagreement on subsidies). Respondents' emphasis on accountability for user fees aligns with the polarized affordability perceptions (49.40% vs. 32.74%). Also, their desirability to pay in case of well-maintained and hygienic facilities can be inferred through qualitative discussion.

Feminist urbanism critiques patriarchal urban planning that sidelines women's needs[17]. The study's findings also validate this critique. Spatial Marginalization is evidenet as only 14.29% of women agreed public toilets are strategically distributed,

with 50.60% disputing their availability. This spatial neglect mirrors global patterns where women's mobility is constrained by caregiving roles[18]. In Hyderabad, India, 46.6% of women avoid public toilets due to distance[19] echoing Kathmandu's "search for alternatives" (malls, hospitals).

Likewise, Safety is not taken care of as 51.79% felt unsafe due to poor lighting, broken locks, and male attendants, reflecting feminist critiques of public spaces as sites of violence.[20] Qualitative accounts of harassment risks align with Reddy's (2019) finding that 36% of Indian women avoid toilets over security fears.[21] Only 20.24% agreed facilities address menstrual needs, with qualitative themes like "no disposal bins" and "filthy conditions" violating menstrual dignity. This perpetuates the "urban sanitation gap" (UN Water, 2019), limiting women's public participation[22]. These findings underscore infrastructural violence[23], where poor design and policy inertia exclude women from urban life.

Participatory design theory emphasizes co-creating solutions with users, yet stakeholder policies and practices reveal disconnects. Neither there are any overarching federal laws and policy nor Local guidelines (e.g., KMC, 2079) lack enforceable standards for disability access, menstrual hygiene, or gender-neutral facilities, contravening Nepal's GEDSI commitments. For instance, 80.36% of women reported inadequate disability provisions, mirroring Kitchin and Law's (2001) critique of "poor design and vandalism" in disabled toilets[10].

Technological Innovations like Aerosan's sensor-based toilets (CCTV, panic buttons) and waste-to-value systems (biogas, solar showers) exemplify participatory design, engaging marginalized Dalit women as operators. However, scalability is hindered by narrow perception towards private sector calling them profit-driven and policy inertia halting possibilities of further collaborations. Women with disability and individuals belonging to gender minorities face compounded barriers, as few toilets adhere to universal design principles. Turkey's distinction between "micro" (disabled-specific) and "macro" (inclusive) provisioning (Afacan and Gurel, 2020) remains unrealized in Nepal.[24]

These gaps highlight the need for just sustainability [11], where infrastructure harmonizes ecological resilience with social equity. Urban sociology posits that infrastructure reflects societal values. The study's findings reveal a culture of neglect, Stigma and Avoidance. Qualitative themes like "disgust" and "holding it in" mirror global patterns where toilets are "last-resort" spaces.[3] In Kathmandu, historical stigma frames toilets as "dirty" or hubs for illicit activity, deterring usage despite emergency needs and not supporting to build on their neighborhood, The "NIMBY" syndrome (Not in My Backyard).[25]

Also, Lower-income women (50% earning <Rs.10,000) relied more on public toilets[19], yet 50.60% reported no subsidies, violating the human right to water and sanitation (UN Resolution 64/292). Working women (33%) used toilets more than students (15%), reflecting occupational stratification. These trends mirror Bourdieu's (1984) concept of spatial habitus[8], were socio-economic status dictates access to dignified infrastructure.

7. Conclusion and Limitation

Public toilets in Nepal suffer from poor accessibility, affordability, and inclusivity due to the absence of standardized policies and inadequate infrastructure. Over half (50.60%) of respondents find toilets poorly distributed, while 57.14% report accessibility challenges for people with mobility issues. Affordability remains a concern—though 49.40% do not find charges burdensome. Additionally, 61.31% find toilet designs unsatisfactory, and 51.79% feel unsafe using them. Inclusion gaps are stark, with 80.36% citing a lack of disability-friendly facilities and over 79% noting inadequate provisions for menstruating women, pregnant women, and caregivers. Addressing these challenges requires coordinated policy reforms, inclusive design standards, and improved management.

Public toilets are not mere infrastructure but barometers of urban equity. For women in Kathmandu and Lalitpur, exclusionary toilets symbolize systemic neglect, violating rights to dignity and participation. Yet, the study illuminates pathways to inclusion: policies centering intersectionality, technologies bridging sustainability and safety, and communities reclaiming urban spaces. By adopting feminist urbanism and participatory design, cities can transform toilets from sites of marginalization into hubs of equity.

This study has some limitations, such as the sample size and the context. Future studies could include larger samples with cross cultural studies. Future research should explore longitudinal impacts of inclusive redesigns on community well-being and participation by pilot projects.

8. Recommendations

New urbanism advocates walkable, inclusive cities[26], yet Kathmandu's toilets fail this vision. To align with SDG 6 (clean water/sanitation) and SDG 11 (inclusive cities), on the basis of findings from surveys and KII some of these strategies can be recommended.

Federal Umbrella Policies Acts Guidelines for public toilet is essential which will guide the local levels for technical as well as inclusive principles broadly. Develop gender-responsive, disability-inclusive (GEDSI) guidelines with specific provisions and mandatory compliances on cubicle ratios, facilities, and accessibility features. Local governments should define and enforce technical and operational standards for public toilets. Public toilet provisions can be integrated in building codes and byelaws.

Local governments should establish a separate municipal unit for planning, operation, and maintenance of public toilets. With different level of sanitary personnels and sanitary inspectors up to ward level or area wise. Develop operation and maintenance manuals and provide training for caretakers and contractors. Raise awareness and communicate with the public. Implement a results-based monitoring mechanism to assess individual toilet facilities and maintain the existing facilities. Also ensure the compliance with accessibility guidelines and readiness of functional inclusive facilities with mandatory provisions of periodic reporting with the objective comprehensive checklists of indicators. Ensure the presence

of female caretakers to enhance safety and comfort for women.

In case of new facilities development, increase public toilets in high-footfall areas and ensure access during public events. Participation of the users and community in the design and implementation process which also increase awareness and acceptability. Encourage socially responsible public-private partnerships for toilet management. Enact supportive policies to attract private sector investment in public toilet infrastructure.

Acknowledgments

The authors extend sincere thanks to Kathmandu Metropolitan City and Lalitpur Metropolitan City and all the key informants and respondents.

References

[1] United Nations Human Settlements Programme. Gender issue guide urban planning and design. Technical report, UN-HABITAT, 2012.

[2] Melanie Lambrick and Karthryn Travers. Women's safety audits: What works and where? Technical report, 2008.

[3] H. Kathryn Anthony and Meghan Dufresne. Potty parity in perspective: Gender and family issues in planning and designing public restrooms. *Journal of Planning Literature*, 21:267–294, 2 2007.

[4] Iturralde Belen Farrus. *FEMINIST URBANISM FOR CITIES THAT RECOGNISE A PLURALITY OF VOICES A COLLECTIVE ASSESSMENT OF THE SANT ANTONI SUPERBLOCK*. PhD thesis, 9 2021.

[5] Bojana Palifrovska. Feminist urbanism approach to urban planning, 11 2024.

[6] Rob Nixon. Slow violence and the environmentalism of the poor. *Slow Violence and the Environmentalism of the Poor*, 12 2023.

[7] Julian Agyeman. Just sustainabilities | julian agyeman, 9 2012.

[8] Pierre Bourdieu. The habitus and the space of life-styles : (1984). *The People, Place, and Space Reader*, pages 139–144, 4 2014.

[9] MARGARET W. ANDREWS. Sanitary conveniences and the retreat of the frontier: Vancouver, 1886-1926. *BC STUDIES*, 1990.

[10] Rob Kitchin and Robin Law. The socio-spatial construction of (in)accessible public toilets. *http://dx.doi.org/10.1080/00420980124395*, 38:287–298, 2 2001.

[11] Harvey Molotch and Laura Norén. *Toilet: Public restrooms and the politics of sharing*. New York University Press, 2010.

[12] Clara Greed. Taking women's bodily functions into account in urban planning and policy: Public toilets and menstruation. *Town Planning Review*, 87:505–524, 9 2016.

[13] Jonathan Grix. Introducing students to the generic terminology of social research. *http://dx.doi.org/10.1111/1467-9256.00173*, 22:175–186, 9 2002.

[14] Leo Heller. Human rights to water and sanitation in spheres of life beyond the household with an emphasis on public spaces. Technical report, United Nations General Assembly, 7 2019.

[15] Kathmandu metropolitan city, lalitpur metropolitan city, kritipur municipality and madhyapur thimi municipality status report on female friendly public toilets mapping and ennumeration of public toilets. Technical report, GUTHI, 2019.

[16] Republica. Kmc stresses free-of-charge use of public toilets - myrepublica - the new york times partner, latest news of nepal in english, latest news articles | republica. *https://myrepublica.nagariknetwork.com/news/kmc-stresses-free-of-charge-use-of-public-toilets*, 5 2024.

[17] Hayden Dolores. What would a non-sexist city be like? speculations on housing, urban design, and human work. *JSTOR*, vol.5, no.3:170–187, 1980.

[18] Siobhan M. Hartigan, Kemberlee Bonnet, Leah Chisholm, Casey Kowalik, Roger R. Dmochowski, David Schlundt, and W. Stuart Reynolds. Why do women not use the bathroom? women's attitudes and beliefs on using public restrooms. *International Journal of Environmental Research and Public Health*, 17, 3 2020.

[19] Raghunathan Meena. Why women don't use public toilets a study with special reference to twin cities of hyderabad and secunderabad. 2006.

[20] F. Vera-Gray. Men's stranger intrusions: Rethinking street harassment. *Women's Studies International Forum*, 58:9–17, 9 2016.

[21] Y. Malini Reddy, Srividya Raghavan, and Srinivas Chary Vedala. A narrative exposition on public toilet usage by women: A study from warangal. *Indian Journal of Gender Studies*, 26:108–137, 2 2019.

[22] Un world water development report 2019 | un-water, 2019.

[23] Dennis Rodgers and O'Neill Bruce. Introduction: Infrastructural violence: Introduction to the special issue. *JSTOR*, Vol. 13, No. 4:401–412, 12 2012.

[24] Yasemin Afacan and Meltem O. Gurel. Public toilets: An exploratory study on the demands, needs, and expectations in turkey. *Environment and Planning B: Planning and Design*, 42:242–262, 2015.

[25] N. R. Brouwer and Jessica Trounstine. Nimbys, yimbys, and the politics of land use in american cities. *Annual Review of Political Science*, 27:165–184, 7 2024.

[26] Peter Calthorpe. Next american metropolis. 4:1–175, 1993.