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Role of Urban Green Space for Social Sustainability:

A Case of Hetauda

By

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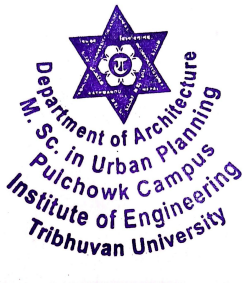

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ABSTRACT

The future of urban development is closely tied to sustainability, which encompasses economic, environmental, and social dimensions. While economic and environmental aspects are widely emphasized, the social dimension of sustainability is often overlooked. However, with increasing urbanization and social challenges, the role of social sustainability has become more critical.

This thesis examines the role of urban green spaces (UGSs) in promoting social sustainability within the context of Hetauda. As publicly accessible spaces, UGSs serve as key urban elements where social interactions, inclusivity, and community well-being are fostered. The study begins with a literature review to establish the relationship between social sustainability and urban green spaces. A conceptual framework based on key social sustainability dimensions including accessibility, social cohesion, quality of life, equity, sense of belonging, and disaster preparedness is developed for assessment.

To ground the research in real-world observations, Hupra Chaur, Children's Park, Puspalaal Park, and Shram Batika in Hetauda were selected as case study areas. Through questionnaires, key informant interviews, and site observations, the research evaluates how these urban green spaces contribute to community engagement, inclusivity, and well-being. The findings highlight that well-maintained green spaces play a crucial role in strengthening social ties and enhancing quality of life, while neglected spaces fail to fulfill their potential as sustainable urban assets.

This study underscores the importance of integrating urban green spaces into social sustainability strategies, emphasizing the need for better planning, maintenance, and community involvement to ensure equitable access to public green spaces in Hetauda.

Keywords: *Urban Green Spaces, Social Sustainability, Dimensions, Public Space*

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ACRONYMS

UGSs: Urban Green Spaces

MoUD: Ministry of Urban Development

UN: United Nations

SDG: Sustainable Development Goal

FGD: Focused Group Discussion

KII: Key informant interview

NUDS: National Urban Development Strategy

UNDP: United Nation Development Program

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1 CHAPTER ONE: INTRODUCTION

1.1 Background

Urban green spaces (UGSs) have emerged as essential components of sustainable urban development, addressing a range of ecological, social, and economic challenges. The concept of urban green spaces has undergone a significant transformation over the decades. In the past, UGSs like Central Park and Hyde Park were primarily created for recreational opportunities and to provide urban populations with escape from the industrial-era. Park. Over time, their role has expanded significantly, with contemporary urban planning recognizing their multifunctional benefits, including biodiversity conservation, climate regulation, and the enhancement of socio-cultural well-being (UN-Habitat, 2022). Parks, urban forests, community gardens, and green roofs are among the areas that are increasingly being acknowledged as being essential to improving urban resilience. With more than half of the world's population currently living in urban areas and that number expected to increase to about 68% by 2050, urbanization is drastically changing the landscape of the planet (United Nations, 2018).

In South Asia, urban green spaces face unique challenges due to high population densities, rapid urbanization, and competing land-use demands. In such contexts within developing nations with high population growth rate and rural-urban migration, street planning is often limited by municipal interference when it does occur (Martin Mwirigi M'Ikiugu, 2012) . It rarely facilitates future green space, which is why the majority of newly developed metropolitan areas around the world are typically devoid of trees. In context of Nepal, the challenges surrounding the provision and management of UGSs are particularly pronounced. Over the past 20 years, Nepal has seen a sharp increase in urbanization, with urban areas growing at a pace of 3.4% year (MoUD, 2020). This expansion has greatly surpassed local governments' ability to design and execute suitable green infrastructure. The National Urban Development Strategy (NUDS, 2017) emphasizes the importance of green spaces in achieving sustainable urban growth but also points out significant shortcomings in their practical execution. Many urban areas lack comprehensive policies for green space development, with existing spaces often being poorly managed, fragmented, or inaccessible to marginalized populations. These drawbacks highlight how urgently focused initiatives are needed to address the uneven distribution and inadequate incorporation of green spaces into urban planning

frameworks. Rapid urban growth and a loss of green space are worldwide trends that are reflected in Nepal's urban landscape. The average amount of green space in Nepalese cities is much less than the nine square meters per capita that is advised (MoUD, 2020). This inadequacy exacerbates environmental degradation, including urban heat island effects and air pollution, while also contributing to socio-economic disparities. Marginalized communities often face limited access to quality green spaces, further perpetuating environmental and social inequities. The gaps in green space planning are not merely logistical but also institutional, with challenges including limited financial resources, weak governance structures, and inadequate technical capacity. . This inadequacy exacerbates social inequities and limits the environmental benefits that UGSs could provide to urban populations.

Hetauda, the administrative capital of Bagmati Province, serves as a critical case for examining the role of UGSs in sustainable urban planning. The city faces increasing pressure from urbanization and infrastructure development. The absence of a comprehensive green space strategy has resulted in fragmented green networks, inequitable access, and a disconnect between urban planning and environmental preservation. These challenges are particularly critical as Hetauda transitions from a small town to a provincial capital, demanding a careful balance between urban growth and social sustainability.

While global studies extensively document the benefits of green spaces, there is limited empirical evidence on their integration into urban planning frameworks in Nepal.. By identifying the challenges and opportunities associated with green space development, the research aims to propose innovative and inclusive strategies for integrating green spaces into Hetauda’s urban framework, contributing to a more sustainable and equitable future for its residents.

Rationale of the study

1.2 Need of the research

The importance of urban green spaces (UGSs) in sustainable urban development is becoming more widely acknowledged due to their ability to improve the quality of urban life and provide vital ecosystem services. Nearly 68% of the world's population is predicted to live in urban areas by 2050, according to UN estimates, which would put more strain on infrastructure, land, and natural resources (United Nations, 2018). Nepal's urban areas, such as Kathmandu Valley, face similar challenges, with declining green cover and increasing pollution (NUDS, 2017). In rapidly urbanizing contexts such as Hetauda, Nepal, the degradation of UGSs due to intensive development and land-use competition poses serious challenges to environmental health and social well-being (UN-Habitat, 2022). Recent studies highlight that a strategic approach to planning and managing UGSs not only mitigates environmental stressors like air pollution and urban heat islands but also strengthens community bond by making spaces for socializing, recreation, and cultural expression.

Social sustainability, which encompasses inclusivity, equity, and the well-being of urban residents, depends heavily on accessible and well-maintained public spaces (Dempsey, 2011). As Hetauda experiences rapid population growth and urban sprawl the need for UGSs that are equitably distributed and accessible to all segments of the population, including vulnerable groups such as children, the elderly, and persons with disabilities have been heightened. Despite their recognized benefits, UGSs often receive insufficient attention in urban planning policies, leading to underutilized or poorly maintained green areas that fail to meet the social and environmental needs of residents.

Moreover, UGSs have the potential to enhance urban disaster resilience—a factor of particular importance in Nepal, a country prone to earthquakes and flooding. When integrated into urban planning, UGSs can serve as emergency gathering points and contribute to the overall disaster preparedness of a city. Recognizing the multifaceted role of UGSs, this research aims to evaluate the current distribution, accessibility, and functionality of UGSs in densely populated wards of Hetauda; examine their contributions to social sustainability; identify barriers to their effective integration into

urban planning; and propose strategies to maximize their social, environmental, and emergency response functions.

Nepal's urban planning has largely focused on infrastructure and housing, with limited attention to ecological balance. A critical need exists to produce evidence-based insights that may guide the sustainable integration of UGSs into Hetauda's urban fabric and advise policy in light of these potential and constraints. In order to promote social cohesiveness, enhance quality of life, and increase community resilience in the face of rising urbanization and environmental instability, it is imperative that urban green spaces be both conserved and improved.

1.3 Importance of the research

This research is critically important for advancing sustainable urban development in Hetauda, particularly in the context of rapid urbanization and changing demographic patterns. Urban green spaces (UGSs) are more than just aesthetic additions; they are essential for promoting social interaction, benefiting the environment, and boosting inhabitants' general well-being. This study fills a critical void in Hetauda's urban planning methods by concentrating on the integration of UGSs for social sustainability. The city's fast development frequently ignores the necessity for easily accessible, well-maintained green spaces.

The study is significant in its potential to influence policy and urban planning decisions. In a place like Hetauda, where urban expansion and rapid population increase are prevalent, making green spaces usable and accessible is crucial for lowering social isolation, and enhancing air quality. In order to help local authorities and planners prioritize UGSs in their development goals, this research offers evidence-based insights. The social sustainability approach emphasizes the value of UGSs in fostering social justice, cultural expression, and community involvement in addition to the advantages they offer for the environment and public safety.

This research explores how UGSs can serve as platforms for cultural activities, foster intergenerational interactions, and create a sense of belonging among residents. Such insights are critical for addressing social disparities and ensuring that urban development is inclusive and beneficial for all community members.

Overall, this study is important because it offers a comprehensive evaluation of UGSs in Hetauda, identifies the barriers to their effective integration into urban planning, and proposes strategies to enhance their role in achieving social sustainability. Its findings can also guide other rapidly urbanizing cities in the country, creating a ripple effect for sustainable urban development practices. It provides replicable insights for other Nepali mid-sized cities and contributes to the preservation of Hetauda's green identity. In the end, the results will help create a more resilient, inclusive, and livable Hetauda by adding to the body of knowledge on sustainable urban development and offering practical suggestions to legislators and urban planners.

1.4 Problem Statement

Despite being essential for promoting sustainable urban growth, urban green spaces (UGSs) are frequently overlooked and left out of urban planning procedures. One of Nepal's major cities, Hetauda, has a difficult time incorporating UGSs into its plan for urban development. The spatial distribution of green areas has become unequal due to rapid urbanization, especially in core wards like Wards 4 and 5, where green infrastructure is limited by high population density and commercial expansion. In contrast, peripheral wards continue to lack official planning for UGSs and are underdeveloped. (Hetauda Sub-Metropolitan, 2024). Accessibility issues further exacerbate the problem, as inadequate infrastructure prevents equitable access to green spaces, disproportionately affecting marginalized communities. Furthermore, urban policies in Hetauda primarily emphasize economic growth and infrastructure, neglecting ecological priorities such as green space integration to address urban challenges like rising temperatures, flooding, and declining livability.

Although UGSs play a crucial role, little is known about how they integrate into Hetauda. The distribution and accessibility of green areas in relation to urban needs are not well assessed by GIS-based spatial analysis (MOFALD, 2023). Furthermore, there is insufficient knowledge of the social and cultural significance of green spaces due to the paucity of qualitative research addressing community perspectives on their use and obstacles to access. There is a need for practical policy proposals because the current frameworks for policy do not critically evaluate their potential to strike a balance between ecological sustainability and urban growth. Additionally, little research has been done on urban design techniques that are suited to Hetauda's particular socio-

environmental setting in order to successfully include green areas into its urban planning initiatives.

1.5 Research Objectives

The primary objective of this research is to explore the role of urban green spaces (UGSs) to promote to social sustainability in Hetauda. The specific objectives are:

i. To examine the current status and distribution of urban green spaces (UGSs) in densely populated wards of Hetauda.
ii. To examine the social sustainability dimensions provided in the area.
iii. To identify the challenges in the effective integration of UGSs into urban planning in Hetauda.

1.6 Topic Validity

Rapid urbanization and population density in Hetauda are placing a tremendous amount of strain on the region's land resources. Urban green spaces (UGSs) are becoming more scarce and of lower quality as urban sprawl increases (Shrestha & Poudel, 2019). To comprehend and lessen the detrimental effects of urban growth on community well-being, it is essential to look into the current distribution and operation of UGSs in Hetauda's densely populated wards.

Social sustainability in urban planning emphasizes inclusivity, community cohesion, and equitable access to public spaces. UGSs are instrumental in fostering social interactions, reducing isolation, and enhancing the overall quality of life (Dempsey, 2011). In a culturally diverse and rapidly evolving urban setting like Hetauda, assessing how UGSs contribute to social sustainability directly addresses the pressing need for inclusive urban development that meets the needs of all residents. Empirical studies indicate that UGSs deliver substantial environmental and public health benefits, such as stress reduction, improved mental and physical health, and enhanced local air quality (Kabisch, Qureshi, & Haase, 2017).

Current urban planning practices in Hetauda have largely prioritized infrastructure and economic development over the preservation and enhancement of public green spaces. The absence of robust policies and strategies to integrate green spaces presents an opportunity to propose actionable recommendations to fill this gap and enhance the

city's urban planning approach. Addressing this gap in research is vital to guide the development of sustainable urban environments that harmonize growth with environmental and social well-being (UN-Habitat, 2022). An in-depth, context-specific examination of UGS integration in a mid-sized metropolitan center in a developing nation is made possible by employing Hetauda as a case study. In addition to adding to the body of knowledge on sustainable urban development, the local empirical data produced by this study will act as a standard for comparable cities dealing with issues of social sustainability and fast urbanization.

1.7 Limitations

The research is limited by a number of reasons due to its scope. Since this study focuses on social sustainability in public urban green spaces, that is its main constraint. This study does not take into account other urban areas such as roadways and sidewalks, parks or private gardens, etc. The opinions of the respondents key personnel, park visitors, and community staff—are crucial to the study. Furthermore, the study only looked at Hetauda's heavily populated wards, which would have limited the findings' generalizability to other places with varied urban settings. Simultaneous observations in the same shifts across all sites were not possible because the observational study was carried out on different days for each park and the researcher was the only one involved. Therefore, the results could show temporal irregularities impacted by other elements like weather, seasonal changes, or daily swings in park attendance. This might have caused some variance in the way that user behavior and activity patterns were analyzed across various parks and shifts.

2 CHAPTER TWO: RESEARCH METHODOLOGY

2.1 Research Paradigm

This study adopts a pragmatic mixed methods research paradigm to investigate the integration of urban green spaces (UGSs) for social sustainability in Hetauda. This paradigm will allow for a comprehensive understanding of UGSs by addressing both the measurable impacts and the subjective experiences associated with these spaces. The pragmatic approach supports the use of both quantitative and qualitative methods, recognizing that a comprehensive understanding of complex urban phenomena requires multiple perspectives. This paradigm is particularly well-suited for examining how UGSs contribute to social sustainability, as it allows the researcher to capture measurable aspects such as distribution, accessibility, and functionality, alongside the subjective experiences of residents regarding social cohesion, quality of life, and equity.

Critical realism, which maintains that reality exists apart from human perception but is comprehended through subjective experiences and interpretations, is the ontological viewpoint taken in this study (Bhaskar, 2008). This indicates that, in the case of UGSs in Hetauda, individual and community viewpoints influence the social value, accessibility, and influence on locals, even though the physical presence, location, and infrastructure of green spaces can be measured objectively. For example, even though a park is centrally situated and well-maintained, its functional reality varies depending on whether social groups feel unsafe or excluded. This dual viewpoint acknowledges that urban green areas are socially produced resources that are impacted by governance, policy, and cultural elements in addition to being physical entities.

Rapid urbanization in Hetauda has resulted in an uneven distribution and invasion of green areas, with infrastructure and commercial development frequently taking precedence over public open spaces (Shrestha & Poudel, 2019). Although the significance of UGSs may be acknowledged in urban planning papers, institutional agendas, public demand, and governance systems will ultimately determine how well they are integrated into the urban fabric. Using a critical realist ontology, this study aims to identify the subjective (social exclusion and cultural beliefs) and objective (land availability and urban policies) restrictions that influence UGS adoption.

Pragmatism and constructivist aspects form the study's epistemological basis, which emphasizes knowledge co-construction through quantifiable data and lived experiences. This method allows the researcher to combine qualitative insights (such as interviews with local authorities and citizens regarding the significance of UGSs in social sustainability) with empirical quantitative data (such as GIS-based mapping of green space distribution and survey responses on accessibility). From a practical standpoint, this study aims to produce knowledge that is applicable to Hetauda's urban planning and actionable. In addition to outlining the present situation of UGSs, the findings will offer tactical suggestions for enhancing their contribution to social justice, community involvement, and environmental risk resilience. Since urban planning decisions are often driven by both policy frameworks and community perceptions, the study aligns with real-world problem-solving approaches, ensuring that the knowledge produced is both theoretically grounded and practically applicable.

Constructivist epistemology acknowledges that governance models, cultural contexts, and human interactions all influence the social functioning of UGSs. For instance, even though a park is intended for public use, local opinions about its affordability, safety, and acceptability will determine how accessible and inclusive it is in practice. To ensure that the research represents the varied perspectives of stakeholders, including locals, urban planners, legislators, and marginalized groups, the study incorporates open-ended survey questions and key informant interviews to capture subjective experiences. This study guarantees a thorough grasp of UGSs in Hetauda by using a practical, mixed-methods approach based on constructivism and critical realism. In overall, this study paradigm recognizes the physical presence and social value of Hetauda's urban green spaces, allowing for a comprehensive investigation of these areas.

2.2 Methodology

With an emphasis on Hetauda, this study intends to investigate how urban green spaces (UGS) contribute to sustainability and social well-being. A mixed-methods approach will be used to do this, combining qualitative techniques like focus groups and interviews with quantitative techniques like surveys and spatial analysis.

There are three primary parts to the research design. First, local residents are given standardized questionnaires as part of the quantitative component. Multiple dimensions of social sustainability, including accessibility, safety, social cohesion, sense of belonging, equity, and overall quality of life, are evaluated using closed-ended questionnaire items structured on a five-point Likert scale for systematic assessment. Furthermore, the spatial distribution and physical state of UGSs are documented using GIS mapping and field observations, which provide objective data to supplement the survey responses. Second, the qualitative component includes open-ended questions in the questionnaires and interviews residents, ward chairpersons, local government representatives, community leaders, and non-governmental organization representatives through key informant interviews (KIIs). The goal of this strategy is to gather detailed information about participants' expectations, views, and experiences with UGSs in Hetauda. While a stratified random selection technique guarantees that the resident sample represents a range of socioeconomic categories across densely populated wards, purposeful sampling is employed to choose important informants with in-depth knowledge of urban planning and community dynamics. Lastly, during the analysis stage, the data from both components is integrated. Descriptive statistical techniques, such computing means and standard deviations, are used to evaluate quantitative data in order to look at the correlations between variables. Simultaneously, thematic analysis is used to qualitative data, such as interview transcripts and open-ended responses, with codes and themes created to identify recurrent trends and insights pertaining to social sustainability. In addition to highlighting the main obstacles and possibilities for better integration of UGSs into urban planning, the triangulation of these many data sources offers a comprehensive picture of how UGSs support social sustainability in Hetauda.

Table 2-1: Methodologies and Methods of information

Objective	**Methodology**	**Methods (Data Collection)**	**Tools**	**Sample**	**Data Analysis**	**Purpose**
Objective i: Evaluate the current state and distribution of UGSs.	Quantitative	Structured questionnaires; GIS mapping; Field observations	Likert-scale surveys; GIS software; Observation check lists	Residents of densely populated wards; Municipal records (secondary data)	Descriptive statistics (means, standard deviations); Spatial analysis; Inferential tests	To quantify the physical characteristics and accessibility of UGSs, thereby determining their current status and identifying spatial or infrastructural gaps.
Objective ii: Examine the social sustainability dimensions provided in the area.	Mixed Methods (Quantitative & Qualitative)	Structured surveys (closed-ended Likert items) and open-ended questions	Structured questionnaires with Likert-scale items; Open-	Residents from densely populated wards in Hetauda	Descriptive statistics for closed-ended responses; Thematic analysis for open-	To capture residents' perceptions and experiences regarding how UGSs contribute to social cohesion, quality of

			ended survey items		ended responses	life, sense of belonging, and equity.
Objective iii: Identify challenges to the effective integration of UGSs into urban planning.	Qualitative	Semi-structured key informant interviews; Open-ended survey questions	Interview guides; Open-ended questionnaires	Ward chairpersons; Local government officials; Community leaders; NGOs (purposively selected)	Thematic and content analysis; Data triangulation with survey responses	To uncover and analyze institutional, socioeconomic, and policy-related barriers that hinder the integration of UGSs into urban planning.

3 CHAPTER THREE: LITERATURE REVIEW

3.1 Urban greens spaces

Urban green spaces play an important role in the sustainable development of cities. Green space interventions nourish the city's existing character, improve environmental conditions, promote outdoor recreational spaces and active lifestyles, and protect biodiversity by creating wildlife habitats. Urban green space (UGS) refers to surfaces of the urban environment with vegetation such as grass, trees, shrubs, etc. Santos et al. (2021) refer to the areas within the urban fabric with vegetation as urban green space, such as urban parks, lawns, street trees, private or public gardens, cemeteries, sports fields, green roofs. Since all spaces with vegetation in the urban fabric are included in the general notion of UGS, this thesis will only concentrate on urban public parks. Any vegetated area found inside a city or urban environment is referred to as urban green space. Parks, street trees, green corridors, public and private gardens, and even little bodies of water—often referred to as "blue spaces"—are all included (WHO, 2017). In order to mitigate climate-related issues like urban heat islands, reduce pollution, and offer recreational possibilities, these spaces are essential in urban areas. According to Schipperijn, Stigsdotter, et al. (2010, p. 26) urban green spaces are "all publicly owned and publicly accessible open spaces with a high degree of cover by vegetation, e.g. parks, woodlands, nature areas and other green space." It can have a designed or planned character as well as a more natural character. Additionally, UGS are centers for cultural expression, community development, and social interaction (Tzoulas et al., 2007).

"There is no universally accepted definition of UGS," a WHO report states. According to the World Health Organization (2016), "green spaces in urban areas are generally public parks; alternative definitions may include private gardens, woodlands, children's play areas, non-amenity areas (like roadside verges), riverside footpaths, beaches, and so on." Urban green spaces are public areas like promenades and tree-lined roadways that are set up by local governments so that people may relax, stroll, and play with their kids.

Urban green spaces, according to Keleş, keep cities from turning into concrete jungles. Urban green spaces can be described as interconnected areas of natural, semi-natural,

or man-made greenery that provide various benefits to urban residents (Zhou, 2012). The definitions of open space and UGS are different; Open spaces are areas of urban land that are open to the public and unenclosed by any type of construction, such as:

• Green lands that covered with vegetation

• Schoolyards

• Vacant lots

• Public seating areas

• Playgrounds

• Public plazas

Therefore, open space is a vast term in comparison with green space. In another word, green space is one of the subcategories of open spaces.

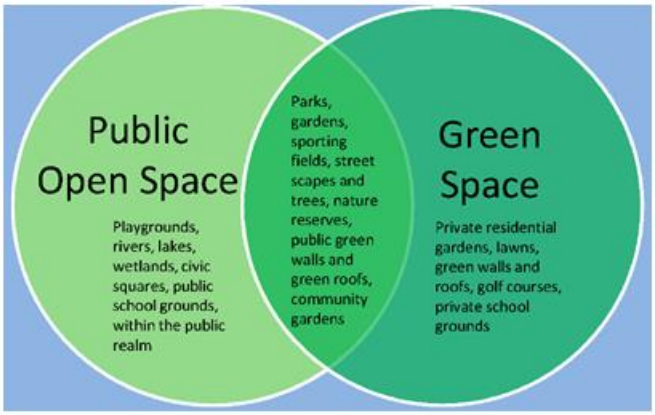


Figure 3-1: Overlaps between the green space and puluc open space

(Source: Davern, Farrar, Kendal, & Giles-Corti, 2017)

Urban green spaces can be categorized into several types such as neighborhood parks, playgrounds, sports grounds, urban forests, and cemeteries. In academic literature, these spaces are classified through various perspectives. The most commonly applied classifications are based on their intended function, their organizational structure, the rights governing their use, and the range of services they provide within specific areas.

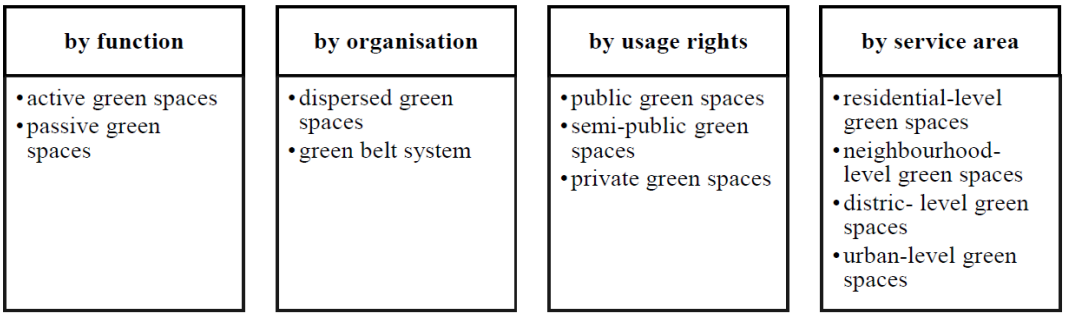


Figure 3-2: Classification framework for Urban Green Areas

(Source: Kap, 2006, p. 37 & Bilgili, 2008, p. 55)

3.2 **Evolution of urban green spaces as public areas**

Urban green areas play a vital role in enhancing the quality of life in cities. The usage of parks is a modern activity, despite the fact that park and garden culture is ancient. In the past, some social groups, including dynasties, the bourgeois, and aristocracy, used urban green spaces. Additionally, urban green spaces served rather distinct purposes. However, the purposes and users of urban green spaces have evolved in the modern era (Demir 2006, 70).

In industrial towns across Europe and America, urban green spaces have a long history. The fast-growing industry started to have an impact on city people' social and physical well-being in the 19th century. This circumstance boosted park movements and raised the value placed on urban green spaces. European parks served as the promenade for nobles and bourgeoisies till the end of the 19th century. The parks in large European cities, particularly Paris and London, were gated and watched over by security personnel. These parks were created based on the elites' aesthetic sensibilities. In a similar vein, European urban parks served as the model for American urban parks. The working class found it particularly challenging to access the parks. The 19th century saw a shift in this strategy (Gunes 2019, 6). Both the physical layout of the cities at this time and the lives of city people were impacted by the industrial revolution. People lost their relationships with environment as a result of the rapid urbanization that began in the 19th century and lasted into the 20th century. Urban green areas are now an essential part of every local and regional infrastructure plan. There was a movement throughout Europe at the start of the 21st century to increase the amount of natural spaces. First,

designers produced landscapes that reflected rural regions, such as New York's Central Park. Later, the park's design was modified to accommodate ecological functions. The 21st century's information era has altered people's needs and lifestyles. The need of time management has grown due to the speed of life. In terms of the program, urban green areas have also evolved into becoming adaptable and variable. As part of today's landscape design concept, the city's abandoned former industrial regions started to be incorporated into the city. As a guideline for guaranteeing access to open spaces across the city, the London Plan categorizes public open spaces according to their size, amenities offered, and community importance (Greenspace Information for Greater London, , 2022).

Table 3-1: Lists of public green spaces along with a description, optimum distance, and size

Type	Description	Size	Distances from homes
Small Open Spaces	Gardens, sitting out areas, children's play spaces or other areas of a specialist nature, including nature conservation areas.	Under 2 hectares	Less than 400 metres
Regional Parks	Large areas, corridors, or interconnected networks of open spaces that are mostly accessible to the public and offer various amenities and functions, delivering recreational, ecological, cultural, or green infrastructure benifits. Provide distinctive facilities and features not commonly found elsewhere in London, are easily reachable by public transport, and are maintained according to recognized best practice quality standards.	400 hectares	3.2 to 8 kilometres
Pocket Parks	Small areas of open space that provide natural surfaces and shaded areas for informal play	Under 0.4	Less than 400 metres

Type	Description	Size	Distances from homes
	and passive recreation that sometimes have seating and play equipment.		
Metropolitan Parks	Extensive open spaces delivering comparable benefits to Regional Parks, featuring a mix of amenities at a sub-regional scale, with good public transport access and management aligned with best practice quality standards.	60 hectares	3.2 kilometres
Local parks and Open Spaces	Providing for court games, children's play, sitting out areas and nature conservation areas.	2 hectares	Distances from homes 400 metres
Linear Open Spaces	Pathways and open spaces, including nature reserves and unofficial recreational routes, can be found beside rivers, canals, and former railroads. These areas frequently have beautiful or natural features that improve the overall experience and pleasure of the region even though they may not be completely accessible.		
District Parks	Large expanses of open space that offer a landscape environment with a diversity of natural elements offer a number of activities, such as informal recreation activities, children's play for various age groups, and outdoor sports facilities and playing fields.	20 hectares	1.2 kilometres

(Source: Greenspace Information for Greater London, 2022)

3.2 Benefits of UGS

3.2.1 Environmental Benefits

By reducing the urban heat island effect brought on by heat-absorbing infrastructure like concrete and asphalt, urban green spaces greatly control urban microclimates. Studies show that parks can lower ambient temperatures by 2 to 5°C thanks to evapotranspiration and shade provided by trees and other plants. In addition to improving comfort, this cooling impact lowers the energy requirements for air conditioning, which is especially important during heat waves (Cilliers, 2015). Additionally, by serving as carbon sinks, urban greenery helps to mitigate the effects of climate change worldwide. By absorbing and storing carbon dioxide, trees help cities meet global sustainability targets and lower greenhouse gas concentrations (Mehdi Rakhshandehroo, June 2017).

Urban greenery not only controls temperatures but also greatly enhances air quality. In addition to trapping particulate matter like PM2.5 and PM10, vegetation absorbs pollutants including sulfur dioxide and nitrogen dioxide. This natural filtration system lowers the incidence of diseases linked to air pollution and improves respiratory health. Urban parks are essential for public health because studies have shown that they may filter up to 85% of the air pollutants in their area (Haq, 2011). Because they serve as habitats for a variety of species, green areas help promote biodiversity. In order to preserve urban ecosystems and foster harmony between urban growth and environment, interconnected parks and gardens establish ecological corridors that facilitate species migration and reproduction.

3.2.2 Health and Well-being

Green areas are essential for fostering physical health because they encourage outdoor pursuits including cycling, jogging, walking, and sports. Being close to parks has been associated with increased levels of physical activity, which lowers the prevalence of lifestyle-related diseases like diabetes and cardiovascular disorders as well as obesity. According to research showing the beneficial effects of physical recreation on general well-being, regular use of green areas promotes a healthier urban population (Cilliers, 2015).

The advantages of urban green spaces for mental health are equally significant. Exposure to greenery lowers cortisol levels, a key stress hormone, and natural settings have been shown to alleviate stress, anxiety, and depression. These areas act as rejuvenating settings that combat mental exhaustion and enhance concentration and cognitive function. Furthermore, by encouraging communal connections, green places enhance social well-being. Parks serve as communal spaces for social events and unofficial get-togethers, fostering links throughout the area. By providing accessible and inclusive areas for recreation and connection, they lessen urban isolation, especially among vulnerable groups like the elderly and low-income groups (Mehdi Rakhshandehroo, June 2017)

3.2.3 Social Benefits

Urban green areas serve as social equalizing factors by creating welcoming spaces where individuals from various backgrounds can socialize. Because parks are places for public meetings, leisure pursuits, and cultural events, this inclusivity promotes social cohesion and equity. Green spaces provide vital leisure options for underserved groups, enhancing their quality of life and reducing socioeconomic inequalities (Addas, 2023).

Another important component of green spaces is their cultural value. Parks frequently serve as lively cultural centers that improve urban life by hosting festivals, concerts, and art exhibits. Residents develop a sense of pride and identity as a result of these activities, which also help them to appreciate the resources of the community.

3.2.4 Sustainable Urban Development

Urban green spaces play a major role in creating resilient and sustainable cities. Green spaces lessen the effects of urban flooding by absorbing and delaying rainfall, which eases the strain on drainage systems. Urban resilience to climate change is improved by vegetation, which acts as a buffer against extreme weather events including heat waves and heavy rains (Mehdi Rakhshandehroo, June 2017).

Urban planning that incorporates green spaces guarantees a balance between ecological protection and development. Equitably placed parks promote accessible for all inhabitants, decreasing inequities in green space availability and supporting sustainable urban life. To optimize their usefulness, planners and legislators stress the importance

of carefully placing and designing green areas (Haq, 2011). Urban agriculture and community gardens in green areas offer further advantages for sustainability.

3.3 National Urban Development Strategy (NUDS), 2017

The **National Urban Development Strategy (NUDS**) 2017 presents a detailed and forward-thinking approach to fostering sustainable urban growth. It places strong emphasis on developing and maintaining green, cool, and humid urban environments, underlining the importance of environmentally conscious urban expansion. The strategy prioritizes the conservation and enhancement of green infrastructure such as parks, urban forests, farmland, and public open spaces. Demonstrating a clear dedication to sustainable practices, the policy recognizes these green assets as essential for improving air quality, reducing carbon output, and enhancing urban livability. Key measures include promoting low-carbon growth, renewable energy use, and mitigating urban heat islands.

However, the strategy also addresses challenges such as urban fragmentation and the encroachment on public land. To tackle these issues, it advocates for the establishment of comprehensive zoning regulations that govern building height, density, and land use. The goal is to foster balanced urban development that meets the needs of a growing population while preserving public open spaces. Despite these positive goals, the strategy review points out some shortcomings, including the lack of municipal-level data and the unclear definition of "open spaces," suggesting the need for a more systematic approach to monitoring and managing these spaces.

Existing Policies for Urban Green Spaces in Nepal (Based on NUDS)

The National Urban Development Strategy (NUDS) 2017 emphasizes the importance of parks and open spaces in urban areas for promoting sustainable development.

Open Space Allocation and Standards:

- Mandatory Open Spaces:
    - Existing urban areas: 2.5% of land at ward level.
    - New urban areas: 5% of land at ward level.

- Apartment plots are required to provide 50% of their total land as open space, with 20% for open land surfaces.
- Residential areas in planned zones must allocate a percentage of land for community spaces:
    - For 5–10 ropanies, 5% of the total area.
    - For 10–25 ropanies, 4% of the total area.
    - For areas above 100 ropanies, 2.5%.

Urban Green Policies:

- Emphasis on creating and maintaining a minimum stipulated open space in urban areas through guidelines and building bylaws.
- Integration of green infrastructure into zoning regulations to mitigate the effects of rapid urbanization.

Disaster Preparedness and Open Space:

- Open spaces are viewed as critical evacuation areas during disasters, particularly earthquakes.
- Municipalities are encouraged to prepare disaster risk management plans, incorporating open spaces as part of the strategy.

Issues with policy implementation:

- Inadequate and inconsistent urban green space policies.
- Unmonitored use of open spaces and encroachment continue to be major problems.
- Inadequate systems to promote the creation of green spaces and tree planting on private property.

NUDS recommends a number of park and open space development techniques to solve these issues. The plan promotes the establishment of green buffers surrounding industrial areas and urban edges, which improve aesthetics, lower pollution, and have ecological advantages. Additionally, it recommends turning transportation corridors

and riverbanks into greenways that may function as both natural corridors and recreational areas. In order to guarantee the efficient administration and upkeep of parks, community involvement is also encouraged. Lastly, the plan emphasizes the significance of integrating open spaces into disaster resilience plans and advocates for the implementation of zoning laws that require parks and open spaces to be included in urban development. Hetauda can also create green buffers between industrial and residential areas to lessen pollution and other negative environmental effects. In order to promote a greener, healthier, and more resilient urban environment, Hetauda may guarantee that 5% of new urban development areas are set aside for parks and open spaces by following the NUDS requirements.

3.3.1 Environment-Friendly Local Governance Framework of 2013

The Environment-Friendly Local Governance Framework of 2013 aims to establish environmental governance and create a sustainable, eco-friendly society at various levels, from households to districts (Environment-friendly Local Governance Framework, 2013) . This framework focuses on fostering accountability, collaboration, and local ownership to encourage environmentally sustainable development. Its key objectives include:

- Ensuring accountability from the most basic level to promote environmentally friendly and sustainable development.
- Encouraging coordination and cooperation between development efforts and environmental preservation.
- Enhancing local ownership by localizing environmental management for sustainable outcomes.

The *Environment-Friendly Local Governance Framework, 2013*, prepared by the Ministerial Council of the Government of Nepal, outlines a range of indicators for green planning across various levels under the theme of eco-friendly municipal governance.

Municipal Level

- Park Development
- A clean and well-maintained park or children’s garden should be established in a location easily accessible to both residents and children.

- Recreational areas for children and resting spots for the elderly must be inclusive and accessible to all genders and individuals with disabilities.
- Encouraging Greenery
- Local communities (including settlements and informal groups) should be encouraged to plant appropriate vegetation along sidewalks.
- Each year, a minimum of 10% of riverbanks, streambeds, and unused public land should be afforested and stabilized with tree planting.
- Implement preventive strategies in zones at risk of flooding, landslides, or erosion.
- Establish a public park or children's garden intended to serve a population of approximately 60,000 people.
- Urban Green Infrastructure
  - Develop green zones within city limits, such as a zoo or biodiversity park.
  - Ensure the creation and maintenance of at least one urban forest within municipal boundaries.
- Climate Action
  - Design and implement a climate change mitigation and adaptation plan tailored to the municipality's specific needs.
- Environmental Awareness
- Organize awareness campaigns promoting eco-friendly practices among local residents.

3.3.2 Hetauda Darpan 2079

Hetauda is one of the greenest cities in Nepal. In the past, Hetauda's main neighborhoods were residential districts and marketplaces. However, Hetauda's environment has greatly improved since planned towns were established. Despite this, the city faces sustainable development issues as it grows. Hetauda may become a modern city by tackling these issues and prioritizing environmental preservation and sustainable urban design. Its designation as a green city is further reinforced by

initiatives like the establishment of public parks, green spaces (Green Belt), forests, and other recreational areas.

One House, Ten Gamalas:

Hetauda has experienced years of plantation initiatives. The environment will get greener if at least ten plants are planted in each home. This practice has been embraced by many residents of the municipality. To enhance vegetation in urban areas, the municipality promotes planting not only in open spaces but also in residences, rooftops, and underutilized spaces.

Do It Yourself, Be Self-reliant:

Flower gardens and vegetable farming are two ways that Hetauda inhabitants are encouraged to improve their environment. Trees and vegetables should be planted in the available spaces by the residents. Every household will profit financially from this, and it will also promote a sustainable and self-sufficient environment.

One Ward, At Least One Park:

The people of Hetauda are eager to see little gardens and parks in every ward. This might be viewed as a way to provide leisure facilities and enhance the environment. Children and the elderly benefit most from these areas, which promote relaxation and improve quality of life.

3.3.3 Annual Budget, Policies and Programs FY 2081/082 of Hetauda

Towards Forest, Environment, and Disaster Management:

In collaboration with the province government and pertinent organizations, a "Plastic Bag-Free City" campaign will be put into place to lessen the pollution that plastic trash causes to the environment. This project will encourage sustainable alternatives while advocating for the prohibition of plastic bags thinner than 40 microns.

Community Forest User Groups' ability to improve urban greenery will be reinforced. The main goal will be to increase public awareness of the need to conserve, promote, and use green spaces sustainably.

Systematic and frequent monitoring of industrial pollution in urban areas will be carried out in order to preserve a clean urban environment. Furthermore, as part of the "Clean and Healthy Hetauda Campaign," coordinated activities with the Toll Development

Organization will increase trash segregation at the source, guaranteeing effective waste management and a more robust urban ecosystem.

क.सं.	कार्यक्रम/आयोजना/ क्रियाकलापकोनाम	उपक्षेत्र	खर्च शीर्षक	स्रोत	लक्ष	इकाई	विनियोजन				
							पहिलो चैमासिक	दोस्रो चैमासिक	तेस्रो चैमासिक	चौथो चैमासिक	जम्मा
१८	जेष्ठ नागरिक भ्रमण	लैंगिक समानता तथा सामाजिक समावेशीकरण	२२५२२	आन्तरिक श्रोत - नगद	१	पटक	१,५०,०००.००	०.००	०.००	०.००	१,५०,०००.००
१९	बालमैत्री बडा घोषणा विविध कार्यक्रम	लैंगिक समानता तथा सामाजिक समावेशीकरण	२२५२२	राजस्व बाँडफाँड - प्रदेश सरकार -नगद	१	पटक	३,००,०००.००	०.००	०.००	०.००	३,००,०००.००
२०	लैंगिक हिंसा विरोद सम्बन्धि कार्यक्रम	लैंगिक समानता तथा सामाजिक समावेशीकरण	२२५२२	राजस्व बाँडफाँड - संघीय सरकार - नगद	१	पटक	०.००	०.००	१,५०,०००.००	०.००	१,५०,०००.००
२१	शैक्षिक तथा सामाजिक अध्ययन भ्रमण	शिक्षा	२२५२२	राजस्व बाँडफाँड - संघीय सरकार - नगद	१	पटक	०.००	०.००	३,००,०००.००	०.००	३,००,०००.००
२२	श्रमिक मा वि बाल कक्षा सुधार कार्यक्रम	शिक्षा	२२५२२	राजस्व बाँडफाँड - प्रदेश सरकार -नगद	१	पटक	०.००	०.००	१,००,०००.००	०.००	१,००,०००.००
२३	सामाजिक रुपान्तरको लागि अभियान संचालन	शासन प्रणाली	२२५२२	नेपाल सरकार - समानिकरण अनुदान	१	पटक	०.००	०.००	२,००,०००.००	०.००	२,००,०००.००
२४	सिस्नुपानि नेपाल कार्यक्रम (सहकार्य)	भाषा तथा संस्कृति	२२५२२	राजस्व बाँडफाँड - प्रदेश सरकार -नगद	१	पटक	०.००	१,५०,०००.००	०.००	०.००	१,५०,०००.००
२५	हुप्रा चौर संरक्षण कार्यक्रम	खानेपानी तथा ससफाई	२२५२२	राजस्व बाँडफाँड - प्रदेश सरकार -नगद	१	पटक	०.००	०.००	०.००	५,००,०००.००	५,००,०००.००

Figure 3-3: Budget for Hupra Chaur

3.4 International plans and policies

3.4.1 Delhi City Plan

The Ministry of Urban Development's Delhi division unveiled the Master Plan for Delhi, which aims to make the city a world-class metropolis by 2021 where residents live in sustainable neighborhoods, work efficiently, and lead better lives. The plan established the framework for Delhi's planned development and was based on the Master Plan of 1962 and the Delhi Development Act of 1957. It covers important topics such transportation, mixed use, trade, the informal sector, cultural preservation, land policy, redevelopment, and shelter. Through 2021, the plan delineates the policies and vision.

Creating a sustainable physical and social environment to improve people's quality of life is one of the main objectives. The management of Delhi can be split into two areas: managing the built environment and natural resources and services, as the city's fast urbanization is straining the environment and creating pollution. While the second focuses on infrastructure such as transportation, waste disposal, sewage, and water supply, the first encompasses air, noise, water (rivers, lakes, drains, etc.), and land (green spaces, open places).

To address these challenges, the plan proposes a three-pronged strategy:

- Managing natural resources and infrastructure to maximize their use and reduce pollution
- Developing and maintaining green spaces, open spaces, and recreational areas
- Conserving and enhancing natural features for better environmental value

Approximately 15% of Delhi's urban area is designated as green space, including neighborhood parks, tot lots, and green areas in educational and government campuses. Additionally, biodiversity parks are being developed by the Delhi Development Authority (DDA). In order to maintain environmental balance, the revised master plan stipulates that 15% of the Urban Extension area must be covered by green spaces, including community parks, woods, and incidental green spaces.Additionally, the plan introduces norms for recreational areas:

Table 3-2: Park Standards at Neighborhood Level

S.No.	Park Type	Population Served/Unit	Area (Ha)
1	Neighborhood Park	10,000	1.0
2	Housing Area Park	5,000	0.5
3	Total Lot (Housing Cluster)	250	0.0125

Table 3-3: Park Standards at Sub-City Level

S.No.	Park Type	Population Served/Unit	Area (Ha)
1	City Park	1,000,000	100
2	District Park	500,000	25
3	Community Park	100,000	5

3.4.2 Europe

The "GreenKeys - Urban Green as a Key for Sustainable Cities" initiative in Europe aims to improve urban environments by integrating green spaces as an essential element

for sustainable, livable cities. Recognizing that green spaces are critical for healthy urban living, the project was designed to address challenges such as social inclusion, community participation, effective use of financial resources, and improved accessibility. Funded jointly by the German Ministry of Transport, Building, and Urban Affairs and the European Union Commission between 2005 and 2008, the initiative brought together 20 partners—12 municipalities and 8 research organizations—to scientifically support urban green development.

The Green Keys Initiative's strategic framework is divided into three primary stages for the development of urban green space:
Initial Stage (Preliminary Tasks):

- Establishing a Core Strategy Group: Form a group comprising community members, environmental services, planning officials, and specialists in sustainable urban development.
- Identification of Skills and Resources: Ascertain the requisite level of experience, create a thorough working program, and set up the necessary resources.
- Stakeholder Engagement: While creating a preliminary mission and vision statement to direct the strategy, identify and establish connections with important stakeholders and observers.

Analytical Phase (Information Gathering and Evaluation):

- Detailed City Profiling: To comprehend the demands and difficulties of the community, provide a thorough picture of the city's topography, population, and green space condition.
- Assessment of Current Green Spaces: Evaluate green spaces according to their structural components (like corridors and connectivity features), functional aspects (like usage, accessibility, and integration with surrounding areas), and physical characteristics (such as the distribution of woodlands, grasslands, and water bodies, the m^2 per capita, and the overall share of urban land).

- Data Collection Methods: To find gaps, high-priority regions, and administrative or legal difficulties, use tools including GIS mapping, community consultations, surveys, and interviews.

Action Phase (Strategy Formulation and Implementation):

- Establishing Strategic Priorities: Integrate the analytical results to pinpoint important concerns including the requirement for additional green space, better accessibility, and increased connectivity amongst current locations.
- Spatial Concept Development: Produce a spatial concept map that illustrates the distribution of current and new green spaces in the urban fabric, emphasizing their potential benefits and applicability to the requirements of the community.
- Establishing Regional Guidelines and Standards: Using national and international standards as a guide, create localized rules and guidelines for the amount, caliber, and accessibility of green areas. Setting maximum walking lengths (e.g., 450 meters within a 10-minute walk) or guaranteeing a minimum amount of green space per person are two examples of benchmarks.

3.4.3 Case Study: Bryant Park, New York City, USA

Bryant Park, an underdeveloped urban area in New York City, was strategically designed to balance architecture and social energy and become a vibrant community asset. In order to promote a design approach that prioritized layout flexibility and utility, cooperation between public and private entities was crucial. The park has been transformed into a multipurpose urban stage by creating areas that can be utilized for everything from peaceful recreation to major events. Its steadfast dedication to cleanliness and safety, which allayed early worries about upholding a welcoming and safe workplace, has been largely responsible for its success. In addition to significantly increasing foot traffic and boosting the local economy, this renovation enhanced the park's standing as a center of urban life and social cohesion.

For instance, Bryant Park highlights the importance of early stakeholder engagement and the creation of strong maintenance plans. The initiative shows how regular programming, such as monthly events and seasonal activities, may broaden user groups and draw a variety of city dwellers and tourists. Its story illustrates how flexible, well-maintained spaces may encourage community involvement and urban planning

revitalization, offering insights that can be used in urban projects worldwide (Lab, 2024).

Figure 3-4: Bryant Park, New York City, USA

3.5 Sustainability

The idea of sustainability has emerged through various debates and perspectives over time. With the addition of social components, the framework which was first created to highlight the environmental effects of specific economic practices has transformed into an increasingly complicated and thorough concept. As outlined in the widely recognized Brudtland Report from 1987, sustainability is understood to encompass three fundamental dimensions: environmental, economic, and social (Boström, 2012). The way these dimensions interrelate has attracted considerable scholarly attention. Partridge emphasizes the need for social sciences to play a more active role in dialogues that have long been primarily shaped by scientific disciplines. Furthermore, this gap regarding social considerations within the sustainability framework offers an opportunity for social and political theorists to expand the meaning of social sustainability (Partridge, 2005).

There is a greater focus on understanding the social dimensions of sustainability due to concerns about environmental and economic sustainability. Social sustainability is the foundation of sustainability, as evidenced by the need for social participation in environmental initiatives. As public, governmental, and management interest in social sustainability has grown, so too have the number of undergraduate and graduate studies on the topic. Several disciplines, including business, public administration, sociology, and economics, have assessed the interaction between society and the environment

during this process. Then, conventional environmental fields like engineering, applied sciences, and agriculture have started to benefit from the social aspects (Dillard, Dujon, and King 2009).

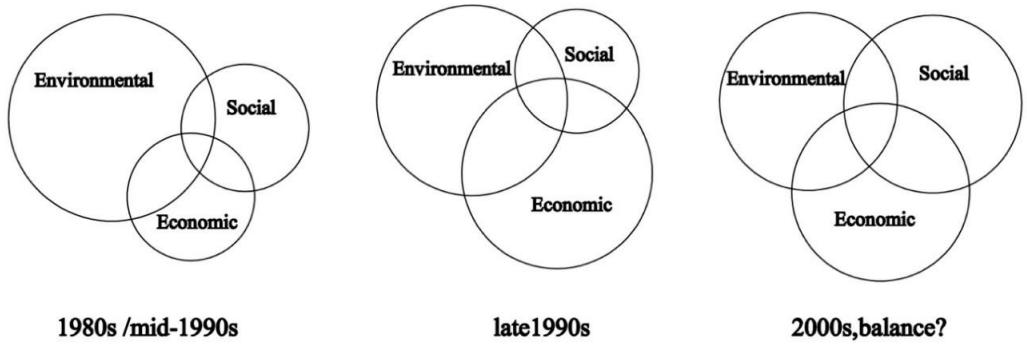


Figure 3-5: Key dimensions of sustainable development and their importance

In this framework, the social, economic and the environmental aspects of sustainability are interconnected and hold equal significance.

3.5.1 Definition of the Concept of Sustainability

Sustainability is described as "the ability to continue a certain level for a while". The words "sustainability" and "sustainable" are commonly used synonymously. Recognized as one of the most rapidly evolving intellectual ideas of the past century, sustainability and sustainable development have become central to academic and policy discussions. Since the 1960s, various academic disciplines have explored sustainability, each interpreting and applying it within their own frameworks. A significant milestone in defining sustainability came with the Brundtland Report, which states: "Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987).

Over time, sustainability has been understood in multiple contexts. Terms like "sustainable development", "sustainable societies", "sustainable communities", "ecological sustainability", "sustainable growth" and "strategic sustainability" underline various aspects of the broader sustainability concept. The origins of this idea can be traced to the work of ecologists and biologists, who initially focused on determining the sustainable rate of renewable resource use and addressing

environmental degradation without destabilizing ecosystems. Subsequently, the concept found its place in economics, examining the interaction between natural resources and economic systems. In recent years, it has further expanded into business, management, and engineering fields.

Ultimately, though the specific approaches to sustainability may differ, they converge on a shared objective: improving quality of life, ensuring healthy environments, and fostering inclusive, developed communities for both current and future generations. To achieve these aspirations, sustainability must be regarded not merely as a component within individual disciplines but as a comprehensive, interconnected framework addressing the well-being of people, economies, and ecosystems alike.

3.5.2 Three Pillars of Sustainability

The interconnection among the core facets of sustainability has been portrayed in various ways over the years. The three-pillar model, which organizes sustainability into environmental, economic, and social dimensions, is widely acknowledged in academic circles. This framework did not stem from a single origin but evolved through early scholarly analyses of ecological and social concerns. Initially, the “concentric circles” model was introduced, presenting the environment as an encompassing sphere surrounding the economic and social domains.

Subsequently, the “interlocking circles” model emerged, depicting environmental, social, and economic sustainability as equally essential and interlinked areas. By the late 1990s, a depiction using three equally proportioned pillars became notable, highlighting the interdependence of economic, social, and environmental aspects as the foundation of sustainable development. Categorizing impacts into these three groups provides greater clarity for analyzing sustainability challenges. “To maintain equilibrium and avoid conflicts among these domains, sustainable development requires seamless integration and balance of the three pillars” (Giddings, 2002).

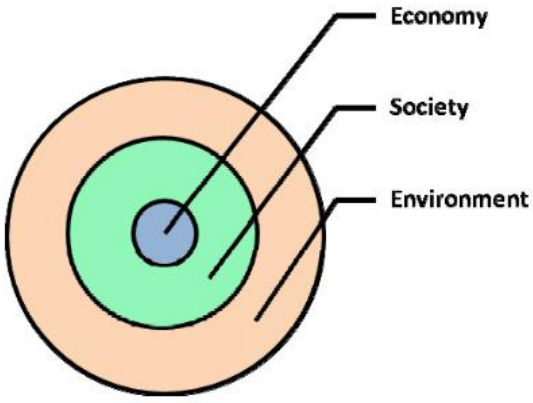


Figure 3-6:Concentric Circles

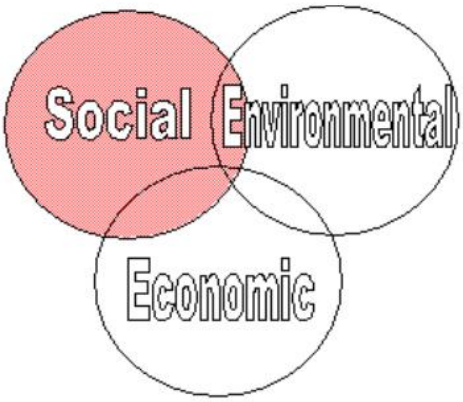


Figure 3-7:Interlocking Circles

(Source: (Barron, L., & Gauntlett, E., 2002)Ba

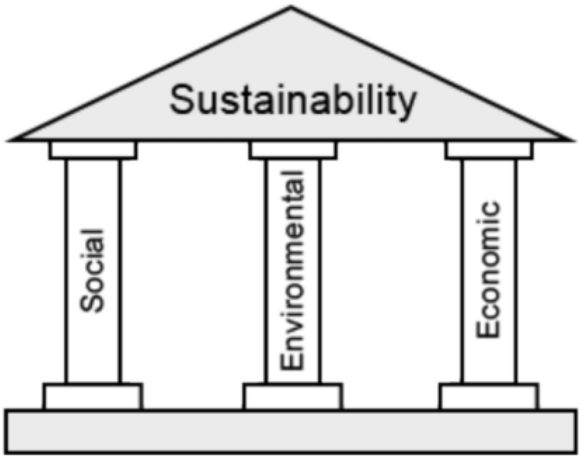


Figure 3-8: Three Literal Pillar Framework

3.5.3 Social sustainability

According to Ziaesaeidi and Cushing (2019), social sustainability is a process that enhances connections and fosters cultural quality of life across various community groups within neighborhoods and regions. The development, maintenance, and support of positive interpersonal relationships which are crucial for reciprocal learning and welfare promotion could be characterized in this context as social sustainability. This capability ought to be taken into account in order to improve the cohabitation of different, intercultural, and intergenerational social groups in space (Banerjee 2003; Washington et al. 2019). By building more inclusive, safe, resilient, and sustainable

cities and human settlements, the United Nations (UN) set the Sustainable Development Goals (SDGs) in 2025 based on specific economic, environmental, and social development principles to support a prosperous life for future generations. There are 17 SDGs, some of which directly or indirectly refer to social aspects of sustainability. For instance, target 11.7 in SDGs highlights the importance of equal accessibility to safe and inclusive urban green and public spaces. This is consistent with target 5.2 which aims to increase safety and security by creating safe public spaces, lighting and openness. While it is important to take social sustainability into account, there are some challenges to this complex multidimensional approach. Despite consideration of environmental and economic dimensions, social sustainability's focus on cultural aspects can be harder to identify. Social exclusion is driven by the power of unequal relationships in different social situations and can have a negative impact on the quality-of-life and social commitments of the societies as a whole. This would include the lack of resources for rights, goods and services alongside the inability to participate in normal relationships and social movements, and also inaccessibility to large groups of society, economically, socio-culturally and politically. Whilst this can be complex to measure, it is necessary to seek ways to mitigate and overcome these exclusive practices.

Building a sense of belonging has been demonstrated to be significantly influenced by social sustainability. However, a feeling of belonging also remained difficult to categorize and quantify for many years, partly due to unclear theorization in human geography. A sense of belonging is an active and intense emotional attachment that has a growing relationship to the social and physical reality of societies for the purpose of living and working. The idea can be experienced both formally and informally on many different levels and dimensions, including on a national and global level as well as in the sense of community and neighborhood. Furthermore, people typically build relationships with others by feeling close, empathetic, and like they belong, such as through common experiences or aspirations. Mastery of the relationship-infrastructure dynamic should be considered in conjunction with the built environment's design to support socio-cultural life, civic engagement's social adaptability, and the development of human, local, and indigenous space.

Theories on Social Sustainability: Numerous scholars have categorized social sustainability aspects in the literature based on their areas of expertise. "There is no single blueprint definition to social sustainability, and the definitions that exist are often derived according to discipline-specific criteria or study perspectives, rather than being general," claim Weingaertner and Moberg (Weingaertner, 2014).

3.6 Key Dimensions of Social Sustainability

3.6.1 Accessibility

People prefer to stay in places with family-friendly amenities and career opportunities nearby, and they would rather travel less to live, work, and attend cultural and entertainment events. Accessibility is largely determined by the location of possible places for people to engage in activities, how well transportation systems function in connecting areas, how people prefer to use transportation systems, and the nature, caliber, and appropriateness of the activities that need to be accessible.

When designing sustainable cities, physical accessibility is a crucial consideration. As a result, designers should make it easier and safer for people to enter and use public areas. Both temporary circumstances like a broken leg, pregnancy, or exhaustion, as well as the conditions of people with disabilities, the elderly, and children, should be taken into account during the design process.

The accessible natural greenspace standard was created to establish the bare minimum of distance that locals must walk in order to access a natural setting. It states that within 300 meters of their residences, residents should have access to a minimum of two hectares of natural green space. The amount of green space necessary rises to 20 hectares for a 2-kilometer route, 100 hectares for a 5-kilometer distance, and at least 500 hectares for a 10-kilometer distance. Furthermore, there need to be at least one hectare of local nature reserve for every 1,000 residents. (Source: (Pengelly Consulting, 2010)

Area (Minimum Size)	Distance
2 hectares	300 meters

20 hectares	2 kilometers
100 hectares	5 kilometers
500 hectares	10 kilometers

The goal of the accessible natural greenspace standard is to improve connectedness, naturalness, and accessibility. Distance is only one factor that affects accessibility; another is making sure that people know about and feel at ease in their local green areas. Furthermore, fostering opportunities for interaction and involvement is crucial to strengthen connectivity (Pengelly Consulting, 2010).

3.6.2 Security

Every neighborhood has to have security. According to some academics, neighborhoods created using particular layout principles are safer places to live, and urban design can influence crime prevention. One of the causes of security flaws like theft and vandalism is said to be the fact that people have no control over the open areas in their surroundings. People take action to defend places that are classified as private or semi-private, yet public spaces are frequently thought to be the responsibility of others. As a result, maintaining public safety is more challenging.

Additional facets of social sustainability are intimately linked to security. Participation in community activities and social connections are increased by the distance from crime and discomfort. In addition to contributing to a person's feeling of location and community, a sense of security strengthens interpersonal trust. Additionally, the built environment has a major influence on the perception of security. A non-profit group of architects and urban planners called the Project for Public Spaces (PPS 2008) has shown that a park's perceived safety is directly influenced by its design. Generally speaking, urban parks with insufficient lighting, unclear layouts, physical and acoustic isolation, low visibility, trouble getting assistance, hidden hiding places, poor upkeep, street art, and undesired components are seen as unsafe. It is crucial to have adequate illumination, which should match directional signage and illuminate possible hiding places. In addition to making the park's plan more understandable, well-lit walkways, gathering spots, and building entrances promote nighttime use. Similar to this, a park's

intelligibility is improved by a clear layout, which makes it simpler for visitors to navigate and gives them a sense of security through easy entrance, obvious directions, and clearly marked boundaries.

In conclusion, perceived safety is strongly associated with demographic characteristics like gender and age. In general, women are more worried about their personal safety in public places; as a result, they tend to steer clear of secluded park areas and discourage nocturnal trips. In a similar vein, older people feel less safe in urban parks than younger people do since they are more likely to be victims of crime (Deniz 2016, 634). The perception of a park's safety can also be influenced by other demographic factors, such as marital status, income, and education (Türkseven Doğrusoy and Zengel 2017, 67).

3.7.3 **Social Cohesion**

Social Cohesion represents a fundamental requirement for achieving a sustainable community. As outlined in the OECD's "Perspectives on Global Development" report, "social cohesion is considered through three core dimensions": "social inclusion, social capital, and social mobility" (OECD, 2016). Some issues including poverty, inequality, and polarization brought on by social exclusion are addressed by social inclusion (OECD, 2016). Social exclusion covers the wider causes and effects of poverty even though it is linked to poverty and low income. "A shorthand term for what can happen when there is a combination of problems, such as unemployment, poor skills, low incomes, poor housing, high crime, bad health, and family breakdown," is how the British government defines social exclusion. Other characteristics of exclusion could be added to this concept, which is open-ended (Social Exclusion Unit, 2001).

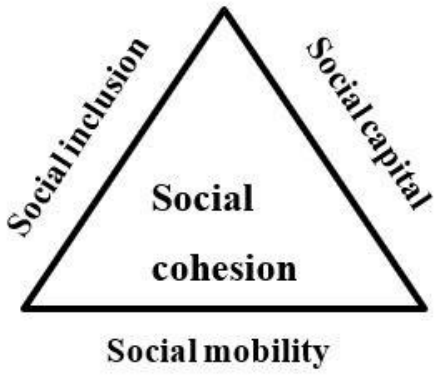


Figure 3-9: The components of social cohesion (Source: OECD 2016, 17)

Although anyone might experience social exclusion, some people are more vulnerable than others. People who are excluded from the advantages and opportunities of physical and social participation—such as unequal access to public

services, employment chances, or transportation—are said to be socially excluded. Overcoming social exclusion requires the implementation of social sustainability policies. As a result, social sustainability strategies ought to concentrate on improving underprivileged communities' integration into the political, social, and economic spheres (Partridge, 2005).

3.6.3 Quality of Life

Quality of life, being a subjective and complex concept, allows for an emphasis on the qualitative elements of social sustainability to help improve individuals' overall living conditions. Instead of defending unsustainable consumption in the name of affluent and privileged groups' quality of life, this idea need to concentrate on enhancing the lives of underprivileged groups. Quality of life is an important ideal, but it is inextricably linked to equality (Partridge, 2005). The integration of sustainable development and well-being in the political agenda, according to Listen and colleagues, elevated the significance of the idea of well-being. In 2008, at the invitation of former French President Nicolas Sarkozy, a team authored a paper focused on developing new metrics for sustainability and prosperity. It set the stage for new initiative to give lawmakers more control over their own paths. These changes led to criticism of the economic growth theory as it was expressed by the gross domestic product. These changes led to criticism of the economic growth theory as it was expressed by the gross domestic product.

People’s perceptions of their own lives shape their sense of well-being and quality of life, and urban green spaces play a vital role in enhancing these aspects. By taking into account factors like "promoting high-quality living conditions" and "life strategies," (Coles, 2001) investigate the quality of life in urban green areas. They contend that by encouraging social connections amongst guests, meeting residents' everyday recreational demands, and permitting unrestricted access at any time, urban green spaces should enhance living circumstances.

3.6.4 Sense of Belonging

The experience of belonging is shaped by the interplay of social identity, attachment to place, and community connection. Since maintaining sustainability depends on residents enjoying their neighborhood, sense of place is considered a component of

social sustainability. People's sense of attachment to a neglected location will be impacted if it is neglected or has a high degree of vandalism. According to Talen, a "combination of social interaction, sense of belonging, and place attachment" forms a sense of community. The built environment has a strong influence on how a place feels since emotions can be influenced by how it is perceived.

The key elements that support social sustainability include a strong sense of community and belonging, acceptance of cultural and ideological diversity, supportive and collaborative neighborhood interactions, and opportunities for cultural and social engagement, a sense of safety, and access to social participation. The identity of a place evolves over time and is closely tied to its historical background, community events and celebrations, and the narratives shared by its residents. In a community, strong local ties offer advantages such a sense of community and belonging, access to local news and information, informal childcare, key exchange neighbors, and job advice.

Urban green spaces are essential to a community's identity and feeling of place because they capture the nuances of local culture and heritage. In addition to providing biological advantages, features like ponds, fences, trees, and forests also contribute to creating a unique sense of place. Their ability to reflect the identity and culture of the population they serve is a major factor in determining how effective these spaces are.

3.6.5 Equity

In social sustainability studies, the ideas of equity and social justice are among the most stressed. While the exact meaning of social equality remains debated, it is commonly viewed as a framework of distribution that seeks to fairly adjust the conditions of both advantaged and marginalized groups within a society. This balance is what makes social equality so important. Sustainability may suffer if there is a disparity between the privileged and the disadvantaged. Social inequality undermines social sustainability by fostering division, conflict, and instability within society. Any strategy for achieving social sustainability should be based on the core tenet of equality. McManus, cited in Partridge, asserts that social justice must be a part of the notion of sustainability since equality between and among generations stops an affluent minority from consuming needlessly. Prioritizing social justice does not imply that sustainability endorses the status quo. For instance, social sustainability has been addressed through a retroactive social justice component in situations when natural capital reserves were already lost

for particular communities (Partridge 2005, 10). Cuthill uses two pillars to support the social aspect of sustainability. First of all, he points out that environmental issues are just as much social issues. Second, he goes on to say that the economy should serve people's interests rather than the other way around. The goal of this economic strategy is to distribute resources equally. The connection between these two fundamentals is further reinforced by the ideas of social justice and equality, social capital, social infrastructure, and associated governance.

Social sustainability depends on ensuring that everyone in society has equal possibilities, particularly the weak and impoverished. Urban green areas should be planned so that all visitors have equitable access to the many physical and psychological advantages they provide. Disparities in usage, however, can arise between various social groups and are frequently impacted by variations in income. These difficulties are not only physical; they are also structural, social, and emotional, and disparities in psychological access exacerbate usage disparities. Additionally, how these areas are used can be influenced by the degree of harmony among users. Given that social sustainability is based on the fair allocation and use of resources, urban green spaces can be an essential tool for guaranteeing that various groups have equal access to these priceless resources.

3.7 The relationship between UGSs and Social Sustainability

Urban green spaces play a vital role in promoting social sustainability within cities. These spaces contribute both socially and ecologically to urban environments. As these spaces are influenced by political, economic, and social transformations, they serve as reflections of broader urban changes. Moreover, they support the expression of our relationship with nature and offer potential responses to various social challenges.

Urban green spaces are public areas that offer social benefits rather than economic gain. They are considered some of the most accessible public environments. The social values of urban green areas are one of the most important factors in guaranteeing social sustainability, the goal of urban green spaces in a socially sustainable society is to enhance social sustainability aspects such as fostering social cohesion and improving welfare.

In addition to environmental factors, social concerns about quality of life form the basis of several notions of a sustainable community. According to Chiesura (2004), factors like the area of public UGS per capita and recreational areas are typically cited as important components of livable, pleasant, and appealing towns. As a result, urban sustainability is a multifaceted problem that prioritizes residential and urban regions. It can be accomplished by ongoing management, citizen involvement, and interactions between various governmental levels.

3.8 Green spaces; a driver of social sustainability

One of the most important and essential landscapes for enhancing or regaining city well-being is urban green space. Particularly for women, children, and the elderly, SGD 11.7 promotes the availability of safe and inclusive green spaces and the functions of the components. Furthermore, public green spaces can be democratic venues for demonstrations or consensus-building in addition to renewing a feeling of community and social vigor. Social connections can occur both formally, as in the context of scheduled activities, such as organized sports in green spaces, and informally, because residents live close to the areas used within a broad territory.

Neighborhood green areas and recreational facilities usually encourage social and physical activity (Joseph and Maddock 2016; Washington et al. 2019). Green spaces may provide a community with a place to unwind and enjoy both active and passive recreation provided they are situated in easily accessible areas that actively enhance transportation. Several behavioral studies have found that social contacts in planted regions are twice as common as those in arid settings with no plant features. Given that urban green spaces have an impact on residents' behavior, thoughtful and precise planning of green spaces can promote moral growth and urban relationships.

4 CHAPTER FOUR: STUDY AREA

4.1 Background

Hetauda is a sub-metropolitan city located at the intersection of the Tribhuvan Highway and the Mahendra Highway in the Makwanpur District of the Narayani Zone of southern Nepal. It is the state capital of Bagmati Province and the administrative hub of the Makwanpur District, which is part of Nepal's Central Development Area. Hetauda is an intriguing illustration of how to strike a balance between preservation of the environment and rapid urban growth.

Figure 4-2: Capital of Bagmati Province Source: Ratopati

Known for its iconic tree-lined streets, particularly the Ashoka trees, and the city has long been celebrated as a " green city" with an inherent connection to nature. Hetauda municipality has 23% of its land covered by forest area with per capita forest area of 121 m2 (Shrestha, 2013). Due to the demands of urbanization brought about by its growth from a small town to a provincial capital, its land use patterns have changed, making sustainable urban planning necessary. This vibrant environment offers the perfect context for investigating the ways in which urban green areas might improve social and environmental well-being while reducing urban sprawl.

Figure 4-1: Case Study Area

Hetauda’s urban expansion has been largely driven by industrialization and its recent designation as the provincial capital. The establishment of the Hetauda Industrial Estate in the 1970s marked the beginning of the town’s transformation into an industrial center, attracting various industries such as textiles, cement production, and agriculture-based sectors. Hetauda's strategic location at the intersection of two major national highways, the East-West Highway and the Tribhuwan Highway, further facilitated its development as a commercial and industrial hub, linking it to both national and international markets. This industrial growth laid the groundwork for rapid urbanization, fostering increased economic activity and infrastructure development.

However, the rapid urban expansion of Hetauda has also brought significant challenges. With the town's population nearly doubling in recent years, the demand for housing and infrastructure has surged, resulting in the transformation of agricultural land into urban developments. Urban sprawl is slowly spreading into ecologically vulnerable areas, such as riverbanks and wooded areas, and displacing what were once mostly farms on the periphery. This unplanned growth has sparked concerns about sustainability, as crucial natural resources such as water and green spaces are being depleted. The city is increasingly troubled by traffic congestion, insufficient parking facilities, and the absence of an effective public transportation network. Additionally, migration from nearby Terai regions and other peripheral areas, often driven by conflict, has further burdened the city's infrastructure. This combination of factors, along with the widespread urban sprawl, has intensified the urban heat island effect—whereby the city records higher temperatures compared to its more rural surroundings as a result of extensive construction and dense built environments. Together, these issues underscore the urgent need for thorough urban planning and sustainable development initiatives to effectively manage the city's growth.

4.2 Demography

Hetauda has experienced significant demographic and spatial changes over the past two decades. The city's population grew from 129,872 in 2001 to 193,576 in 2021, reflecting an annual growth rate of 2.2%. Spanning an area of 261.6 km² with a population density of 740 people per km², Hetauda has transitioned from a small town to a bustling provincial capital. This transformation has intensified urban activities and increased demands on infrastructure, services, and green spaces. The demographic profile of Hetauda highlights its diverse and dynamic population. The city has a predominantly young and economically active population, with 70% of residents falling into the 15-64 age group, while 23.5% are children aged 0-14 years, and 6.5% are senior citizens. This age distribution underlines the importance of urban green spaces that cater to various age groups, from playgrounds for children to serene parks for the elderly. Furthermore, Hetauda's demographic trends demand strategic planning to balance rapid urbanization with the preservation and expansion of green spaces.

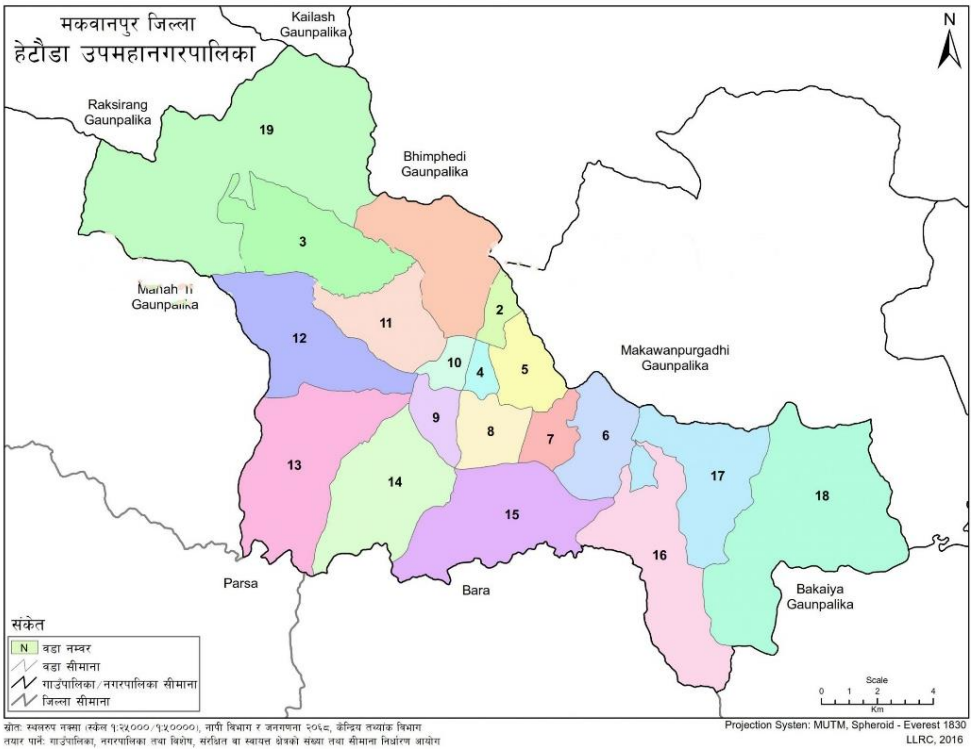


Figure 4-3: Wards of Hetauda

The Ward 1 and Ward 3 reflect the challenges in effective integration of open spaces in older, more developed parts of Hetauda, which can be contrasted with newer development areas. These wards represent different parts of the city with diverse urban characteristics. Ward 1 is close to central areas and may have significant green space usage, while Ward 3 and Ward 7 are residential and potentially underserved in terms of accessible green spaces.While the Ward 4 and Ward 5 could provide a look at more recently developed or developing areas, where green spaces may not have been prioritized. Ward 4 and Ward 5 also have potential for study, as they include a mix of residential, commercial, and institutional spaces. Focusing on these wards could help identify spatial distribution issues, gaps in green space integration, and community needs, especially since they might include neighborhoods with emerging development pressures.

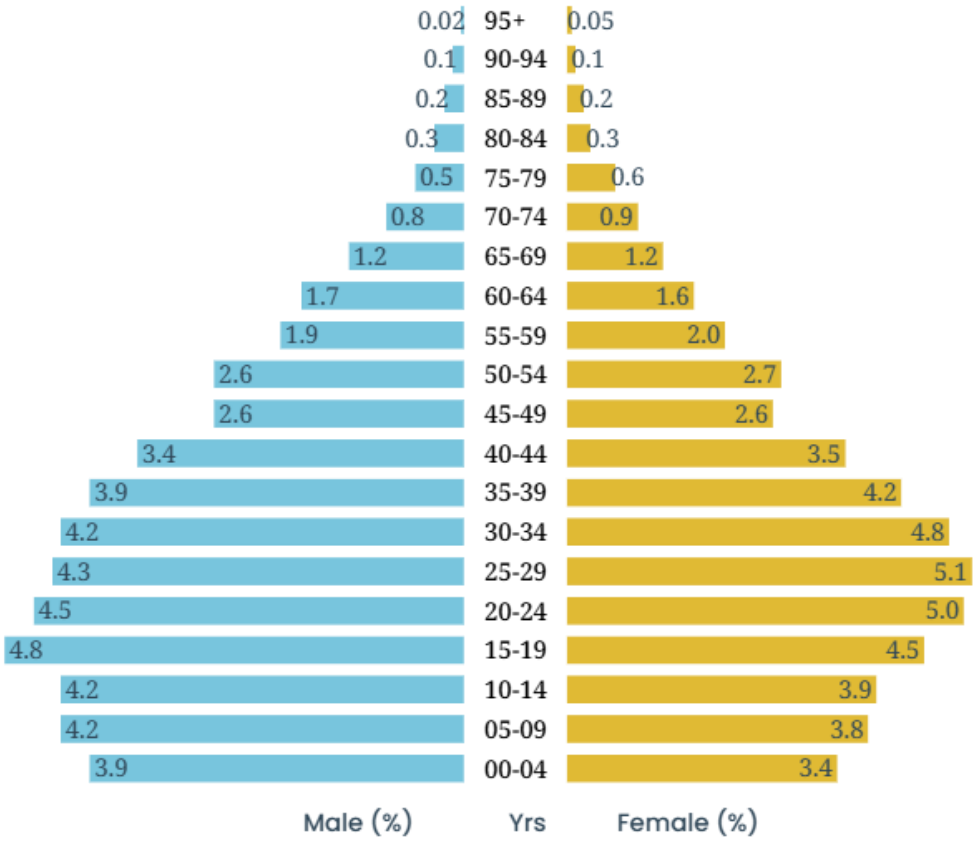


Figure 4-4: Population by 5 year age group and sex

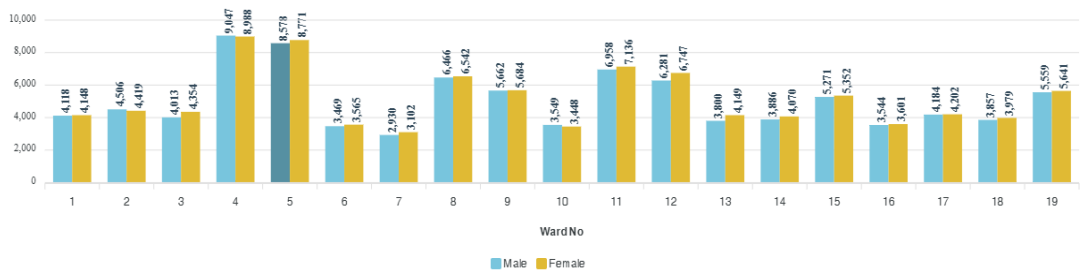


Figure 4-5: Ward wise Populayion of ward 4 and 5

Source: National Population and Housing Census 2021

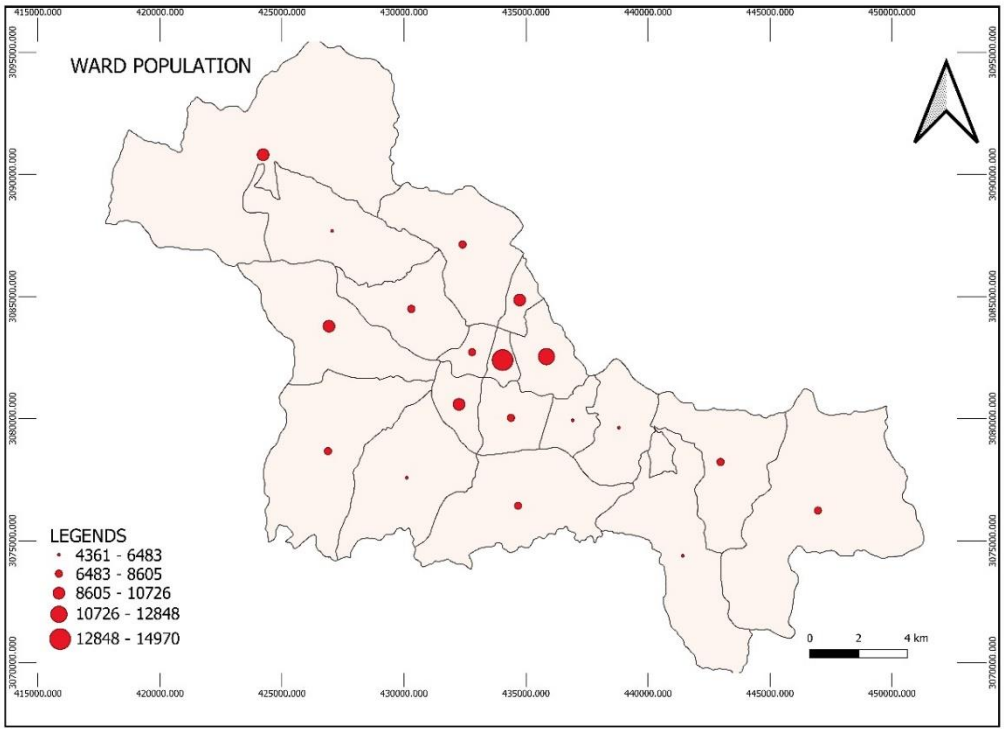


Figure 4-6: Ward Population of Hetauda

In the past, Hetauda's main neighborhoods were residential districts and marketplaces. However, Hetauda's environment has greatly improved since planned towns were established. Despite this, the city faces sustainable development issues as it grows. Hetauda may become a modern city by tackling these issues and prioritizing environmental preservation and sustainable urban design. Its status as a green metropolis is further reinforced by initiatives such the establishment of public parks, *green* spaces (Green Belt), forests, and other recreational areas (Hetauda Darpan

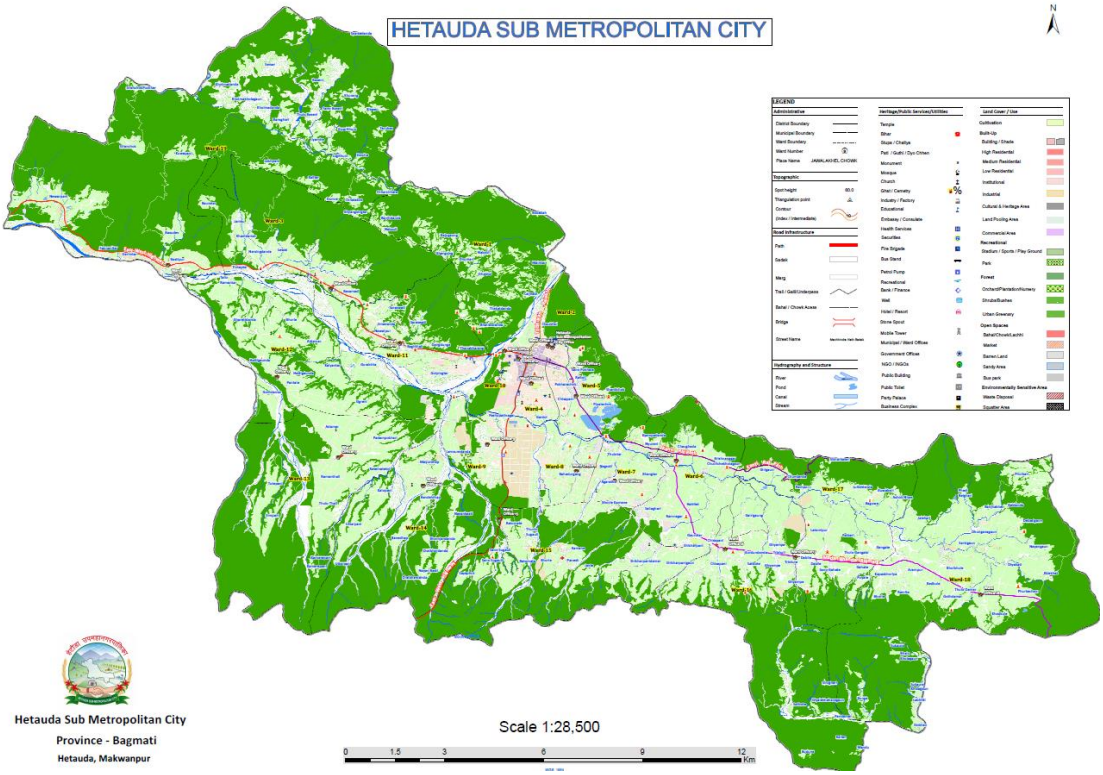


Figure 4-7: Landuse map of Hetauda

Source: Hetauda Sub-Metropolitan City

2079).This land use map shows the spatial distribution of several land use categories within the municipal border of Hetauda Sub-Metropolitan City, which is situated in Bagmati Province, Makwanpur, Nepal. Hetauda has a lot of greenery and protected places, as seen by the large amount of the map that is covered in green, which represents woods, open lands, and other natural landscapes. On the other hand, the core area, which is indicated by orange, pink, or gray hues, represents built-up or urban regions, which include administrative buildings, commercial centers, and residential communities. With built-up areas predominating the land use pattern, wards 2, 4, 5, and 10 may be classified as urban wards. Wards 1, 3, 6, 7, 8, 9, and 11 can be classified as semi-urban wards, and wards 12, 13, 14, 15, 16, 17, and 18 can be classified as rural wards. Wards 10 and 11 are home to the majority of large-scale industry.

4.3 Methods of Case Study

This section details the approach used to collect and analyze data for the case study. Data gathering was achieved through both site observations and the administration of a structured questionnaire, which was divided into four segments. The first segment collected basic socio-demographic information, including age, gender, and income brackets of the respondents. The second segment comprised a series of closed-ended questions, categorized into six sections that reflect different dimensions of social sustainability as outlined in the evaluation framework. Quantitative research often prioritizes closed-ended questions because their structured format facilitates straightforward data analysis. In this study, such questions were designed using a five-point Likert scale, which allowed for the numerical measurement of attitudes and provided a means to represent variables quantitatively. The questionnaire's third section featured open-ended questions intended to gather in-depth insights into participants' personal interests, as well as their favorable and unfavorable views of the area, and their overall expectations. These questions are a cornerstone of qualitative research, enabling respondents to express their thoughts in detail without being confined by predetermined response options. Although this approach yields richer and more varied data, it can also present challenges during the analysis phase. For data summarization, descriptive methods applied, starting with frequency analysis. The categorical data, measured on a nominal scale, were visualized using pie charts that depict the distribution of proportions and percentages. In this investigation, responses were scored on a scale of one to five, with a mean score of three interpreted as supportive of social sustainability. Moreover, the standard deviation was computed to gauge the agreement among the participants—lower values indicated a higher level of consensus, whereas higher values pointed to a broader range of opinions.

To supplement the survey findings, key informant interviews were conducted with the ward chairperson and several members of the management committee, providing further qualitative depth to the overall analysis.

4.4 Current state of urban green spaces

Hetauda's urban green spaces play a vital role in enhancing the city's environment and quality of life. In Ward 4, Hupra Chaur serves as a major public space for sports, gatherings, and community events, while Children's Park provides recreational facilities for children. Similarly, Ward 5 features

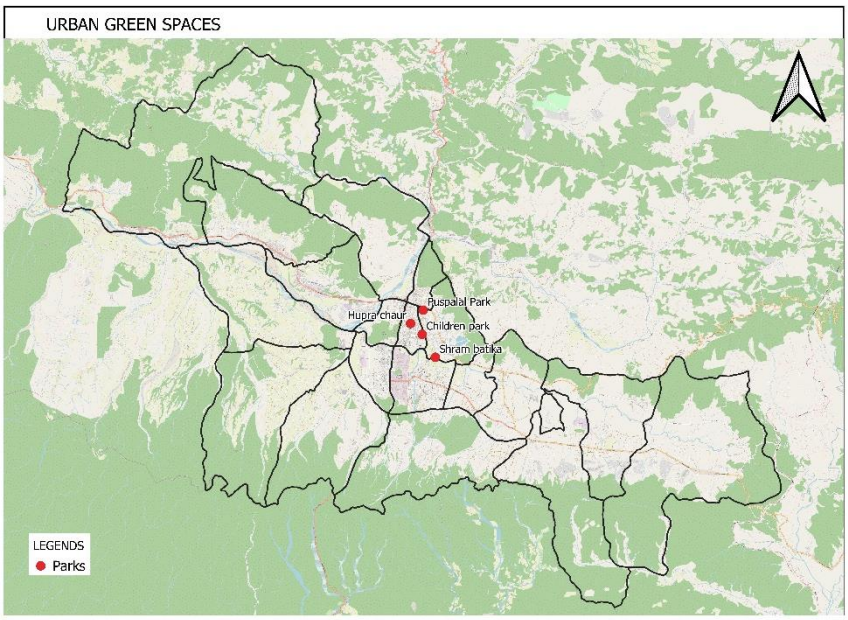


Figure 4-10: Open Spaces of ward 4 and 5

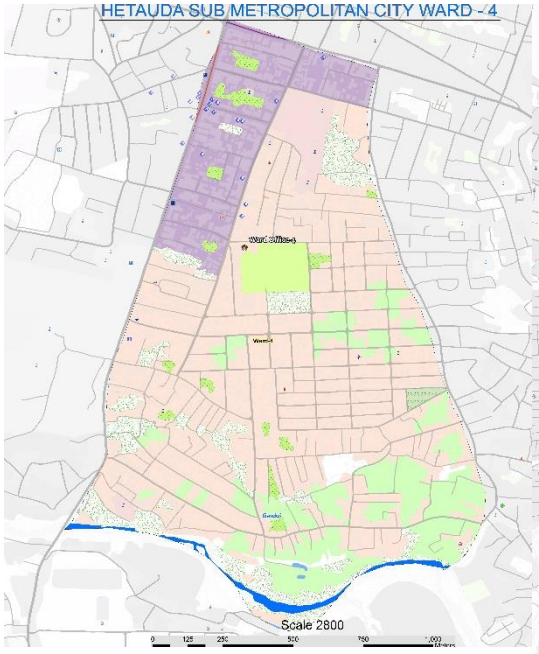


Figure 4-8: Open spaces in ward 4

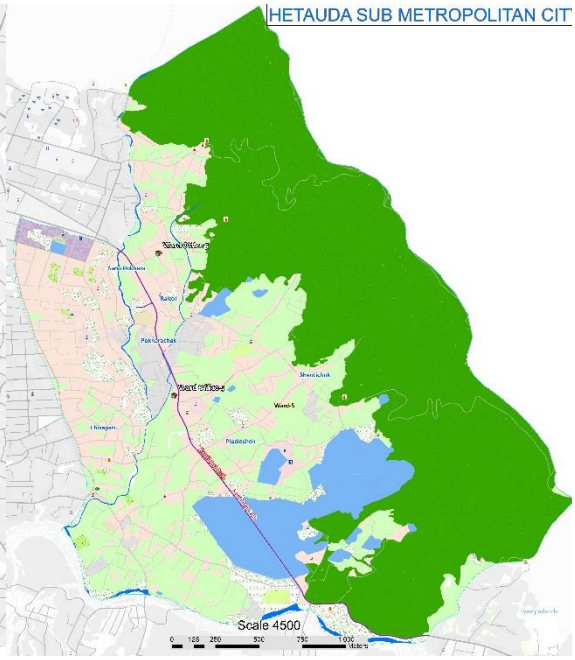


Figure 4-9: Open spaces in ward 5

Puspalal Park, a well-maintained space with seating areas and walking paths, and Shram Batika, a smaller park used for relaxation and social activities.

4.4.1 Hupra Chaur

Location and context

Hupra Chaur is located in Ward No. 4 of Hetauda Sub-Metropolitan City in Makwanpur District, Bagmati Province, Nepal. This central location within the city makes Hupra Chaur easily accessible to residents of various wards and surrounding areas. Its location in Ward No. 4 puts it in close proximity to important administrative buildings, shopping centers, and educational institutions, strengthening its function as a major gathering place for locals for social and recreational activities. It is a large, open grassy field in the center of the city that has long been a vital part of Hetauda's urban life. The area is often used for a variety of purposes, from large-scale public events and meetings to morning walks, fitness, and leisure. Its accessibility and roominess make it a priceless public resource that supports the social, cultural, and environmental sustainability of the city. The multipurpose nature of Hupra Chaur is one of its primary attractions.

Figure 4-11: Hupra Chaur (Source: Google earth)

Elements and features of park

Access

Hupra Chaur is easily accessible due to its location in Ward No. 4 of Hetauda, which is strategically connected to the city's main roads. Easy access to the area from different areas of the city is made possible by the vicinity of the East-West Highway (Mahendra Highway) and Tribhuvan Highway. The park's accessibility is essential for attracting visitors for public events and recreational activities from both Hetauda and the surrounding areas.

Walkways

The purpose of the Hupra Chaur walkways is to give park visitors a practical and secure method to navigate the area. These trails provide convenient access to the park's center grass and picnic areas as they circle it. Even during crowded events, the layout guarantees that guests can move about the park with ease. The park is an inclusive place for everyone because of the pathways, which are essential to its overall usability and movement.

Figure 4-12: Walkways

Central Lawn

Hupra Chaur's center lawn serves as its focal point. Sports and cultural events are among the many leisure pursuits that take place in this large open space. It is perfect for public events, festivals, and concerts because it is roomy enough to hold big audiences. Both casual guests and those taking part in planned events can find a space in the center lawn. The grass serves as a focal point for community participation because of its size and prominent location within the park.

Sitting Area

There are places to sit in Hupra Chaur so that visitors relax and take in their time there. There aren't many places to sit along the walkways that run around the park, giving guests a good view of the main lawn. The park's seating sections are a crucial feature since they let visitors relax while taking in the open space. To make these spaces comfortable for people who are visiting alone, with friends, or with families, benches have been installed.

Gym Equipment

Along with encouraging physical fitness and well-being, Hupra Chaur has outdoor exercise equipment. These amenities are offered to those who want to work out while taking in the scenery outside. The park's efforts to offer a wide variety of activities that appeal to all interests and age groups include the gym equipment. The community frequently uses these exercise stations to keep an active lifestyle, particularly for people who might not have access to indoor gyms.

Figure 4-13: Sitting area

Figure 4-14: Gym equipments

Public Toilet

In order to provide visitors with basic facilities while they are in the park, Hupra Chaur has public restrooms. Any public area must include public restrooms, but this is especially true for areas that serve varied populations and sizable audiences. Accessible and hygienic restrooms enhance the overall experience of visitors by making it more pleasant and cozy for people, families, and event attendees.

Stage

One of Hupra Chaur's main features is a stage, which is utilized for a variety of public events, including as speeches, concerts, and cultural acts. The stage gives lecturers and entertainers a place to interact with the audience. It is an essential part of the park's function as a community center and is made to support a range of activities.

Figure 4-15: Public toilet

Figure 4-16: Stage

Maintenance and Management

Local governments and municipal organizations are in charge of managing and maintaining Hupra Chaur, making sure the park is kept tidy and clean. Maintaining the park's condition requires routine lawn care, cleaning, and upkeep of amenities like the gym equipment, restrooms, and walkways. In order to keep the park a secure and friendly place for the neighborhood, the management also supervises the planning of

events and activities. Nevertheless, despite its importance, Hupra Chaur still faces a number of difficulties. While some parts of the field are covered with grass, others remain dusty or muddy, depending on the season. Additionally, the absence of designated seating areas, shaded spots, and proper lighting limits its usability during different times of the day. Unauthorized vehicle parking and sometimes disrupt the intended use of the space, reducing its overall appeal. The lack of proper infrastructure and maintenance has led to issues such as uneven terrain, and occasional encroachments. Uneven topography and sporadic encroachments are problems caused by inadequate infrastructure and maintenance.

4.4.2 Childrens park

Location and context

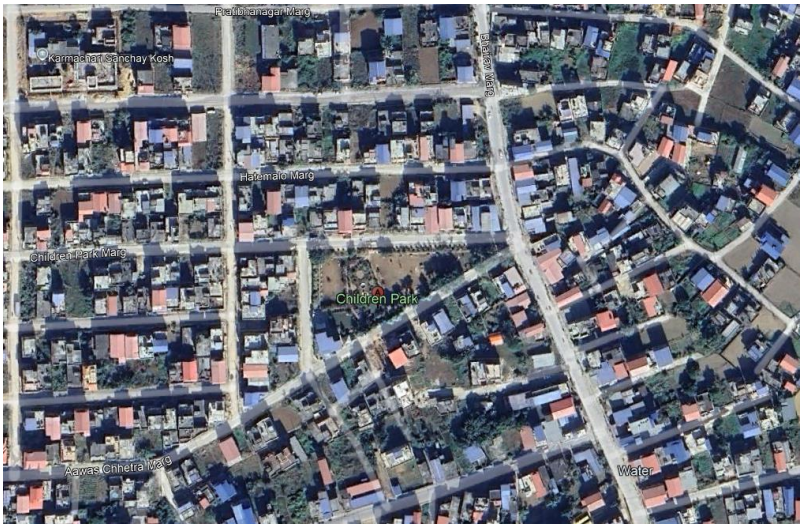


Figure 4-17: Children Park (Source: Google earth)

The Children's Park in Ward 4 is strategically located in one of the most densely populated and vibrant areas of Hetauda, Nepal. Situated within a short walking distance from local schools, community centers, and residential clusters, the park is easily accessible to families, children, and the elderly. The park covers approximately 5,000 square meters and is designed to cater to a diverse range of activities. Hetauda, as a rapidly urbanizing city, faces significant challenges related to land-use competition and the loss of public green spaces. In this context, the Children's Park emerges as a critical public space, providing much-needed recreational and social functions amid the urban sprawl. In recent years, municipal efforts have increasingly focused on integrating urban green spaces into the city's overall planning strategy to address issues of environmental degradation and social isolation (Shrestha & Poudel, 2019). The park serves not only

as a recreational facility but also as an essential social infrastructure that contributes to the well-being of local residents..Overall, the location and context of the Children's Park in Ward 4 of Hetauda make it a critical case study for exploring how urban green spaces can be integrated into city planning to promote social sustainability.

Elements and features of park

Access

The Children's Park is conveniently accessible to a wide range of urban residents due to its convenient location in Ward 4 of Hetauda Sub-Metropolitan City. The park is well-connected by footpaths and local transit due to its close vicinity to important educational institutions, residential areas, and administrative buildings. According to local government estimates, more than 70% of Ward 4's people live within ten minutes' walk of the park, highlighting how easily accessible it is (Hetauda Municipality, 2018). This accessibility is essential for promoting impromptu social encounters and community involvement in addition to regular leisure activities.

Walkways:

The carefully thought-out walkways are an essential part of the park's design. Because of their wide, level, and unobstructed design, these paths are appropriate for a variety of users, such as elderly people, families using strollers, and people with mobility issues. Using non-slip paving materials improves the walkways' longevity and guarantees safety during wet seasons. Additionally, the pathways connect the park's many areas, including the play area, library, and seating areas, forming a seamless network that encourages guests to partake in a variety of park activities.

Play Area:

The play area features a variety of playground equipment that has been built with safety regulations in mind, including swings, slides, climbing frames, and interactive play structures. To keep the equipment in good operating order, the management team inspects and maintains it on a regular basis. The design of the play space promotes children's cooperative and imaginative play in addition to physical activity, both of which are essential for social development. This lively play area draws a sizable number

of families during peak hours, according to observations and local media accounts (Nepali Times, 2019), supporting the park's mission to foster community ties.

Figure 4-18: Walkways of Children park

Figure 4-19: Play area of Children park

Library

A notable aspect of the Children's Park is its dedicated children's library, which is rather uncommon among Hetauda's urban green areas. In addition to encouraging literacy and education, the library provides youngsters with a peaceful haven that strikes a balance between energetic play spaces and areas for introspection and relaxation. Under the direction of Brahma Kumaris Hetauda, the library is kept up to date with pertinent resources and is set up to promote community use. The park's diverse purpose is highlighted by the addition of this educational facility, which is in line with more general objectives of social and cultural sustainability.

Figure 4-20: Library of children park

Figure 4-21: Green space in children park

Toilets and Water Facilities

To ensure that visitors have a comfortable and convenient experience, the Children's Park is equipped with modern public toilets and a dedicated drinking water station. These facilities are strategically located near high-traffic areas and are maintained to high standards of cleanliness and hygiene. Regular maintenance schedules, overseen by Brahma Kumaris Hetauda, ensure that these amenities are functional and accessible at all times. The availability of such essential facilities is particularly important for families and young children, as it

supports prolonged recreational activities and contributes to the overall user satisfaction and safety of the park.

4.4.3 Puspalal park

Location and context

Puspalaal Park is a prominent urban green space situated in Ward 5 of Hetauda Sub-Metropolitan City. This park occupies a central position within Ward 5, an area characterized by a mix of residential neighborhoods, local marketplaces, and educational institutions. Its strategic placement not only enhances the park's accessibility for residents but also reinforces its role as a key communal asset in a rapidly urbanizing city.

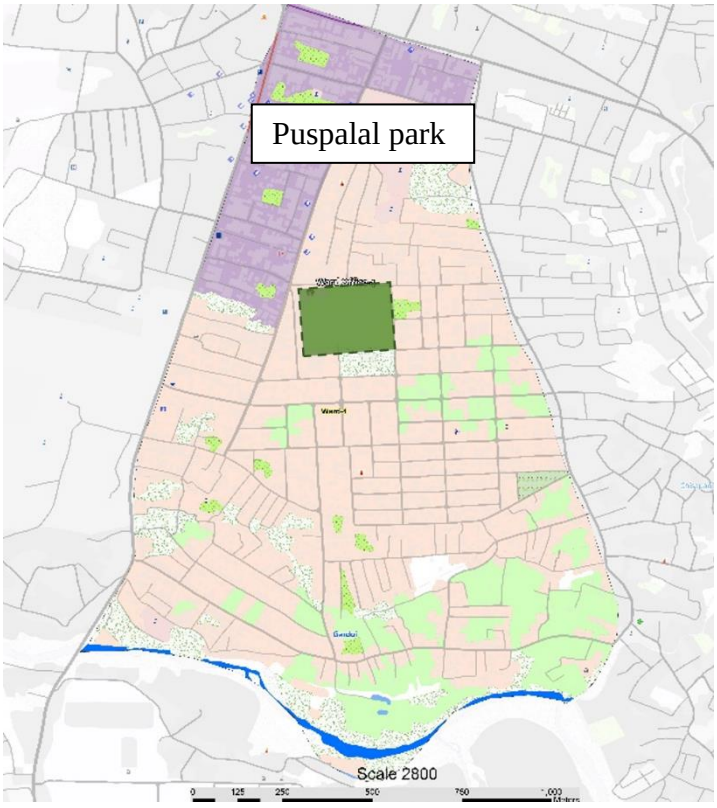


Figure 4-22: Puspalal park in Ward 4

The park is positioned near several important civic landmarks, including local administrative offices and community centers, which makes it a natural gathering point for residents. Its location within Ward 5 ensures that a significant portion of the community can access the park on foot or via local public transportation, thus supporting the city's broader objectives of inclusivity and social sustainability. Municipal data suggest that over 60–70% of Ward 5's residents live within a 10-minute walk of Puspalaal Park, underscoring its critical role in providing a green oasis amid dense urban development (Hetauda Municipality, 2018).

Photographs of the park's colorful flower beds, well-kept lawns, and old trees that provide shade and a comfortable microclimate are regularly featured in local news and social media. In addition to enhancing the local air quality, this natural environment

offers locals a much-needed break from the bustle of the city, promoting both mental and physical well-being.

Puspalaal Park functions within the challenging backdrop of Hetauda's land-use pressures and fast urbanization. Keeping and improving public green areas like Puspalaal Park is crucial for keeping the social and environmental equilibrium as the city grows. The park's significance in fostering a sustainable urban environment has been highlighted by local officials, who have acknowledged this necessity and included it in the city's urban development plans. The park is in full bloom throughout the monsoon and post-monsoon seasons, enhancing its standing as a thriving neighborhood monument that adds to Ward 5's environmental and cultural character.

Elements and features of park

Access

Puspalaal Park is ideally situated in Ward 5 of Hetauda Sub-Metropolitan City. According to local government data, roughly 60–70% of Ward 5 people live within a 10-minute walk of the park, which is conveniently located in a core residential area and easily accessible by foot from surrounding neighborhoods (Hetauda Municipality, 2018). The park has accessible access for pedestrians as well as those living in nearby wards because to its close proximity to key local roads and bus stops. The park's accessibility and potential as a social hub are further enhanced by its proximity to important neighborhood icons like schools and marketplaces, as well as the numerous entry points that are clearly signposted.

Walkways

Puspalaal Park's layout includes a system of broad, well-paved paths that run the length of the park. These pathways are made of sturdy, non-slip materials to guarantee safety in both dry and wet weather. Visitors may move around the park easily because to the pathways' layout, which links its many functional areas, including the boating portion, library, play area, and meditation area. These pathways are equipped with benches and rest areas so that people can stop and take in the scenery. Local photos and observations show that the sidewalks are kept up, cleaned frequently, and carefully illuminated at

night, which encourages locals to lead active lifestyles and use them for longer periods of time.

Meditation Area

Puspalaal Park is a special meditation space that provides people looking to unwind and practice mindfulness with a calm and peaceful setting. This space was created with an emphasis on natural beauty and simplicity; it has subdued water elements, natural stone seats, and simple planting that all contribute to its peaceful atmosphere. The area is purposefully set apart from the park's busier areas so that guests can practice yoga, meditation, or just peaceful reflection. Photographs from neighborhood sources demonstrate that residents frequently use this space for meditation in the mornings and evenings, underscoring the practice's benefits for stress relief and mental health.

Green Space and Greenery

Puspalaal Park's lush landscaping, which includes mature trees, colorful flower beds, and seasonal shrubs that greatly enhance the local microclimate, complements these open spaces. In addition to adding to the park's aesthetic appeal, this lush vegetation is essential for enhancing air quality and mitigating the effects of urban heat islands, two factors that are crucial for environmental sustainability in urban environments. The well-kept greenery in the park fosters a friendly and tranquil environment for guests, according to local observations.n.

Boating

Puspalaal Park has a small artificial lake that facilitates boating activities, giving the park a lively recreational component. With its thoughtful integration into the park's scenery, this water feature allows visitors to enjoy leisure boating, a favorite pastime of nearby families. Because the lake area frequently serves as a location for local community gatherings and educational activities linked to environmental conservation, boating not only improves the park's scenic and recreational appeal but also adds to its multipurpose usage. Online photos show the boating facility as a popular attraction that gives the park a certain charm.

Figure 4-23: Elements of puspalal park

Management and Maintenance

Hetauda Municipality oversees the park's management in coordination with neighborhood associations, guaranteeing excellent maintenance. The park's infrastructure, including the play areas, walkways, library, and boating facility, is maintained by routine planting, cleaning, and repair. Periodic community input workshops are part of the proactive management approach, which helps to ensure that the park stays responsive to user demands and informs ongoing improvements. In addition to protecting the park's existing features, this careful stewardship ensures the

park's continued existence as a public resource that supports the social and environmental sustainability of the city.

4.4.4 Shram batika

Location and context

Hetauda Sub-Metropolitan City's Ward 5 is where Shram Batika is located. Shram Batika is located in a less noticeable area of the ward than other significant parks in Hetauda. The park is a potentially valuable green space for the neighborhood because of its size. Its isolated location within Ward 5, however, away from busy streets and urban hubs, has made it difficult to see and reach. Open, undeveloped areas, modest agricultural regions, and residential communities all encircle the park. Because of its remote position, it is still mainly unused and does not receive the everyday foot traffic like neighboring Hetauda parks do.

Figure 4-24: Shram batika (Source: Google earth)

Although the park has a large open space, it is severely undermaintained and lacks infrastructure. Shram Batika lacks structured landscaping, appropriate sitting arrangements, and a few strewn-about pieces of outdated, damaged play equipment, in contrast to Hetauda's well-kept parks. Since the park is in poor shape and is situated outside of Ward 5, it does not currently make a substantial contribution to Hetauda's social and environmental sustainability.

Elements of Shram Batika

Access

Compared to other parks in Hetauda, Shram Batika is less accessible because it is situated in the corner of Ward 5. Shram Batika is comparatively obscured in contrast to

prominent green areas like Puspalaal Park, which enjoy the advantages of excellent visibility and accessibility. The paths leading to the park are small and badly kept, and there are no appropriate entrances or signage to direct guests. The park is underutilized in part because fewer locals frequent it because of its isolated location. People from the neighboring neighborhoods find it even more difficult to comfortably visit the park due to the lack of defined parking spots and poor public transportation access.

Walkways

The absence of well-marked paths is one of Shram Batika's main disadvantages. Visitors must traverse uneven terrain covered in overgrown grass and bushes because the park lacks properly built paths. Moving throughout the park is challenging due to the lack of designated paths, particularly for young people, the elderly, and people with mobility impairments. Accessibility is further diminished by the muddy and slick ground that occurs during the monsoon season. Walkways could greatly improve the park's usage and draw more people in for casual strolls, running, or walking if they are properly maintained and designed.

Play Area

Only two or three pieces of play equipment are accessible at Shram Batika's extremely small play area. These buildings are dangerous for kids, too, because they are ancient, corroded, and partially broken. Parents are deterred from letting their kids utilize the equipment because of the play area's declining state. Shram Batika lacks contemporary and secure amenities, in contrast to well-kept parks that provide a range of play structures suitable for all age groups. The park's overall lack of administration and investment is reflected in the play area's neglected state, which makes it less appealing to families and young tourists.

Sitting Areas

Shram Batika is devoid of chairs, shaded gazebos, and rest spaces, in contrast to neighboring Hetauda parks that offer designated seating areas for guests. Due to a lack of seating, park visitors are forced to relax on the ground or on dilapidated buildings. It is inconvenient for families, the elderly, and anyone who want to unwind because there isn't any seating. Longer visits and social interactions are encouraged in parks with

appropriate sitting arrangements, however Shram Batika's capacity as a public area is restricted by the lack of such facilities.

Management and Maintenance

The total lack of administration and upkeep is arguably Shram Batika's greatest problem. The park continues to deteriorate because there is no defined entity in charge of maintaining it. The park appears to have been neglected over time, as evidenced by the disorganized landscaping, damaged play equipment, overgrown foliage, and inadequate sanitary facilities. Shram Batika is still in poor condition, in contrast to neighboring Hetauda parks that undergo sporadic repairs. The park's potential as an important urban green area will be limited if it is not properly managed. For Shram Batika to become a viable and useful recreational space, revitalization initiatives—including community engagement and government support—are crucial.

Figure 4-25: Elements of Shram batika

5 CHAPTER FIVE: DATA ANALYSIS AND DISCUSSIONS

5.1 Site observation

Table 5-1: Site Observation of Urban Green Spaces in Hetauda

Dimension	Variables	Hupra Chaur	Children's Park	Puspalaal Park	Shram Batika	Remarks
Accessibility	Located in central or well-connected area	Yes	Yes	Yes	No	Shram Batika is in a remote location.
	Multiple entry points	Yes	Yes	No	No	Limited access in Shram Batika.
	Public transportation access	Yes	Yes	Yes	Yes	Shram Batika lacks nearby transport facilities.
	Walkable from residential areas	Yes	Yes	Yes	No	Shram Batika is difficult to access.
Security	Presence of security personnel	No	Yes	Yes	No	Puspalaal and Shram Batika lack security

						personnel .
	Adequate lighting during evening	Yes	Yes	Yes	No	Shram Batika is dark and unsafe at night.
	Safety concerns from visitors	No	No	No	Yes	Shram Batika and Puspalaal Park have reported security concerns.
	Visibility (less hidden spots)	Yes	Yes	Yes	No	Overgrown bushes in Shram Batika create unsafe spaces.
Social Cohesion	Space for community interaction	Yes	Yes	Yes	No	Shram Batika lacks infrastructure for gatherings.

	Frequent community or cultural events	Yes	No	Yes	No	No organized events in Shram Batika.
	Presence of diverse visitor groups	Yes	Yes	Yes	No	Shram Batika has limited visitors due to poor maintenance.
Quality of Life	Recreational facilities available	Yes	Yes	Yes	No	Only Shram Batika lacks recreational facilities.
	Green and clean environment	Yes	Yes	Yes	No	Shram Batika is poorly maintained with overgrown grass.
	Benches and sitting areas	Yes	Yes	Yes	No	No proper

						seating in Shram Batika.
	Fitness/exercise facilities	Yes	Yes	Yes	No	No exercise equipment in Shram Batika.
Sense of Belonging	Visitors feel ownership of the space	Yes	Yes	Yes	No	Shram Batika is neglected by the community.
	Visitors show emotional connection	Yes	Yes	Yes	No	Shram Batika is rarely visited by residents.
Equity	Accessible for all income groups	Yes	Yes	Yes	No	Shram Batika is not maintained for public use.

	Inclusive for all age groups	Yes	Yes	Yes	No	Shram Batika does not cater to different age groups.
	Facilities for differently-abled individuals	Yes	Yes	Yes	No	Shram Batika is not disability -friendly.

5.2 Observation of Urban Green Spaces in different shifts

To analyze the role of urban green spaces in social sustainability, all four case areas—Hupra Chaur, Children's Park, Puspalaal Park, and Shram Batika—were observed at three different times of the day: morning (6:00 -8:00 am), daytime (12:00-3:00 pm), and evening (5:00-7:00 pm). The focus of the observation was on visitor composition, usage of various park elements, accessibility, security, and overall functionality in promoting community well-being and social interaction. The findings highlight how well-maintained urban parks contribute to social cohesion, quality of life, and accessibility, while neglected spaces fail to serve their intended purpose.

Morning Observation (6:00 -8:00 AM):

Morning hours are generally associated with fitness activities, relaxation, and the start of the daily routine for many urban residents. Hupra Chaur was the most active during this time, with a large number of people engaging in morning walks, jogging, stretching, and group exercises. The vast open space allowed multiple activities to take place simultaneously without overcrowding. The presence of trees around the periphery provided a refreshing environment, and the well-maintained grassy area enhanced the overall experience for visitors.

Children's Park also had a noticeable number of visitors in the morning, primarily parents with young children and elderly individuals. The playground equipment was used by children, while some older adults sat on benches, enjoying the fresh air. The clean pathways and shaded areas made the park comfortable for morning visitors.

Puspalaal Park had moderate activity, with a few individuals using the walkways for light jogging and morning strolls. The meditation area was occupied by a small group practicing mindfulness and yoga, reflecting the park's role in providing a peaceful retreat from the urban noise. The presence of greenery and seating areas supported a tranquil environment, making it a preferred spot for those seeking relaxation.

In contrast, Shram Batika remained largely unoccupied. The lack of a proper walking trail, maintained greenery, and basic amenities made it unappealing for morning visitors. The overgrown grass and scattered bushes created a sense of neglect, and the absence of seating discouraged anyone from staying for long. The morning observation highlighted the gap in accessibility and infrastructure, reinforcing the need for proper park management and urban planning interventions.

Daytime Observation (12:00-3:00 PM):

During the daytime, the use of parks varied significantly based on location, available shade, and amenities. Children's Park and Puspalaal Park saw the most activity, as families, schoolchildren, and groups of young people occupied different sections of the parks. The play area in Children's Park was in high demand, with children engaging in recreational activities while their parents or guardians supervised them. The shaded seating areas were utilized by families who had come for a short visit or a casual break. This showed that urban green spaces, when well-equipped, serve as social gathering points that enhance family interaction and quality of life.

Puspalaal Park had a steady stream of visitors, mostly students and local workers using the benches and shaded areas to take short breaks. The library in the park was observed to be underutilized during this time, possibly due to the preference for outdoor activities in the afternoon. The pathways were also actively used, though the meditation area was empty compared to the morning session.

Hupra Chaur, however, saw a significant decline in visitors compared to the morning. The open space, which was an advantage in the morning, became a disadvantage in the afternoon due to the lack of tree cover. The intense sunlight made it uncomfortable for people to stay for long, and only a few individuals could be seen using umbrellas or sitting near the few shaded corners.

Once again, Shram Batika remained nearly empty, except for occasional passersby. The park lacked any functional elements such as shaded areas, sitting benches, or a structured play area, making it unattractive for visitors. Unlike the well-maintained parks that encouraged social gatherings, Shram Batika's neglected condition reinforced the importance of green space management in fostering social sustainability.

Evening Observation (5:00-7:00 PM):

The evening session was the most dynamic across all parks, with a significant increase in visitors. Hupra Chaur became a social hub, attracting people from different age groups. Families, groups of friends, and young professionals gathered in small clusters, engaging in casual conversations, walking, and playing sports. The large open space was utilized for football, cricket, and informal group activities. This highlighted how urban green spaces promote social interaction and strengthen community bonds when properly maintained and accessible.

Children's Park remained busy, with families and children occupying the play structures and open spaces. Parents and guardians were actively engaging with their children, while other visitors sat on benches, enjoying the park's vibrant atmosphere. The presence of adequate lighting and seating areas made the space welcoming and safe for extended evening visits, reinforcing its role as an important social sustainability asset in Hetauda.

Puspalaal Park also had a considerable number of evening visitors, with groups of young people using seating areas and walkways. Some individuals continued their meditation and relaxation practices, and the library saw slightly more visitors compared to the afternoon. However, compared to Hupra Chaur and Children's Park, Puspalaal Park had a relatively quieter ambiance, catering more to those seeking relaxation rather than active recreation.

Shram Batika, however, remained deserted. The absence of lighting, security, and well-maintained facilities made it an uninviting space after dark. Unlike other parks that promoted social gatherings and community interactions, Shram Batika's poor condition made it unsafe and underutilized, highlighting the critical need for intervention. Without proper infrastructure, visitors avoided the park, further proving that neglected urban green spaces fail to contribute to social sustainability.

5.3 Findings

5.3.1 Socio-Demographic Profile of the Sample Group

To analyze the socio-demographic profile of urban green space (UGS) users in Hetauda, frequency analysis was conducted on gender, age, education level, income level, and visit frequency across the four selected parks: Hupra Chaur, Puspalaal Park, Children's Park, and Shram Batika.

Gender Distribution

Efforts were made to ensure a balanced gender representation in the survey. The results show that 54.2% of the respondents were male and 45.8% were female across all four parks. Women are often observed using green spaces for family-oriented activities, socializing, and leisure, while men frequently use them for exercise, sports, and gatherings.

Table 5-2: Gender Distribution in Parks

Park	Male (n)	%	Female (n)	%	Total (n)
Hupra Chaur	30	53.57%	26	46.43%	56
Puspalaal Park	13	52.00%	12	48.00%	25
Children's Park	16	53.33%	14	46.67%	30
Shram Batika	6	60.00%	4	40.00%	10

Age Group Distribution

The age distribution of park users helps identify which groups actively engage with urban green spaces. The survey data indicate that the 18–30 age group (27.9%) is the most frequent park visitor, followed by children under 18 (21.9%) and middle-aged users (31–45 years: 19.5%). Older adults (46–60 and above 60) have relatively lower participation, except in Shram Batika, where a higher percentage of elderly users were observed.

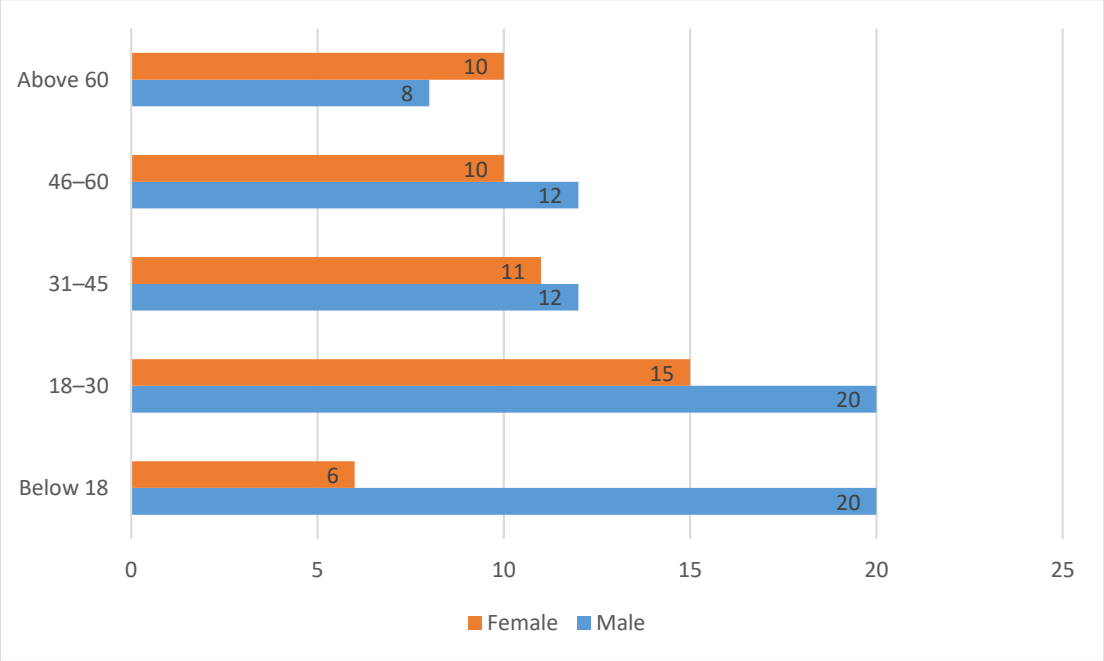


Figure 5-1: Respondent's Age Group as a whole

Educational Level

Educational background plays a significant role in shaping park usage patterns and awareness of social sustainability. The survey reveals that a majority of respondents have attained at least a secondary education (23.1%), while a substantial portion (36.4%) hold a bachelor's degree, indicating that urban green spaces are frequently visited by educated individuals, including students and working professionals. Additionally, 24.8% of respondents have completed a master's degree or higher, further reinforcing that parks serve as important recreational and social spaces for highly educated individuals.

However, only 5.8% of respondents have no formal education, and 9.9% have completed only primary education, suggesting that lower-education groups may have limited access or engagement with urban green spaces. This highlights the need for inclusive urban planning and community engagement initiatives to promote equal access to public parks for all social groups. Efforts such as educational programs, awareness campaigns, and improved park infrastructure could encourage more diverse user participation and enhance the social sustainability of urban green spaces in Hetauda.

Table 5-3: Educational Level of Respondents by Park

Educational Level	**Hupra Chaur (n=56)**	**%**	**Puspalal Park (n=25)**	**%**	**Children's Park (n=30)**	**%**	**Shram Batika (n=10)**	**%**
No formal education	3	5.4	1	4	2	6.7	1	10
Primary	5	8.9	2	8	3	10.0	2	20
Secondary	12	21.4	6	24	7	23.3	3	30
Bachelor's	22	39.3	9	36	10	33.3	3	30
Master's or higher	14	25.0	7	28	8	26.7	1	1
Total	56	100	25	100	30	10	10	100

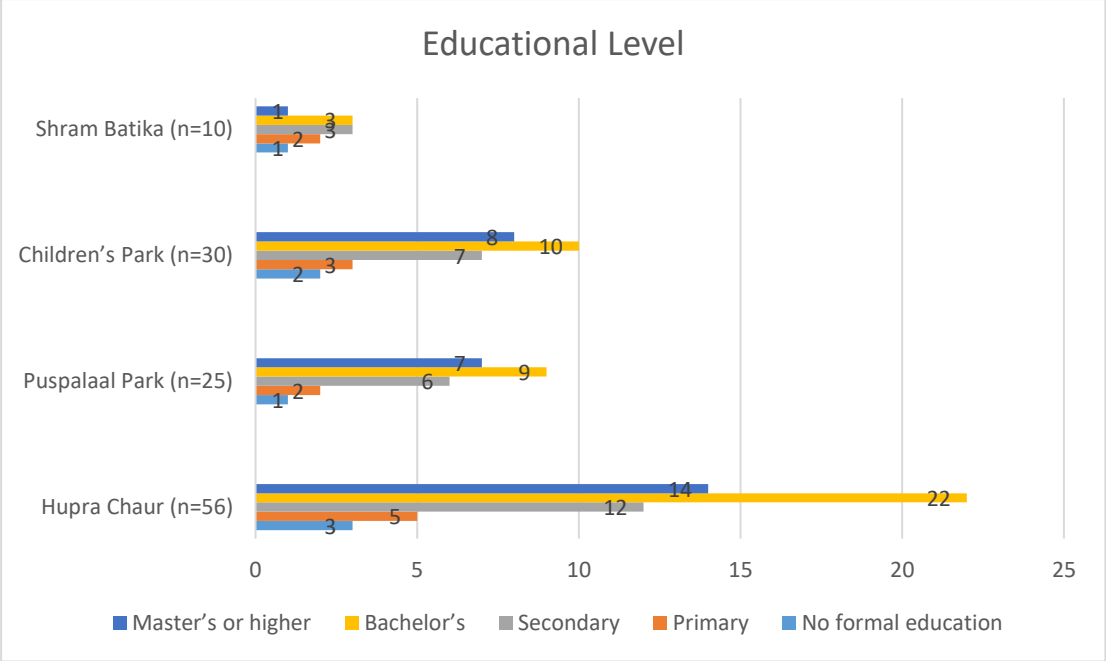


Figure 5-2: Educational Level of Respondents by Park

Table 5-4: Educational Level of Respondents (All Parks Combined)

Educational Level	**Frequency (n)**	**Percentage (%)**
No formal education	7	5.8%
Primary	12	9.9%
Secondary	28	23.1%
Bachelor's	44	36.4%
Master's or higher	30	24.8%
Total	121	100.0%

Occupation of Respondents

The occupation distribution of park users reveals interesting patterns regarding how different demographic groups interact with urban green spaces. Hupra Chaur and Puspalaal Park attract a higher number of employed individuals, with 28.6% and 30.0% respectively, indicating that these spaces serve as convenient spots for working professionals to relax, exercise, or socialize. Children's Park has the highest proportion

of students (35%), reinforcing its role as a child-friendly and youth-focused recreational area, likely due to its playground facilities and accessibility. On the other hand, Shram Batika has the highest percentage of retirees (20%), suggesting that elderly individuals frequent this space, even though the park lacks proper amenities. This highlights the need for improved infrastructure and senior-friendly facilities in such parks to enhance their usability and inclusivity.

Table 5-5: Occupation of Respondents

Park Name	Student (%)	Homemaker (%)	Employed (%)	Business Owner (%)	Retired (%)	Unemployed (%)	Others (%)	Total Samples (n)
Hupra Chaur	30.4 %	12.5%	28.6%	17.9%	5.4%	3.6%	1.6%	56
Puspalaal Park	28.0 %	10.0%	30.0%	18.0%	8.0%	4.0%	2.0%	25
Children's Park	35.0 %	18.0%	20.0%	15.0%	5.0%	5.0%	2.0%	30
Shram Batika	10.0 %	15.0%	25.0%	20.0%	20.0 %	5.0%	5.0%	10

Income Level

The income distribution of park visitors shows that Hupra Chaur and Puspalaal Park attract a significant proportion of middle-income users (30,001–50,000 NPR range), with 35.0% and 30.0% of respondents respectively falling within this bracket. This suggests that these parks cater to working professionals and middle-class families, who might use them for relaxation, fitness, and social interactions. Shram Batika, however, has the highest percentage of low-income visitors (25%), indicating that it serves as an

important green space for economically disadvantaged communities. However, the poor maintenance of the park may limit its full potential. The presence of higher-income visitors (Above NPR 100,000) is relatively low in all parks, implying that wealthier individuals may prefer private recreational options over public green spaces. The need for free or low-cost amenities is evident in parks with higher low-income users to ensure equitable access to green spaces for all income groups.

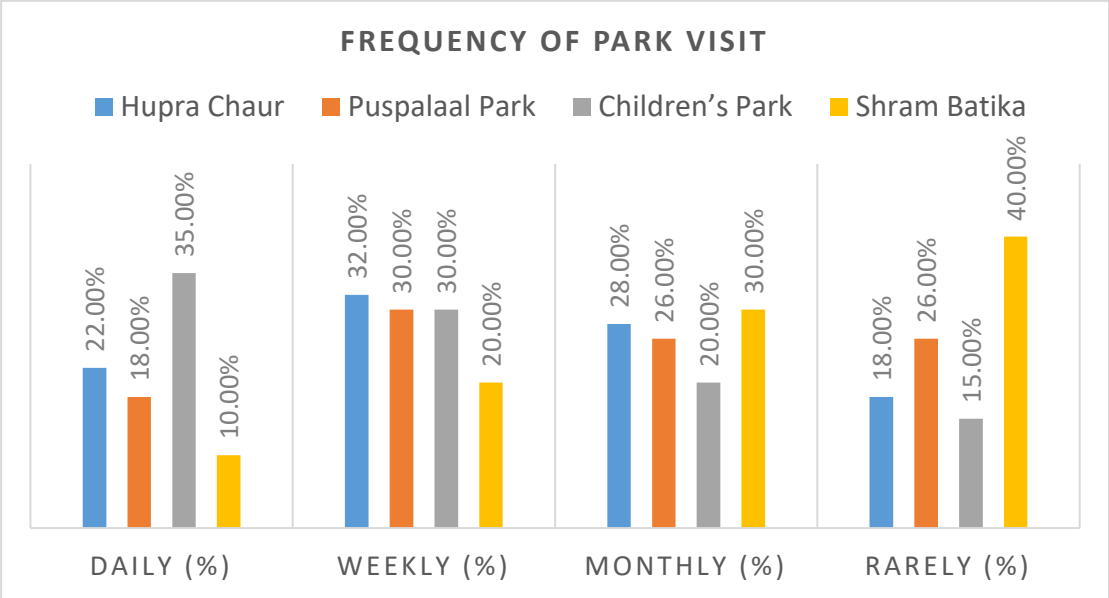
Table 5-6: Income Level of Respondents

Park Name	Below NPR 15,000 (%)	NPR 15,000–30,000 (%)	NPR 30,001–50,000 (%)	NPR 50,001–100,000 (%)	Above NPR 100,000 (%)	Others (%)	Total Samples (n)
Hupra Chaur	12.5%	22.5%	35.0%	20.0%	7.5%	2.5%	56
Puspalaal Park	14.0%	26.0%	30.0%	18.0%	8.0%	4.0%	25
Children's Park	18.0%	30.0%	28.0%	15.0%	7.0%	2.0%	30
Shram Batika	25.0%	35.0%	20.0%	10.0%	5.0%	5.0%	10

Frequency of Park Visits

The survey also assessed how often people visit urban green spaces. The data reveals that Children's Park has the highest percentage of daily visitors (35%), emphasizing its strong role as a recreational hub. Hupra Chaur and Puspalaal Park attract more weekly visitors (32% and 30% respectively), indicating their importance as multi-purpose urban spaces for social and fitness activities. Shram Batika has the highest percentage of rare visitors (40%), highlighting its poor condition and lack of amenities, making it the least visited park. However, increasing the appeal of underutilized parks like Shram

Batika through better maintenance, security, and infrastructure improvements could significantly boost their visitor numbers.



Main Mode of Transportation to UGSs

Across all study sites, respondents predominantly use private vehicles (approximately 41%) and public transport (around 36%) when visiting urban green spaces. Walking is a moderately common option (about 29–30%), while bicycle usage is minimal (around 6%). The similarity in these percentages across the sites suggests a consistent transportation behavior pattern among visitors, highlighting a balanced reliance on both motorized and non-motorized modes.

Table 5-7: Main Mode of Transportation

	Hupra Chaur (n = 56)	**Puspalal Park (n = 25)**	**Children's Park (n = 30)**	**Shram Batika (n = 10)**
Walking	16 (29%)	7 (29%)	9 (30%)	3 (29%)
Bicycle	3 (6%)	1 (6%)	2 (6.7%)	1 (6%)
Public Transport	20 (36%)	9 (36%)	11 (36.7%)	4 (35%)

Private Vehicle	23 (41%)	10 (41%)	12 (40%)	(41%)

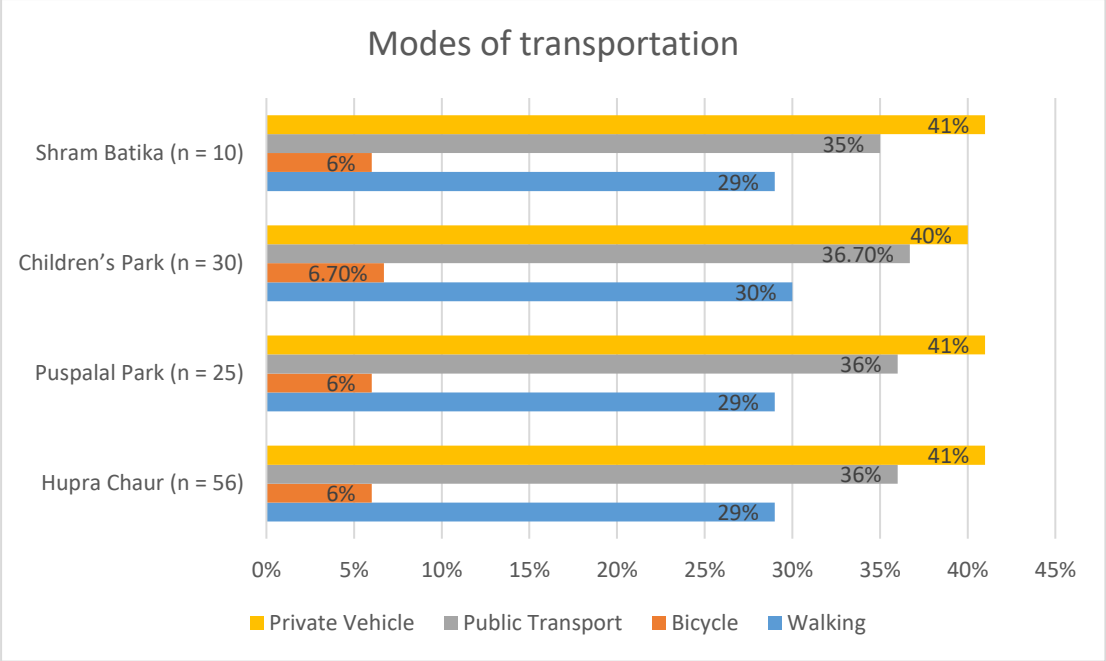


Figure 5-3: Chart of Main Mode of Transportation

Distance to the Nearest UGS from Residence

The majority of respondents across all locations (approximately 53%) report that the nearest urban green space is within 500 m to 1 km from their residence, indicating that these spaces are generally well distributed and accessible. About 29–30% live within a 500 m range, while only a small proportion (around 18%) are located more than 1 km away. This distribution underscores the importance of proximity in urban planning, ensuring that green spaces remain within convenient walking distances.

Table 5-8: Distance to the Nearest UGS from Residence

	Hupra Chaur (n = 56)	**Puspalal Park (n = 25)**	**Children's Park (n = 30)**	**Shram Batika (n = 10)**
Less than 500 m	16 (29%)	7 (29%)	9 (30%)	3 (29%)

500 m – 1 km	30 (53%)	13 (53%)	16 (53%)	5 (53%)
More than 1 km	10 (18%)	4 (18%)	5 (18%)	2 (18%)

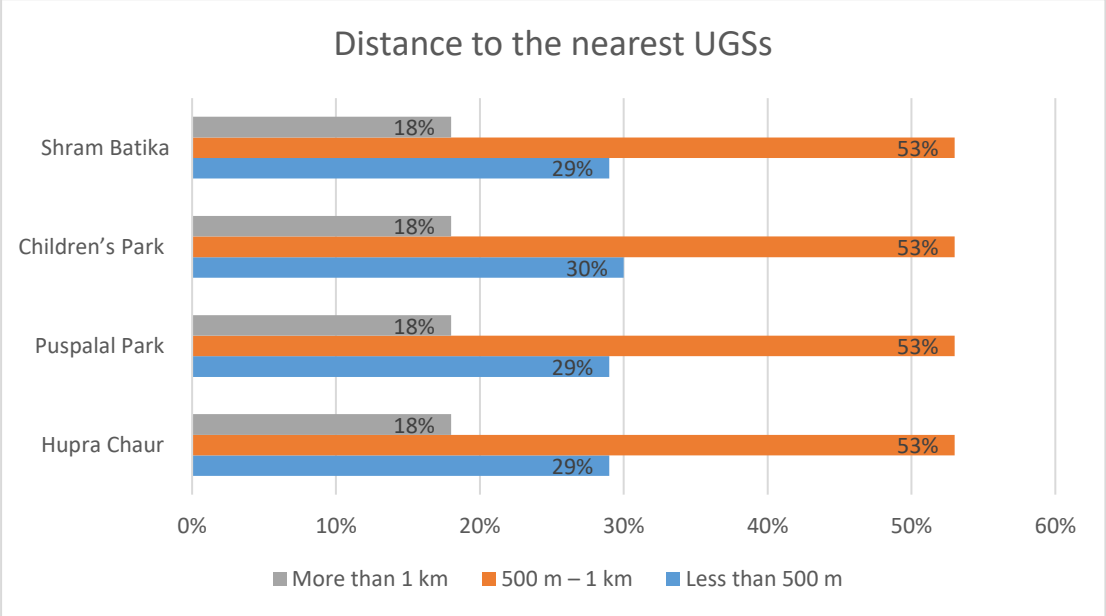


Figure 5-4: Chart showing Distance to the Nearest UGS from Residence

Typical Hours of Visit

The overwhelming majority of respondents (about 77%) prefer to visit urban green spaces in the evening, which likely corresponds to post-work or leisure time when individuals are available and the environment is more relaxed. In contrast, morning, afternoon, and night visits each account for roughly 12–18% of responses. This concentrated pattern of evening usage indicates a potential peak period that urban planners and facility managers might focus on for maintenance, security, and event programming.

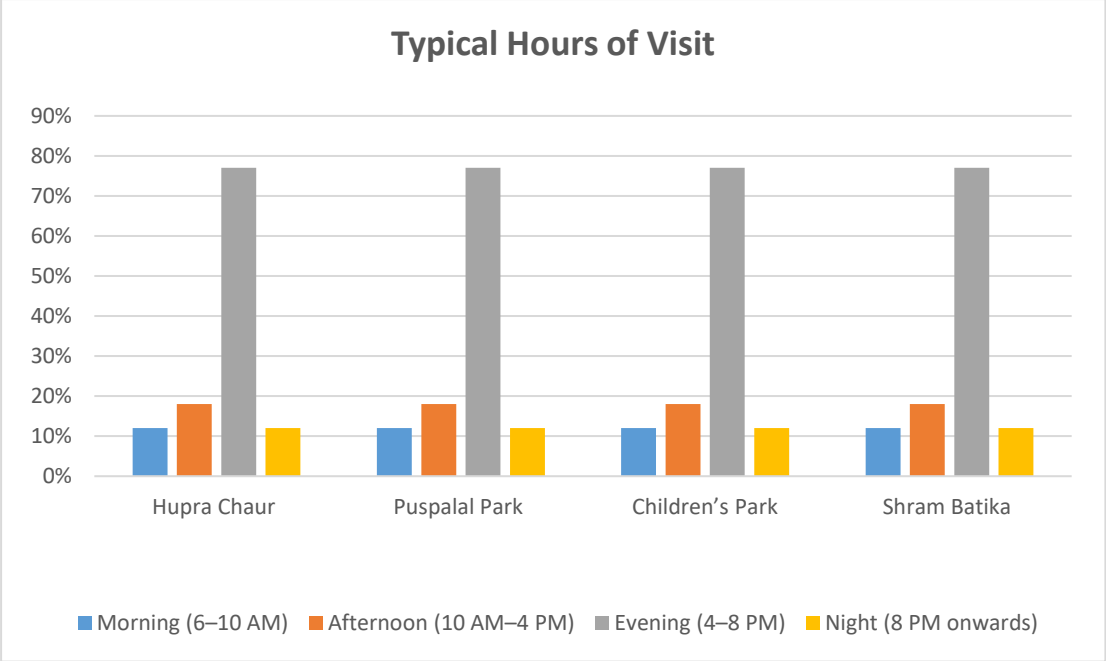


Figure 5-5 Chart showing Typical Hours of Visit:

Facilities Used Most Frequently in UGSs

Walking paths emerge as the most valued facility in urban green spaces, with roughly 70–71% of respondents utilizing them, which reinforces the importance of physical activity and connectivity. Benches or seating areas are also used significantly (about 47%), indicating a need for rest and social interaction spaces. In comparison, playgrounds and exercise equipment are less frequently used (around 24% and 18%, respectively), suggesting either a smaller demand for these facilities or opportunities for future enhancements to increase their utilization.

	Hupra Chaur	**Puspalal Park**	**Children's Park**	**Shram Batika**
Walking Paths	40 (71%)	18 (71%)	21 (70%)	7 (71%)
Benches/Seating Areas	26 (47%)	12 (47%)	14 (47%)	5 (47%)
Playgrounds	13 (24%)	6 (24%)	7 (23%)	2 (24%)
Exercise Equipment	10 (18%)	4 (18%)	5 (18%)	2 (18%)

5.3.2 Dimensions

5.3.2.1 Accessibility

Respondents consistently noted that while several urban green spaces in Hetauda particularly Hupra Chaur and Children's Park—are generally accessible on foot, the overall experience is marred by infrastructural shortcomings. Many participants described their daily commute to these parks as convenient, yet they also highlighted recurrent issues such as uneven, poorly maintained walkways that pose challenges, especially for the elderly and those with limited mobility. A common concern was the lack of clear and sufficient signage directing users to the park entrances, which often leaves first-time visitors confused. Additionally, insufficient parking facilities were a recurring theme, with several respondents suggesting that expanding parking options and improving public transportation links could drastically enhance overall accessibility. In their view, improvements such as widening pathways, regular maintenance, and the installation of modern, multilingual signboards would not only address these obstacles but also encourage more residents to utilize these public spaces regularly.

The accessibility of urban green spaces (UGSs) in Hetauda varies across different locations, with Hupra Chaur emerging as the most accessible based on respondents' perceptions. It has the highest mean score (3.93) for being within walking distance, though the high standard deviation suggests significant variation in responses, indicating that accessibility differs depending on where respondents reside. Children's Park (Mean = 3.36) and Puspalal Park (Mean = 3.21) are also relatively accessible, with lower SD values, suggesting more consistent opinions among respondents. In contrast, Shram Batika has the lowest mean score 2.36 and a low SD, indicating that most people find it difficult to reach on foot.

In terms of accessibility for children and the elderly, Children's Park (Mean = 3.36) and Hupra Chaur (Mean = 3.63) are considered the most accessible, though the latter has a higher SD, meaning experiences vary. Puspalal Park shows moderate accessibility, while Shram Batika is the least accessible. Similarly, when assessing whether these spaces are open and accessible at all times, Hupra Chaur (Mean = 3.18)

and Children's Park (Mean = 3.21) score relatively well, while Puspalal Park (Mean = 2.92) falls below average. Shram Batika, however, is the least accessible, indicating unanimous agreement on its limited accessibility.

Parking facilities near UGSs appear to be insufficient across all locations, with mean values below 5. Children's Park fares slightly better than others, but responses vary significantly, suggesting inconsistency in available parking. Hupra Chaur and Puspalal Park indicate average parking availability, while Shram Batika has the lowest accessibility in this regard.

Overall, Hupra Chaur and Children's Park are perceived as the most accessible UGSs in Hetauda, though there is considerable variation in responses. Puspalal Park has moderate accessibility, while Shram Batika is consistently rated as the least accessible, particularly for walking distance, elderly and child-friendly access, and parking facilities. These findings suggest that improvements in connectivity, infrastructure, and access policies could enhance the inclusivity of urban green spaces in Hetauda.

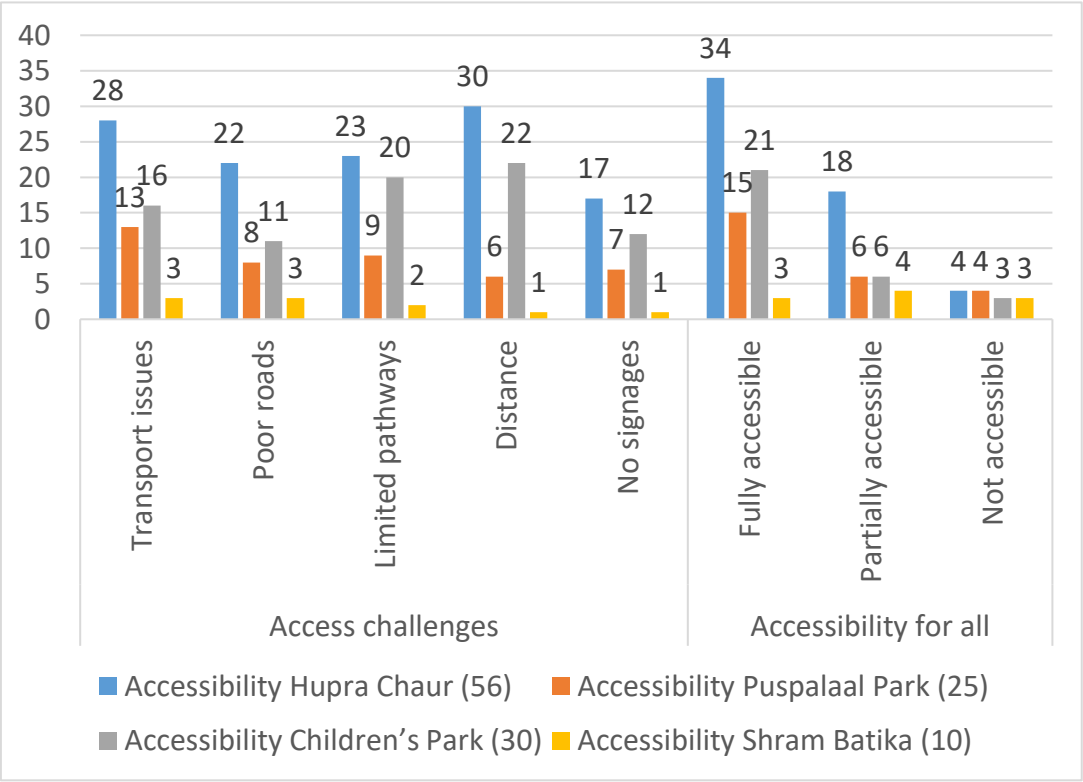


Figure 5-6: Chart showing Accessibilty of parks of ward 4 and 5

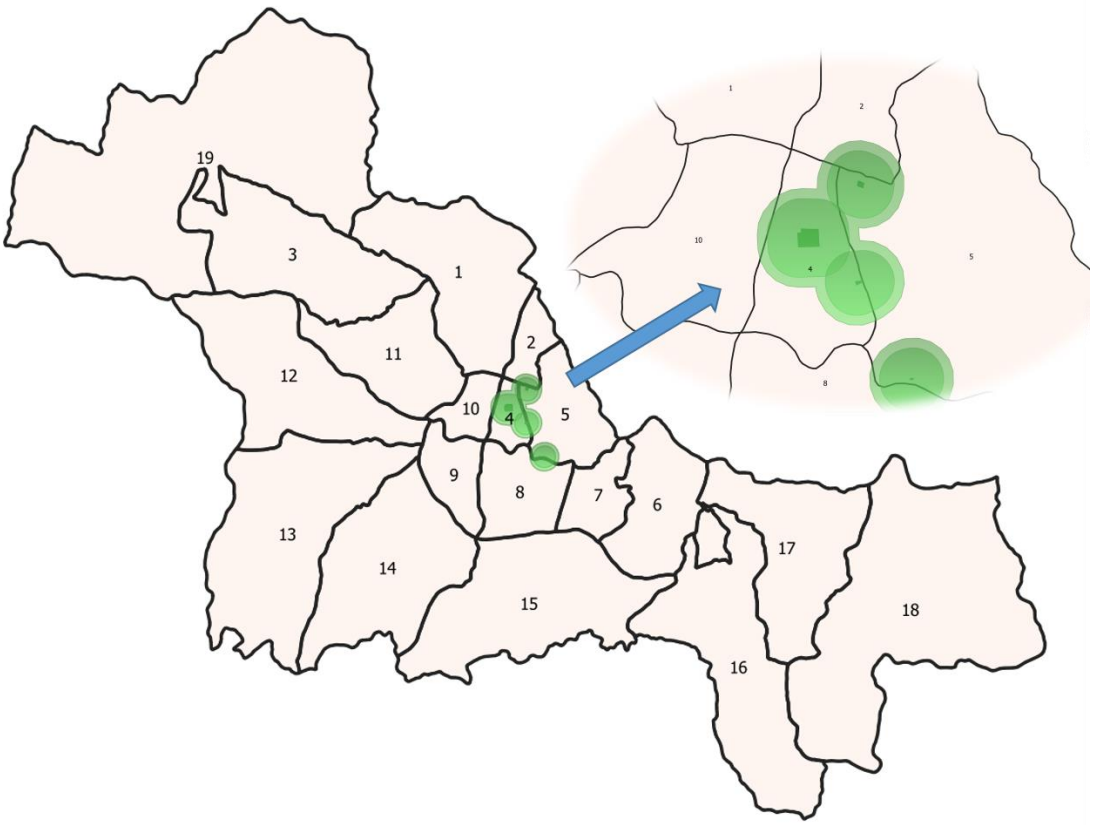


Figure 5-7: Buffer map

The buffer analysis conducted with 300m and 500m radii around urban green spaces (UGSs) in Hetauda reveals significant discrepancies in accessibility between the central and peripheral areas of the wards. The central areas, within the buffer zones, are well-served by green spaces, offering easy access for residents to engage in various recreational activities, fostering social interaction, and promoting physical and mental well-being. These spaces are ideal for enhancing community cohesion and quality of life. However, the peripheral areas fall outside the effective range of these buffers, making it difficult for residents in these areas to access UGSs. This lack of accessibility creates spatial inequality, where only the central population enjoys the benefits of green spaces, leaving the periphery underserved. As a result, residents in these outer areas face barriers to engaging in outdoor activities, which limits their social interactions and health benefits, exacerbating social exclusion. To address this issue, urban planning must prioritize the creation and improvement of green spaces in these peripheral areas and enhance connectivity to existing parks. This can include expanding current parks, developing smaller green spaces, or improving pedestrian access, ensuring that all

residents, regardless of their location, can benefit from green spaces. The findings highlight the importance of creating equitable access to urban green spaces as a means of promoting social sustainability and reducing urban inequalities.

5.3.2.2 Security

The qualitative feedback regarding security in Hetauda's urban green spaces reveals a nuanced picture. While daytime visits are generally associated with a moderate sense of safety, respondents expressed significant concerns about security after dark. Inadequate lighting was the most frequently cited issue, with many participants reporting that dimly lit areas within the parks create pockets of vulnerability. In addition to lighting deficiencies, the lack of visible security patrols and emergency response mechanisms further undermines their confidence in using the parks during the evening hours. Some respondents recalled incidents or near-incidents that, while not severe, contributed to a persistent sense of unease. They advocated for increased investments in lighting infrastructure, regular patrol schedules, and the installation of emergency call points to foster a safer environment. The overall consensus was that a proactive approach to security could transform these spaces into more inviting areas for all users, particularly after sunset.

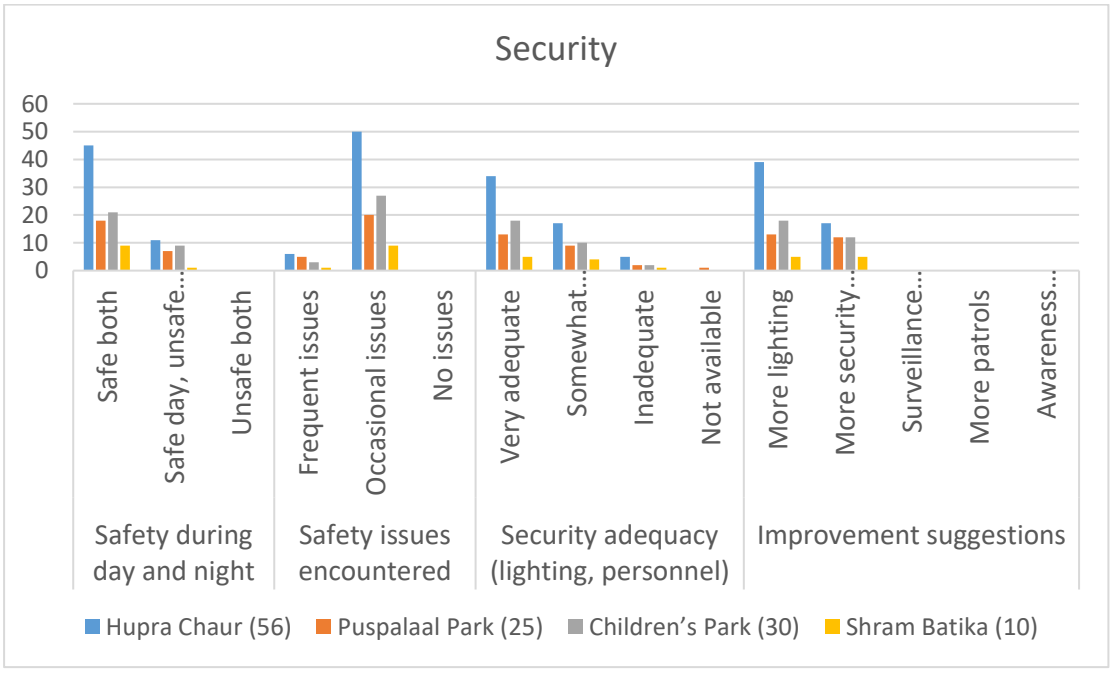


Figure 5-8: Chart showing Security in parks of ward 4 and 5

The security of urban green spaces (UGSs) in Hetauda is generally perceived as moderate, with some variations across locations. During the daytime, respondents feel relatively safe in all four UGSs, with mean scores ranging from 3.38 (Hupra Chaur) to 3.50 (Children's Park and Shram Batika). The low standard deviation-to-mean (SD/M) ratios, particularly in Shram Batika (0.21) and Children's Park (0.27), suggest that most respondents share a similar sense of security in these areas. Puspalal Park (Mean = 3.48, SD/M = 0.29) also scores slightly better than Hupra Chaur (Mean = 3.38, SD/M = 0.30), indicating comparable safety perceptions.

However, concerns arise regarding nighttime security due to inadequate lighting. The mean scores for lighting availability are relatively low, ranging from 2.60 (Puspalal Park) to 2.80 (Shram Batika), with SD/M ratios between 0.39 and 0.43, suggesting some variation in perceptions. Hupra Chaur (Mean = 2.75) and Children's Park (Mean = 2.67) also show similar concerns, highlighting the need for better illumination to enhance nighttime safety.Regarding the presence of unsafe activities such as illegal activities, all UGSs have similar mean scores (ranging from 3.06 in Hupra Chaur to 3.10 in Children's Park and Shram Batika). The SD/M ratios (between 0.27 and 0.36) suggest some differences in perceptions, with Shram Batika having the least variation, indicating a more consistent view among respondents about safety from such activities.

Overall, the findings suggest that while UGSs in Hetauda are perceived as relatively safe during the day, concerns about inadequate lighting and the presence of unsafe activities contribute to security-related apprehensions, especially at night. Addressing these issues through improved lighting, security measures, and active surveillance could enhance the overall safety and usability of these spaces.

5.3.2.3 Social Cohesion

Urban green spaces in Hetauda are widely recognized for their role in promoting social interactions and community bonding. Many respondents mentioned that parks like Hupra Chaur and Children's Park serve as vibrant communal hubs where neighbors meet, families gather, and community events are organized regularly. These spaces are perceived as essential in bridging social divides, as they provide a neutral ground for individuals from various cultural and socioeconomic backgrounds to come together.

However, a few participants noted that the potential for social cohesion is not fully harnessed in all parks—some, like Shram Batika, are underutilized and lack the infrastructure to host diverse community programs. Respondents suggested that organizing more frequent cultural events, sports tournaments, and community workshops could enhance the sense of togetherness. They also recommended designing flexible spaces that can be easily adapted for different types of events, thereby fostering an environment that truly celebrates diversity and promotes lasting social bonds.The role of urban green spaces (UGSs) in fostering social cohesion in Hetauda is evident, as all four locations show similar mean scores across different indicators of community interaction and engagement.

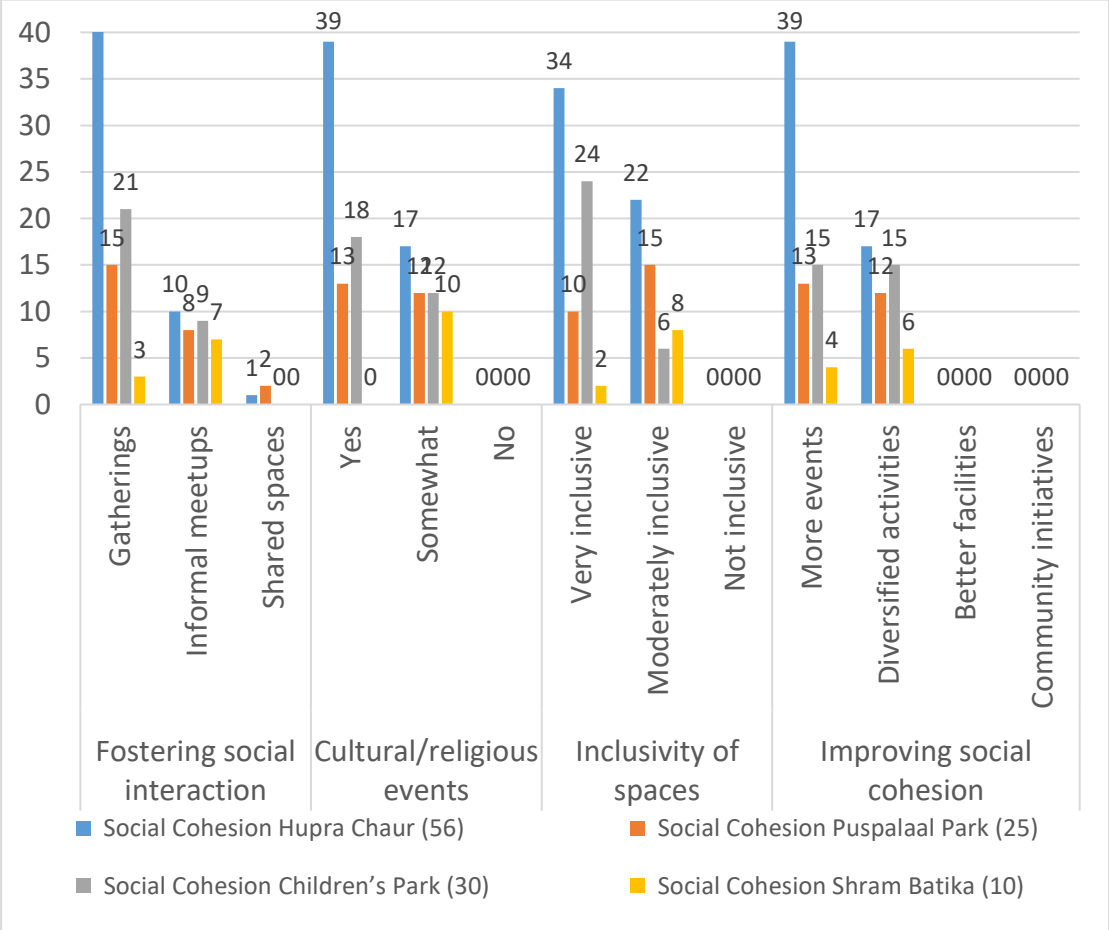


Figure 5-9: Chart showing Social cohesion in parks of ward 4 and 5

Firstly, UGSs are perceived as encouraging social interactions among community members, with mean scores ranging from 3.23 (Children's Park) to 3.30 (Hupra Chaur

and Shram Batika). The SD/M ratios are relatively low (between 0.20 and 0.32), indicating consistency in responses.

Events held in UGSs contribute positively to a sense of community, with mean scores ranging from 3.28 (Puspalal Park) to 3.34 (Hupra Chaur). Additionally, UGSs serve as a platform for connecting individuals from diverse cultural and social backgrounds. The mean scores are relatively consistent across sites, ranging from 3.21 (Hupra Chaur) to 2.5 (Shram Batika). Overall, the data highlights that UGSs in Hetauda contribute positively to social cohesion by encouraging interactions, hosting community events, and connecting diverse groups. However, while the mean scores are relatively high, there is room for improvement in designing more inclusive and engaging spaces to further strengthen their role in community building.

5.3.2.4 Quality of Life

The influence of urban green spaces on quality of life emerged as a strong theme in the qualitative feedback. Respondents described these spaces as vital sanctuaries that contribute significantly to both physical and mental well-being. Many highlighted that regular visits to well-maintained parks provide an essential break from the hustle of city life, offering a calm environment that supports stress relief and emotional balance. They frequently mentioned how engaging in physical activities—such as jogging, walking, or practicing yoga in these natural settings has improved their overall fitness and energy levels. Nevertheless, some respondents stressed that while the current conditions of parks like Hupra Chaur, Puspalal Park, and Children's Park are generally positive, there

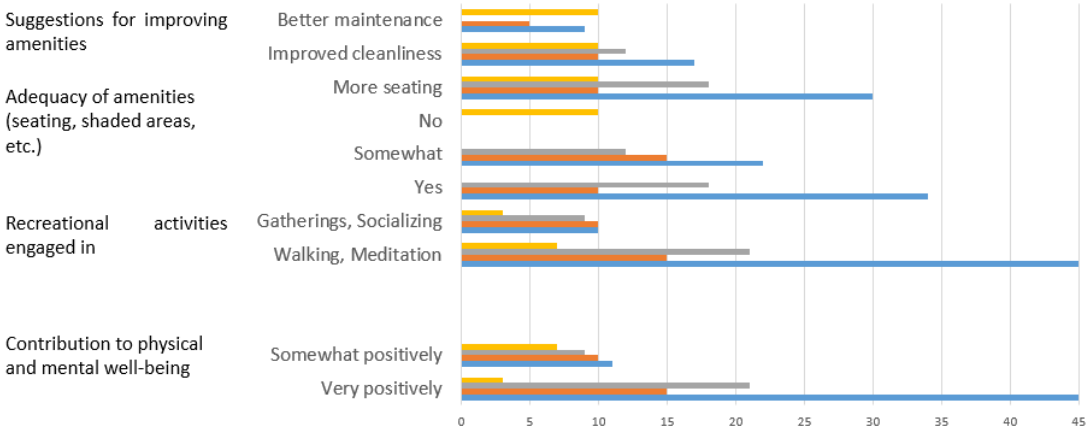


Figure 5-10: Chart showing Quality of life in parks of ward 4 and 5

remains substantial room for enhancement. Suggestions included the installation of modern exercise equipment, the creation of additional jogging tracks, and the expansion of shaded resting areas.

The data from the study on urban green spaces (UGSs) in Hetauda reveals significant differences in the perceived impact of these spaces on residents' physical health, stress reduction, and recreational opportunities. UGSs are seen as beneficial for physical health, with Hupra Chaur, Puspalal Park, and Children's Park scoring high mean values (around 4.2 to 4.3), suggesting that they provide adequate opportunities for activities like walking and exercise. However, Shram Batika stands out with a notably low mean score of 2.0, indicating that this park is perceived as ineffective in promoting physical health. The relatively low standard deviation-to-mean ratios (ranging from 0.12 to 0.18) in the higher-scoring parks demonstrate strong consensus among respondents, while Shram Batika's higher SD/M ratio (0.55) highlights a more varied perception.

In terms of stress reduction and relaxation, the green spaces in Hupra Chaur, Puspalal Park, and Children's Park are all highly rated (mean scores between 4.16 and 4.23), reinforcing their positive impact on mental well-being. Shram Batika again shows a lower mean score (2.1), indicating that it is less effective in reducing stress, with a relatively high SD/M ratio of 0.50, further suggesting inconsistency in user experiences.

In summary, while green spaces in Hetauda generally contribute positively to physical health, stress reduction, and recreation, Shram Batika appears to have a significantly lower impact on these aspects, suggesting that it may need improvements in facilities and management to better serve the community's needs.

5.3.2.5 Equity

When discussing equity, participants acknowledged that urban green spaces are intended to be accessible to all residents; however, several expressed concerns about the uneven distribution of these spaces across different neighborhoods. While many felt that parks like Hupra Chaur and Children's Park are accessible to a broad segment of the community, there was a recurring sentiment that some areas remain underserved, leaving vulnerable groups—such as the elderly, children, and individuals with disabilities—at a disadvantage. Respondents noted that equitable access is not solely

about geographic distribution; it also involves designing spaces that cater to the diverse needs of the community. They recommended that future planning should incorporate universal design principles and ensure that new green spaces are developed in underrepresented areas. By adopting such measures, authorities can help create a more inclusive urban landscape where every resident enjoys the benefits of green space, regardless of their background or physical abilities.

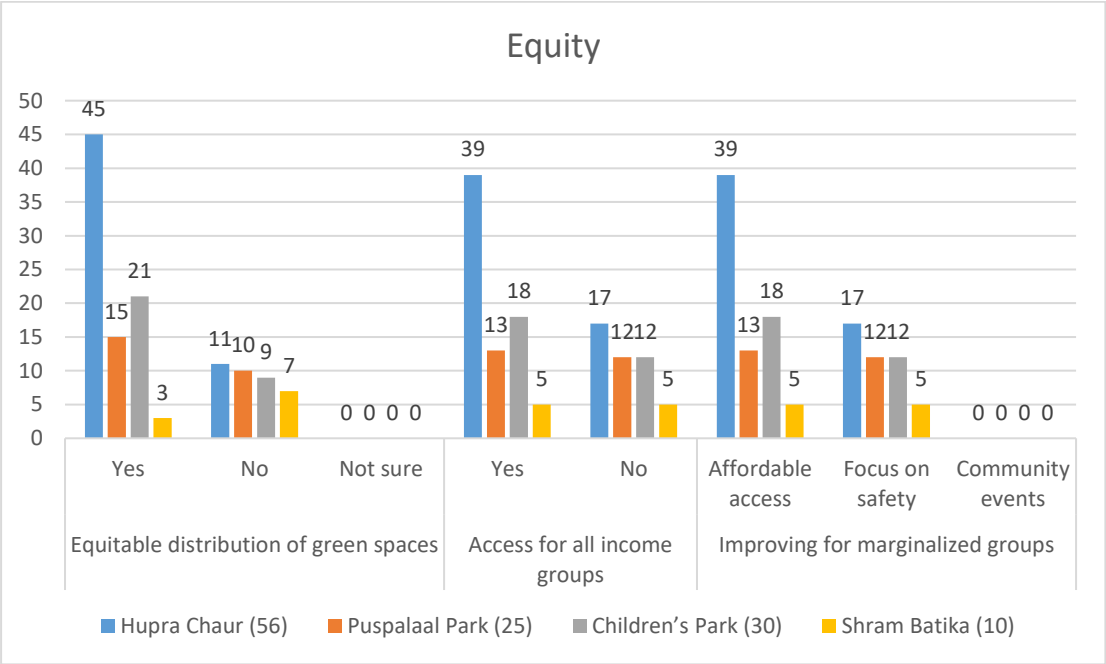


Figure 5-11: Chart showing Equity in parks of ward 4 and 5

The perception of equity in UGS access and distribution varies across different locations in Hetauda.First, respondents generally believe that all residents have equal access to UGSs, with mean scores ranging from 4.03 (Hupra Chaur) to 4.20 (Shram Batika). The SD/M ratios are relatively low (0.10 to 0.23), indicating strong agreement. Shram Batika has the highest mean (4.20) and the lowest SD/M (0.10), suggesting a strong perception of equitable access there.However, perceptions regarding the fair distribution of UGSs across all neighborhoods are lower, with mean scores between 3.47 (Children's Park) and 3.60 (Hupra Chaur and Shram Batika). The SD/M ratios (0.26 to 0.33) are slightly higher, indicating some variability in opinions. This suggests that while people feel UGSs are accessible, their distribution across neighborhoods may be uneven.

5.3.2.6 Sense of Belonging

A profound sense of community and local identity is one of the most valued outcomes associated with urban green spaces in Hetauda. Many respondents shared that parks, particularly those well-maintained like Hupra Chaur and Children's Park, serve as cultural landmarks that foster a strong sense of pride and belonging. These spaces are seen as integral parts of the community, where local festivals, art exhibitions, and neighborhood gatherings reinforce the collective identity of residents. However, not all parks meet this potential equally. Some respondents observed that areas such as Shram Batika, which suffer from poor maintenance and lack of engaging activities, do little to evoke community pride or personal attachment. They stressed that a regular schedule of community-led events, along with participatory planning processes that involve local residents, would greatly enhance the sense of belonging.

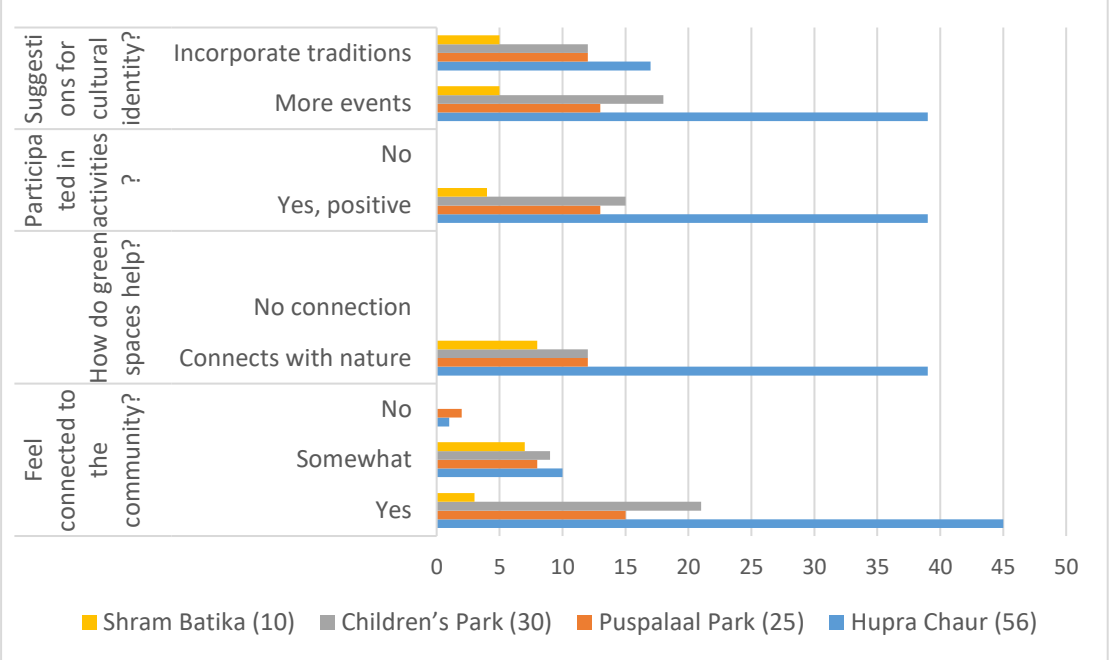


Figure 5-12: Chart showing Sense of belonging in parks of ward 4 and 5

Urban green spaces (UGSs) in Hetauda play a vital role in fostering a sense of belonging among residents by enhancing community connections, civic pride, and social participation. The findings indicate that UGSs make people feel more connected to their community, with mean scores ranging from 4.08 (Hupra Chaur, Puspalal Park) to 4.30 (Shram Batika). The data reveals that Shram Batika scores significantly lower across

all three statements when compared to the other urban green spaces, highlighting its underperformance in fostering a sense of community connection, pride in the city, and belonging. Visitors to Shram Batika report the lowest levels of engagement with the space, for community connection, city pride, and sense of belonging, respectively. These low ratings suggest that the park fails to provide an environment conducive to social cohesion and positive emotional connections. In contrast, Hupra Chaur, Puspalal Park, and Children's Park all received relatively high ratings, indicating that these parks successfully foster a stronger sense of connection, pride, and belonging among visitors.

Here is the combined table for all parks, aggregating the values across each dimension:

Table 5-9: Overall state of urban green spaces in ward 4 and 5

Dimension	**Mean**	**SD**	**SD/Mean**
Accessibility	3.47	1.84	0.36
Security	3.1	1.02	0.33
Social Cohesion	3.09	1.01	0.33
Quality of Life	3.75	0.93	0.25
Equity	3.78	0.95	0.23
Sense of Belonging	3.77	0.97	0.24

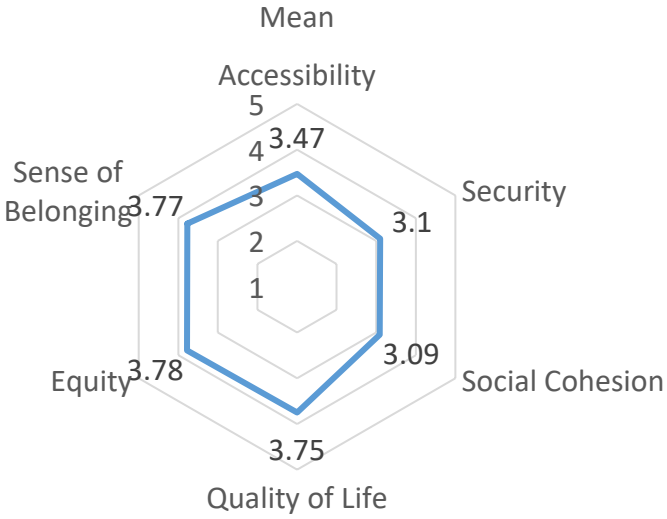


Figure 5-13: Radar chart of overall accessibility of ward 4 and 5

In the case of Hetauda, certain dimensions of social sustainability need higher priority to ensure inclusive and sustainable urban development. One key area is accessibility and inclusivity, which involves creating green spaces that are easily accessible to people from all age groups, genders, and socioeconomic backgrounds, including differently-abled individuals. Safety and security is another critical dimension, focusing on ensuring that public spaces are well-lit, monitored, and safe for all users, particularly women and children. Additionally, quality of life and well-being must be prioritized by promoting recreational opportunities, reducing pollution, and enhancing the overall livability of urban spaces. Finally, fostering social interaction and community engagement is essential to strengthen social cohesion by designing spaces that encourage cultural activities, social gatherings, and citizen participation in the planning and management of urban green areas.

5.3.3 Opinions and Requests through KII

Urban green spaces (UGSs) are essential components of urban planning, contributing to social sustainability, environmental resilience, and public health. However, the effective integration of UGSs into urban planning in Hetauda faces several challenges, particularly in densely populated areas. These challenges, which include space scarcity, inadequate maintenance, lack of inclusivity, and insufficient resources, hinder the optimal development and sustainability of these green spaces.

Space Scarcity and Competing Land Uses

One of the main challenges Hetauda faces in integrating UGSs into urban planning is space scarcity. As the city continues to grow and urbanize, there is increasing competition for limited land resources. Densely populated areas, in particular, face difficulties in allocating sufficient land for parks and green spaces. In some neighborhoods, private land ownership and commercial development have led to a reduction in the availability of land that could be designated for green spaces. Competing land uses, such as residential, commercial, and industrial development, often take precedence over UGSs in urban planning discussions.

Lack of Maintenance

The lack of maintenance in existing UGSs, especially in areas like Shram and Hupra, has made these spaces less accessible and less appealing to the public. Over time, the infrastructure in these spaces has deteriorated due to neglect, with insufficient waste management, damaged paths, and poorly maintained facilities. As a result, these areas fail to meet the needs of the community, despite their potential to serve as valuable green spaces.

Limited Financial and Administrative Resources

Financial constraints and limited administrative resources also impede the development and upkeep of UGSs in Hetauda. Respondents in the community highlighted that there is often insufficient funding allocated to the maintenance and development of green spaces, which leads to poorly maintained parks and inadequate facilities. The lack of a dedicated budget for UGSs makes it difficult for local authorities to carry out regular maintenance or to invest in new green space projects. Furthermore, the administrative capacity to oversee UGS development is often stretched thin, with urban planners and municipal officials focusing on other urgent priorities, such as infrastructure development and housing projects.

Legal and Policy-Related Barriers

Legal and policy-related barriers also hinder the integration of UGSs into urban planning. There is often a lack of clear and enforceable policies that prioritize the development of green spaces within urban planning frameworks. In some cases, zoning laws and land-use regulations do not adequately allocate space for green areas, particularly in newly developed or rapidly urbanizing zones. Furthermore, existing laws may not be enforced consistently, leading to encroachment and the gradual reduction of available green space.

6 CHAPTER SIX: CONCLUSION

This research provides a comprehensive exploration of how UGSs contribute to social sustainability in Hetauda. The research confirms that UGSs are not solely environmental components but serve as critical building blocks for enhancing community health, social interaction, and overall quality of urban life. By employing both quantitative surveys and qualitative field observations at four urban parks—Hupra Chaur, Children's Park, Puspalaal Park, and Shram Batika—this study offers a comprehensive understanding of the multifaceted role that these spaces play in densely populated wards of Hetauda.

Analyzing the current status and distribution of UGSs

The results shows there is a great deal of variance in the city's UGS distribution and management. In several wards, parks such as Hupra Chaur and Puspalaal Park are well-maintained, equipped with adequate infrastructure, and are actively used by a broad spectrum of community members. Conversely, areas like Shram Batika exhibit signs of neglect, characterized by poor upkeep, insufficient facilities, and low utilization. These discrepancies highlight a significant spatial imbalance in the provision of green spaces a pattern that reflects broader challenges in urban land use planning and resource allocation. The uneven distribution suggests that while some parts of Hetauda enjoy the benefits of accessible, well-resourced green environments, other areas lag behind due to limited investment and attention from urban planners.

Assessing Social Sustainability Dimensions of UGSs

The study demonstrates that UGSs are influential in promoting various aspects of social sustainability within urban settings. First, these green spaces offer environments conducive to physical well-being by providing areas for exercise, recreational activities, and relaxation. They also contribute to mental health by offering natural, serene environments that serve as refuges from the intensity of urban life. Importantly, UGSs foster social cohesion by acting as communal meeting points where individuals from varied socio-economic backgrounds, age groups, and cultural identities can gather and interact. These social interactions help build trust and mutual understanding among community members.

Identifying Integration Challenges within Urban Planning Contexts

The study further reveals several critical barriers to the effective integration of UGSs into urban planning frameworks. One of the primary challenges is the reactive nature of current planning practices, which often addresses green space development only after urban issues arise rather than anticipating growth and needs. Additionally, limited financial resources, fragmented institutional coordination, and insufficient engagement of local residents in the planning process are significant constraints. Such challenges call for a proactive and inclusive planning strategy that embeds green space development into the broader urban growth agenda from the outset.

In conclusion, the study clearly shows that integrating UGSs into Hetauda's development framework is essential for promoting social sustainability.

7 CHAPTER SEVEN: RECOMMENDATIONS

Drawing on the insights from the Hetauda case study, it is clear that urban green spaces are pivotal in bolstering social sustainability. However, significant variations in the quality and functionality of these areas—particularly the less effective performance of Shram Batika compared to Hupra Chaur, Children's Park, and Puspalaal Park—highlight a pressing need for targeted infrastructure upgrades. Enhancing these parks through comprehensive landscaping efforts, establishing clearly marked walking trails, and renovating recreational facilities can directly elevate community well-being. Beyond physical upgrades, ensuring ease of access is essential for promoting inclusivity in Hetauda's urban environment. Urban planning policies should focus on creating barrier-free routes, inclusive ramps, and dedicated cycling paths that seamlessly connect residential zones with green spaces. These measures will not only support children, seniors, and individuals with disabilities but also help distribute access equitably across different socio-economic groups Active engagement of local stakeholders in the planning, execution, and management stages is vital to ensure that the design and functionality of these urban green areas reflect the community's diverse needs. Such a participatory process is likely to foster a stronger sense of ownership and community pride, further enhancing the social sustainability of these public spaces.

Finally, sustaining long-term success necessitates continued community engagement and public awareness. Creating cooperative relationships between local government, civic associations, and commercial organizations can aid in obtaining ongoing financing and support for the creation and maintenance of urban green spaces. These recommendations collectively provide a thorough framework for incorporating urban green areas into Hetauda's larger urban fabric, opening the door to a future where cities are more resilient, inclusive, and sustainable.

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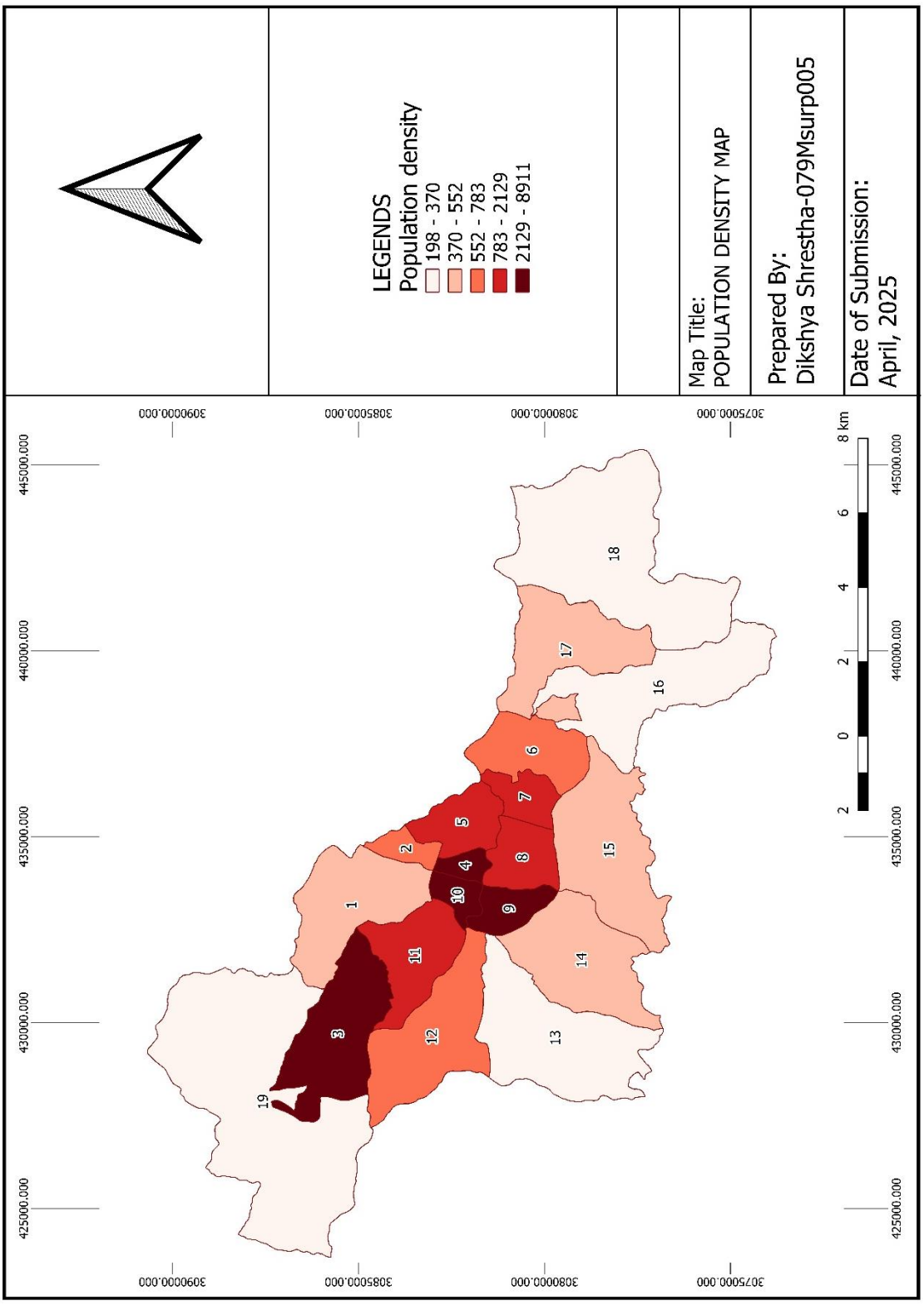
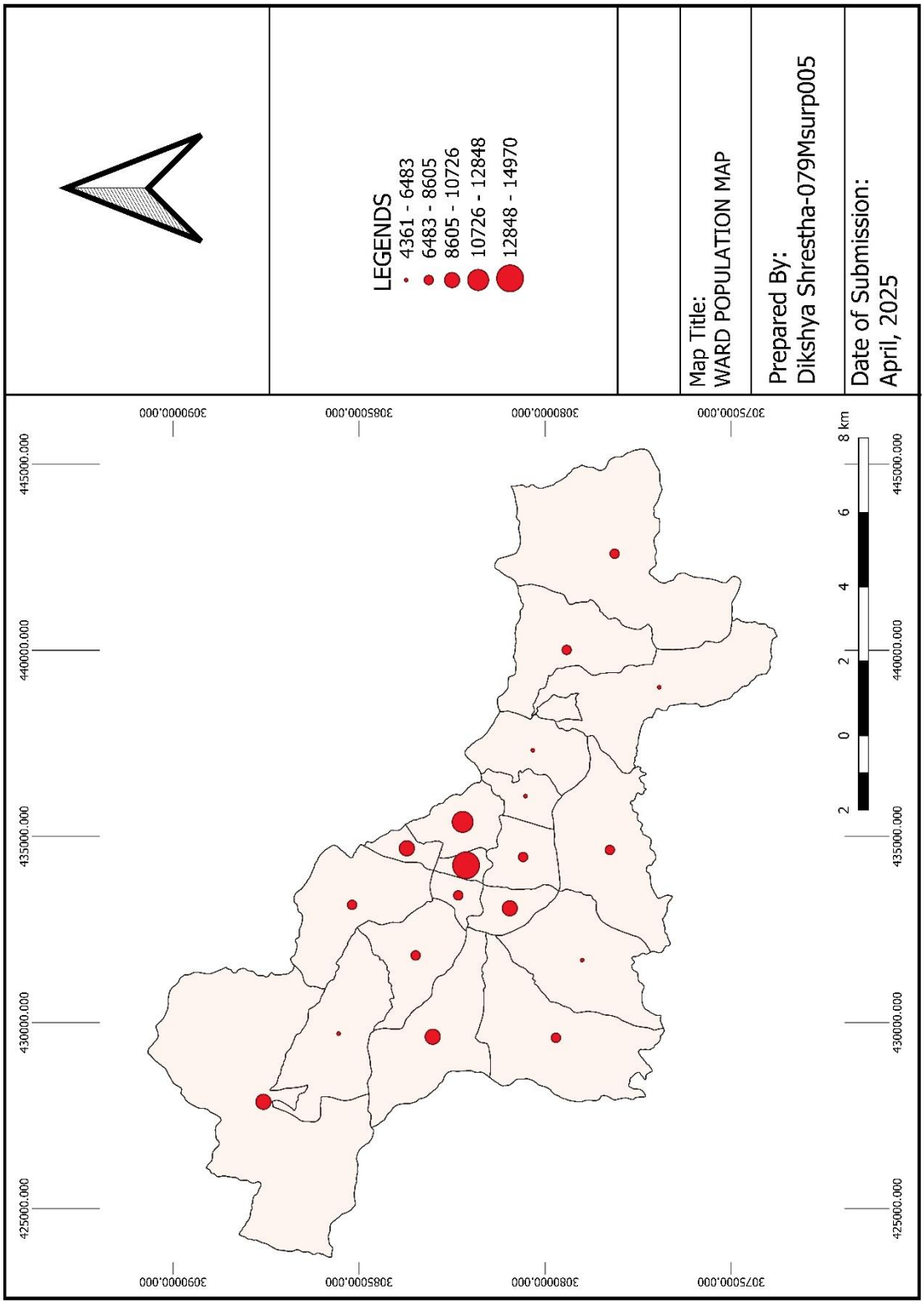
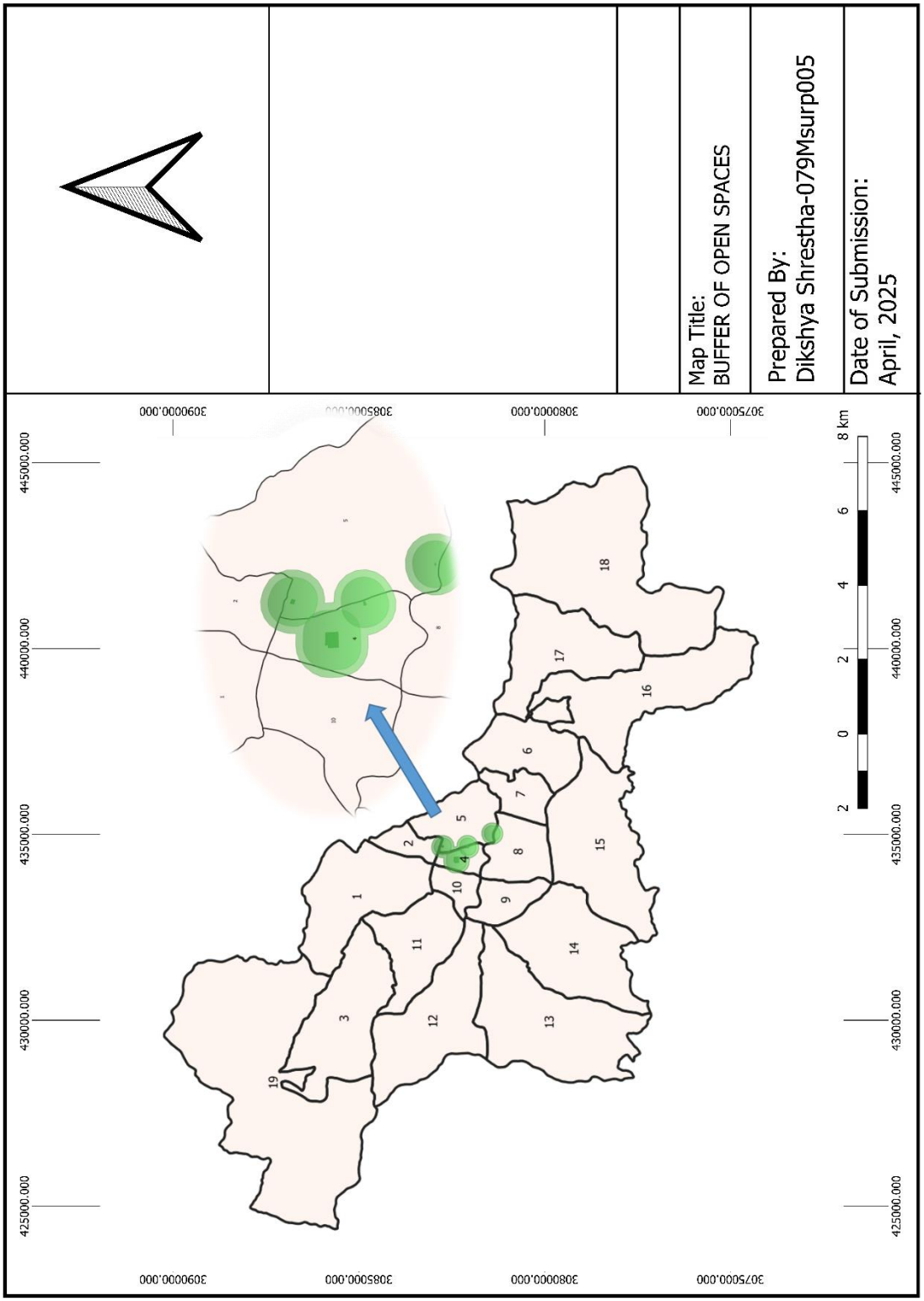
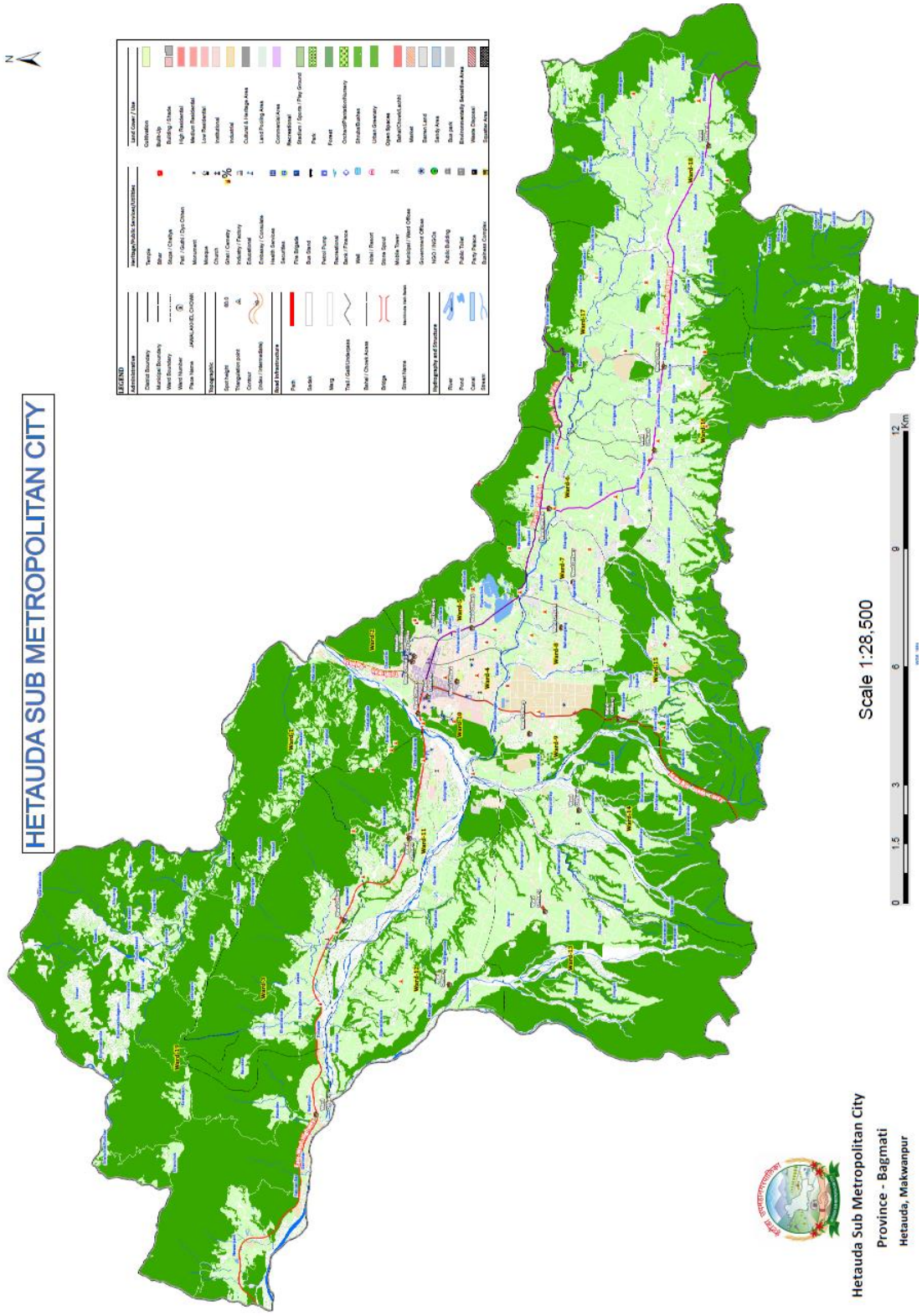
APPENDIX A: GIS Maps


LEGENDS
Population density
198 - 370
370 - 552
552 - 783
783 - 2129
2129 - 8911
Map Title:
POPULATION DENSITY MAP
Prepared By:
Dikshya Shrestha-079Msurp005
Date of Submission:
April, 2025
8 km
445000.000
440000.000
435000.000
430000.000
425000.000
307500.000
308000.000
308500.000
309000.000


LEGENDS
4361 - 6483
6483 - 8605
8605 - 10726
10726 - 12848
12848 - 14970
Map Title:
WARD POPULATION MAP
Prepared By:
Dikshya Shrestha-079Msurp005
Date of Submission:
April, 2025
8 km
0
2
4
6
445000.000
440000.000
435000.000
430000.000
425000.000
307500.000
308000.000
308500.000
309000.000


Map Title:
BUFFER OF OPEN SPACES
Prepared By:
Dikshya Shrestha-079Msurp005
Date of Submission:
April, 2025
8 km
445000.000
440000.000
435000.000
430000.000
425000.000
307500.000
308000.000
308500.000
309000.000


HETAUDA SUB METROPOLITAN CITY
LEGEND
Scale 1:28,500
Hetauda Sub Metropolitan City
Province - Bagmati
Hetauda, Makwanpur

APPENDIX B: Survey Questionnaires Sample

Tribhuvan University

Institute of Engineering

Pulchowk Campus

M Sc Urban Planning Program

Questionnaire for Interview

Title of the Thesis: Role of urban green space for social sustainability: A case of Hetauda

Consent from the Interviewee

This survey is completely anonymous. All the information gathered will be compiled and analyzed to draw logical conclusions for my study, and the results will be published in my research thesis and related papers. Your voluntary participation is highly appreciated. Would you be willing to participate in the survey?

Yes ☐ No ☐

If you have any questions about the research, please feel free to ask.

Interviewer Name: _____ **Date:** _____

Name: _____

Age: _____

Gender: M ☐ F ☐ Other ☐

Questionnaire for key informants

1. How are urban green spaces distributed across neighborhoods?

2. How would you rate the functionality of UGSs in your ward in terms of meeting community needs (e.g., recreation, social interaction, relaxation)?

3. Do you think the existing UGSs are sufficient to meet the needs of the residents in densely populated areas? Why or why not?

4. Are there any recent or ongoing projects in your ward focused on improving UGSs?

5. What role do UGSs play in promoting equity and inclusivity within the community?

6. What are the main challenges your ward faces in integrating UGSs into urban planning, especially in densely populated areas?

7. How do issues like land scarcity, encroachment, or competing land uses affect the development and maintenance of UGSs?

8. Are there sufficient financial and administrative resources allocated for the development and upkeep of UGSs in your ward?

9. What legal or policy-related barriers hinder the effective integration of UGSs ?

10. What strategies do you propose to enhance the role of UGSs in achieving social sustainability in your ward?

Questionnaire for Respondents

Section 1: Socio demographic profile

Name (नाम):

Gender (लिंग):

- ☐ Male
- ☐ Female
- ☐ Other

Age (उमेर):

- ☐ Below 18
- ☐ 18–30
- ☐ 31–45
- ☐ 46–60
- ☐ Above 60

Educational Level :

- ☐ No formal education
- ☐ Primary
- ☐ Secondary
- ☐ Bachelor’s
- ☐ Master’s or higher

Occupation (पेशा):

- ☐ Student

- ☐ Homemaker
- ☐ Employed
- ☐ Business owner
- ☐ Unemployed
- ☐ Others

Income Monthly (आय महिनाको):

- ☐ Below NPR 15,000
- ☐ NPR 15,000–30,000
- ☐ NPR 30,001–50,000
- ☐ NPR 50,001–100,000
- ☐ Above NPR 100,000
- ☐ Others

Frequency **of Visits to Urban Green Spaces** (शहरी हरित स्थानमा जानुको आवृत्ति):

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Rarely
- ☐ Never

Typical **Hours of Visit** (जाने सामान्य समय):

- ☐ Morning (6 AM–10 AM)
- ☐ Afternoon (10 AM–4 PM)

- ☐ Evening (4 PM–8 PM)
- ☐ Night (8 PM onwards)

Section 2

Accessibility (पहुँच)

1. Urban green spaces in Hetauda are located within walking distance from my residence. (शहरी हरियाली क्षेत्र मेरो आवासबाट पैदल दूरीमा छन्।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
2. Children and elderly individuals can easily access UGSs in Hetauda. (बालबालिका र वृद्ध व्यक्तिहरू शहरी हरियाली क्षेत्र सजिलै पहुँच गर्न सक्छन्।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
3. UGSs are open and accessible at all times of the day without restrictions. (शहरी हरियाली क्षेत्र दिनको सबै समयमा बिना कुनै प्रतिबन्ध खुला र पहुँचयोग्य छन्।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
4. There are sufficient parking facilities near urban green spaces for private vehicle users. (शहरी हरियाली क्षेत्र नजिक निजी सवारी साधन प्रयोगकर्ताहरूको लागि पर्याप्त पार्किङ सुविधा उपलब्ध छन्।)
    - Strongly Disagree

- Disagree
- Neutral
- Agree
- Strongly Agree

Security (सुरक्षा)

1. I feel safe walking in urban green spaces during the day.
   (म दिनको समयमा शहरी हरियाली क्षेत्रमा हिँड्दा सुरक्षित महशुस गर्छु।)
   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree
2. There is adequate lighting in green spaces during the evening or at night. (साँझ वा रातको समयमा हरियाली क्षेत्रमा पर्याप्त बत्तियाँ छन्।)
   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree
3. Green spaces in Hetauda are free from activities or behaviors that make them feel unsafe (e.g., illegal activities). (हरियाली क्षेत्रहरू त्यस्ता क्रियाकलापहरू वा व्यवहारहरूबाट मुक्त छन् जसले तिनीहरूलाई असुरक्षित महशुस गराउँछन् (जस्तै, गैरकानूनी गतिविधिहरू)।)
   - Strongly Disagree
   - Disagree
   - Neutral
   - Agree
   - Strongly Agree

4. I avoid certain green spaces in Hetauda due to safety concerns. *(Reverse-coded for analysis).* (मैले सुरक्षा चिन्ताका कारण हेटाउडामा केही हरियाली क्षेत्रहरूलाई टाढा राख्छु।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

Social Cohesion (सामाजिक एकता)

1. UGSs in Hetauda encourage social interactions among community members. (शहरी हरियाली क्षेत्रहरूले समुदायका सदस्यहरू बीच सामाजिक अन्तरक्रिया प्रोत्साहितगर्छ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
2. Events held in UGSs foster a sense of community in Hetauda. (शहरी हरियाली क्षेत्रहरूमा आयोजना गरिएका कार्यक्रमहरूले हेटाउडामा समुदायको भावना बढाउँछन्।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
3. UGSs connect people from different cultural or social backgrounds. (शहरी हरियाली क्षेत्रहरूले विभिन्न सांस्कृतिक वा सामाजिक पृष्ठभूमिबाट आएका व्यक्तिहरूलाई जोड्छ।)
    - Strongly Disagree

- Disagree
- Neutral
- Agree
- Strongly Agree

Quality of Life (जीवनको गुणस्तर)

1. UGSs in Hetauda improve my physical health through activities like walking or exercise. (शहरी हरियाली क्षेत्रहरूले हिँड्न वा व्यायाम गर्न जस्ता गतिविधिहरू मार्फत मेरो शारीरिक स्वास्थ्य सुधार्छ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
2. Spending time in green spaces reduces my stress and enhances relaxation. (हरियाली क्षेत्रमा समय बिताउँदा मेरो तनाव घटाउँछ र विश्राम बढाउँछ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
3. Green spaces provide recreational opportunities that contribute to my overall quality of life. (हरियाली क्षेत्रहरूले मनोरञ्जनात्मक अवसरहरू प्रदान गर्छ जसले मेरो समग्र जीवनको गुणस्तरमा योगदान पुर्याउँछ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

Sense of Belonging (आवश्यकता र सम्बन्धको भावन)

1. UGSs in Hetauda make me feel connected to my community. (हेटौडामा शहरी हरियाली क्षेत्रहरूले मलाई मेरो समुदायसँग जडान महशुस गराउँछन्।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
2. Spending time in green spaces fosters a sense of pride in my city. (हरियाली क्षेत्रमा समय बिताउँदा मेरो शहरमा गर्वको भावना बढाउँछ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
3. Participating in activities in green spaces enhances my sense of belonging. (हरियाली क्षेत्रहरूमा गतिविधिहरूमा भाग लिँदा मेरो सम्बन्धको भावना बढाउँछ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

Equity (समानता)

1. All residents of Hetauda have equal access to urban green spaces. (हेटौडाका सबै बासिन्दाहरूसँग शहरी हरियाली क्षेत्रहरूको समान पहुँच छ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

2. UGSs are equally distributed across all neighborhoods in Hetauda. (हेटौडाका सबै इलाकामा शहरी हरियाली क्षेत्र समान रूपमा वितरण गरिएको छ।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree
3. Green spaces in Hetauda are designed to meet the needs of diverse user groups. (हेटौडाका हरियाली क्षेत्रहरू विभिन्न प्रयोगकर्ता समूहहरूको आवश्यकताहरू पूरा गर्न डिजाइन गरिएको छन्।)
    - Strongly Disagree
    - Disagree
    - Neutral
    - Agree
    - Strongly Agree

Section 3: Open-Ended Questions

1. How accessible are UGSs in Hetauda for you and your community, and what improvements would you suggest? (हेटौडाका शहरी हरित स्थानहरू तपाईं र तपाईंको समुदायको लागि कति पहुँचयोग्य छन्, र तपाईं के सुधारका सुझाव दिनुहुन्छ?)

2. How can UGSs in Hetauda be made more inclusive and beneficial for vulnerable groups, such as children, elderly, and differently-abled individuals? (हेटौडामा शहरी हरित स्थानहरूलाई बालबालिका, वृद्धवृद्धा, र अपांग व्यक्तिहरूसँग जस्ता संवेदनशील समूहहरूको लागि कसरी समावेशी र लाभकारी बनाउन सकिन्छ?)

3. What challenges or barriers do you think prevent the effective integration of UGSs into urban planning in Hetauda?
(हेटौडामा शहरी योजनामा शहरी हरित स्थानहरूको प्रभावकारी एकीकरणलाई रोक्ने के के चुनौतीहरू वा अवरोधहरू छन्?)

4. What do you like most about the existing UGSs in Hetauda, and what aspects do you think need improvement?
   (हेटौडामा रहेका शहरी हरित स्थानहरूको बारेमा तपाईंलाई सबैभन्दा के मन पर्छ, र कुन पक्षहरूमा सुधारको आवश्यकता छ?)

5. What are your expectations for the future development of UGSs in Hetauda, and how can they better serve the community?
   (हेटौडामा शहरी हरित स्थानहरूको भविष्य विकासको बारेमा तपाईंका के आशा छन्, र तिनीहरूले समुदायलाई कसरी अझ राम्रो सेवा पुर्याउन सक्छ?)

APPENDIX C: Matrix Of Responses To External Examiner's Comments

S.N.	Comments	Addressed Comments	Page No.	Commented by:
1.	a. Time range not mentioned; Different observation days may have affected consistency.	Time range specified; And addressed about observations were conducted on different days in the Limitations section.	68-70 7	Er. Saroj Basnet (External Examiner)
	b. "No" option included in visit frequency question, though only park visitors were surveyed.	"No" option removed; charts updated to show relevant responses only.	76-77	
2.	a. Revised the urban expansion section of Hetauda.	Revised the section and described the establishment of the Hetauda Industrial Estate in the 1970s.	42	Er. Chakravarti Kanth (External Examiner)
	b. Error in phrase from Hetauda Darpan 2079	Corrected the phrase "One House, One Park" to "One Ward, At Least One Park."	24	
	c. Old maps were used	Updated the thesis with new maps of Nepal	41	

APPENDIX D: IOE Graduate Conference Paper

त्रिभुवन विश्वविद्यालय
Tribhuvan University
इन्जिनियरिङ्ग अध्ययन संस्थान
Institute of Engineering
थापाथली क्याम्पस
THAPATHALI CAMPUS
Accredited By University Grants Commission (UGC) Nepal, 2024

GPO Box- 280, Thapathali, Kathmandu
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E-mail: info@tcioe.edu.np
Website: www.tcioe.edu.np
गोश्वारा पो. नं. २८०, थापाथली, काठमाडौं
फोन: ०१-५३३५७६६

Date: April 21, 2025

To Whom It May Concern:

This is to certify that the paper titled **"Integrating urban green space for social sustainability: A case of Hetauda"** (Submission# **564**) submitted by **Dikshya Shrestha** 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.

INSTITUTE OF ENGINEERING
16th IOE Graduate Conference

Dr. Raj Kumar Chaulagain,
Convener,
16th IOE Graduate Conference

IOE Graduate Conference
[Placeholder for Publication Information]

ROLE OF URBAN GREEN SPACE FOR SOCIAL SUSTAINABILITY: A CASE OF HETAUDA

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Abstract
The future of urban development is closely tied to sustainability, which encompasses economic, environmental, and social dimensions. However, the social dimension of sustainability has received much less attention despite increasing urbanization. This paper examines the current state, distribution, and social sustainability dimensions of UGSs in Hetauda, while identifying key challenges in their integration into urban planning. In this research a mixed-method approach was employed, incorporating observational research, resident surveys, GIS mapping, key informant interviews with municipal officials. The results of the research identified disparities in UGS distribution, with well-maintained parks enhancing recreational and social interactions, improve quality of life while neglected spaces suffer from poor accessibility and infrastructure. This study identified barriers to urban green space integration in Hetauda, including space scarcity, poor maintenance, financial constraints, and weak policy enforcement highlighting the need for better planning and inclusive policies for sustainable development. The evidence presented in this paper advocates for targeted interventions and strategic planning efforts that collectively contribute to creating resilient and inclusive urban communities.

Keywords
Urban Green Spaces, Role, Social Sustainability, Dimensions, Public Space

1. Introduction

Urban green spaces (UGSs) have evolved from being mere recreational areas to vital components of sustainable urban development, addressing ecological, social, and economic challenges. These green spaces were originally created to allow urban citizens a respite from the industrial setting - as exemplified by iconic spaces such as Central Park in New York and Hyde Park in London Over time, their role has expanded significantly, with contemporary urban planning recognizing their multifunctional benefits, including biodiversity conservation, climate regulation, and the enhancement of socio-cultural well-being [1]. This change in the way UGSs are perceived reflects their importance in improving the urban areas' resilience and life quality of its inhabitants. In particular, Nepal has to deal with the problem of UGSs in the context of a rapidly urbanizing region in South Asia. The high population concentration and powerful competing land use make it very difficult to sustain and increase the UGSs. Urban centers in Nepal are growing at the rate of 3.4% per year [2] but many cities do not even meet the green space recommended standards of 9 square meters per capita. This growth has significantly outpaced the capacity of municipal governments to plan and implement adequate green infrastructure. The National Urban Development Strategy [3] identifies green spaces as integral to sustainable urban development; however, it also highlights substantial gaps in their implementation. The lack of green spaces increases already existing socio economic inequalities for untapped the marginalized societies and other environmental problems like the urban heat islands phenomenon and air pollution. Hetauda, the administrative capital of Bagmati Province, presents a critical case study as it transitions from a small town to a provincial capital, demanding a careful balance between urban growth and social sustainability. The city is under severe strain from urbanization, making the green spaces highly fragmented and their access unequal among the population. While much is said about the importance of UGSs for social sustainability, regarding the case of Hetauda, there is a scarcity of data concerning how the residents regard these social open spaces. These sociological aspects are important for the successful adaptation of UGSs in urban planning and designs that focus on participation and social wellbeing of the people. While global studies

extensively document the benefits of green spaces, there is limited empirical evidence on their integration into urban planning frameworks in Nepal. This study explores the spatial and social aspects of UGSs in Hetauda by coordinates obtained from a questionnaire survey as well as through key informant interviews and case studies of sites- Hupra Chaur, Children's Park, Puspalaal Park, and Shram Batika. By identifying the challenges and opportunities associated with green space development, this study aims to propose innovative and inclusive strategies to the integration of green space in the urban development of Hetauda to make its future more sustainable and equitable.

2. Research Objective

The primary aim of this research is to explore the role of urban green spaces (UGSs) in in achieving social sustainability in Hetauda. The specific objectives are as follows:

i. To analyze the current state, usability and distribution of urban green spaces (UGSs) in densely populated wards of Hetauda.

ii. To examine the social sustainability dimensions provided in the area.

iii. To identify the challenges in the effective integration of UGSs into urban planning in Hetauda.

3. Limitations

The research is focused on social sustainability in public urban green spaces. Other urban spaces like sidewalks and streets, private gardens or parks, etc. are not considered in this research. The study is dependent on the views of the respondents (key personnel, park users, and community personnel). Additionally, the research focused on densely populated wards of Hetauda, which may limit the applicability of the findings to other areas with different urban contexts.

4. Literature Review

4.1 Urban Green Spaces

Urban green spaces play an important role in the sustainable development of cities. Green space interventions nourish the city's existing character, improve environmental conditions, promote outdoor recreational spaces and active lifestyles, and protect biodiversity by creating wildlife habitats. Urban green space refers to any area of land covered by vegetation within an urban environment. It includes public and private gardens, parks, street trees, green corridors, and even small water bodies, often referred to as "blue spaces" [4]. Moreover, UGS serves as hubs for social interaction, community building, and cultural expression.Green spaces also support biodiversity and filter runoff, enhancing water quality [5]. Parks enhance social cohesion by providing inclusive spaces for interaction and cultural events, strengthening community bonds and identity [5]. They improve mental health by lowering stress and cortisol levels [6]. Additionally, they foster social connections, reducing isolation, especially for vulnerable groups [7].

4.2 Social Sustainability

The definition of the concept of sustainability and sustainable development is shaped in the Brundtland Report: "Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs." [8] Social sustainability is based on a particular set of social relationships and institutions that can be sustained or adapted over time. The social sustainability of cities depends on national sectoral policies as well as on urban policies that respond to local problems. Social sustainability aims to develop relationships that are conducive to positive and cultural standards in the society thereby creating vibrant and healthy communities The Sustainable Development Goals of the United Nations highlight the need for safe and accessible public areas.

4.3 Key Dimensions of Social Sustainability

Accessibility

Accessibility forms an important element of social sustainability because it allows marginalized populations to be able to reach, enter, and utilize open and closed facilities. This is particularly important for urban green spaces, which allow citizens to step away, at least for a short while, from the busy city life and actively or passively interact with nature. The accessible natural greenspace standard was formulated in order to find out the minimum distance a person is likely to walk to access a nature area. It states that every individual should have access to

natural green space measuring not less than 2 hectares within 300 meters from their residence. Along with 20 hectares of green space, a working distance of 2 kilometers requires epitopes of 100 hectares of green space for 5 kilometers of walk and an overall distance greater than 10 kilometers requires a minimum of 500 hectares of green space. As well as 'one' locality nature reserve should exist for a population of hundred thousand people [9]. Another factor as essential as physical accessibility is psychological accessibility. Partridge emphasizes the importance of "equal access to all aspects of life, from housing and living conditions, services and facilities to opportunities for participation in social, cultural and political structures and processes".

Security

Urban green spaces are underused due to issues of safety and security. A socially sustainable community rests on the presence of strong social bonds and an underlying sense of security that enables people to come together. Traditionally, public urban green spaces have acted as places of social interactions and gatherings .Safety is an aspect that involves the existence and contact of people [10] and has both an emotional and perception side to it. Safety can differ based on age, gender, social context, time period, situation, place, and socio-economic and cultural traits. Fears, risks, threats, and dangers are common terminologies for such perceptions

Equity

Equity is the most frequently mentioned requirement for social sustainability. Social inequality leads to social division, conflict and instability, thus prevents social sustainability. Equality should be the fundamental guiding principle for any approach to social sustainability. According to McManus quoted in Partridge, the definition of sustainability must include a component of social justice because intergenerational and intergenerational equality prevents unnecessary consumption by a wealthy minority. Focusing on social justice does not mean that sustainability approves existing social conditions. For example, in cases where natural capital stocks were previously lost for specific groups, social sustainability had been addressed through a retrospective social justice component.

Quality of Life

Urban green spaces play a role in improving quality of life and well-being which includes physical health together with mental and emotional health alongside optimism social connections and financial factors. Social sustainability means protecting the well-being of current and future generations according to Castillo et al. Green spaces in urban areas play an essential role in sustaining overall well-being because they deliver benefits across physical, emotional and mental health dimensions.

Urban green spaces promote relaxation and emotional warmth and they help people to lower their stress levels. Research conducted in Helsinki, Finland showed that patients admitted to hospitals with windows overlooking a park needed less pain medication and recovered quicker than patients without park views. Vegetation improves air quality which benefits physical health and strengthens human-nature connections that are vital for mental well-being. The research demonstrates that urban green spaces lead to better physical and psychological health outcomes for city residents [11]. Green spaces provide health advantages by reducing blood pressure, increasing life expectancy, decreasing stress levels, and enhancing concentration skills.

Sense of Belonging

Community identity and sense of place depend on urban green spaces that reflect local culture and heritage. Forests along with trees and wetlands alongside fences deliver ecological advantages while simultaneously creating a unique sense of place. The success of these spaces depends primarily on how well they reflect the identity and culture of their corresponding society If a place is neglected or there is a high level of vandalism, it will affect people's sense of attachment to this neglected place. Moreover, urban green spaces foster a widespread sense of community by drawing people out of urban isolation, thereby alleviating feelings of loneliness. They enhance personal well-being and contribute to the formation of social capital by facilitating increased social interactions. This sense of community is built on several key factors: membership, influence, integration, and shared emotional connections. Membership is characterized by the feeling of belonging to a group; influence emerges when individuals value their relationships with other group members; integration occurs when the group's resources meet the members' needs; and shared emotional connections develop over time through a common history.

5. Methodology

This study adopts a mixed-method approach to analyze the role of urban green spaces (UGS) in promoting social sustainability in Hetauda. It integrates observational research, quantitative surveys, and qualitative interviews to provide a comprehensive understanding.

Observational research involved field visits to major UGSs, such as Hupra Chaur, Children's Park, Puspalaal Park, and Shram Batika, assessing their condition, accessibility, usability of space and the level of maintenance.

Quantitative surveys were conducted among residents using a five-point Likert scale to examine dimensions of social sustainability. GIS mapping to analyze the spatial distribution, complemented by surveys that collected numerical data on factors like park usage frequency, accessibility, and overall satisfaction with UGSs.

The qualitative component included key informant interviews (KIIs) with municipal officials and community leaders, alongside open-ended survey responses of residents. By integrating these methods, the study provides a holistic understanding of UGS contributions to social sustainability, highlighting key challenges and opportunities for better urban planning.

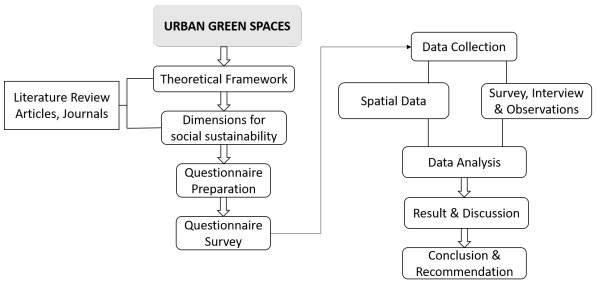

Figure 1: Flow Chart for Research Framework

6. Study Area

Hetauda is a sub-metropolitan city in the Makwanpur District, Nepal, strategically located at the intersection of the Tribhuvan and Mahendra Highways. Serving as an administrative and developmental hub for both the Makwanpur District and Bagmati Province, Hetauda is famous for its tree-lined streets, particularly its iconic Ashoka trees, and is often referred to as a "green city." About 23% of the municipality's land is covered by forests, providing a per capita forest area of 121 m² (Shrestha, 2013). For my case study, ward 4 and 5 are studied taking four public open spaces.

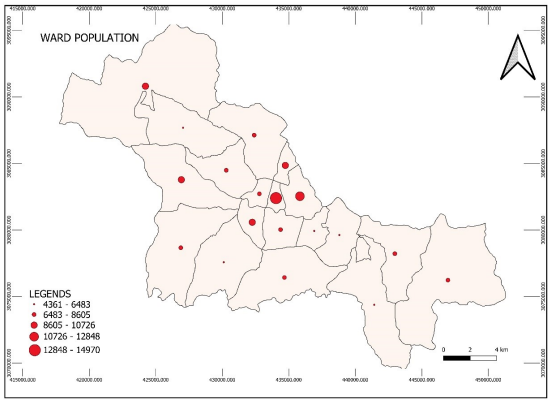

Figure 2: Ward Population of Hetauda

Hupra Chaur is a centrally located open space in Ward No. 4 of Hetauda Sub-Metropolitan City, serving as a key recreational and social hub. Surrounded by administrative offices, marketplaces, and educational institutions. Maintenance is overseen by local authorities, though improvements such as enhanced landscaping, better seating, and structured management could further optimize its potential as a sustainable urban green space. Children's Park, also in Ward 4 of Hetauda, is a vital recreational space catering primarily to children and families. Located near schools and residential areas, it provides easy access for community members, with over 70 percent of nearby residents living within a 10-minute walk. Managed by Brahma Kumaris, the park benefits from routine maintenance, community feedback, and periodic improvements, reinforcing its role in promoting social and environmental sustainability. Puspalaal Park is a key urban green space in Ward 5 of Hetauda, strategically located amid residential areas, marketplaces, and educational institutions. Its central position near civic landmarks like administrative offices and community centers makes it easily accessible—over 60–70% of Ward 5 residents live within a 10-minute walk of the park. Administered by Hetauda Municipality in collaboration with local community organizations, the park benefits from regular landscaping and maintenance, ensuring its long-term viability as a model green space that supports social sustainability in a rapidly urbanizing city. Shram Batika, located on the outskirts of Ward 5, occupies a large area but suffers from poor visibility and limited accessibility

due to its remote position and lack of proper entry points. Surrounded by low-rise residential areas and undeveloped plots, the park experiences low foot traffic and gradual neglect.

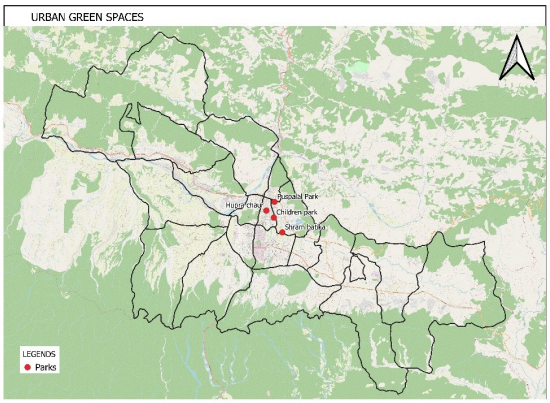

Figure 3: Open Spaces of ward 4 and 5

7. Data Analysis and Discussion

7.1 Identification of Key dimensions of social sustainability

Based on the literature review, following dimensions were identified for social sustainability to understand, if a public open space is well integrated or not in context of Hetauda: i. Accessibility ii. Security iii. Social cohesion iv. Equity v. Quality of life vi. Sense of belonging The selected areas are assessed on the basis of all these identified social dimensions.

7.2 Examining the usability of space

Frequency of Park Visits

The survey also assessed how often people visit urban green spaces. The data reveals that Children's Park has the highest percentage of daily visitors (35 percent), emphasizing its strong role as a recreational hub. Hupra Chaur and Puspalaal Park attract more weekly visitors (32 and 30% respectively), indicating their importance as multi-purpose urban spaces for social and fitness activities. Shram Batika has the highest percentage of rare visitors (40%), highlighting its poor condition and lack of amenities, making it the least visited park. The removal of "Never" responses (0%) across all parks suggests that all parks are used to some extent, even if irregularly. However, increasing the appeal of underutilized parks like Shram Batika through better maintenance, security, and infrastructure improvements could significantly boost their visitor numbers.

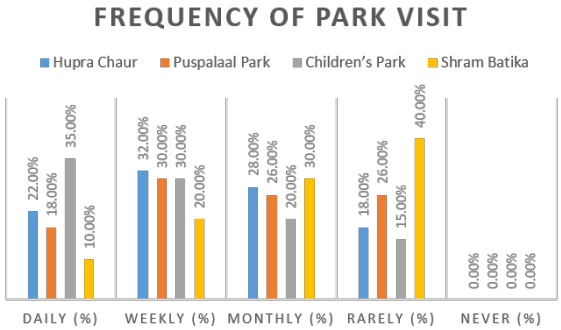

Figure 4: Frequency of Park Visits

Main Mode of Transportation to UGSs

Across all study sites, respondents predominantly use private vehicles (approximately 41%) and public transport (around 36%) when visiting urban green spaces. Walking is a moderately common option (about 29–30%), while bicycle usage is minimal (around 6%). The similarity in these percentages across the sites suggests a consistent transportation behavior pattern among visitors, highlighting a balanced reliance on both motorized and non-motorized modes.

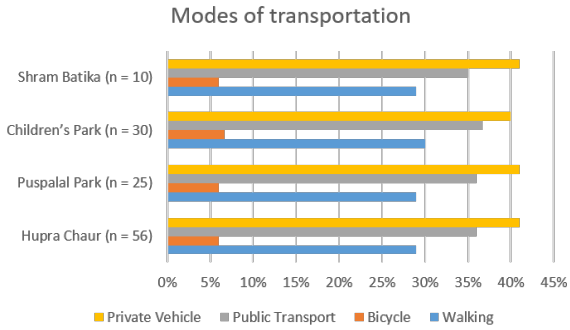

Figure 5: Main Mode of Transportation

Typical Hours of Visit

The overwhelming majority of respondents (about 77%) prefer to visit urban green spaces in the evening, which likely corresponds to post-work or leisure time when individuals are available and the environment is more relaxed. In contrast, morning, afternoon, and night visits each account for roughly 12–18% of responses. This concentrated pattern of evening usage indicates a potential peak period that urban planners and facility managers might focus on for maintenance, security, and event programming.

Facilities Used Most Frequently in UGSs

Walking paths emerge as the most valued facility in urban green spaces, with roughly 70–71% of respondents utilizing them, which reinforces the importance of physical activity and connectivity. Benches or seating areas are also used significantly (about 47%), indicating a need for rest and social interaction spaces. In comparison, playgrounds and exercise equipment are less frequently used (around 24% and 18%, respectively), suggesting either a smaller demand for these facilities or opportunities for future enhancements to increase their utilization.

7.3 Examining the the dimensions of social sustainability

Accessibility:

Respondents consistently noted that while several urban green spaces in Hetauda—particularly Hupra Chaur and Children's Park are generally accessible on foot, the overall experience is marred by infrastructural shortcomings. Many participants described their daily commute to these parks as convenient, yet they also highlighted recurrent issues such as uneven, poorly maintained walkways that pose challenges, especially for the elderly and those with limited mobility. Additionally, insufficient parking facilities were a recurring theme, with several respondents suggesting that expanding parking options and improving public transportation links could drastically enhance overall accessibility. In their view, improvements such as widening pathways, regular maintenance, and the installation of modern, multilingual signboards would not only address these obstacles but also encourage more residents to utilize these public spaces regularly.

Security:

The qualitative feedback regarding security in Hetauda's urban green spaces reveals a nuanced picture. While daytime visits are generally associated with a moderate sense of safety, respondents expressed significant concerns about security after dark. Inadequate lighting was the most frequently cited issue, with many participants reporting that dimly lit areas within the parks create pockets of vulnerability. In addition to lighting deficiencies, the lack of visible security patrols and emergency response mechanisms further undermines their confidence in using the parks during the evening hours. Some respondents recalled incidents or near-incidents that, while not severe, contributed to a persistent sense of unease. They advocated for increased investments in lighting infrastructure, and the installation of emergency call points to foster a safer environment.

Social Cohesion:

Urban green spaces in Hetauda are widely recognized for their role in promoting social interactions and community bonding. Many respondents mentioned that parks like Hupra Chaur and Children's Park serve as vibrant communal hubs where neighbors meet, families gather, and community events are organized regularly. These spaces are perceived as essential in bridging social divides, as they provide a neutral ground for individuals from various cultural and socioeconomic backgrounds to come together. However, a few participants noted that the potential for social cohesion is not fully harnessed in all parks—some, like Shram Batika, are underutilized and lack the infrastructure to host diverse community programs. They also recommended designing flexible spaces that can be easily adapted for different types of events, thereby fostering an environment that truly celebrates diversity and promotes lasting social bonds.

Quality of Life:

The influence of urban green spaces on quality of life emerged as a strong theme in the qualitative feedback. Respondents described these spaces as vital sanctuaries that contribute significantly to both physical and mental well-being. Many highlighted that regular visits to well-maintained parks provide an essential break from the hustle of city life, offering a calm environment that supports stress relief and emotional balance. They frequently mentioned how engaging in physical activities such as jogging, walking, or practicing yoga—in these natural settings has improved their overall fitness and energy levels. Nevertheless, some stressed that while the current conditions of parks like Hupra Chaur, Puspalal Park, and Children's Park are generally positive, there remains substantial room for enhancement. Suggestions included the installation of modern exercise equipment, the creation of additional jogging tracks, and the expansion of shaded resting areas.

Equity:

When discussing equity, participants acknowledged that urban green spaces are intended to be accessible to all residents; however, several expressed concerns about the uneven distribution of these spaces across different neighborhoods. While many felt that parks

like Hupra Chaur and Children's Park are accessible to a broad segment of the community, there was a recurring sentiment that some areas remain underserved, leaving vulnerable groups—such as the elderly, children, and individuals with disabilities—at a disadvantage. Respondents noted that equitable access is not solely about geographic distribution; it also involves designing spaces that cater to the diverse needs of the community. They recommended that future planning should incorporate universal design principles and ensure that new green spaces are developed in underrepresented areas.

Sense of Belonging:

A profound sense of community and local identity is one of the most valued outcomes associated with urban green spaces in Hetauda. Many respondents shared that parks, particularly those well-maintained like Hupra Chaur and Children's Park, serve as cultural landmarks that foster a strong sense of pride and belonging. These spaces are seen as integral parts of the community, where local festivals, art exhibitions, and neighborhood gatherings reinforce the collective identity of residents. However, not all parks meet this potential equally. Some respondents observed that areas such as Shram Batika, which suffer from poor maintenance and lack of engaging activities, do little to evoke community pride or personal attachment. They stressed that a regular schedule of community-led events, along with participatory planning processes that involve local residents, would greatly enhance the sense of belonging. By actively celebrating local traditions and encouraging community interaction, urban green spaces can become true symbols of civic unity and pride.

Dimension	Mean	SD
Accessibility	3.47	1.84
Security	3.1	1.02
Social Cohesion	3.09	1.01
Quality of Life	3.75	0.93
Equity	3.78	0.95
Sense of Belonging	3.77	0.97

Table 1: Overall state of urban green spaces in ward 4 and 5

8. Findings and discussions

The study highlights that urban green spaces (UGSs) in Hetauda are not evenly distributed, with densely populated areas experiencing limited access. GIS mapping reveals that major parks like Hupra Chaur and Children's Park are centrally located and well-utilized, whereas areas on the outskirts lack sufficient green spaces. The study found that while some parks are well-maintained and serve as vibrant community hubs, others, such as Shram Batika, suffer from neglect, making them less attractive and accessible to residents.

UGSs significantly contribute to social sustainability by fostering recreational activities, improving mental and physical health, and strengthening social cohesion. Parks like Hupra chaur, Puspalaal Park and Children's Park provide essential spaces for exercise, relaxation which enhance the quality of life for diverse demographic groups. However, inadequate maintenance, poor infrastructure, and safety concerns limit the potential of certain spaces, reducing their usage and social impact. The lack of adequate seating, lighting, and security measures particularly affects vulnerable groups such as women, children, and the elderly.

Challenges in integrating green spaces into urban planning include space scarcity, insufficient maintenance, and financial constraints. Many respondents noted that limited municipal funding and administrative focus on other urban priorities lead to underinvestment in green space development and upkeep. Addressing these challenges requires improved urban planning strategies, better resource allocation, and stronger community engagement to ensure that green spaces remain accessible, functional, and beneficial to all residents. Overall, the findings from the case studies suggest that while urban green spaces are vital for the long-term social sustainability of Hetauda, several interconnected challenges must be addressed. Addressing these issues is essential for creating a more inclusive and resilient urban environment.

9. Conclusion

This study highlights the significance of urban green spaces (UGSs) in achieving social sustainability in Hetauda. The research identified the existing UGSs in densely populated wards, revealing disparities in their

distribution and accessibility. While spaces like Hupra Chaur and Children's Park are well-utilized, others, such as Shram Batika, suffer from neglect, indicating the need for better maintenance and equitable distribution. The study found that UGSs contribute to social cohesion, community interaction, and well-being. Accessibility, security, and inclusivity were key factors influencing the effectiveness of these spaces in fostering community well-being. However, effective integration of green spaces into urban planning requires overcoming policy barriers, addressing land-use conflicts, and ensuring dedicated funding for sustainable development. A holistic approach that includes strategic urban planning, stronger policy frameworks, and community engagement is essential for maintaining and expanding green spaces in Hetauda. Addressing existing gaps through strategic urban planning and inclusive policy interventions will ensure that green spaces effectively contribute to a more sustainable and livable city.

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