

Situational Analysis of Open Green Areas and the Wellbeing of Urban Residents: The Case of Gelan Town, Oromia Region, Ethiopia.



Anatoli Mekonnen Megersa

A Thesis Submitted to the department of Architecture

School of Civil Engineering and Architecture

Presented in Partial Fulfillment of the Requirement for the Degree of Master's in Urban
Planning and Design

Office of Post Graduate Studies

Adama Science and Technology University

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Adama, Ethiopia

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Advisor Name: Sileshi Azagew (Phd)

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Declaration

I hereby declare that this Master Thesis entitled “*Situational Analysis of Open Green Areas and the Wellbeing of Urban Residents: The Case of Gelan Town, Oromia Region, Ethiopia.*” is my original work. That is, it has not been submitted for the award of any academic degree, diploma or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledged through citation

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_____	_____	_____
Major Advisor	Signature	Date
_____	_____	_____
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_____	_____	_____
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_____	_____	_____
Co-advisor	Signature	Date

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ABBREVIATIONS

ART - Attention Restoration Theory

ANOVA - Analysis of Variance

FGI - focus group interview

FSOSZ - Finfinnee Surrounding Oromia Special Zone

GIS - Geographic Information System

GPS - Global Positioning Systems

LULCC - Land Use Land Cover Change

OGS - Open Green Space

SPSS - Statistic Package for Social Science

UGS - Urban Green Space

UN - United Nations

UNDP - United Nation for Development Program

UNESCO - United Nations Educational, Scientific and Cultural Organization

USGS - United States geographical survey

WHO - World Health Organization

ABSTRACT

Because of various factors such as design exclusivity, society awareness against open green space, inequitable proximity and distribution, less quality and amenities in open green spaces; many residents have limited access to open green areas that potentially depriving urban residents benefits from open green areas: physical, psychological, mental, social, and environmental well-being. This thesis presents a situational analysis of open green areas of Galan town in relation to the wellbeing of its residents. The study aims to investigate the relationship between open green spaces and urban residents' wellbeing, particularly residents of Galan town. In addition to case studies of various urban green spaces and their significance in relation to visitors' and inhabitants' quality of life, the research depends on a survey of the literature on the connections between urban green space and residents' health. The study also examines qualities of green space, including parks, gardens and playgrounds in the study neighborhood. The research methodology includes \the combination of qualitative and quantitative research technique. For data collection questionnaire, site observation survey and focus group interviews were used. SPSS tool have deployed for Statistical data analysis. To analyze spatial data Arc GIS and remote sensing (RS) have used. The study found that urban green spaces have a positive impact on residents' mental and physical health, and the quality and accessibility of green spaces are important factors in promoting wellbeing. The study also founds access to urban green space is not equitable and spending more time in green spaces is associated with increased self-satisfaction and social interaction. The study highlights the community-oriented green space planning and recommends the development and improvement of urban green spaces should involve different stakeholders in the planning and designing process of green spaces that are sustainable, equitable, and accessible to all residents.

Keywords: Open green space, Greenery, Well-being, City Park, Gardens.

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

More than half of the world's population now lives in cities, which has drastically changed the landscape (United Nations(UN), 2018). Urban environments provide many social and economic advantages, but they also present threats to people's physical and mental wellbeing. One of the main issues in urban settings is access to open green spaces like parks, gardens, and recreational areas.

Green spaces are crucial for enhancing urban inhabitants' overall quality of life, according to a growing body of research. (Dadvand et al., 2015; Gascon et al., 2015). These areas offer chances for exercise, rest, social connection, and nature contact, all of which improve both physical and mental health. Stress reduction has been linked to exposure to green environments. (Bratman et al., 2019), improved mood, increased physical fitness (Kondo et al., 2018) and overall wellbeing (White et al., 2016).

However, the availability and quality of green areas in urban environments are not uniform and can vary significantly (Mavoa et al., 2019). The disparities in access to green spaces are often influenced by factors such as geographical location, socioeconomic status, and urban planning policies (James et al., 2015). A thorough situational study that considers the distribution, accessibility, and quality of open green spaces in connection to the wellness of urban dwellers is therefore urgently required.

Urban green space includes a variety of vegetated areas in a city, such as formal and informal green trees, paved walkways, gathering places, cemeteries, sports fields, private gardens, road medians, vacant lots, and gardening areas. These accessible areas, whether public or private are sometimes referred to as "green spaces." (Morar et al., 2022). Unfortunately, urbanization and growth reduce the amount of available open green space, which has a negative impact on social wellbeing. Stress, obesity, and mental illnesses have all been related to the disappearance of green space in metropolitan areas. Experts advise maintaining access to a range of green spaces in order to foster social connection, community cohesion, and active community participation all of which contribute to societal well-being. (Morar et al., 2022). Modern society is fundamentally characterized by urbanization and population increase, and urban residents are emotionally drained by increasing social problems and population density (Li et al., 2021). Cities all over the world are realizing the value of green

areas and implementing green infrastructure into their design based on the idea of sustainable development to address environmental concerns and create livable and sustainable societies. Urban greenery is essential for increasing socioeconomic and environmental aspects of urban sustainability (Li et al., 2021).

Urban green spaces play a crucial role in the public services and open spaces that cities provide, promoting public health. They are also necessary for the health of urban inhabitants. They are a crucial component of urban green infrastructure and serve a variety of purposes linked to sanitation, cleanliness, and aesthetics, which affect urban dwellers' quality of life (Reyes et al., 2021).

Urban green areas play a crucial role in the long-term viability of urban ecosystems by acting as environmental settings, fostering a healthy living environment, offering recreational possibilities, and more. As a fundamental component of urban architecture, green infrastructure encourages physical activity, emotional stability, clean air, and the decrease of air pollution, ultimately enhancing human quality of life. These green spaces encourage social connection and physical activity by offering secure and healthy environments for jogging, walking, and other activities (Jabbar et al., 2021). Additionally, urban green areas improve comfort, mental well-being, social contact, and contribute to sustainable and livable communities. They also have favorable social, economic, and ecological consequences. In densely populated areas, they also aid in reducing urban heat islands (Ma et al., 2019).

Urban green spaces provide a variety of advantages including social interactions, noise reduction, and air pollution abatement. They meet the need for ecosystem services, which is advantageous to both city residents and the ecosystem as a whole. For the purpose of supplying ecological functions, well-managed urban green spaces are particularly crucial. These areas minimize noise pollution, lessen wind speed, enhance air quality, regulate temperatures, absorb carbon dioxide, release oxygen, improve air quality, save soil and water, and stop soil erosion. They also foster social connection, human health, and wellbeing, and they lessen the effects of climate change. Urban green spaces offer opportunities for exercise, which helps to enhance health outcomes. (Mavoa et al., 2019).

Notably, urban parks promote the well-being of those from disadvantaged origins and low socioeconomic status by providing more leisure options. However, issues like crime, noise, and poor upkeep can limit the benefits of urban green spaces. Benefits can be increased by adding features like paths and benches surrounded by vegetation. To maximize their benefits, urban societies need additional green spaces and effective maintenance. Real fitness

has been connected to physical enjoyment, and public health has been demonstrated to benefit from green places' accessibility and aesthetic appeal. Urban green spaces, physical exercise, and public health have all been linked in studies by: (Houlden et al., 2019, Jabbar et al., 2021, Ma et al., 2019).

Regular park visits encourage physical activity, foster social harmony, and provide recreational possibilities, all of which improve human wellbeing. Socio-environmental harmony can be improved by highlighting the ecological benefits afforded by urban green spaces. As urban parks are better, more people visit them, which has advantages including lessened walking fatigue and better attention restoration when sitting. To improve human health, boost health benefits, and reduce death rates, urban plants' biophysical properties must be improved (Venter et al., 2020).

1.2 Statements of the Problem

The idea that urban green spaces enhance the wellness of a urban residents has frequently been advanced by researchers and numerous studies have demonstrated how urban green spaces improve comfort and security, mental relaxation, social cohesion, and urban sustainability all of which are factors in enhancing human well-being (James et al., 2015). Green spaces are important for resolving environmental problems and are linked to good lifestyle decisions. But, factors such as urbanization, society awareness against green space, and globalization has resulted in where many residents have limited access to open green areas, potentially depriving them of the physical and mental health benefits associated with such spaces (Dadvand et al., 2015; Gascon et al., 2015).

The use and degree to which open green spaces in urban settings contribute to residents' wellbeing greatly impacted by their quality and amenities (Barton & Pretty, 2010; Mavoa et al., 2019). The lack of well-maintained, safe, and accessible green spaces may hinder their potential positive effects on wellbeing.

The limited availability and subpar quality of open green areas in urban environments may have detrimental effects on the physical and mental health of residents, including increased stress levels, reduced physical activity, and compromised overall wellbeing (Bratman et al., 2019; Kondo et al., 2018). These implications require investigation and mitigation strategies. People's self-reported well-being and the percentage of public green space in their local areas are positively and nonlinearly correlated (Ambrey & Fleming, 2012) and the research specifically discovered that inhabitants benefit more from public green spaces in single-

parent households, low-education areas, and areas with tall structures. Urban green spaces have a significant positive impact on residents' wellbeing as well as the broader public's physical and mental health. Another empirical study found that those who lived near urban green spaces, such as parks, experienced less emotional distress and had lower incidences of heart disease and asthma (White & Depledge, 2013). This demonstrates how green spaces can protect people's health from stressful situations.

Numerous studies on urban green spaces in Ethiopia focus primarily on spatial-temporal analysis, design of urban green spaces, planning and policy implementation, accessibility, management techniques, appropriateness analysis, and composition and configurations of urban green spaces (Mikias et al., 2018, Eshetu et al., 2021, & Gizaw, 2021). There are no many researches on the connection between urban green spaces and citizens' welfare, especially at the level of residential communities.

Ethiopia has created a number of projects and policies pertaining to open space and green space. The objective is to promote urban sustainability on the social, economic, and environmental fronts. In reality, most of towns in Ethiopian are deteriorating more frequently. In the urban areas of Oromia, it is difficult to locate published evidence on the general situational analysis of open green spaces in relation to the wellbeing of urban society or people.

The ecologically delicate topography of Gelan, one of the regional state towns in Oromia, makes it particularly susceptible to the effects of climate change, including ecosystem destruction caused by the extinction of its microbes and small animal species, rising temperatures, floods, and landslides (Gizaw, 2021). The town also has serious problems with its green space as a result of poor planning for green areas, less attention to green space, switching land use types from green space to other land uses, a lack of community awareness, insufficient budget allocation, and poor sector decision-making. Unfortunately, the urban green spaces in Gelan town have deteriorated physically and socially, and contemporary urban planning techniques commonly undervalue both their relevance for a community's well-being and their variety and diversity.

In conclusion, urban green areas are essential for providing important environmental services that have a favorable effect on people's physical and emotional health. Despite increased government investment in constructing these spaces, the availability of suitable locations is limited due to rapid urbanization.

1.3. Objective of the Study

1.3.1. General Objective

The study's main objective is to investigate the relationship between open green spaces in Gelan town and its residents' wellbeing, particularly residents of Tulu-Guracha district.

1.3.2. Specific Objectives

1. To evaluate the spatiotemporal condition of open green spaces in the study area.
2. To examine the driving factors for green space changes in the study area.
3. To investigate how open green space affected residents of the study area in terms of their wellbeing
4. To provide strategies that will improve urban green spaces for the general welfare of Tulu-Guracha district residents.

1.4. Research Questions

To achieve research objectives, the following research questions where stated:

1. What are the spatiotemporal condition of open green spaces in Gelan town?
2. What are the driving factors for the existing situation of green spaces in the study area?
3. What are the impact of open green space on the wellbeing of the Tulu-Guracha district residential dwellers?
4. What are the strategies that will helps to enhance urban open green areas for the overall welfare of urban residents of the study area?

1.5. Scope of the Research

The scope of the research study is to conduct a situational analysis of open green areas and their impact on the wellbeing of urban residents in Gelan Town, Ethiopia. The study aims to analyze the changes in urban green spaces, their drivers, and the impact on the quality of human well-being in rapidly urbanizing towns of Ethiopia, taking into account the socioeconomic, mental, and environmental aspects. It also involves the use of GIS-based multi-criteria analysis to identify suitable sites for urban green spaces, and the development of strategic approaches to promote sustainable urban green infrastructure in rapidly urbanized cities of Ethiopia. The study will provide insights into the relationship between urban green spaces and the health and general well-being of urban residents, with a focus on the specific case of Tullu guracha district, Gelan Town, Ethiopia.

Due to the specific characteristics and context of tullu guracha neighborhood the findings from this research may not be easily generalizable to other districts in Gelen town. Availability of data on green spaces, wellbeing indicators, and residents' characteristics somehow limited, potentially affecting the depth and comprehensiveness of the analysis. Hence, the sample of residents surveyed or interviewed derived by probability sampling it may not be fully representative of the entire population of the study area.

1.6. Significance of the Study

This study lies in its potential to address critical issues in urban planning, public health, and environmental sustainability. It can provide insights into the role of open green areas in mitigating these stressors and improving the overall wellbeing of urban residents in Tullu Guracha kebele of Gelan town located in Oromia regional state.

Thus, having access to green areas has been linked to a number of advantages for both physical and mental health, such as lowered stress levels, greater physical activity, and improved air quality. Investigating these connections can help with public health initiatives.

The study can clarify any differences in access to green spaces that may exist among various societal groups. This information is crucial for promoting social equity in urban planning and ensuring that all residents benefit from green spaces.

It can encourage community engagement and participation in local decision-making processes related to these spaces to understand how urban inhabitants view and use open green spaces. Cities will keep changing as long as there is continued urbanization. This study

can provide valuable insights into how green areas can be integrated into future urban development plans to improve the quality of life for residents.

In turn, the findings of the research add to the existing knowledge on the area of open green space and wellbeing of community. The study will be significant to the Gelan Town Tullu Guracha kebele for the fact that the findings of the study will contribute a lot for enhancing open green space management concerning wellbeing of people. This study contributes the basic concept of open green space and wellbeing of community to land use planning at local level or town level.

In summary, this research study's value rests in its ability to educate urban planning, public health initiatives, and policy choices that can improve urban people' quality of life and contribute to sustainable, healthy, and equitable urban settings. Moreover, the results are helpful to provide useful evidence to other kebeles located in Gelan town and other towns with similar conditions. The study's findings may be useful to policymakers and experts as they explore the relationship between open green space and societal health. The study's results might also serve as a source of information for other academics and researchers.

1.7. Definition of key terms and concepts

There are broad and multidimensional explanations for the key terms and concepts mentioned in this thesis paper. However, in the context of this study their equivalent definitions are as follows:

Greenery: "Greenery" typically refers to an area or environment filled with green plants, such as grass, trees, shrubs, and other vegetation. It is often associated with lush and vibrant landscapes, gardens, or natural settings. Greenery is important for environmental reasons as it contributes to oxygen production, carbon dioxide absorption, and overall biodiversity.

Open Green space: Open Green Areas are undeveloped or partially developed areas that are predominantly covered in greenery. Typically, these places are set aside for a variety of uses, such as recreation, conservation, and aesthetic improvement.

Urban Green Spaces: Urban Green Spaces are defined and protected areas within urban environments that are used for aesthetic, recreational, and horticultural purposes. These areas are intentionally designed and maintained to provide urban residents with access to nature, outdoor leisure, and opportunities for social interaction, contributing to a higher quality of life in densely populated cities.

Wellbeing: "well-being," refers to the overall quality of an individual's life and their state of being well, content, and fulfilled. It encompasses various dimensions of a person's life, including physical, mental, emotional, social, and even spiritual aspects. Wellbeing is not solely about the absence of illness; it is about experiencing a high quality of life and flourishing in different aspects.

City Park: A city park is a public recreational area located within an urban area, typically in a city or town. These parks are designed to provide a wide range of outdoor and green space amenities for residents and visitors, offering a break from the urban environment and opportunities for leisure, exercise, and relaxation.

Garden: A garden is a cultivated outdoor space, often found near a residence, that is used for growing plants, flowers, and sometimes vegetables. Gardens come in various shapes, sizes, and styles and they can serve different purposes.

Playgrounds: Playgrounds are designed recreational areas equipped with a variety of play structures, equipment, and features that cater to different age groups and play styles. Playgrounds offer several benefits, including promoting physical fitness, fostering social development, and enc

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Theoretical Review

2.1.1. Open green space and Well-being relationship:

More people risk having to live in residential areas with less green resources due to growing urbanization and a spatial planning policy of densification (Kolimenakis et al., 2021). Services Urban green spaces minimize the heat-absorbing surface, boost solar protection, improve cooling through shadowing, and increase evapotranspiration as benefits provided by open green areas, provide a sink for pollution, muffle noise, improve air quality by filtering out environmental toxins, and boost natural water retention (Harasimowicz, 2018).

Open green areas also decrease stress to visitors, increase property values and make urban areas more attractive. The interactions of people with green spaces promote psychological wellness, improve mood and attention and reduce stress and anxiety. Views of nature have been found to improve people's mental health and subjective well-being (Gascon et al., 2015). Additionally, it has been discovered that residents of places with higher levels of greenery report better perceived health, which may be related to increased physical activity, which in turn can improve health and subjective well-being (De V. et al., 2003). They also argued that greenery can influence social well-being. More public green places resulted in increased face-to-face contacts and thereby improved levels of neighborhood satisfaction.

Moreover, (Kim & Miller, 2019), discovered that green infrastructure plays a significant role in encouraging tranquil moods and providing spaces for relaxation, exercise, and walks with loved ones based on their survey of citizen attitudes and opinions. It has been discovered that having access to nature and green infrastructure lowers anxiety and promotes thinking.

2.1.2. Definitions

Open Green Area

Open Green Areas are undeveloped or partially developed areas that are predominantly covered in greenery like grass, trees, and other types of plants. Typically, these places are set aside for a variety of uses, such as recreation, conservation, and aesthetic improvement. Urban and rural environments need open green spaces because they offer places for recreation, physical activity, and ecological advantages. (Beatley T., 2011).

Urban Open Green Areas are defined and protected areas within urban environs that are used for aesthetic, recreational, and horticultural purposes. These areas are intentionally designed and maintained to provide urban residents with access to nature, outdoor leisure, and opportunities for social interaction, contributing to a higher quality of life in densely populated cities (Beatley T., 2011).

Public parks, community gardens, green belts, botanical gardens, and urban forests are just a few examples of the many different types of urban open green spaces that exist. They are essential for reducing the negative consequences of urbanization, such as noise and air pollution, and enhancing the physical and emotional health of city people. These areas also improve the aesthetic appeal of metropolitan environments, provide chances for exercise and relaxation, and support biodiversity (Kuo F. E. & Sullivan W. C., 2001).

Wellbeing

A multifaceted notion, wellbeing differs from person to person and can be impacted by elements like culture, socioeconomic level, and unique situations. It is a primary concern in disciplines like psychology, public health, and economics where attempts are made to comprehend and improve the wellbeing of individuals and communities. It is frequently employed as a gauge of quality of life (Dodge R. et al., 2012).

2.1.3. Theories and Concepts

Here is a discussion of several pertinent theories and concepts in urban planning and design, environmental psychology, public health, and sociology that relate to open green spaces and urban residents' wellbeing.

Attention Restoration Theory (ART): Kaplan's Attention Restoration Theory (ART) posits that nature environments can restore cognitive resources and reduce mental fatigue (Kaplan S. & Kaplan R. 1989).

The Theory of Urbanism: According to urbanism theory, urbanization caused a shortage of green space and an increase in population density. The Theory of Urbanism as a Way of Life (Wirth, 1938) suggests that the lack of natural components and crowded conditions in urban surroundings might lead to stress. The welfare of urban people may be affected by this.

Biophilia Hypothesis: The Biophilia Hypothesis (Wilson, 1984) suggests that humans have an innate connection to nature, and exposure to green spaces can have positive psychological and physiological effects.

The concept of Environmental Justice: This concept emphasizes that all residents, regardless of socioeconomic status or ethnicity, should have equal access to green spaces.

Social Capital Theory: (Putnam, 2000) suggests that green spaces can serve as hubs for social interaction and community cohesion.

The concept of Urban Resilience:

Urban Resilience theory emphasizes the importance of green infrastructure in enhancing a city's ability to adapt to environmental and social challenges (Grafiati, 2022).

The concept of Sense of Place: This idea highlights how emotionally and psychologically connected people are to their surroundings. By encouraging residents' connection to their urban environment and increasing welfare, open green spaces can contribute to a good sense of place (Gustafson, 2001).

2.1.4. Indicators for open Green Space

Numerous indicators have been created based on the locations and dimensions of open green spaces, and they can generally be divided into two categories: accessibility and availability (Liu, 2022). Both of these are wide concepts with a variety of applications in different fields. Land accessibility is "the potential for chances for engagement," according to one definition. In this view, a location's accessibility may be split into two components: the scope of the activities it offered and the ease with which one can access those activities, with the scope being determined by the amount of time or distance needed to get from one location to another (Maas R. et al., 2006).

Urban green space—especially the publicly accessible kind—plays a significant role in improving the quality of life of city dwellers and the environment. It has been shown that the quantity and accessibility of urban green space is associated with good physical health, mental health and a lower degree of stress. In addition, to ensure that urban green spaces provide a wider range of benefits to the urban system, they must have certain characteristics such as quantity (sufficiency), availability (1m^2 of green area/inhabitant) and accessibility (that people can reach the green areas). In this regard, the recommendation of the World Health Organization (WHO, 2012) has determined there should be a minimum provision of nine square meter (9m^2) of green area per inhabitant located within a 15-minutes' walk.

Availability of open green areas: Related to the sizes of open green areas, a widely-used definition of availability is “the amount of green area in a certain defined distance to where urban residents live”, which indicates the area of open green areas is an essential metric of

availability. At individual levels, the availability can be equated to the amount of open green spaces area within a tolerable distance of each person.

Accessibility to open Green Spaces: In the context of accessibility, distance is referred to as "the relative and dynamic ability to reach or be reached." Strong evidence suggests that residing close to open green areas may increase residents' inclination to visit and utilize them, which enhances the community's overall well-being (Terfa B K., et al., 2020).

In order to provide urban open green areas that encourage social inclusion, physical activity, and overall welfare for all inhabitants, availability and accessibility standards are crucial.

Table 1: Availability and accessibility standards for urban open green spaces

Key considerations	Indicators of open Green Space	
	availability	accessibility
Proximity and Distribution	Green spaces should be distributed equitably throughout urban areas	The proximity of green spaces and standards may vary depending on population density
Design for Inclusivity	Green space design should incorporate elements that cater to diverse user groups	Design should accommodate individuals with varying levels of mobility and sensory abilities.
Pathways and Circulation	Adequate pathways should be provided within green spaces	Pathways should include width, surface materials, slope gradients, and the absence of obstacles.
Amenities and Facilities	Green spaces should offer amenities such as seating, picnic areas, restrooms, and water fountains.	These amenities must be designed and located to accommodate individuals with disabilities.
Recreational Facilities	Urban green spaces may include play areas, sports facilities, and recreational features	These facilities should be designed following inclusive play and sports guidelines
Safety and Lighting	Adequate lighting and safety measures should be in place.	Lighting should be designed to support navigation and enhance safety for all users,
Information	Clear signage and information boards should be present	Information should be provided in formats that cater to individuals with visual or cognitive impairments
Community Engagement	Communities should be involved in green space planning and development	Engagement processes should be accessible to all residents

2.1.5. Indicators for Public Well-Being

The study state of our bodies, which is reflected in the regular functioning of organisms, can be thought of as well-being. According to the various definitions, a wide variety of indicators, including both the objective and subjective components of health, can be used to indicate health, including things like mortality, disease, happiness, abilities, objectives, and more (Liu, 2022).

There are numerous qualitative and quantitative markers that can be used to indicate various aspects of health. While qualitative indicators can be used to assess a person's mental health, it runs the danger of being difficult to generalize to other situations and takes a lot of time to gather a lot of information through open-ended questions in interviews or surveys. The five Key components of wellbeing includes:

Physical well-being: Physical well-being is a state of the body with the absence of diseases, but also it is a balanced state of the human body with its lifestyle, having choices to ensure health (White et al., 2017). Urban green spaces have observed in various ways to benefit human well-being through physical activities.

Psychological well-being: Psychological well-being is a positive functioning of self-esteem, including a sense of mastery and personal growth at inter and intra-individual levels (Southon et al., 2018). It is state of positive feelings, happiness, and life satisfaction.

Mental well-being: Mental well-being is a state in which humans can; understand their potential, work productively, manage the stress of life, and participate in society usually (Gascon et al., 2018).

Social well-being: Social well-being is a state in which humans can coexist peacefully in communities with opportunities for advancement Wellman et al., 2014). It is characterized by equal access to basic needs and services by avoiding conflict in community life.

Environmental well-being: Environmental well-being is a significant state in our surroundings that allow humans to live in harmony on the earth by improving human environment interaction. Green spaces are a necessary element of the environment and a compulsory part of making the earth livable for human life (Koprowska et al., 2018).

2.2. Empirical Literature Review

The study entitled "Urban green spaces use and management in rapidly urbanizing countries: The case of emerging towns of Oromia special zone surrounding Finfinne, Ethiopia" by (Yared G. et al. & Girma et al., 2019) analyzed the use and management of green spaces in urban centers of Ethiopia with reference to the emerging towns of the Oromia special zone surrounding Finfinne. The study concluded that although the temporary use of open spaces in residential areas is common, the provision of permanent green spaces is limited. The study also identified the need for effective management of urban green spaces to ensure their sustainability.

The study by (Gelan, E. & Girma, Y. 2021) explored the impact of development on the inhabitants of Gelan town, which is located 25 km southeast of Addis Ababa. The study examined the social, cultural, and economic impacts of industrial development and additional public development projects in the area. The study found that Gelan is undergoing major transformations in social, cultural, and economic changes due to the development dynamics, including industrialization, highway road construction, hotels, residential development, and other formal and informal businesses undertakings. Consequently, the local inhabitant's social relations and networks, cultural practices, and economic lives are affected directly and indirectly.

Based on the above studies, it can be concluded that the provision of permanent green spaces in urban areas is limited in Ethiopia, including Gelan town. Effective management of urban green spaces is necessary to ensure their sustainability. The development dynamics, including industrialization, highway road construction, hotels, residential development, and other formal and informal businesses undertakings, have significant impacts on the social, cultural, and economic lives of the local inhabitants. Therefore, the situational analysis of open green areas in relation to the wellbeing of urban residents in Gelan town is crucial to identify the current status of green spaces and their impacts on the wellbeing of the local inhabitants.

The review suggests that urban green spaces have a positive impact on the well-being of urban residents. Studies have shown that green areas can improve general well-being, self-perceived health status, and increase physical activity levels (Gianfredi V. et al., 2021). However, the availability and quality of urban green spaces in Gelan Town, Ethiopia, need to be assessed, considering environmental and socio-economic factors, proper site selection, and planning (Gelan, E. & Girma, Y., 2021). The review also highlights the importance of

maintenance, renovation, closeness to residential areas, planning of interactive activities, and perceived security aspects for the well-being of urban residents (Yared G. et al, 2019). The review suggests that public green spaces should be considered essential public health resources. The literature review provides insights into the significance of urban green spaces for the well-being of Gelan Town residents, considering the town's unique environmental and social characteristics.

2.3. CASE STUDY

These case studies provide a comprehensive understanding of the current state of green spaces in urban areas and their potential impact on the well-being of urban residents. The findings from these case studies can be used to develop strategies and recommendations for the sustainable planning and management of green spaces in urban areas, considering the unique environmental and social characteristics of each area. The sources selected for the case study are:

- The Analysis of Green Areas' Accessibility in Comparison with Statistical Data in Poland
- The Importance of Urban Green Spaces in Enhancing Holistic Health and Sustainable Well-Being for People with Disabilities.
- Association between Urban Greenspace and Health and
- Assessing the role of urban green spaces for human well-being

These sources provide insights into the current state of green spaces and their potential impact on the well-being of urban residents as follows.

"The Analysis of Green Areas' Accessibility in Comparison with Statistical Data in Poland"(Wysmulek J. et al., 2020):

This study discusses the problem of public green areas' accessibility for the residents of large cities in Poland. The identification of green areas for 18 voivode-ship cities in Poland was prepared using the GIS programme, taking into account public green space, provided for general access and free of charge.

The verification of the Accessible Natural Greenspace Standard (ANGSt) method (LaRosa D., 2014) Consisted of mapping spatial barriers extending the route of access either on foot or by roads as well as closed private areas. The Accessible Natural Greenspace Standard (ANGSt) method:

- No person should live more than 300 m from their nearest area of accessible natural green space of at least 2 ha in size.
- There should be at least one 20 ha accessible natural green area within 2 km from home.
- There should be one accessible natural green zone 100 ha site within 5 km.
- There should be one accessible natural green space 500 ha within 10 km.

It was also found that the introduced barriers did not affect the accessibility of more distant, larger green space areas. The study highlights the importance of green areas in improving the quality of life of urban residents and their contribution to sustainable urban development.

"The Importance of Urban Green Spaces in Enhancing Holistic Health and Sustainable Well-Being for People with Disabilities " (Selanon, P. & Chuangchai, W., 2023)

This article emphasizes the value of having green spaces within cities and acknowledges how people with disabilities gain the benefits through active participation in green spaces. With that, this article argues that urban green spaces or the development of sustainable urbanism must prioritize and include people with disabilities in the planning process, as this inclusive plan has greatest potential for advancing public resources (e.g., environmentally, socially, and economically) and moving cities closer to being truly sustainable.

"Association between Urban Greenspace and Health" (Gianfredi V. et al., 2021).

This systematic review analyzes the association between urban green spaces and health, including general well-being, self-perceived health status, and physical activity levels. The study highlights the importance of maintenance, renovation, closeness to residential areas, planning of interactive activities, and perceived security aspects for the well-being of urban residents.

"Residents' Preferences and Perceptions toward Green Open Spaces in an Urban Area"(Zhang, L. et al., 2021)

This study analyzes the preferences and perceptions of urban residents toward green open spaces in an urban area. The study highlights the importance of providing suitable facilities and services in green spaces to enhance the well-being of urban residents.

"Assessing the role of urban green spaces for human well-being " (Jabbar, M. et al., 2021).

This systematic review analyzes the significance of urban green spaces for human well-being, including physical, psychological, mental, social, and subjective well-being. The

review provides a comprehensive understanding of the impact of urban green spaces on the well-being of urban residents.

2.4. Summary of the case study

By evaluating the status of these areas, comprehending utilization patterns, and looking at inhabitants' reactions to them, the study introduces urban open green spaces and their significance for urban residents' physical and emotional welfare. The report also highlights chances for development as well as problems with maintenance and accessibility.

Overall, the case study provides a holistic view of the current state of urban open green spaces, their significance for urban residents, and actionable steps to enhance their quality and accessibility, ultimately contributing to improved urban wellbeing.

The researcher gives recommendations for improving the quality, availability, and accessibility of open green spaces based on the case study findings. These recommendations may include raising funding levels, upgrading infrastructure, or putting in place community participation programs.

2.5. Summary of Literature Review

This summary emphasizes the significance of open green spaces in boosting the wellness of urban dwellers by providing an overview of the major themes and findings from the literature review. Green spaces are crucial for urban wellbeing as a result of increased urban stress and decreased access to nature brought on by urbanization. The goal of the study is to better understand how open green spaces might improve urban dwellers' wellbeing. Theories and hypotheses support the notion that people have a natural affinity for nature. Open green spaces can relieve stress and promote relaxation, which can have a favorable impact on mental health.

Green spaces encourage physical activity, serve as recreational spaces, and facilitate social interactions, acts as communal hubs, fostering a sense of belonging and social wellbeing. They contribute to a sustainable urban environment by promoting biodiversity and reducing pollution. Green spaces are accessible to people of all abilities because to universal design principles. Accessibility and usability are influenced by design elements like walkways and amenities.

2.5. Research Gaps

Based on this review literature, there are several research gaps that can be identified for the situational analysis of open green areas in relation to the wellbeing of urban residents in Gelan town. Some of these research gaps are:

- Researchers suggests that the availability and quality of urban green spaces in Gelan Town, Ethiopia, need to be assessed
- The empirical review suggests that public green spaces should be considered essential public health resources.
- As my research retrieving sites (i.e. ResearchGate, Paperpile, Scribbr, Google scholar, etc.) implies there is no study on the health benefits of open green spaces in my study area.
- Lack of information on the accessibility of urban green infrastructure in the town.
- Insufficient evaluation of the quality of open public spaces in gelan town.
- In their Researches (Girma, Y. etal., 2019); (Mengistu, H. 2014) recommends that there is limited research on the implementation strategies and challenges of urban green space planning and policy in Gelan town.

By addressing these research gaps, a more comprehensive understanding of the relationship between open green areas and the wellbeing of urban residents in Gelan town, can be achieved, which can inform policy and planning decisions to improve the quality of life of residents.

CHAPTER THREE

3. RESEARCH METHODS AND MATERIALS

3.1. Description of the Study Area

The town of Gelan is located in central Ethiopia, Oromia Regional State, and found at the distance 25 km from Addis Ababa city. It is located south of Addis Ababa along the highway connecting Addis Ababa and Adama. Gelan is one of the eight towns of the Finfinnee Surrounding Oromia Special Zone (FSOSZ). Geographically, the towns lie between 8°53'N - 8°44'N latitude and 38°46'E-38°56'E longitude. There are four rural kebeles in this special zone. Tullu Guracha kebele, which is in the heart of Gelan town, is one of the case study area. Land use type in this study area is undergoing rapid changes due to the ongoing dynamic demographic and economic changes in this area.

The physical proximity of the area to the capital city of Addis Ababa makes these more attractive than many other places for the establishment of investment projects. The government policy of establishing different investment projects and the use of scarce natural resources such as agricultural land with cheap price tags as an incentive to attract private enterprises but it plays a key role for the prevailing rapid Agricultural land invasion in the study area (Gizaw, 2021). As a result, the land use types in most parts of this area have passed through considerable changes over the last decades. According to (CSA;Orc Macro, 2012) report the total population of Tullu Guracha kebele is 3,577. Number of males accounts 57 percent of the total population whereas number of female accounts 43 percent of the total population. Tullu Guracha residential districts estimated population by the year 2023 would be 7,809. This study analyzes the relation between open green areas and wellbeing of the community.

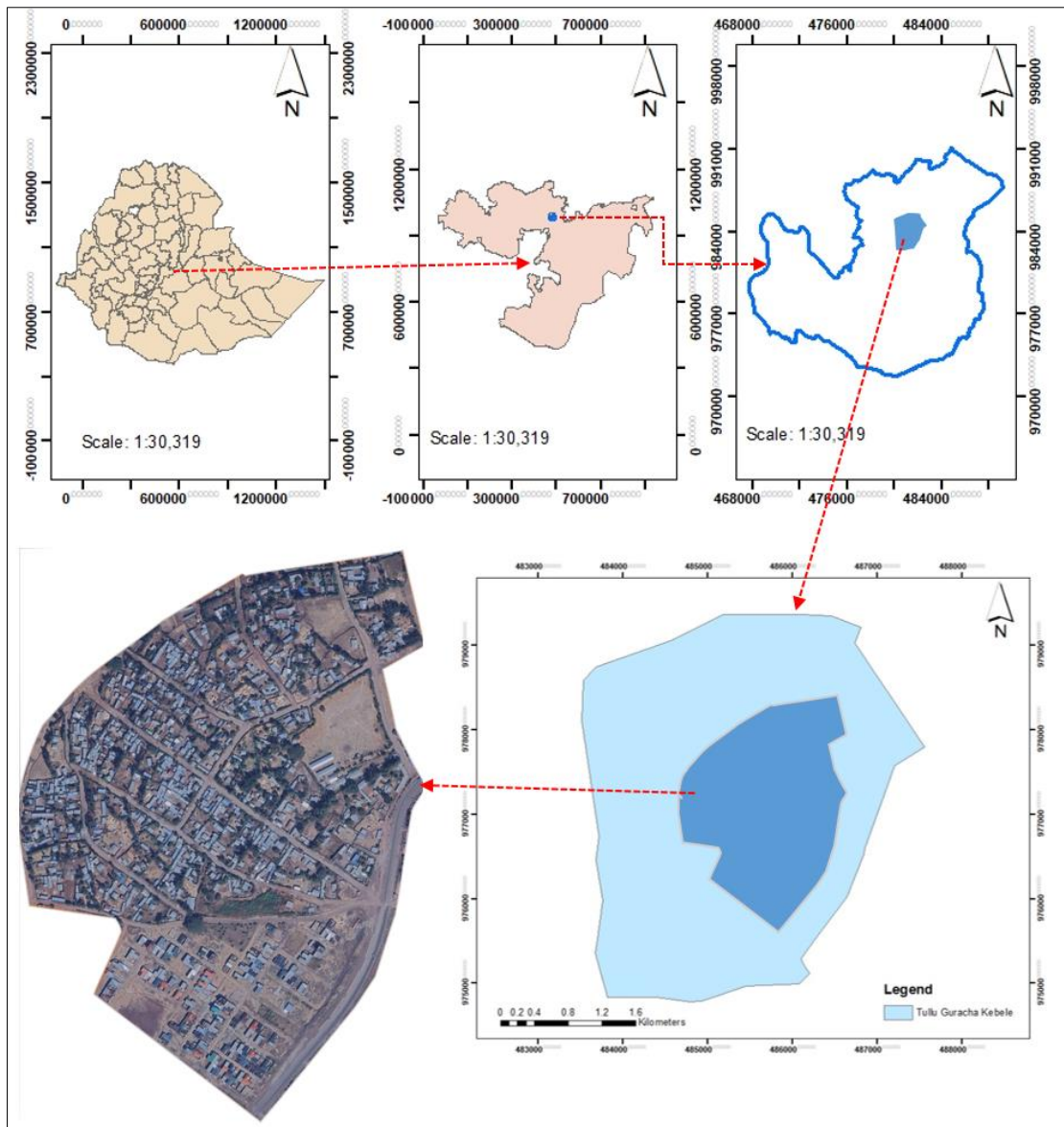


Figure 1: relative location of the study area

Source: satellite maps and google earth image

3.2. Research Design

To conduct the study, I have integrated both quantitative and qualitative data collection techniques. The researcher have conducted a comprehensive literature review to understand existing theories, frameworks, and empirical evidence related to the relationship between green spaces and human well-being to establish a solid foundation for the study and develop research questions. Additionally, to provide a comprehensive understanding of the current state of green spaces, to develop strategies and recommendations for the sustainable planning and management strategies and evaluate green spaces impact on the well-being of urban residents, case studies conducted.

Questionnaires and interviews with a sample of participants developed to measure various aspects of well-being among urban residents living in Gelan town, Tulu-guracha district. Spatial analysis done using geographic information systems (GIS) to map green spaces and analyze spatial associations between the features and well-being indicators.

Finally, the findings from statistical data analysis and outcome of remote sensing and GIS, discussed in order to engaging with stakeholders to inform policy decisions and promote sustainable urban planning initiatives aimed at enhancing public well-being through green spaces in Gelan town. Accordingly, the study design employed is as shown in the following diagram.

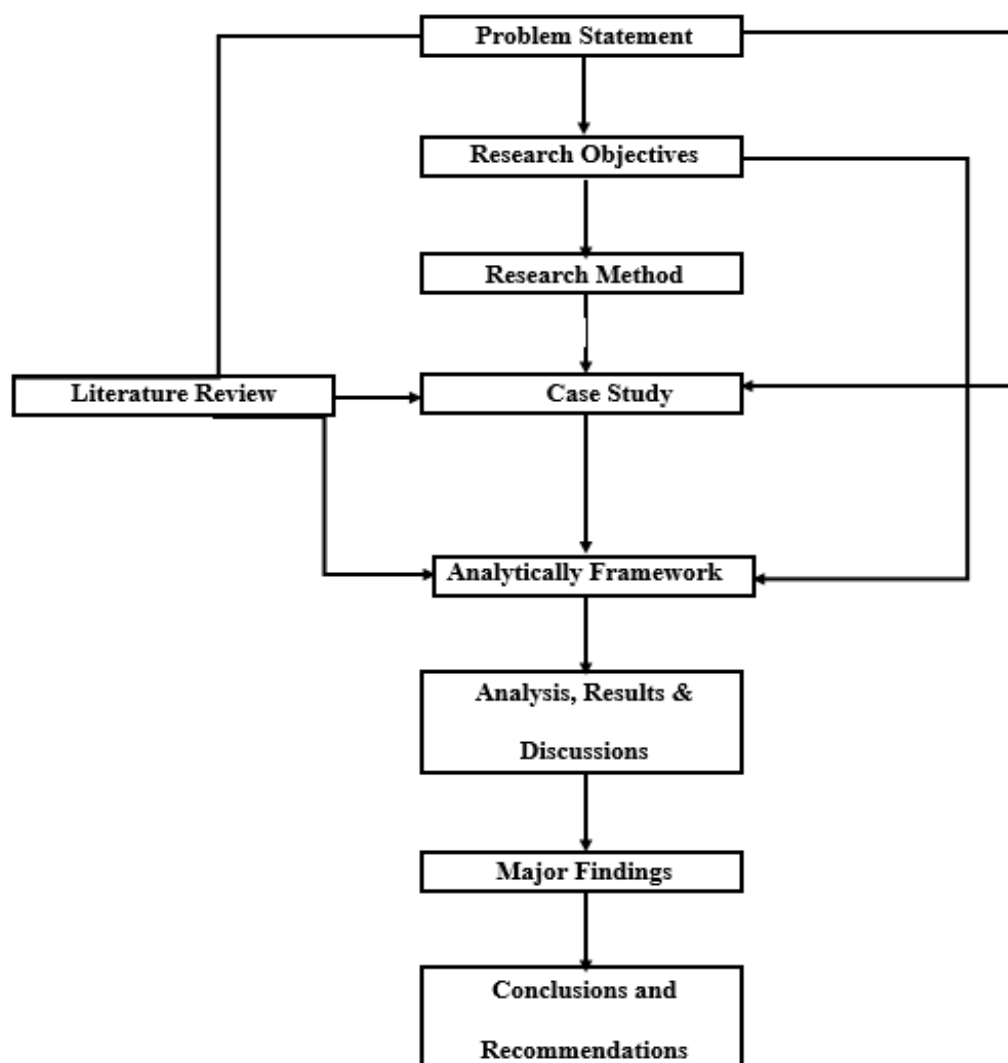


Figure 2: Schematic diagram of research design

Source: own diagram, (August, 2023)

3.3. Study approaches

With an emphasis on the welfare of the residents, this study intends to comprehend and characterize the dynamics taking place inside the green areas of the residential districts of Tullu Guracha kebele in Gelan. These dynamics can vary depending on the specific context in which they occur.

gathering pertinent information and papers for use in addressing my research goals, done in accordance with research design. In order to gather their perspectives, experiences, and opinions, focus groups of residents of the study region were interviewed for primary data. Site visits and questionnaire questionnaires were also used to gather primary data. Secondary data obtained from smart city-related research sites, documents, case studies, and literature. This method enables a more thorough data collection, which when taken as a whole, contributes to a more thorough and complex story.

The case study approach is preferred as it provides in-depth information and facilitates the presentation of diverse data sources to capture the complete picture. Then collected data's and documents analyzed to extract meaningful findings and draw conclusions.

This specific research has prioritized the residential neighborhood locations where the researcher has been working and people in this area whom the researcher may approach in order to acquire relevant primary data and for the simplicity of the survey. Assuming a reasonably older residential neighborhood, which may show the consequences of phenomena that have occurred through time, was another selection factor for the case study area. Furthermore, many residential locations inside Tulu Guracha Kebele were chosen to see various scenarios of open green space areas.

The research findings would be discussed in relation my research objectives and the existing literature and finally Conclusion and Recommendations Summarized from the main findings of the study.

3.4. Sample Design

3.4.1. Study Population

By directly observing the case areas, the researcher documented the movements and sedentary routines of the residents. This method proved to be valuable, especially in situations where residents were not easily approachable or cooperative for interviews or photography. Direct observation allows for a non-intrusive approach to data collection, as the researcher can simply observe and record what they see without disrupting the natural

environment or behavior of the individuals being studied. It provides an opportunity to capture authentic and unfiltered data about people's activities, interactions, and use of the green spaces. Using direct observation as a data collection method, the study was able to gain valuable insights into how residents behave and engage with the case areas, which contributes to a more comprehensive understanding of the phenomena under investigation.

Another method of gathering data is through an interview and questionnaire, in which the interviewer asks the responder questions in person and distributing question papers. Unstructured interviews, semi-structured interviews, and structured interviews are the three different types (Stuckey, 2013).

As a result, residents of the neighborhoods were the subject of the inquiry, Tullu Guracha kebele and woreda administration, and members of the resident at neighborhood organization were all contacted for these interviews. Additionally, the process of random sampling was used to choose the residence from which an interview and questionnaire would be conducted. Using systematic random sampling technique based on the following sample size calculation formula. Tulu Guracha kebele has 120 House Holds based on the formula of Yamane (1967) the sample size will be:

$$n = \frac{N}{1 + (N)e^2}$$

Where: - n = size of sample.
 N = size of population.
 e = acceptable error (the precision).

$$n = \frac{120}{1 + (120)0.05^2}$$

$$n = 92.31 \approx 92$$

Table 2: Sample Size Determination

Subjects.	Category of respondents.	No of informants
city Community	Household/Resident	85
Politicians, Land administration, Housing and Urban Development	Urban designer/Architect/engineer/health officer.	7

Accordingly (85) sample informants out of 120 household are distributed to the Tulu Guracha Kebele, using systematic random sampling methods. Additionally 7 purposively selected Municipal officials and kebele chairs men, who have direct concern with the subject under the study, are interviewed. Hence, 85 respondents were randomly selected for questioners. The randomization was carryout by obtaining the housing number offered by the Gelan town administration or Tullu Guracha kebele.

3.4.2. Sampling techniques

Both random and deliberate sampling methods were employed. A random sample approach is needed since each participant's participation in the study region is crucial for this research. As a result, links between communities and stakeholders that were created through a participatory method were successful in promoting information flow. The intentional sampling approach focuses on decision-makers from the government, business, and other groups. They are therefore end consumers and players in the execution of the quality open green space. The evaluation of the measurement, which is done by looking at its characteristics, validity, and reliability, is the first of SPSS's key investigations. Second, it involves statistical analysis, which involves examining the relationships between the hypotheses and spatial analysis, which involves examining the situational analysis of the study area. While acceptance of well-being is the dependent variable, awareness/perception, availability, accessibility, quality, activity, and obstacles are independent variables.

3.5. Data Type and Sources

To explore different facets of the study's objective, data from multiple sources has been incorporated. Primary data collection involved conducting field survey and observing the study area. The researcher also conducted interviews with individuals, including residents, municipal officials, and householders in the study locations. These interactions allowed for firsthand information gathering and insights into the specific context. In addition to primary data, secondary data was gathered from various sources. Official reports from local government entities provided valuable information, while previous research studies, journal papers, and published books offered insights from existing knowledge and literature. Drawings and maps were obtained from the Gelan town administration to aid in the understanding and visualization of the study area.

By combining primary and secondary data, the study is able to gain a comprehensive understanding of the research topic, drawing from multiple perspectives and sources of information. This approach enhances the validity and reliability of the study's findings and contributes to a well-rounded analysis of the urban green spaces in the case study locations. Primary and secondary data from both quantitative and qualitative categories are used in this study. Questionnaire Surveys, observations, interviews, and the researcher's own photos were used to acquire primary data. Books, official websites such as Google Scholar, Scihub, Researchgate and ScienceDirect are a few examples of secondary data.

Table 3: summary of Data Type and Sources

Area of SURVEY	Survey technique	Data types	Data collection techniques	Specific Sources Include:
Gelan town	Integrated data Development	Primary, secondary Qualitative quantitative	Interview , literature, case study, and Archival	Gelan town municipality, Google Maps.
Tulu guracha district	Systematic Probability sampling	Primary, secondary Qualitative quantitative	Interview, questionnaire, literature, photographs, observation & Archival	Researcher's observation, Google Maps, arch GIS, kebele's vital event Bureau

3.6. Analysing Land use land cover Change

To detecting and analyzing LULCC of Gelan town as well as the study are (i.e Tullu guracha) conducted in according to the following steps:

Data acquisition: Landsat images from USGS (United States geographical survey) used Aerial photos of 2007, 2012, 2017 and 2023 of the study areas and ERDAS IMAGINE 2015 for accuracy assessment. after which the classified maps are compared and stack to visualize changes over time. The increase and/or decrease of each type and see the percentage change per year is also calculated.

Justification of Data: Gelan town got its structural plan in 2005 as one of Finfinnee Surrounding Oromia Special Zone (FSOSZ). Clear Landsat images from USGS of the town begins from 2007. Landsat Thematic Mapper (TM) images for 1996 and SPOT 5 satellite images were used as sources. To provide consistent historical time series data and spatial and temporal dynamics of land use change the consecutive five years detected and analyzed in combination with geographic information systems (GIS) and global positioning systems (GPS) to assess land cover changes more efficiently than using data alone.

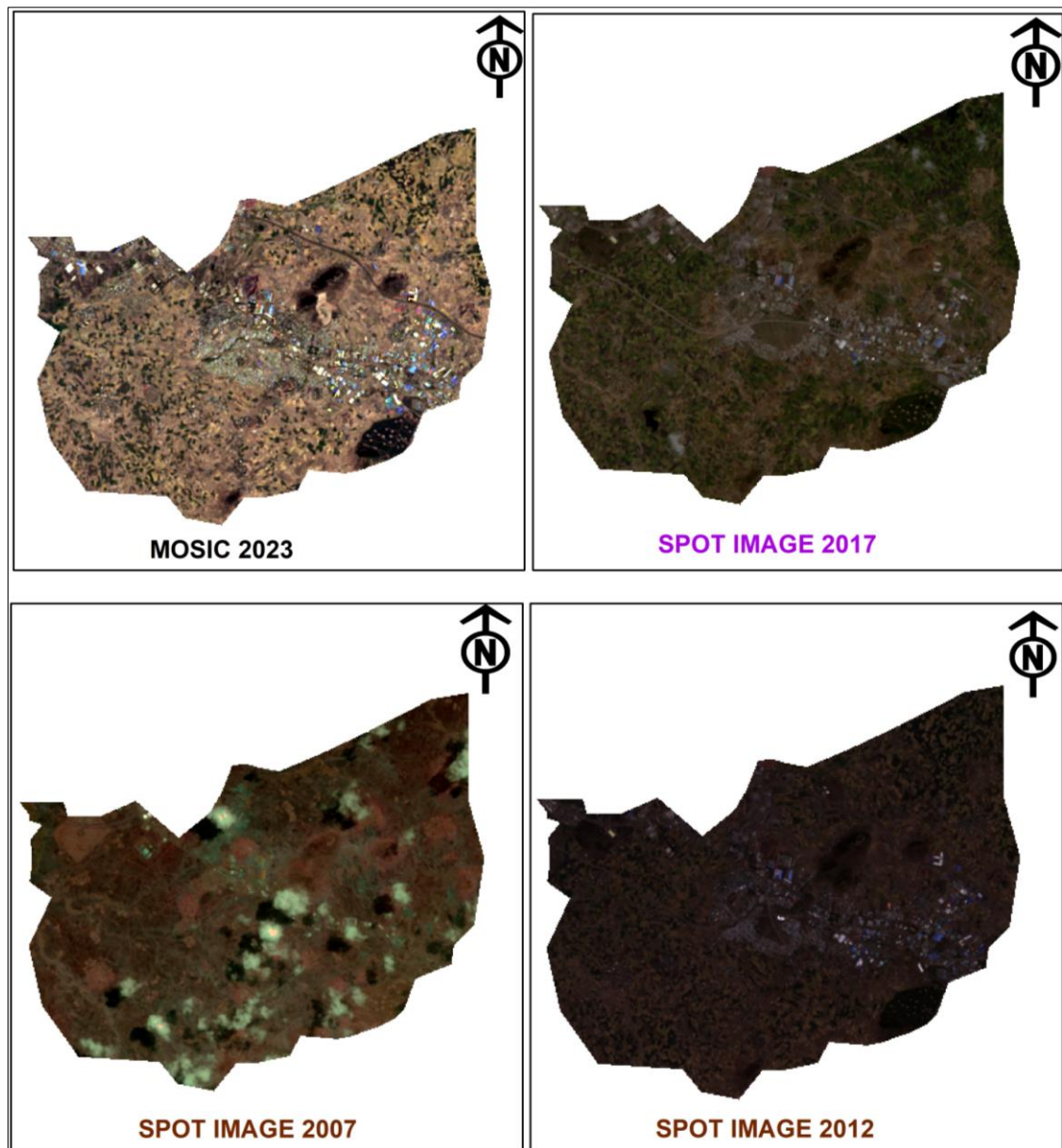


Figure 3: Satellite images used in analysis for LULCC of Gelan town

Source satellite image of specified years and processed by ERDAS



Figure 4: Satellite images used in analysis for LULCC of study area

Source satellite image of specified years and processed by ERDAS

Study Variables: The study area's spatial and temporal land use land cover (LULC) change was evaluated using the land cover change detection characteristics. For this purpose, four (4) land use land cover (LULC) variables were chosen are Built up area, open green space, an agricultural area, and bare land. Each land cover class's amount and rate of change were analyzed, along with the total areas covered by each class in each study year.

Table 4: land use land cover classification scheme

Sr.no	Land use category	Description
1	Built up Area	Includes all developed areas roads, buildings, housing units, Commercial and resident areas, under construction areas
2	Open green space	Refers to functioning areas covered by vegetation of any type, including riverine trees or vegetation and other pockets of green areas.
3	Agriculture land	Includes all areas employed for agricultural activities farmland parcels both with and without
4	Barren land	Refers to open spaces without any function, bare soils, rocky areas, quarries and gravel pits, grazing land, open areas in side vegetation and resident areas,

Change detection: Change detection involves comparing classified images from different dates to identify changes in land use and land cover over time. This process requires several steps, including analyzing the spatial distribution of changed types, determining the rate of change, identifying change trajectories of land cover types, and assessing the accuracy of change detection results. In this study, separate LULC maps from 2007, 2012, 2017, and 2023 created and compared to identify changes in each category of land use and land cover.

3.7. Data Analysis and Interpretation

The demographic characteristics of the respondents are summarized by frequency and percentage. The respondents were specifically chosen to offer information on the reliability of the literary components of Open Green Areas in Relation to the Wellbeing of Urban Residents in order to ascertain their prior knowledge issues.

3.7.1. Quantitative data Analysis

Quantitative data statistics provide light on the data's main trends, variability, and distribution. In this study's analysis, Scores for each item used to rank the domains namely, Awareness/perception, Availability, Accessibility, quality, activity, and challenges, as well the dependent variable well-being of Open Green Areas in Relation with the Wellbeing of Urban Residents. This analysis used to draw conclusions about a population based on sample data. It can examine relationships between variables, and make predictions.

3.7.2. Qualitative data analysis

The research interview respondents' perspectives and ideas based on the interview questions flow discussed and summarized.

CHAPTER FOUR:

3. RESULT AND DISCUSSION

This chapter focuses on the analysis and discussion of the data that was gathered in order to meet the study's overall and specific objectives. The discussion of the information gathered on the relationship between open green space and residential wellness in the case of Tullu Guracha kebele Gelan town is presented in the part that follows. The data analysis, interpretation, and discussion of the research findings are all included in this chapter.

4.1.Demographic Characteristics

The demographic details of the survey respondents are shown as in the in table 6 below.

Table 5: Demographic characteristic of survey respondents

Profile	Options	Frequency	Percentage
GENDER	Male	40	43.5%
	female	51	55.4%
	not prefer to say	1	1.1%
AGE	18-24	13	14.1%
	25-34	28	30.4%
	35-44	27	29.3%
	45-55	22	23.9%
	>55	2	2.2%
Educational status	<grade 12	29	31.5%
	Diploma	25	27.2%
	Degree	24	26.1%
	Master's degree and above	14	15.2%
Occupational status	governmental	56	60.9%
	non-governmental	4	4.3%
	Private	18	19.6%
	Other	14	15.2%
House Hold status	<1 years	8	8.7%
	1-5 years	12	13.0%
	>5 years	72	78.3%

This table displays the demographic data derived from an ordinal scale for the 92 survey participants. Displayed in the subsequent figure are the comprehensive details and attributes of the 92 respondents who participated in the study as residents of Tullu Gurraacha kebele in Gelan town. The research endeavor encompassed an extensive exploration of several key facets, including gender distribution, educational attainment, age demographics, and

professional experience. These pertinent background and respondent characteristics were meticulously derived from the questionnaire, which was administered as an integral component of the research methodology. The data gathered through this meticulous process will serve as a crucial foundation for interpreting and comprehending the subsequent research findings.

4.1.1. Age Structure

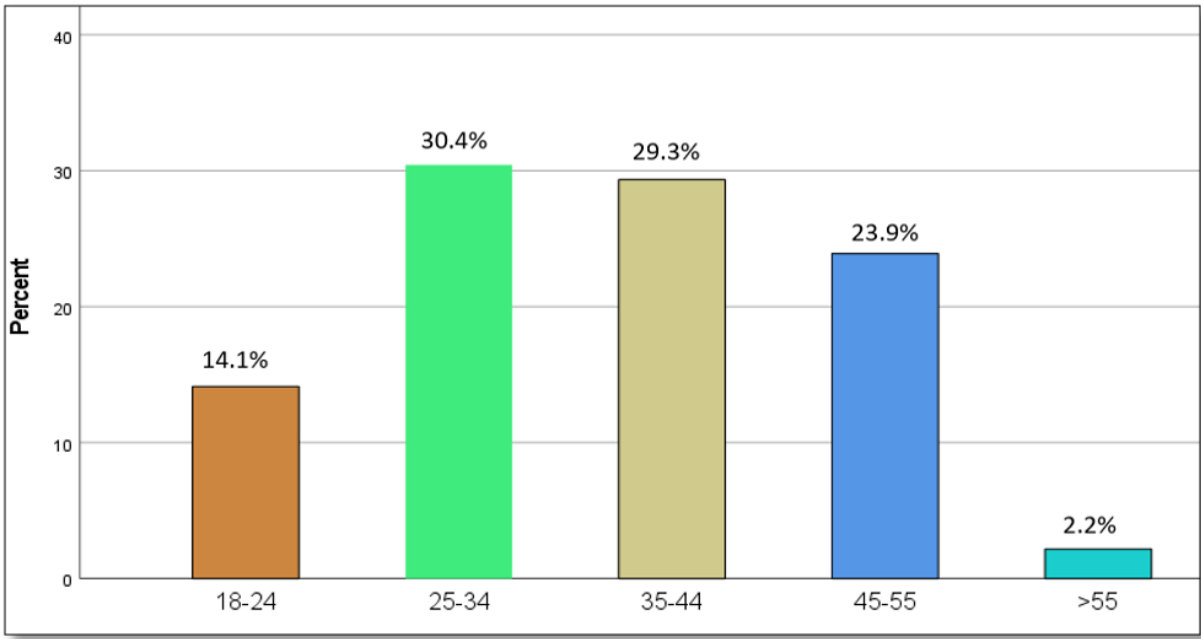


Figure 5: Age Structure map.

Source: Own survey (August, 2023)

A comprehensive depiction of the age distribution among residents of Tullu Gurraacha kebele is presented as labelled in Figure7. The gathered data unveils significant patterns, providing key insights into the preferences and reliance on open green spaces for well-being among different age groups. Remarkably, the largest segment of respondents, constituting over 30.4% of the total participants 28, falls within the age range of 25-34. This finding suggests a notable interest and reliance on open green spaces within this demographic segment. It implies that individuals in this age group may consider such spaces vital for enhancing their overall well-being. Subsequently, the age group of 35-44 encompasses 27 respondents, representing 29.3% of the total. This demographic segment constitutes a significant portion of the survey sample and further emphasizes the relevance of open green spaces to their well-being.

Additionally, the age range of 18-24 includes 13 respondents, comprising 14.10% of the total participants and the lowest segment of respondents, constituting over 2.2% of the total

participants 2, falls within the age range of greater than 55. The presence of a considerable number of individuals in this age group indicates their recognition of the significance of open green spaces for their well-being as well. The age distribution depicted in Figur5 plays a pivotal role in informing the spatial analysis of open green spaces and their correlation to the well-being of residents in Tullu Gurraacha kebele, Galan town. These valuable insights shed light on the specific age groups that may benefit the most from the provision and utilization of such natural environments.

4.1.2. Gender structure

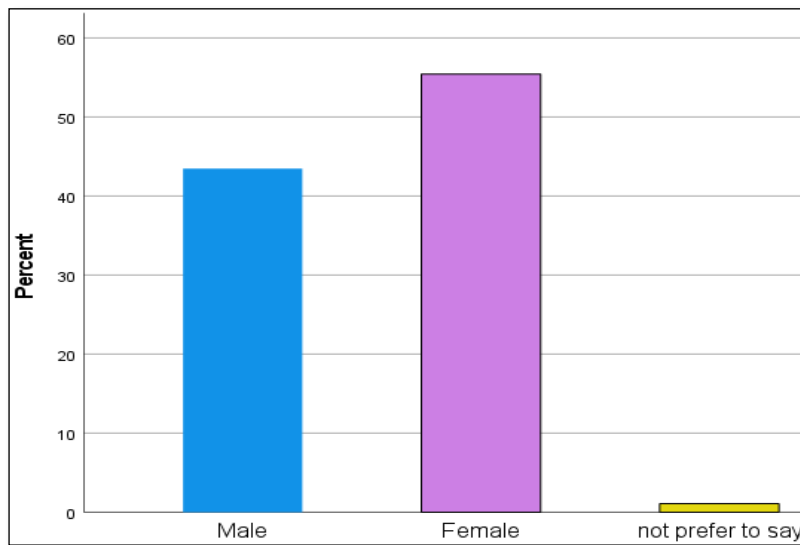


Figure 6: Gender structure

Source: Own survey (August, 2023)

Illustrated in Figure6, the gender distribution among residents of Tullu Gurraacha kebele reflects the composition of male and female participants in relation to their perception and utilization of open green areas within the community. The data reveals that out of the sampled residents, 51 individuals (55.4%) identify as female, while 40 individuals (43.5%) identify as male and one of respondent (1.1%) not preferred to tell his/her gender type. Understanding the gender structure in relation to open green areas is crucial for recognizing potential variations in preferences, needs, and utilization patterns. These findings offer valuable insights into the perspectives and behaviours of male and female residents regarding the availability and significance of open green spaces.

4.1.3. Education level of the respondents

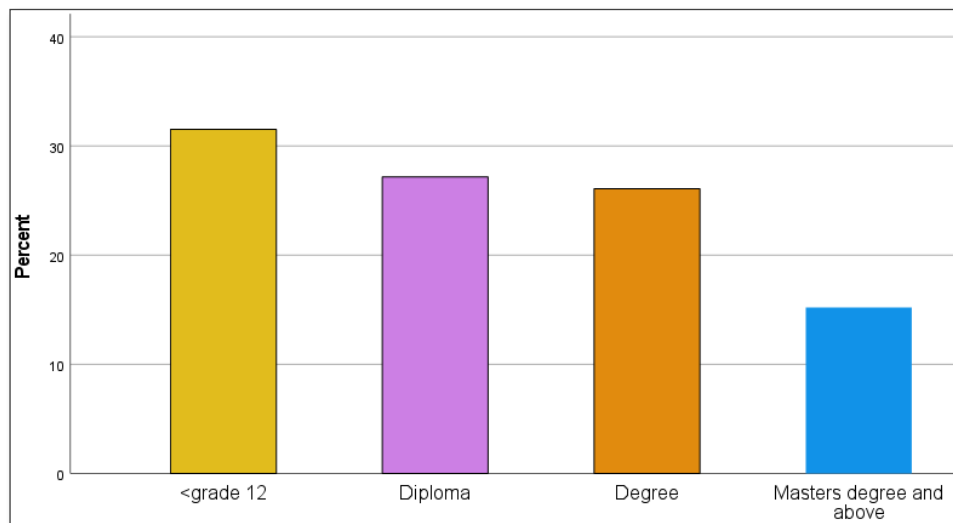


Figure 7: Educational status

Source: Own survey (August, 2023)

Figure 7 presents a comprehensive overview of the educational backgrounds of respondents selected from the residents of Tullu Gurraacha kebele. The findings highlight the diverse educational statuses of the participants and their potential influence on their understanding of and engagement with green areas within the community. Analysis of the data reveals that the largest proportion of respondents possesses a first-degree educational status, constituting the majority with 30 individuals (32.61%). Following this, respondents with a vocational education background account for 22 individuals (23.91%). These two categories demonstrate a significant level of knowledge and expertise, suggesting that individuals with higher educational qualifications are likely to possess valuable insights into the status and benefits of green areas.

Furthermore, the data illustrates that the most frequent educational backgrounds among respondents are high school, represented by 29 individuals (31.50%), followed by diploma with 25 individuals (27.2%). The inclusion of these groups further enhances the breadth of perspectives and reliable information that can be obtained regarding green areas within the community. Lastly, respondents with an elementary education status comprise 11 individuals (11.96%), contributing their unique perspectives and experiences to the overall understanding of green areas and their advantages. By considering the educational backgrounds of respondents as depicted in Figure 9, it becomes evident that the participants possess a wide range of educational qualifications, providing valuable insights and reliable information regarding the status and benefits of green areas within Tullu Gurraacha kebele.

4.1.4. *Living experience at kebele*

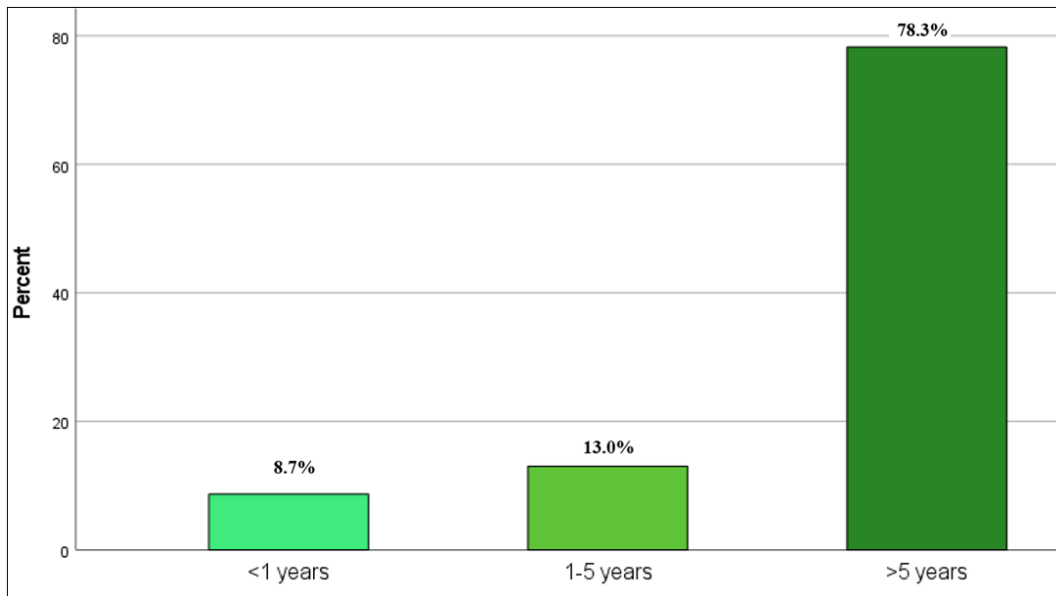


Figure 8: Living experience at kebele

Source: Own survey (August, 2023)

The analysis reveals that a significant majority, comprising over 78.3% of the selected respondents, have resided in Tullu Gurraacha kebele for more than 5 years. Most of the respondents have lived in the community for approximately 10-20 years and This substantial percentage suggests that the collected data can be deemed highly reliable for addressing the research problem, as these respondents possess valuable insights, hints, and clues regarding the open green spaces and their relation to the well-being of the residents. Furthermore, the figure indicates that the remaining frequency of respondents, in terms of their duration of residency, falls within the ranges of 1-5 years and less than 1 years, representing 13.0% and 8.7% of the respondents, respectively. By considering the duration of residency in Tullu Gurraacha kebele as illustrated in Figure10, it becomes evident that the selected participants bring a range of experiences and perspectives, making their contributions highly valuable in understanding the open green spaces and their impact on the well-being of the community residents.

4.1.5. Occupation status

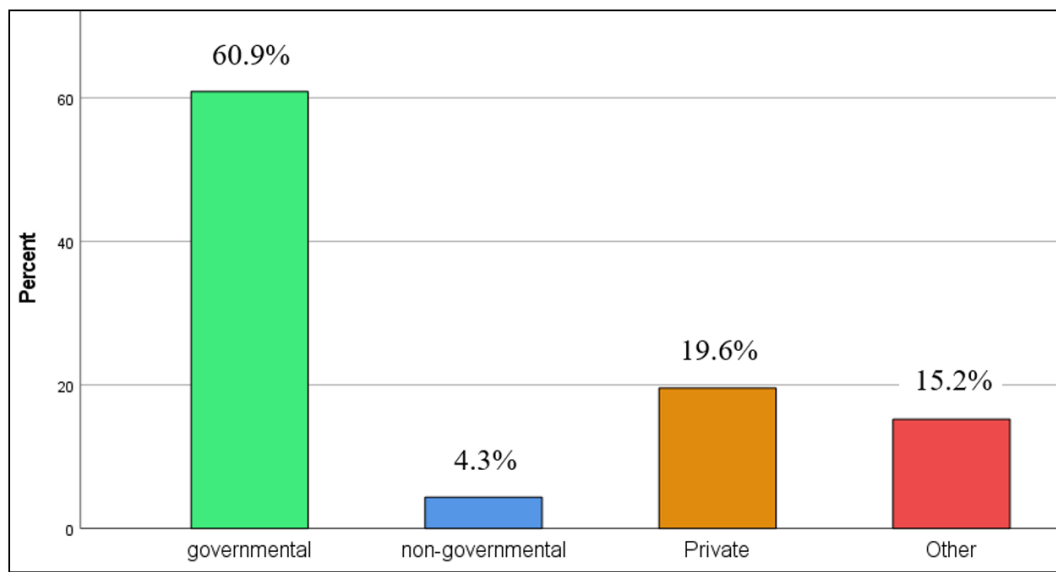


Figure 9: occupation status at kebele

Source: Own survey (August, 2023)

Job distribution among residents of Tullu Gurraacha kebele is presented as labelled in Figure 9. The largest segment of respondents, constituting over 60.9% of the total participants 56 are working in government sectors. Subsequently, respondents working in private sectors encompasses 18, representing 19.6% of the total. 14 residents representing 15.2% generates their means of living income either from farming, daily labour, or other and 4 residents representing 4.3% of the total sample are employee of non-governmental sector. This demographic segment constitutes a significant portion of the survey sample and further emphasizes the relevance of open green spaces to their well-being.

4.2. Spatiotemporal Situation of open green space at Gelan town.

4.2.1. Land use land cover Change (LULCC) of Green Spaces

Under this section, Land use land cover change of green spaces in relation with other land uses for four consecutive five years (2007, 2012, 2017 & 2023) was analysed. The current situation of green space in the study area explained based on the field observation data too.

Before commencing the analysis, it is crucial to understand the meaning of Land Use (LU) and Land Cover (LC) dynamics. Land use pertains to the process of managing and altering the natural environment or wilderness into a built environment, including settlements, and semi-natural habitats. Land cover refers to the physical material observed at the Earth's surface, including vegetation, water, soil, and man-made features. Land cover is subject to change over time due to natural or human factors.

4.2.2. Results of LULC maps of 2007 - 2023

The land cover maps were generated after running the classification algorithm for estimated maximum monitoring in 2007, 2012, 2017 and 2023, as shown in the figures below. These maps show built up areas in red, agricultural areas in dark green, open green area in light green, and vacant or bare land in broken yellow.

The evolution of the coverage of each category from 2007 to 2023 is clearly visible on the maps presented. At the beginning of 2007, Gelan town was a very small, scattered settlement, but a vast agricultural and open green area. However, based on 20 years of land use data, population or built-up areas are increasing at alarming rates, forcing uncontrolled urbanization.

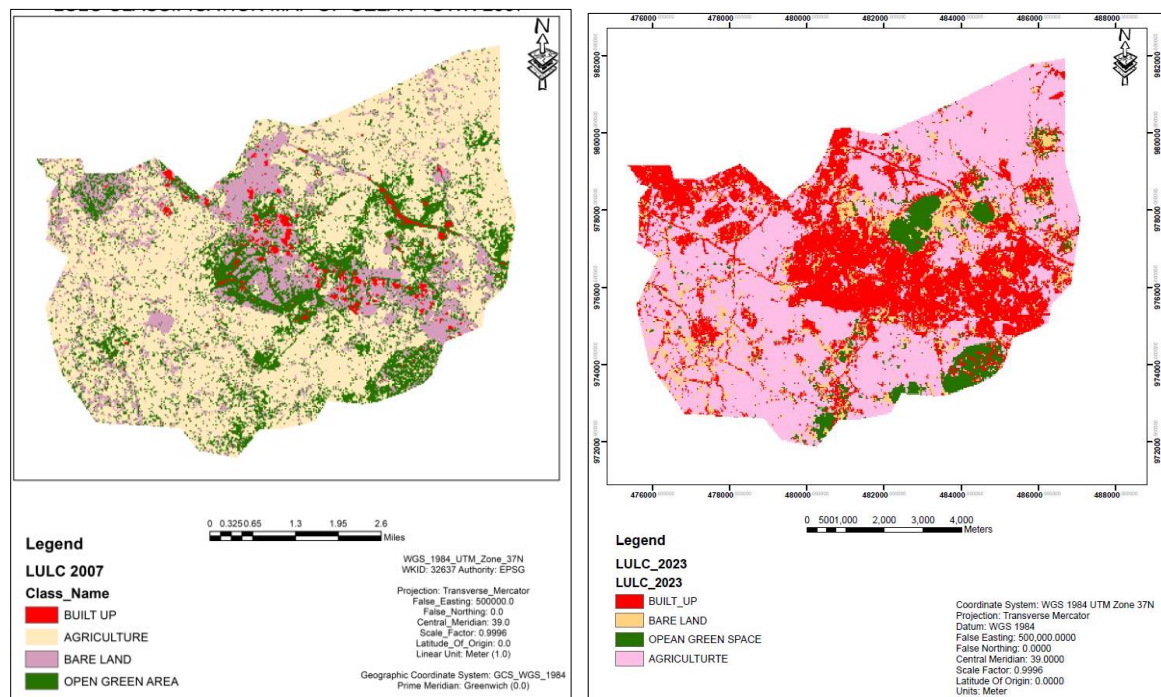


Figure 10: LULCC classification map of Gelan Town (left side=2007, right side=2023)

Source: Satellite image of year 2007, 2023 and processed by ERDAS

As illustrated in the table below the LULC change from 2007 to 2023 built up is increasing by 15.62 % , bare land is increasing by 14.35% and **open green space** is also increasing by 4.14%. on the opposite agriculture is reduced by 34.12% .

Land Use Land Cover Classification

The land use land cover characterization classification for the year 2007, 2012, 2017 and 2023 is produced and introduced consecutively as follows.

LULC of Gelan Town by 2007 Built Up inclusion is 19.97% from the absolute region, Bare Land is 24.45%, Agriculture covers 39.05%, and Open Green Space is 16.53%.

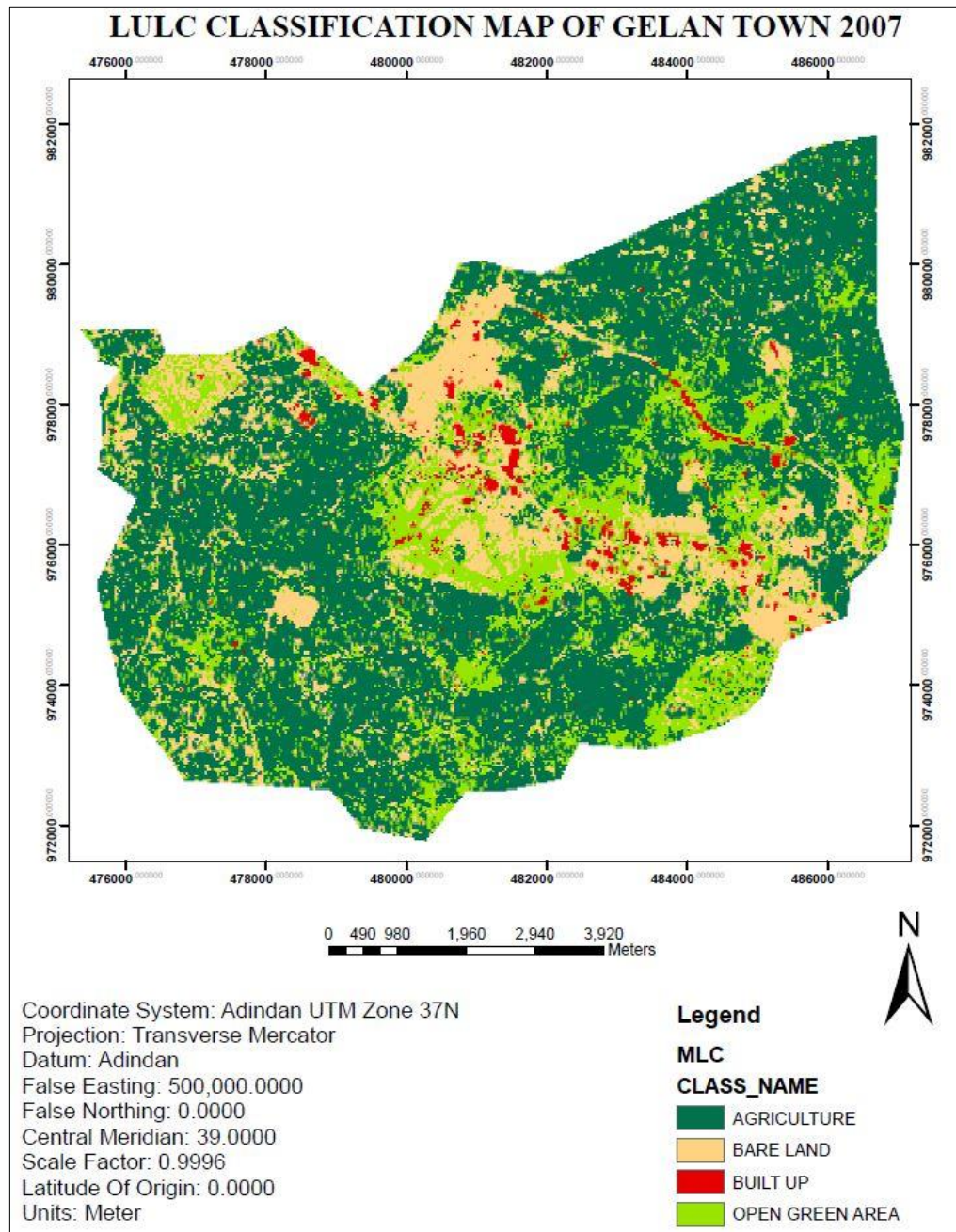


Figure11: LULC of Gelan Town 2007

Source: Satellite image of year 2007 and processed by ERDAS

LULC of Gelan Town by 2012 Built Up, inclusion is 21.02% from the absolute region, Bare Land is 27.42%, Agriculture covers 28.70%, and Open Green Space is 22.86%.

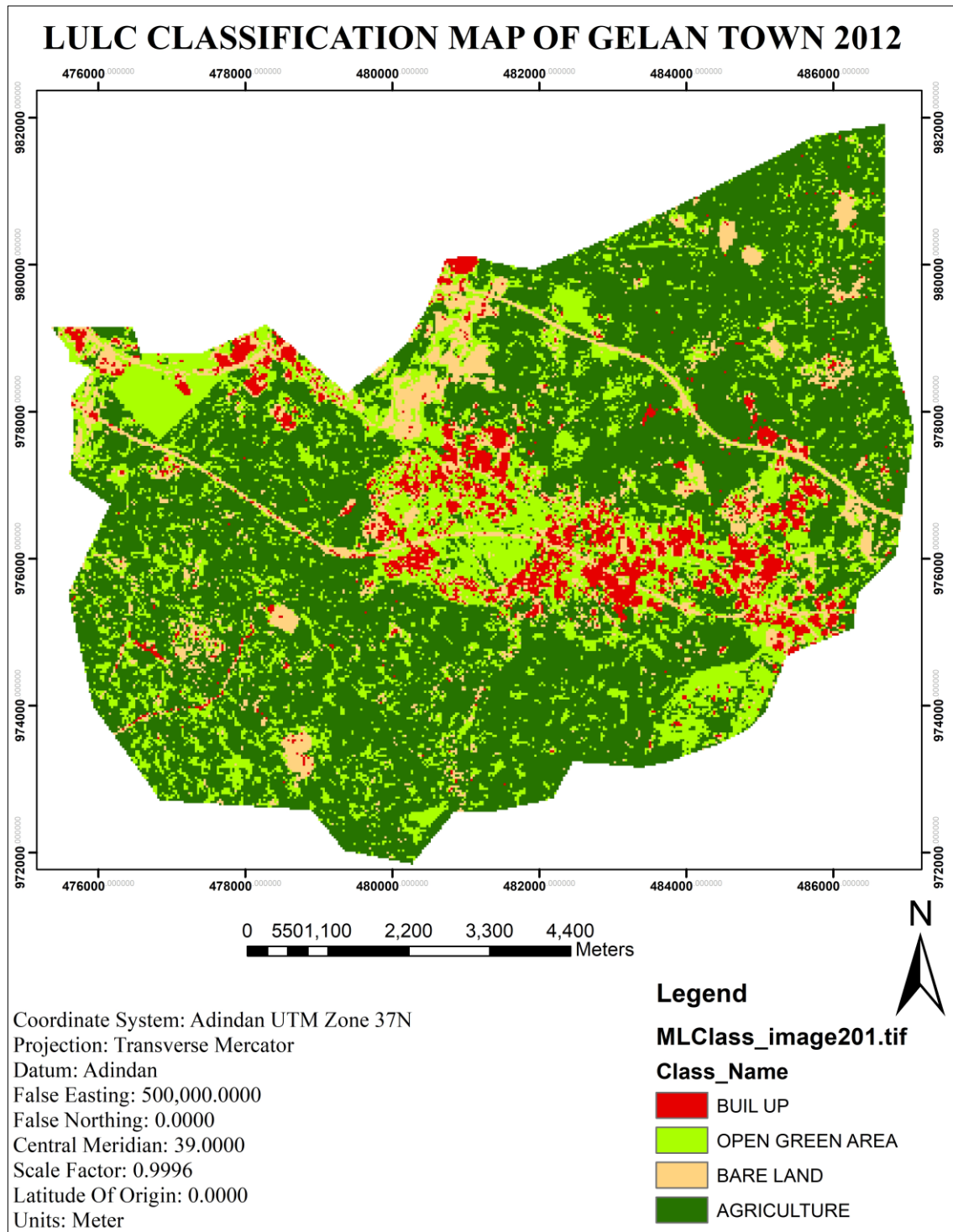


Figure12: LULC of Gelan Town 2012

Source: Satellite image of year 2012 and processed by ERDAS

LULC of Gelan Town by 2017, Built Up inclusion is 26.013% from the absolute region, Bare Land is 55.22%, Agriculture covers 5.557%, and Open Green Space is 13.208%.

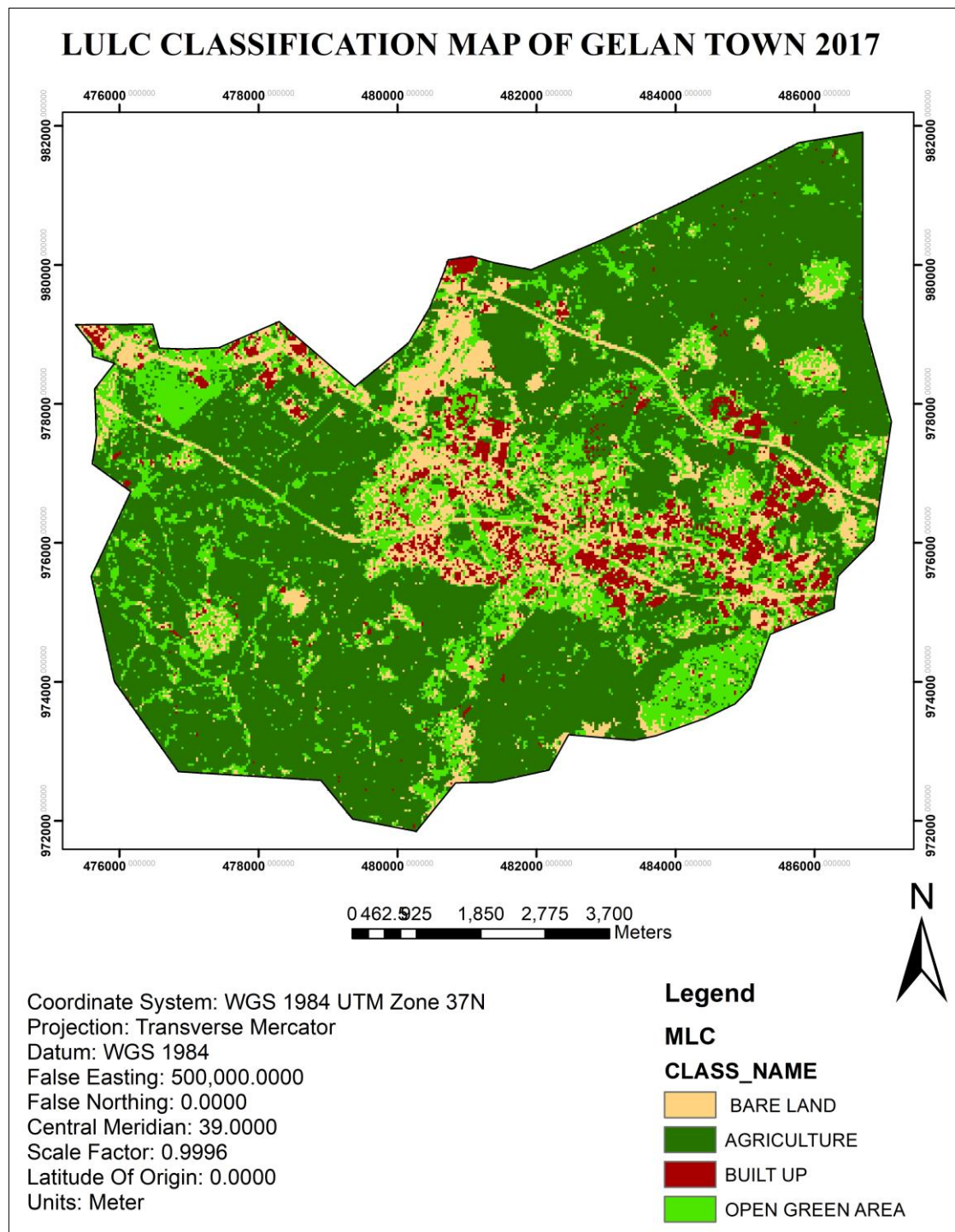


Figure13: LULC of Gelan Town 2017

Source: Satellite image of year 2017 and processed by ERDAS

LULC of Gelan Town by 2023 Built Up, inclusion is 35.593% from the absolute region, Bare Land is 38.801%, Agriculture covers 4.936%, and Open Green Space is 20.67%.

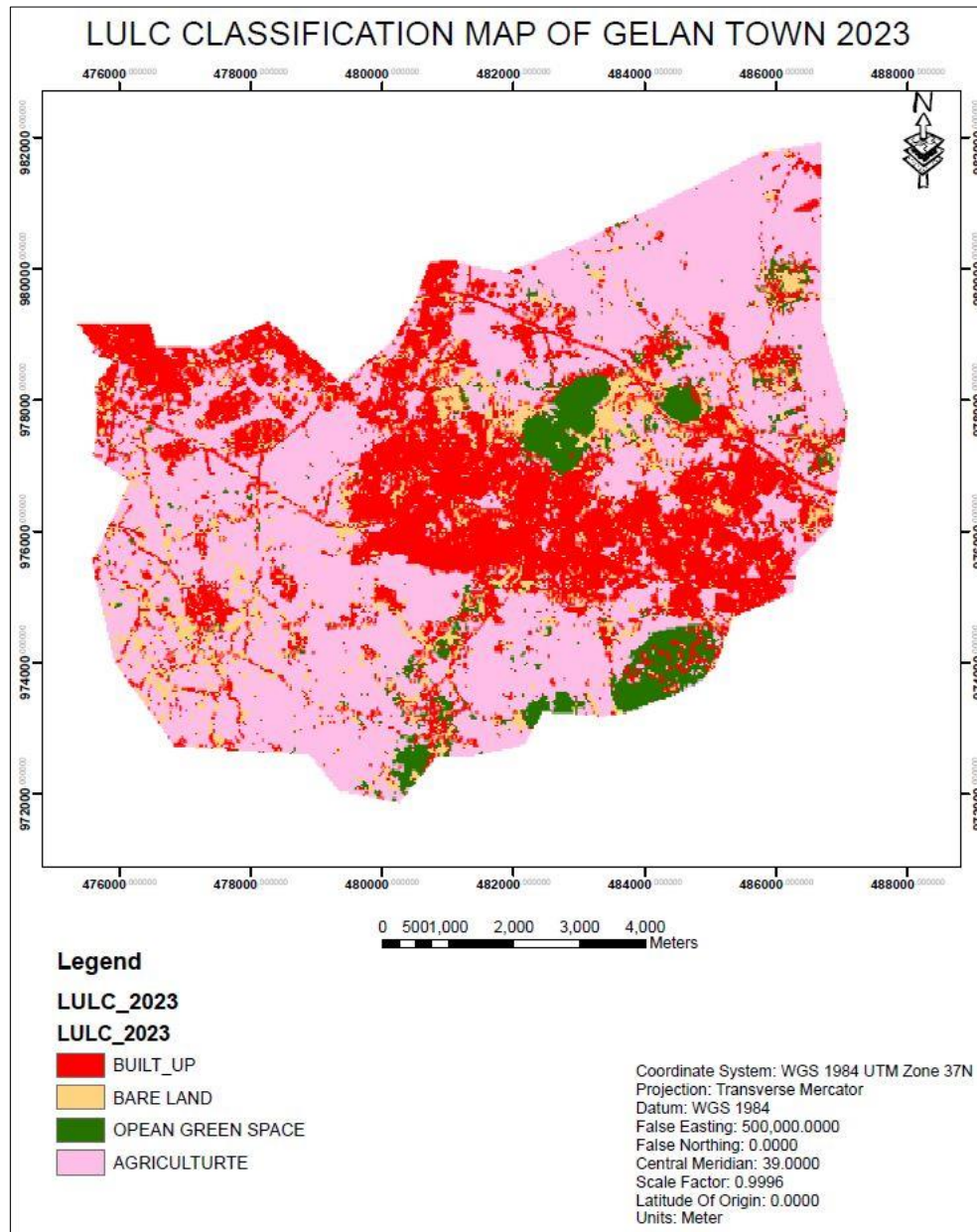


Figure14: LULC of Gelan Town 2023

Source: Satellite image of year 2023 and processed by ERDAS

4.2.3. Results of area coverage land use category in table (2007 – 2023)

As we can see the land use land cover change inclusion for over 15 years chosen report from the table four land class result is different in a given different example years. As per the result in the primary year, (2007) Agricultural area is high region inclusion and open green space is tiny covered, also (2012) again agricultural area is the maintained but functional vegetation and timberland coverage is reduced. In 2017, the outcome is

somewhat different from the results of 2007 and 2012; built up area/settlement and functional vegetation are almost on a similar level, yet the Agricultural area is declining. At last, in 2023 a sensational change is occurring that implies a high inclusion of settlement and immense loss of Agricultural area as it is displayed beneath. The aggregate sum of land use land cover order for every class in hectares is 270.45.

Table 6: LULC classification of 2007_2023 Area in hectares and percentage

Source: satellite image of years 2007 to 2023 and processed by MS. Excel

land use category	2007		2012		2017		2023	
	Area_hac	% age	Area_hac	% age	Area_hac	% age	Area_hac	% age
Built Up	54.01	19.97	56.83	21.02	70.301	26.01	96.23	35.59
Bare Land	66.12	24.45	74.16	27.42	149.24	55.22	104.90	38.80
Agriculture	105.62	39.05	77.86	28.70	15.014	5.557	13.85	4.94
Open Green Space	44.70	16.53	62.09	22.86	22.859	13.208	55.47	20.67
Total	270.45	100.00	270.45	100.00			270.45	100

4.2.4. Accuracy Assessments Results

The accuracy assessment of the land use land cover (LULC) map of Gelan town for the year 2007 was performed using a confusion matrix. The LULC map was derived from SPOT image using support vector machine algorithm. The LULC classes included built-up, agriculture, barren land, and open green spaces. The overall accuracy of the LULC map was 82.00% and the overall kappa statistics was -2.37, indicating a high agreement between the classified map and the reference data.

Table7: kappa coefficients of year 2007

Source: satellite image of years 2007 and processed by MS. Excel

Reference						
Object	Class name	Open green space	Built up	Agriculture	Bare land	Total
1	Open green space	1	0	0	27	28
2	Built up	26	5	4	6	41
3	Agriculture	12	54	4	2	72
4	Bare land	1	0	57	1	59
	TOTAL	40	59	65	36	200
Correctly classified		164	K= Observed Accuracy-Chance Agreement 1-Chance Agreement			
Total no- of reference point		200				
Over All accuracy		82.00				
Observed Accuracy		0.82				
Chance Agreement		1.59593				
Kappa (K)		-2.37				

This paragraph is an accuracy assessment of the land use land cover (LULC) classification of Gelan Town in Ethiopia for the year 2012. The LULC classification was based on satellite imagery analysis using ArcGIS software. The LULC classes included built-up, agriculture, barren land, and open green spaces. The overall accuracy of the classification was 76.00% and the overall kappa statistics was 1.42, indicating a high agreement between the classified map and the reference data.

Table8: kappa coefficients of year 2012

Source: satellite image of years 2012 and processed by MS. Excel

Reference						
Object	Class name	Open green space	Built up	Agriculture	Bare land	Total
1	open green space	20	0	0	0	20
2	biult up	0	27	1	0	28
3	agriculture	0	0	29	1	30
4	bare land	1	20	1	0	22
	total	21	47	31	1	100
Correctly classified		76	Observed Accuracy-Chance Agreement $K = \frac{\text{Observed Accuracy}}{\text{1-Chance Agreement}}$			
Total # of reference point		100				
Over All accuracy		76.00				
Observed Accuracy		0.76				
Chance Agreement		0.53436				
Kappa (K)		1.42				

The accuracy assessment of the land use land cover (LULC) map of Gelan Town in Ethiopia for the year 2017. The LULC classification was based on satellite imagery analysis using ArcGIS software. The LULC classes included built-up, agriculture, barren land, and open green spaces. The LULC classes included built-up, agriculture, barren land, and open green spaces. The overall accuracy of the classification was 100% and the overall kappa statistics was 0.83, indicating a high agreement between the classified map and the reference data

Table 9: kappa coefficients of year 2017

Source: satellite image of years 2017 and processed by MS. Excel

Object	Class name	Built up	Bare land	Open green space	Total
1	Built up	15	0	0	15
2	Bare land	0	15	0	0
3	Open green space	0	0	20	0
	TOTAL	15	15	20	15
Correctly classified		50			
Total no- of reference point		50			
Over All accuracy		100			
Observed Accuracy		1			
Chance Agreement		0.08500			
Kappa (K)		0.83			

Finally, the accuracy assessment of the land use land cover (LULC) map of Gelan Town in Ethiopia for the year 2023. The LULC classification was based on satellite imagery analysis using ArcGIS software. The LULC classes included built-up, agriculture, barren land, and open green spaces. The overall accuracy of the classification was 91.97% and the overall kappa statistics was 0.90, indicating a high agreement between the classified map and the reference data

Table 10: kappa coefficients of year 2023

Source: satellite image of years 2023 and processed by MS. Excel

Reference						
Object	Class name	Open green space	Built up	Agriculture	Bare land	Total
1	Built up	10	0	0	0	10
2	Agriculture	0	26	1	0	27
3	Bare land	0	0	21	0	21
4	Open green space	0	1	4	10	15
	Total	10	27	26	10	73
Correctly classified		67	Observed Accuracy-Chance Agreement $K = \frac{\text{Observed Accuracy}}{1 - \text{Chance Agreement}}$			
Total # of reference point		73				
Over All accuracy		91.79				
Observed Accuracy		0.9179				
Chance Agreement		0.18100				
Kappa (K)		0.90				

4.2.5. Change detection

Understanding that change detection is the identification of variation in land use land cover category based on the observation of a specific area in a different time by using multi-temporal data sets from satellite images. In the study, this method was used to analyze classified images for each year (2007 and 2012), (2012 and 2017), and (2007 and 2023)

a. Land use land cover change between 2007 and 2012

Based on output below the LULC change from 2007 to 2012 built up is increasing by 1.05%, bare land is increasing by 2.97% and open green space is also increasing by 6.33%. On the opposite agricultural land is reduced by 10.35% respectively as shown in the following table and graph.

Table 11: LULC of 2007_2012 Change detection Area in hectares and percentage

Source: satellite image of years 2007, 2012, and processed by MS. Excel

land use category	2007		2012		Change 2007_2012	
	Area_hect	% age	Area_hect	% age	Area_hect	% age
Built Up	54.01	19.97	56.83	21.02	2.82	1.05
Bare Land	66.12	24.45	74.16	27.42	8.04	2.97
Agriculture	105.62	39.05	77.86	28.7	27.76	10.35
Open Green Space	44.7	16.53	62.09	22.86	17.39	6.33
Total	270.45	100	270.45	100		

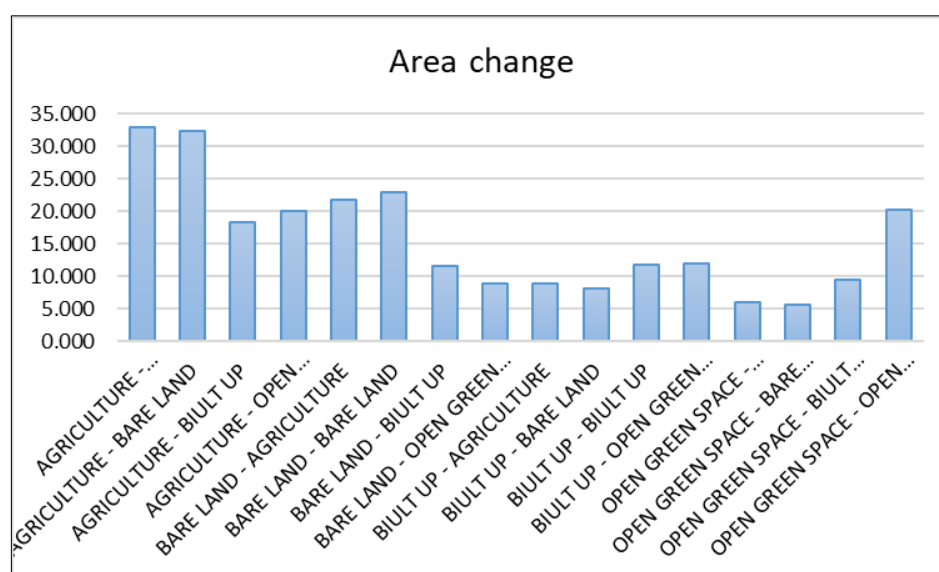


Figure15: Graphs of LULC 2007_2012

Source: satellite image of years 2007, 2012, and processed by MS. Excel

b. Land use land cover change between 2012 and 2017

Based on output below the LULC change from 2012 to 2017 built up is increasing by 5.017%, and bare land is increasing by 27.77%. On the opposite open green space is reduced by 9.527% and agricultural land is reduced by 23.24% respectively as shown in the following table and graph.

Table 12: LULC of 2012_2017 Change detection Area in hectares and percentage

Source: satellite image of years 2012, 2017, and processed by MS. Excel

land category use	2012		2017		Change 2012_2017	
	Area_h ect	% age	Area_h ect	% age	Area_h ect	% age
Built Up	56.83	21.02	70.301	26.04	13.471	5.017
Bare Land	74.16	27.42	149.130	55.19	74.970	27.765
Agriculture	77.86	28.7	15.014	5.46	62.846	23.24
Open Green Space	62.09	22.86	36.009	13.33	26.081	9.527
Total	270.45	100	270.454	100		

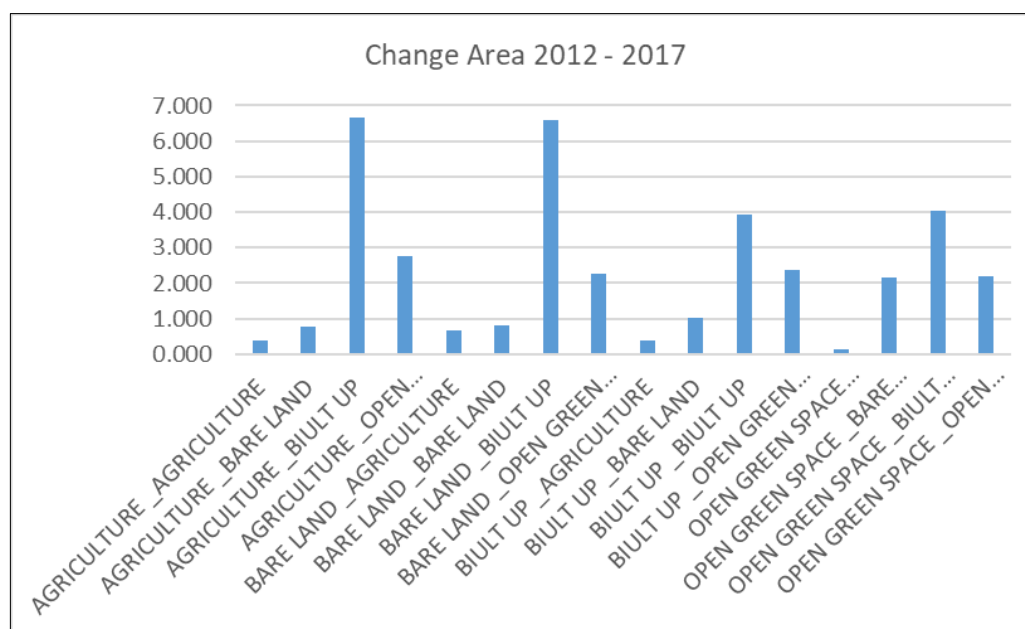


Figure 16: Graphs of LULC 2012_2017

Source: satellite image of years 2012, 2017, and processed by MS. Excel

c. Land use land cover change between 2017 and 2023

Based on output below the LULC change from 2017 to 2023 built up is increasing by 5.017%, and bare land is increasing by 27.77%. On the opposite open green space is reduced by 9.527% and agricultural land is reduced by 23.24% respectively as shown in the following table and graph.

Table 13: LULC of 2017_2023 Change detection Area in hectares and percentage

Source: satellite image of years 2017, 2023, and processed by MS. Excel

land use category	2017		2023		Change 2017_2023	
	Area_hect	% age	Area_hect	% age	Area_hect	% age
Built Up	70.301	26.037	96.232	35.593	25.931	9.556
Bare Land	149.130	55.185	104.901	38.801	44.229	16.384
Agriculture	15.014	5.46	13.845	4.936	1.169	0.524
Open Green Space	36.009	13.333	55.472	20.67	19.463	7.337
Total	270.454	100.015	270.45	100		

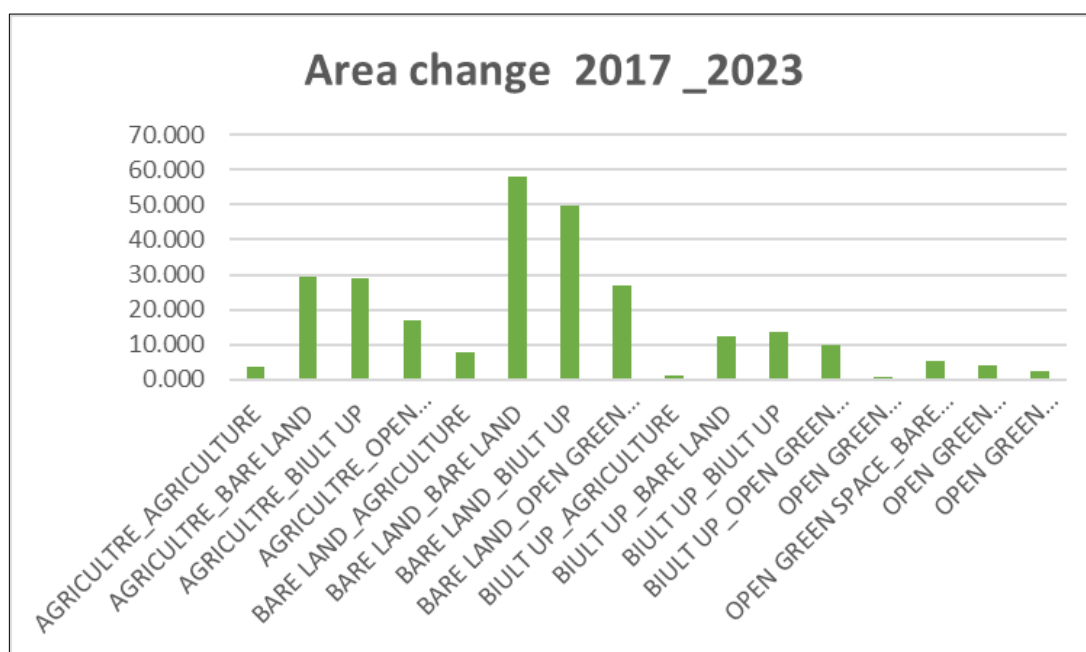


Figure17: Graphs of LULC 2017_2023

Source: satellite image of years 2017, 2023, and processed by MS. Excel

d. Land use land cover change between 2007 and 2023

Based on output below the LULC change from 2007 to 2023 built up is increasing by 15.62 % , bare land is increasing by 14.35% and **open green space** is also increasing by 4.14%. on the opposite agriculture is reduced by 34.12% respectively as shown in the following table and graph.

Table 14: LULC of 2007_2023 Change detection Area in hectares and percentage

Source: satellite image of years 2007, 2023, and processed by MS. Excel

land use category	2007		2023		Change 2017_2023	
	Area_hect	% age	Area_hect	% age	Area_hect	% age
Built Up	54.01	19.97	96.232	35.593	42.222	15.62
Bare Land	66.12	24.45	104.901	38.801	38.778	14.35
Agriculture	105.62	39.05	13.845	4.936	91.772	34.12
Open Green Space	44.70	16.53	55.472	20.67	10.768	4.141
Total	270.45	100.00	270.45	100		

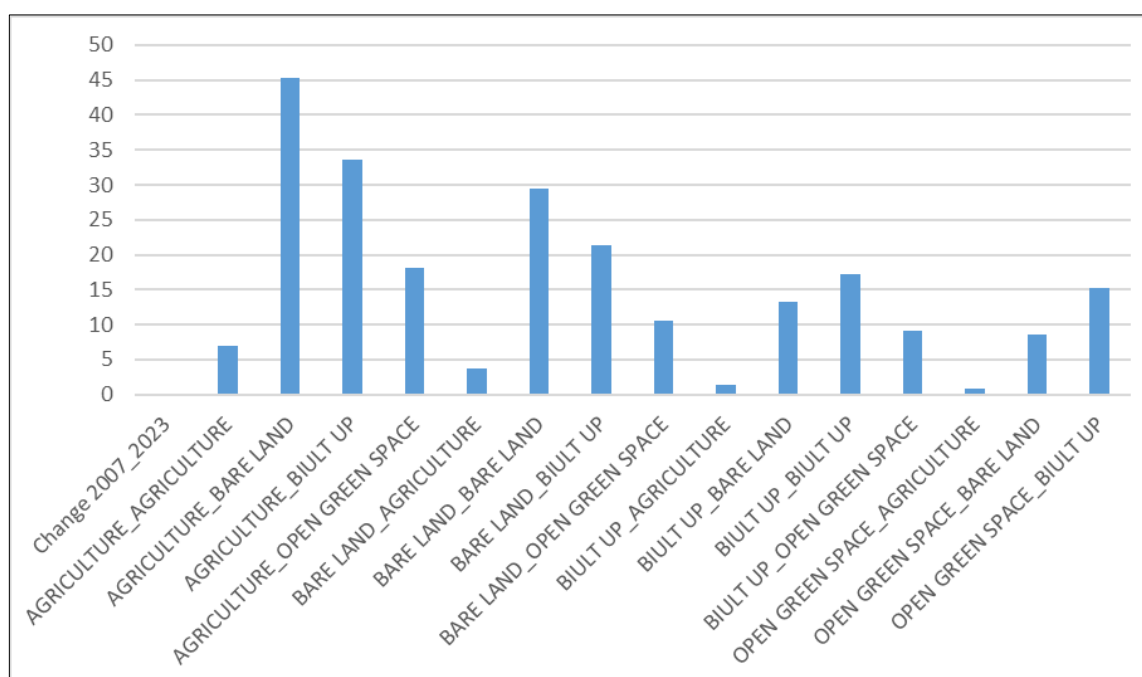


Figure18: Graphs of LULC 2007_2023

Source: satellite image of years 2007, 2023, and processed by MS. Excel

4.2.6. The driving factors for change in green space in Tullu Guracha kebele.

This study suggests that the heterogeneity and richness of urban green spaces are often neglected, and their contribution to the well-being of the community is ignored within current urban planning instruments in Tulu guracha kebele. However, the study does not provide specific information on the current state of open green spaces in gelan town. The most common types of open green spaces in study area include: Parks, Community gardens, and Playgrounds. Observation data of each illustrated as the following.

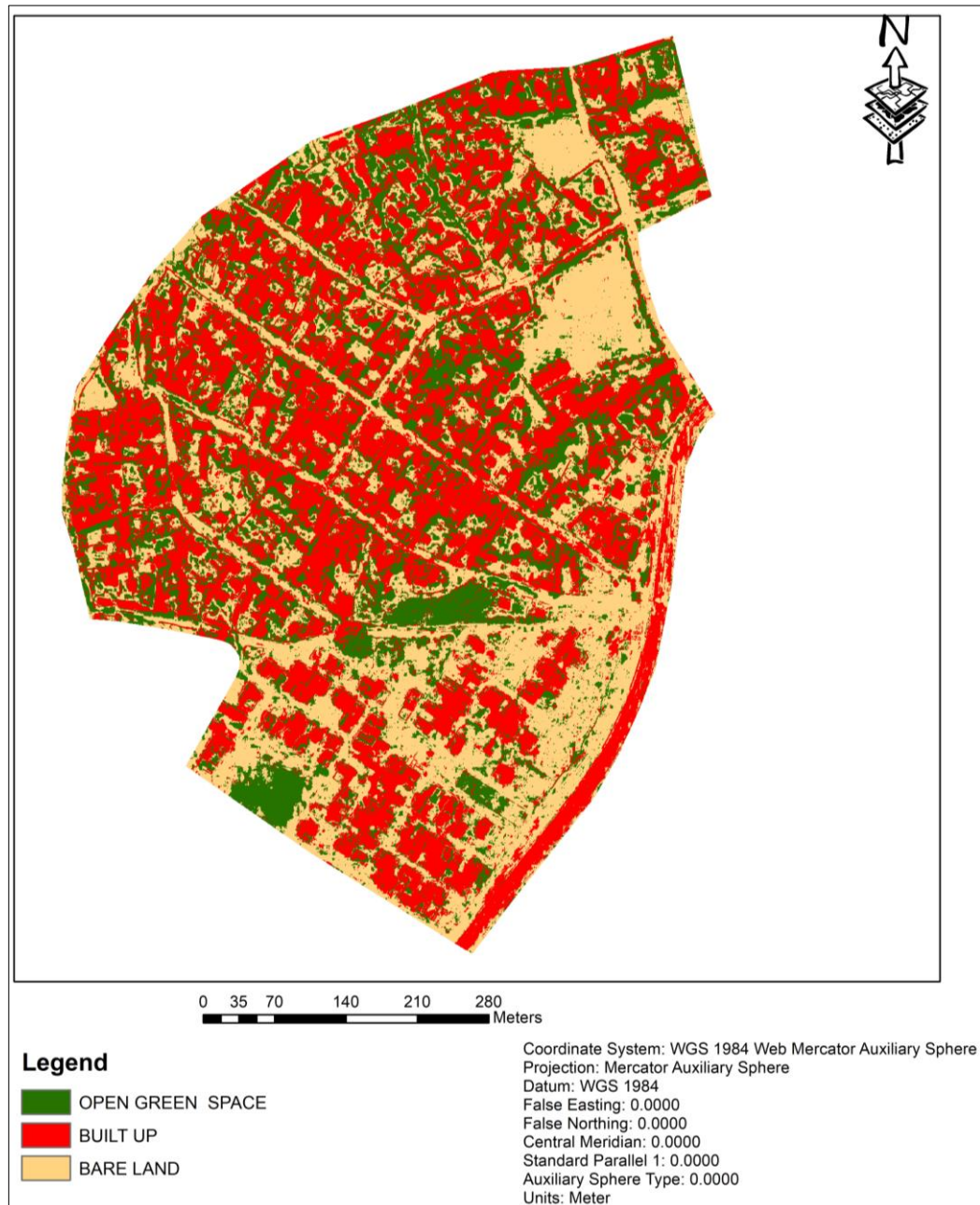


Figure 19: existing condition of study area

Source: Satellite image of year 2023 and processed by ERDAS

Driving factors for change in green space in the Gelan Town mainly in study area attributed to the following factors, including:

- Physical expansion of the built-up area that encroaching on green spaces and affecting their availability.
- Population growth which puts pressure on the available green spaces, making it difficult to provide adequate recreational areas for residents.
- High land value that can lead to the conversion of green spaces for development purposes, reducing their availability for public use.
- Laxity in the enforcement of planning regulations: Weak enforcement of planning regulations can contribute to the loss of green spaces in urban areas.
- Migration, which can lead to the formation of new towns and the need for green spaces in these emerging areas.
- Less consideration to urban spatial planning and land-use management: this, lead to challenges related to urbanization and the loss of green spaces.
- Proximity to settlement areas: The distance between green spaces and settlement areas is a critical factor, as it affects the availability of green spaces for public use. Unclear criteria in defining urban areas:
- The lack of clear criteria for defining urban areas in Ethiopia can lead to the spontaneous emergence of towns and the loss of green spaces in these areas.

The most common types of open green spaces in study area include: Parks, Community gardens, and Playgrounds. Observation data of each green spaces illustrated as the following.

Parks: These are designated areas of land for public recreation, often featuring grass, trees, and amenities such as benches. It also includes Natural areas such as undeveloped or minimally developed green spaces.



Figure 20: existing parks in study area

Source: Own survey (November, 2023)

Community gardens: These are spaces where residents can grow their own greenery in order to access to fresh produce. Linear stretches of Green corridors, such as tree-lined streets or pathways are experienced.



Figure 21: existing garden in study area

Source: Own survey (November, 2023)

Playgrounds: Specifically designed for children, that include equipment such as swings, slides, and climbing structures and football area.



Figure 22: existing playground in study area

Source: Own survey (November, 2023)

The area appears neglected, with overgrown vegetation, unkempt pathways, and broken amenities. This state of disrepair may deter residents from utilizing the space and limit their ability to fully enjoy the benefits of the green area. Efforts to improve maintenance and restore the functionality of the open green space would be essential to revitalize this area and enhance its contribution to residents' well-being. The lack of maintenance and functionality hinders the green space's potential contribution to the well-being of the residents. The

overgrown vegetation gives the impression of neglect and may make the space appear less inviting and less safe for use. Unkempt pathways make navigation difficult and can pose safety hazards. Broken amenities further diminish the usability of the green space, preventing residents from engaging in recreational activities or finding respite in nature. To revitalize the open green space and maximize its potential, it is crucial to prioritize maintenance efforts and restore its functionality.

4.3. Open green space and the wellbeing of the community

4.3.1. Quantitative data Analysis

In this study's analysis, Scores for each item used to rank the participants reply for domains of Open Green Areas in Relation with the Wellbeing of Urban Residents. This analysis used to draw conclusions about a population based on sample data. The summary column explains and examine response on variables.

Table 15: Respondents' feedback on analysis

Source: Own data analysis, 2023/2024

Questionnaires on Variables	Respondents		summary
	#	%ge	
Knowledge gap of OGS	72	78.3	Most of participants knows about OGS
Understanding health benefits of OGS	60	65.2	More than half of respondents have understanding about health benefits of OGS
spending time for Physical health	12	13.0	Most of them do not have time for exercise to improve their physical health
spending time for Mental Health	22	23.9	Only some of participants do exercise to improve their mental health
spending time for social health	18	19.6	Almost all of residents do not have good social integration within each other
Activity perspective	86	93.5	Almost all of participants do here and there.
Challenges	56	60.9	There are various challenges
less Accessible	81	88.0	Less accessibility of OGS is one of challenge raised by respondents
Suggestion on Awareness gap	54	58.7	More than half of respondents suggested on necessity Awareness gap improvement
Suggestion on Availability & Accessibility	67	72.8	Most of respondents suggested on OGS Availability & Accessibility improvement
suggestion on Quality	70	76.1	Quality issue raised by most of respondents
suggestion on Activity	71	77.2	Activity improvement issued by most of them
suggestion on Challenging factors	83	90.2	Almost all of participants suggested on how to improve Challenging factors

4.3.2. Results from qualitative data analysis

From aimed 7 Interview participants I have taken minutes with all of them. From my respondents six are professionals such as urban planners, architects, engineers and environmentalist. The one of them is politician.

Researcher summarizes the research interview respondents' perspectives and ideas based on the interview questions flow: Most of them has knowledge about greenery, recreation centers, and sport. In addition, almost more than half of my interview respondents understands relationship of Open Green Areas with their Wellbeing. Their response on Situational Analysis of Open Green Areas in Relation to the Wellbeing of Urban Residents discussed by variables sub-heading as follows.

Awareness on Open Green Space and its wellbeing benefits:

They voiced worry about the current infrastructure condition and suggested that it needed to be up graded and improved. To make tulu guracha green areas more attractive and improve health of the residents all must be work together and upskilled.

Availability of Open Green Space:

We observed that open green areas are not evenly distributed throughout the kebeles. Some areas have an abundance of green spaces, while others have nothing access. This spatial inequality can impact residents' well-being, as those in underserved areas may have reduced access to nature's benefits.

The size and variety of open green areas vary considerably. In some neighborhoods, residents have access to large gardens, or nature reserves, while in others, the available green spaces might be smaller tree-lined streets. The diversity in green spaces caters to different preferences and recreational needs.

Accessibility of Open Green Space:

Proximity to open green areas emerged as a significant factor. Residents living in close proximity to green spaces reported higher utilization rates and perceived well-being benefits. However, those living further away faced challenges in accessing these areas, especially without reliable public transportation.

Quality:

The quality of open green areas plays a vital role in determining their impact on the well-being of urban residents in Gelan town. Urban planners and policymakers should prioritize regular maintenance, thoughtful landscape design, the provision of amenities, and efforts to make these spaces inclusive and engaging. By improving the quality of green areas, the city can create environments that promote physical and mental well-being, foster a sense of community, and contribute to a higher quality of life for all residents.

Activity:

Many residents used green spaces as places for quiet contemplation, nature appreciation, and relaxation. These activities were associated with reduced stress levels and enhanced mental well-being. Residents found solace in the natural surroundings, such as sitting by a pond or reading under a shaded tree. Artistic and cultural activities, such as outdoor art exhibitions, musical performances, and cultural festivals, took place in green areas. These activities enriched the cultural fabric of the city and provided opportunities for creative expression and cultural engagement, positively impacting residents' well-being. Recognizing the importance of these activities in green spaces, urban planners and policymakers can design and manage these areas to maximize their potential in promoting the well-being and quality of life for all.

Challenging factors:

While open green areas have the potential to significantly enhance the well-being of urban residents in Tulu Guracha, several challenges must be addressed to maximize their benefits. These challenges include unequal distribution, maintenance issues, safety concerns, accessibility barriers, cultural norms, economic disparities, and environmental sustainability. Identifying and mitigating these challenges is essential for creating equitable and well-maintained green spaces that can positively impact the well-being of all residents in the city.. According to the results of the interviews, maintenance or cleanliness of the open green areas are essential to well being of the residents in tuluguracha district as well guests come to the area. Additionally, to attract investors, upgrading Economy and citizen involvement noted as crucial elements for creating inclusive and long-lasting sustainable area. Also praised were the state of technology and the city's dedication to environmental sustainability. However, a lack of financing and technological readiness became important obstacles.

Benefit of open green space on the wellbeing of residential dwellers.

As per the data collected from Tullu Gurraacha kebele sampled residence they understood as open green space have a significant correspondence with social wellbeing. Open green spaces have a significant impact on the wellbeing of residential dwellers. Based on the research results, the following are some benefits of open green spaces on the wellbeing of residential dwellers:

Physical health: Open green spaces provide opportunities for physical activity, which can improve overall physical health. They create environments that support active lifestyles and improve access to exercise opportunities.

Mental health: Open green spaces have been linked to improved mental health and wellbeing. Green spaces can lower levels of stress and reduce rates of depression and anxiety.

Community engagement: Open green spaces provide opportunities for community engagement and social interaction.

Reducing health inequalities: Green spaces can help reduce the health inequality between high and low-income groups

In summary, the respondents from Tullu Gurraacha Kebele concur with the idea that exposure to nature in open green spaces has a positive impact on cognitive function. They recognize that these spaces offer a respite from the urban environment, allowing individuals to recharge their cognitive resources and improve their attention span, focus, concentration, and creativity. The presence of green spaces provides an opportunity to connect with nature and experience the mental benefits it offers, contributing to improved cognitive well-being.

4.3. Summary of analysis from observations and focus group interview

The research findings, derived from observations, focus group interview (FGIs) with Tullu Guracha Kebele officers, highlight the disparity between the existing condition of open green spaces in Tullu Guracha and the Ethiopia National Urban Green Infrastructure Standard. These findings offer valuable firsthand information about the real situation on the ground. Let's delve into a discussion that expands upon the research findings:



Figure 23: study area observation

Source: Own survey (November, 2023)

The findings from the research clearly indicate a significant misalignment between the current state of open green areas in Tullu Guracha and the guidelines outlined in the Ethiopia National Urban Green Infrastructure Standard. The standard, which was implemented in November 2015, primarily emphasizes the importance of greening and landscaping open spaces in residential areas.

One important aspect underscored in the standard is the significance of creating a peaceful and comfortable environment for residents through the greening and landscaping of open spaces. However, the research findings reveal a dearth of amenity green spaces within Tullu Guracha, resulting in limited access to such environments for the residents. This finding highlights the urgent need for competent authorities and stakeholders to address this issue by implementing greening and landscaping initiatives. Doing so will help establish the desired open green spaces outlined in the standard, ultimately enhancing the overall living conditions for the residents.

The research's findings provide important light on the connection between public green spaces and social wellbeing. Participants agreed that the social wellbeing of locals is significantly impacted by the existence of green spaces in urban settings. They understood that green areas serve as gathering places, encouraging social interactions, community

cohesion, and a sense of belonging while also providing more chances for social contacts and better mental health.

Different types of green areas, such as parks, gardens, and forests, were seen to have distinct effects on social well-being. Participants highlighted the crucial role of factors like accessibility, safety, and maintenance in influencing the impact of green spaces on social well-being. Easy access, well-lit pathways, and proper maintenance were deemed essential for creating inviting environments conducive to social engagement. The findings also emphasized the significance of key spatial characteristics of open green areas: size, design, amenities, and proximity to residential areas, in shaping positive social well-being outcomes.

Utilizing Geographic Information Systems (GIS) and other spatial analysis tools was seen as valuable in mapping and analyzing the distribution and accessibility of open green areas, allowing for a better understanding of their relationship to social well-being outcomes. Incorporating spatial analysis into the planning and design of open green areas was recognized as crucial for maximizing their potential positive impact on social well-being. Factors like land use, zoning regulations, and transportation infrastructure were identified as influential in determining the spatial distribution and accessibility of green spaces, highlighting the importance of thoughtful planning and equitable distribution. Monitoring and evaluating the impact of spatially analyzed open green areas on social well-being was considered vital, utilizing indicators, surveys, and user feedback to inform future planning and design decisions.

Accessibility and inclusion are additional crucial elements emphasized in the standard. It stresses the importance of making open spaces within administrative and commercial compounds accessible to all, including individuals with disabilities. Nevertheless, the research findings indicate a lack of accessible green open spaces in Tullu Guracha, deviating from the standard's guidelines. This discovery underscores the significance of incorporating accessibility features such as ramps, pathways, and facilities within the open spaces. These measures will create inclusive environments that promote the well-being and participation of all residents, regardless of their physical abilities.

The standard emphasizes the provision of facilities within open spaces, including play items, playgrounds, and amenities tailored to mass housing without private plots. However, the research findings indicate a deficiency of such facilities within the open spaces of Tullu Guracha. This discovery suggests the need to prioritize the integration of these amenities to enhance recreational opportunities and community engagement. By providing these

facilities, competent authorities can improve residents' quality of life and foster a sense of community within the area.

There is a consensus that the existing open green areas are insufficient to meet the needs of the growing population. Regarding facilities, some participants mentioned the presence of playgrounds with swings, slides, and seating areas in certain green spaces. However, there were also concerns about the lack of proper maintenance, resulting in issues such as overgrown vegetation and inadequate lighting, particularly at night.

In terms of social and cultural events, participants highlighted the importance of open green spaces as venues for community gatherings, picnics, and festivals. However, they also expressed the need for larger public green spaces to accommodate such events, as the current areas often become overcrowded. From a personal perspective, participants discussed how they utilize the open green spaces for their psychological well-being, including activities such as walks, relaxation, and engagement in meditation. They emphasized the positive impact of being surrounded by nature and the fresh air in these areas on their stress levels and overall mood.

Participants also stated that having access to open green space encourages them to engage in physical activities like jogging, playing sports, and exercising, which benefits their personal health. A healthy lifestyle and enhanced well-being are facilitated by the natural surroundings and chances for outdoor recreation in the green spaces. Participants noted a sense of community and fruitful social interactions taking place in the open green spaces when it comes to social well-being. They also emphasized how kids routinely use the parks and other green places for play and relaxation, which helps young people in the neighborhood form social bonds.

4.6. Strategies for improving and development of open green space in Gelan town.

The mentioned strategies are considered as a recommendations that the Gelan city administration can be used in the future. These strategies are:

- ❖ **Policy implementation:** The city needs to implement policies that promote the creation of public spaces and parks, such as the Environmental Policy of Ethiopia and the Urban Greenery and Beautification strategy, to develop green spaces that reduce environmental degradation.

- ❖ **Integrated management:** The town needs to establish integrated green space management that encompasses additional recreational areas and focuses on long-term design and to ensure sustainability.
- ❖ **Conducting a GIS-based multi-criteria analysis:** A GIS-based multi-criteria analysis can be used to select potential sites for green spaces in Gelan town. This analysis can assist in an effective planning process of green areas in the town.
- ❖ **Investment in green and blue infrastructure:** Investment in green and blue infrastructure can bring multiple benefits, such as addressing urgent water supply challenges, flood risks, air quality, and heat, enhancing biodiversity, creating new livelihood opportunities, and improving residents' overall well-being and social cohesion. This can be achieved by developing vegetated road buffers, which can improve the aesthetic quality, air quality and reduce noise.
- ❖ **Involvement of the local community:** involvement of the local community in the development and management of open green spaces can help ensure their sustainability. The local community can be involved in the planning, implementation, and maintenance of green spaces.

CHAPTER FIVE:

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusion

In conclusion, the research findings derived from observations and interviews with Tullu Guracha Kebele officers shed light on the misalignment between the current state of open green areas in Tullu Guracha and the Ethiopia National Urban Green Infrastructure Standard. The concerns raised by participants regarding the limited size, inadequate maintenance, and shortage of recreational facilities reflect the need for improvement. The absence of amenity green spaces, the lack of accessibility, and the inadequate provision of facilities hinder the well-being and quality of life of urban residents in Tullu Guracha. Addressing these discrepancies requires prioritizing the implementation of the standard by creating amenity green spaces, ensuring accessibility, and providing necessary facilities within the open spaces of Tullu Guracha. These efforts will contribute to enhancing the well-being of residents and creating a more sustainable and inclusive living environment in accordance with the national standard.

The research findings show that a total of 92 questionnaires were distributed among residents of Tullu Gurraacha kebele in Galan town. An outstanding response rate of 100% was achieved, with 92 completed questionnaires suitable for analysis. This high response rate demonstrates the strong engagement and cooperation of the participants, indicating their commitment to the study.

The situational analysis of open green areas in relation to the wellbeing of urban residents suggests that urban green spaces have the potential to support positive emotional and mental wellbeing, reduce stress, and provide health benefits. However, access to urban green space is not equitable, and disparities exist based on socioeconomic status and less consideration given by stakeholders.

The study findings revealed that Tullu Gurraacha Kebele residents strongly believe that open green spaces have numerous benefits for their well-being. The main findings of the study on open green areas and urban residents' wellbeing are discussed under the following five components of human well-being:

Physical well-being: A positive relationship has shown in a cross-sectional study conducted in tullu guracha district of Gelan town to explore relationships between open green space and human well-being. The study concluded that urban green spaces positively interact with human health and save the human body from different diseases. Even a weekly visit to green spaces has positive effects on the human body. The study concluded that low air quality and high temperatures negatively affect human health. In contrast, the frequent visit and maximum time consumption in the green environment resulted positively for human physical health in Tulu guracha, and these results have obtained during a cross-sectional study based on 92 respondents. The proximity of green spaces provides maximum benefits to humans, and 300 m is an ideal range of access suggested for taking full benefits.

The study concluded that cleanliness has strong positive relations with general health. The study resulted that poor human health was reported where the green spaces were not properly managed and cleaned. A study directed to assess Gelan city resident's level of satisfaction with urban green spaces for human well-being. The results showed that the people who live within 1–5 km zone and regular visitors of public green spaces are found more physically and mentally fit and healthier than 5–10 zone residents.

Psychological well-being: The impacts of green spaces on human psychological health and well-being differ with green spaces' quality, availability and accessibility. Several human benefits are closely associated with nature, and the closeness of green spaces from home or workplace has positive effects. In this way, visitors release stress and boost up their psychological health. Therefore, green parks with numerous trees and flowers are recommended by studying mental stress recovery and aesthetic preference. Furthermore, urban green spaces promote social interaction, which helps to enhance psychological well-being.

Mental well-being: The study concluded that green spaces improve human mental health, reduce anxiety and release human depression during interaction of green spaces, clean the air, reduce noise, provide spaces for physical activities and social interaction.

The presence of green space in the neighbourhood or within walking distance (maximum 1.5 km by WHO) is essential for human mental well-being. Quality, size, and cleanliness were found significant concerning human health. The accessibility of green spaces is essential in urban areas within the free range (400–1600 m) for different buffer zones. The study found positive relations between green spaces and mental well-being in Gelan city.

Social well-being: Recreational activities in urban parks provide an opportunity for social interaction and create better social cohesion. Frequent use of urban parks reduces the stress level in the human body. The results showed strong positive relationships between urban parks and overall well-being.

Environmental well-being: The study found that the highest satisfaction with urban parks resulted positively. The presence of vegetation at the street-level serves as a ventilator by filtering air, reducing temperature with shades, providing social interaction, and regulating the local climate. In this way, green spaces serve by improving humans' social and natural environment.

Vital Respondents suggestion and review findings are also discussed as following:

- ✓ Spending more time in green spaces is associated with increased self-satisfaction and social interaction, which can improve residents' environmental satisfaction and sense of social satisfaction and happiness in life.
- ✓ Green areas can improve general well-being, self-perceived health status, and increase physical activity, which can lead to positive health outcomes.
- ✓ Access to urban green space is not equitable, with disparities based on socioeconomic status.
- ✓ Types of green space should be considered individually rather than aggregated as 'simply green' and 'size' of forest in urban areas, and the quality of green space is important for mental wellbeing.
- ✓ Urban green spaces can mitigate the effects of pollution from nearby factories and reduce the urban heat island effect, which can improve the health of urban residents.
- ✓ More greenness in urban residential areas is associated with more physical activity.
- ✓ Safety concerns are another significant issue for residents. They fear criminal activities, inadequate lighting, and poor maintenance in urban green spaces, which diminish their sense of security and limit their utilization of these areas. Inadequate lighting and overcrowding due to a scarcity of green spaces further contribute to residents' concerns and impact their well-being. They feel that these limitations restrict their opportunities for physical activity and outdoor enjoyment.

5.2. Recommendation

To capitalize on the residents' long-term exposure to open green spaces in Tullu Guracha kebele, it is recommended to leverage their knowledge and experience by involving them in community-led initiatives. This collaborative approach will ensure that the community's expertise and insights are utilized in decision-making processes and contribute to the long-term sustainability and well-being of the open green spaces.

Here below prioritizing streets with greenery, analyzing the availability of green space through specific indicators, considering the quality and type of green space individually, incorporating green space during city planning and in public health policies, and assessing the role of urban green spaces for human well-being are raised as recommendations.

- ✚ Leveraging knowledge to enhance awareness and understanding of the benefits of open green spaces. It is about Conducting educational workshops, seminars, or awareness campaigns can help disseminate information about the positive impact of green spaces on well-being.
- ✚ Considering inclusiveness. It is recommended to design age-specific programs and activities that cater to the diverse inability, needs and interests of residents. By tailoring initiatives to specific age groups, the open green spaces can effectively cater to the well-being needs of residents across different stages of life. Also Engaging residents in the planning and design processes can help create spaces that align with their preferences.
- ✚ prioritizing the development and maintenance of accessible and well-designed green spaces within Tullu Gurraacha Kebele. This may involve establishing new parks or enhancing existing ones, ensuring they are easily accessible from residential areas.
- ✚ Incorporating amenities such as walking paths, seating areas, and recreational facilities can encourage physical activity and social interaction.
- ✚ Addressing safety measures such as increased lighting, installing surveillance cameras, and improving maintenance can help alleviate residents' fears and enhance their sense of security. Collaborating with local law enforcement agencies can further enhance safety. Additionally, fostering a sense of community ownership and stewardship through awareness campaigns and volunteer programs can discourage criminal activities and promote a safe environment for all residents to enjoy the green spaces.
- ✚ Clearing and trimming the overgrown vegetation, repairing or replacing broken amenities, and ensuring the pathways are well-maintained would be essential steps towards creating a more welcoming and usable environment.

- ✚ By addressing these challenges, the open green space can regain its appeal and become a valuable resource for residents.
- ✚ Consider the quality and type of green space individually rather than aggregating them as 'simply green' and 'size' of forest in urban areas, as the quality of green space is important for mental wellbeing.

Generally, this research study focus on open green areas and urban residents' wellbeing and explore greeneries, analyzing the availability of green space through specific indicators, considering the quality and type of green space existing in the study area. incorporating green space during city planning, neighborhood design and in public health policies is my strategic recommendation.³

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APPENDIX I: QUESTIONNAIRE DESIGNED FOR RESPONDENTS

Survey Questionnaires

My name is Anatoli Mekonnen. I am Masters of Science Degree candidate in urban Planning and design from Adama science and Technology University. As a part of the Curriculum, I am doing the research paper entitled "Situational Analysis of Open Green Areas in Relation with the Wellbeing of Urban Residents: The Case of Gelan Town, Tullu Guracha Residential Districts."

Appreciating your kind cooperation, I would like to affirm the informants that the following list of questions will only use for educational research purpose.

a. Demographic Information

0. Name/code of respondent _____
1. What is your age range?
 - a) 18-24 b) 25-34 c) 35-44 d) 45-54 e) 55+
2. What is your gender?
 - a) Male b) Female c) Prefer not to say
3. Your higher education level?
 - a) Less than < Grade 12
 - b) Diploma
 - c) Bachelor's degree
 - d) Master's degree and above
4. Your employment status?
 - a) Governmental
 - b) Non-governmental
 - c) Private
 - d) other
5. How long you have lived in Tulu guracha district ?
 - a) 6 months to one year b) 1-5 years c) greater than 5 years

b. Awareness Assessment

6. Are you aware of open green space and its wellbeing benefits?
 - a) Yes b) No
7. Which do you think are type of open green space? (you can choose multiple)
 - a) Parks b) gardens c) play grounds
8. What motivates you to visit open green spaces? (you can choose multiple)
 - a) Relaxation b) Exercise c) Social interactions d) Health benefit e) Sense of Community
9. Do you believe that spending time in open green areas contribute to the overall wellbeing of urban residents?
 - a) yes, highly b) yes, somewhat c) Not at all
10. What specific benefits do you derive from spending time in open green areas? (you can choose multiple)
 - a) Physical health b) Mental Health c) social health d) Safety
- 10b. Do you believe that you are benefited from where ever open green space.
 - a) Yes b) No

c. Availability and Accessibility Assessment

11. Do you confirm that existing open green space in tulu guracha district is wide enough?
 - a) Yes b) No
12. How long do you walk to access nearby open green area in tulu-guracha district?
 - a) Less than 15 minutes (<15') b) 15 to 30 minutes c) greater than 30 minutes
13. How frequently you to visit open green spaces in tulu-guracha district within a year.
 - a) Daily b) Weekly c) Monthly d) Occasionally e) not remember

d. Quality Assessment:

14. How do you perceive the cleanliness and maintenance (quality) status of open green areas in your living Neighbor?
a) At best quality b) At Good quality c) At Fair quality d) At bad condition e) At worst condition
15. Are there enough shaded areas and seating options available in open green space/s?
a) Yes b) No
16. In your opinion, do open green space/s in tulu-guracha district giving expectable service to the residents?
a) Yes, functioning effectively b) yes, functioning less c) no, not functioning

e. Activity Assessment:

17. Which activities more experienced in your nearby Open Green Space? (you can choose multiple)
a) Walking b) Running c) Cycling d) Playing ball games e) Performing public events
f) other (specify)_____

f. Challenges Assessment:

18. Which one of barrier/s prevent you from visiting open green areas more often in tulu-guracha district? (you can choose multiple)
a) Entrance lodging costs b) Lack of amenities c) safety concern d) Lack of Knowledge
e) Time Constraints f) other (specify)
19. Which additional amenities or features you would like to see in tulu-guracha district to enhance the quality and impact of open green areas on urban residents' wellbeing? (you can choose multiple)
a) Digital Tools that provide information for residents to discover and plan visits.
b) Redesigning open green spaces making Accessible and inclusive
c) Re-Designing green spaces that can accommodate various activities
d) Ensuring Safety and Security
e) Maintaining green spaces to ensure cleanliness, which more likely be attractive and inviting.
f) Other (specify)

g. Suggestion/ Feedback:

20. Please, if you would like to share about your experiences with open green areas and their impact on your wellbeing explain here below!

APPENDIX II: INTERVIEW DESIGNED FOR EXPERTISE

Interview questions

My name is Anatoli Mekonnen. I am Masters of Science Degree candidate in urban Planning and design from Adama science and Technology University. As a part of the Curriculum, I am doing the research paper entitled "*Situational Analysis of Open Green Areas in Relation with the Wellbeing of Urban Residents: The Case of Gelan Town, Tulu Guracha Residential Districts.*"

Appreciating your kind cooperation, I would like to affirm the informants that the following list of questions will only use for educational research purpose.

1. Name/code:-	4. Education level:-
2. Age :-	5. Employment status:-
3. Gender:-	6. House hold status:-

1. How do you explain open green space and its wellbeing to urban residents?

2. From Parks, gardens, playgrounds, in which open green space you spend most of your time. Why?

3. Do you believe that spending time in open green areas contribute to the overall wellbeing of urban residents? How?

4. Do you accept that existing open green spaces in tulu guracha district are accessible and available enough? How?

5. How do you perceive the quality of open green areas in tulu-guracha district? How it can be improved?

6. Do you think open green space/s in tulu-guracha district functioning the residents adequately? How?

7. Is there experienced activities you noticed in tulu-guracha Open Green Spaces? Would you list?

8. Is there any barrier/s prevents you from visiting OGS more often in tulu-guracha district? explain?

9. In order to enhance the quality and impact of open green areas on urban residents' wellbeing, what additional amenities or features you suggest to incorporated in tulu-guracha district? Please list them.

10. Please, if you would like to share about your experiences with open green areas and their impact on your wellbeing explain here below!

APPENDIX III: SITE PHOTOS



