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Research Article

Urban Green Space Development and Management Challenges in Debre Tabor Town, Ethiopia

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Article Info

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Abstract

The development and management of green spaces is challenging in Ethiopia, as in many other developing countries, resulting in the reduction and destruction of green spaces. This study identifies the primary challenges and factors influencing the development and management of urban green spaces in Debre Tabor Town. Data were collected through household surveys, key informant interviews, and focus group discussions, using descriptive and inferential statistical analyses. The household survey revealed that connectivity (92.9%) and the need for continuous follow-up and maintenance activities (88.2%) are critical challenges in the management of urban green spaces. Additionally, the study highlights how inadequate government policies, weak institutional capacities, political instability, inefficient land use and the absence of clear norms significantly hinder effective green space development, often leading to illegal activities. The socioeconomic status of respondents was found to play a significant role in shaping their perceptions of urban green space benefits. The predictive model indicated that six independent variables—age ($p = 0.000$), educational status ($p = 0.010$), family size ($p = 0.044$), income ($p = 0.027$), access to information ($p = 0.004$), and years of residence ($p = 0.000$) collectively accounted for 49.9% of the variance in residents' perceptions of green space benefits. Conversely, household sex, marital status, and occupation were weakly associated with these perceptions. Overall, the findings underscore the urgent need for enhanced public awareness, strategic policymaking, and efficient land use systems to improve the development and management of urban green spaces in Debre Tabor, thereby enriching the community's quality of life.

Keywords: Challenge, Development, Green Space, Management, Perception, Urban, Debre Tabor Town

1 Introduction

Urban green spaces (UGS), defined as urban areas transformed from natural or semi-natural ecosystems into spaces influenced by human activity, are essential for enhancing urban living conditions (Bilgili & Gokyer, 2012). These spaces are integral contributors to urban sustainability, as they fulfil various ecological and social functions. For instance, Shah & Haq (2011) asserted that urban green spaces provide crucial social, economic, cultural, and psychological services that significantly enhance the well-being of urban dwellers. Such multifunctionality highlights the urgency for careful planning and management of urban green spaces in urban settings.

The development and management of urban green spaces necessitate interdisciplinary and integrative approaches that maximize their potential benefits. According to Tuzin et al. (2002), urban green spaces encompass both public and private open spaces that are predominantly covered by vegetation, providing opportunities for active and passive recreational activities. Moreover, they play a pivotal role in improving the urban microclimate. Research has shown that urban areas rich in vegetation can significantly mitigate the urban heat island effect, which is intensified by extensive hard surfaces such as asphalt and concrete that absorb solar radiation and retain heat. Appropriately managed green spaces help reduce the overheating phenomenon characterized by urban heat islands, thereby improving the comfort and health of urban inhabitants (Konijnendijk et al., 2013; Fam et al., 2008).

At a system level, urban green spaces generate benefits that extend

beyond the individual, contributing to cities' overall attractiveness and liveability. Well-managed green spaces can enhance city appeal by drawing in residents and businesses, fostering economic vitality and job creation (Tarrant & Ken, 2002). For instance, studies have demonstrated that neighbourhoods with ample green space often experience higher property values, increased local spending, and lower healthcare costs, all of which are attributable to improved public health outcomes (Feng et al., 2020). Trees also provide vital ecosystem services, including air filtration, noise reduction, and carbon sequestration, which have profound health implications (Azagew & Worku, 2020). However, the degradation of urban green spaces poses significant environmental and socioeconomic challenges. For example, Girma et al. (2019) emphasize that the erosion of urban green spaces can lead to habitat destruction, biodiversity loss, increased urban heat island effects, compromised stormwater management, and disruption to urban ecosystems.

Despite these numerous benefits, many cities are currently grappling with significant challenges in urban green space development and management. Rapid urbanization and infrastructure expansion have increasingly placed urban green spaces at risk, with unplanned urban growth leading to the degradation and loss of these vital ecosystems (Nebel & Wright, 2000). Recent urban management strategies highlight the necessity of developing comprehensive master plans designed to protect such spaces from ongoing threats (Azagew & Worku, 2020). This is crucial as many countries struggle to address a multitude of urban management challenges, including environmental degradation and climate change, which require effective strategies to harness the benefits of urbanization while minimizing its adverse effects (Alemayehu, 2014).

The issue of urban green space degradation is particularly pronounced in developing countries, where uncontrolled urbanization and burgeoning populations have severely impacted the urban environment (Mpofu, 2013; Haq, 2020). The environmental, economic, aesthetic, and social values associated with urban green areas are affected by rapid urban expansion and insufficient green amenities. The United Nations (2020) estimated that urbanization trends will continue to escalate, necessitating urgent measures to maintain urban ecological integrity.

In the context of Ethiopia, rapid urbanization and population growth have significantly contributed to the deterioration of urban green spaces, as seen in towns like Debre Tabor. Urban expansion leads to issues such as inadequate waste management systems, water and air pollution, illegal settlements, and adverse impacts on urban landscapes (Tegenu, 2010). Moreover, the migration from rural areas to urban centers amplifies these challenges, resulting in chaotic development patterns and increased pressure on already limited green resources. As stated by DTUDHCO (2019), Debre Tabor is experiencing an unprecedented rate of urbanization characterized by extensive land demand and fragmentation of natural habitats.

Despite the evident benefits of urban green spaces, their essential role in urban development remains inadequately recognized within Ethiopia's policy framework. The lack of holistic policies addressing green space integration into urban planning continues to hinder progress in urban sustainability (MUDH, 2015). Furthermore, the inadequate provision of high-quality urban green space does not align with the population growth and governance systems of various Ethiopian cities (Tsegaye & Tegenu, 2010). This oversight is particularly concerning given that well-planned and managed urban green spaces are critical for improving urban resilience against climate change and pollution (Alemayehu, 2014; Azagew & Worku, 2020).

While various studies have explored urban green space conditions in different parts of Ethiopia, there remains a notable gap in research that has focused specifically on Debre Tabor Town. Understanding the status, challenges, and management practices surrounding urban green space in this location is vital for identifying gaps and developing effective mitigation strategies. Therefore, this study assesses the challenges and opportunities associated with urban green space development and management in Debre Tabor Town. It is anticipated that the findings will raise awareness among planners, managers, and policymakers, prompting them to adopt measures that effectively address the challenges while maximizing opportunities for enhancing urban green spaces.

2 Research Methods

2.1 Description of the study area

Debre Tabor is one of the oldest cities in Ethiopia; its existence dates as far back as fourteen centuries (SGCTO, 2017). Geographically, the Town is located 97km from Bahir-Dar, the capital city of the Amhara regional state, and 667 km from Addis Ababa, the capital city of the country. It is situated between 11°50'–11°51' N latitude and 38°00' - 38°1'E longitude with an altitude of 2,706 m above sea level (Figure 1). Currently, the town has been serving as a center for the seat of the South Gondar administration Zone and Farta District. The town is divided into six kebeles (the smallest administrative unit in Ethiopia). According to the Debre Tabor Town Administration Mayor office (2018) report, in 2004, the total population was approximately 78,000 (DTAO, 2018); however, based on population projection data, the total population of the town was estimated to be approximately 96,973 (CSA, 2013). The livelihoods of town residents are dominated by small businesses and urban agriculture. The town covers a total of 3515.98 hectares of land. From the total urban land use, approximately 37.61% (469.85 hectares) of the parcels were occupied by social services, residential areas, and road networks covering 23.82% (297.56 hectares) and 18.11% (226.27 hectares, respectively. On the other hand, agricultural land within the town boundary covers 17.52 (397.06 hectares) and urban forest land accounts for 15.74% (356.73 hectares) of the land (DTAO, 2018).

Urban green area has to be delineated within the frameworks of urban plans at the town or kebele level together with a conducive working environment that guarantees sustainable participation of the public. Currently, only a small area of urban land (2.99 ha) is developed as a green area, which shares 0.24%; thus, little attention is given to the development and management of green space in the town.

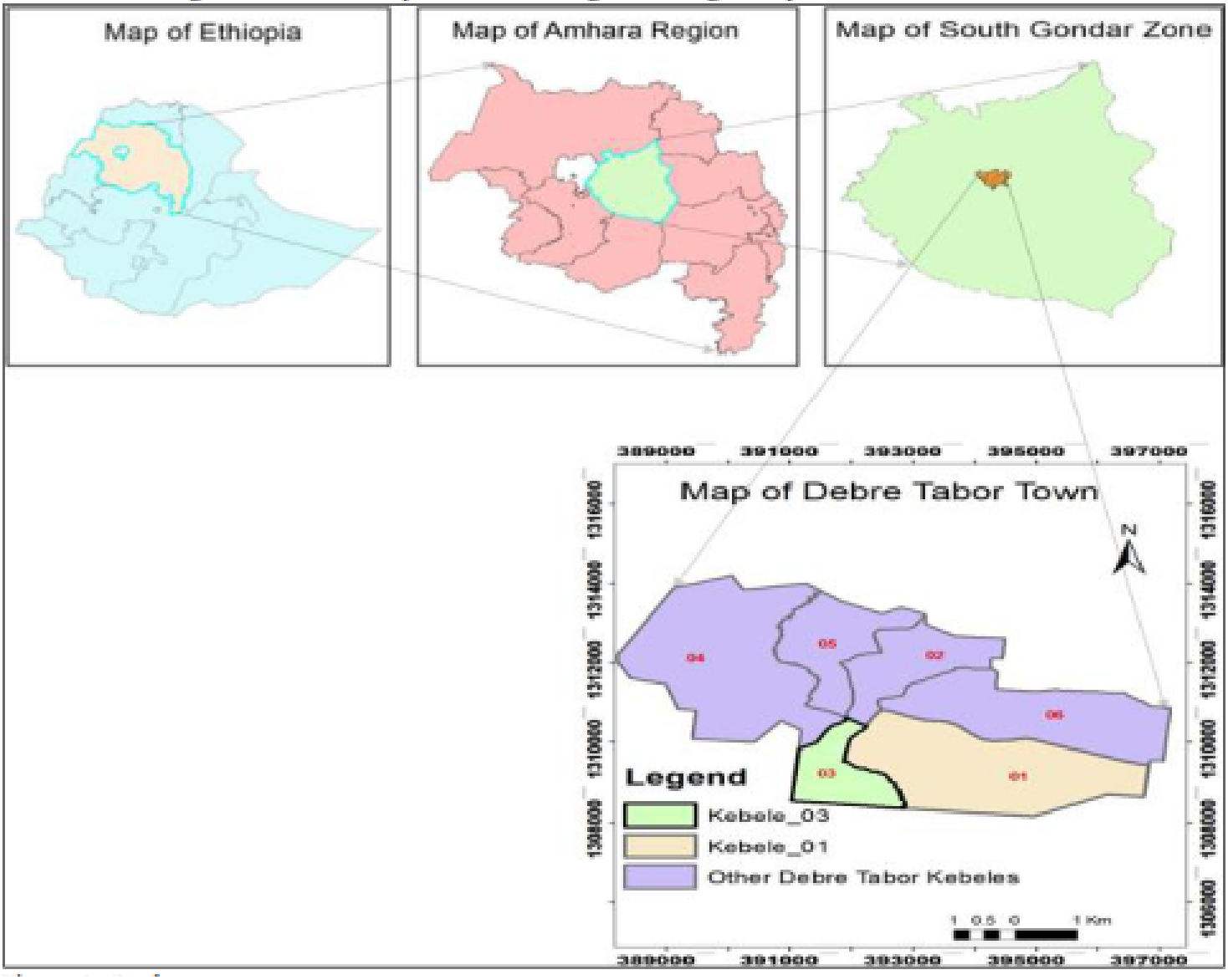

Figure 1: Study area map

2.2 Research design and sampling techniques

The study employed a mixed-methods research approach, incorporating both quantitative and qualitative methods. The quantitative approach involved collecting numerical data through household surveys using questionnaires, whereas the qualitative approach focused on collecting non-numerical information through in-depth interviews, focus group discussions, and field observations. This methodological choice was made to address potential deficiencies associated with the use of a single method.

The sampling frame for the questionnaire survey encompassed all urban areas within the town boundaries. Purposive sampling was then employed to select kebeles and households for the survey, with an initial stratification by kebele population to ensure broad geographical coverage. Out of the six kebeles, two were selected based on residents' green space management practices and attitudes toward urban green space management, encompassing both poor and good practices. Subsequently, mature respondents (age¿18 years) were selected within the selected villages using simple random sampling.

2.2.1 Sample size determination

The target population of this study included heads of household living in sampled kebele administrations. Due to cost, time, and variable measurement procedure limitations, all populations were not included in the study. Hence, in this study, the total sample size was determined based on Cochran's (1977) equation 1 which is described below. These sampling techniques are often regarded as superior due to their systematic approach to sample size estimation

and ensure that the sample accurately reflects the population.

$$n = \frac{Nz^2pq}{d^2(N-1) + z^2pq}$$

Where n is the sample size, N is the Population of the town, $q = 1 - P = 1 - 0.14 = 0.86$, d is the level of precision 0.06 (Cochran, 1977), and Z is the standard normal deviation at a 94% confidence interval equal to 1.

Proportion of the population (P) = Total household sample unit of kebeles = 0.14

Total population of the town .....(2)

For the selected kebeles, the total number of households is 9388 and 3395, and the sum is 12783, respectively. The ±6% precision level of the sample size was computed using the equation above, with a confidence level of 94% and $d = 0.06$ (maximum variability). Therefore, the total number of sample households' sizes is expressed as follows.

$$n = \frac{12783(1.96)^2(0.14)(0.86)}{(0.06)^2(12783–1) + (1.96)^2(0.14)(0.86)}$$

Generally, out of 12783 households in the two villages, 127 sample HH respondents were selected for the questionnaire survey to collect data related to the challenges and opportunities of the development and management of urban green space in the study area.

2.3 Method of data collection and analysis

This study employed several key methods for data collection, including household surveys, key informant interviews, focus group discussions (FGDs), transect walks, and field observations. Each of these methods played a vital role in comprehensively capturing the various dimensions of the subject matter.

2.3.1 Household survey

The household survey gathered factual information, identified challenges, and documented observations and experiences from the sampled households. This method addressed the current public understanding of urban green spaces as well as the challenges associated with the development and management of urban green spaces. A total of 127 respondents were selected for face-to-face interviews from different kebeles, comprising 72 male-headed households and 55 female-headed households. The selection of respondents was conducted using simple random sampling techniques, ensuring a diverse representation of different socioeconomic conditions. Throughout the survey, all social groups were identified and accounted for, which facilitated in-depth discussions later in the research.

2.3.2 Baseline Survey and Pre-testing

Prior to the main survey, a baseline survey and pretest involving 10% of the total sample were conducted. This preliminary phase aims to assess the socioeconomic, environmental, and physical conditions of urban green spaces within the study area. The findings from the baseline survey were instrumental in refining the household questionnaire and developing the semi-structured questionnaires necessary for gathering comprehensive data from the respondents.

2.3.3 Key informant interviews

For this study, 16 key informants were selected and interviewed from sample kebeles. The key informants included urban park leaders, gardeners, beautification and sanitation officers, urban planners, land administration officers, and town administration managers. Their expertise provided in-depth insights into the development and management of urban green spaces in the area and contributed valuable context to the findings.

2.3.4 Focus group discussions (FGDs)

Additionally, 25 individuals were selected for the FGDs, comprising elders, gardeners, youth association members, and businesspeople. These discussions focused on predetermined topics and served to verify and cross-check the data obtained from the household surveys for each sample kebele.

2.3.5 Transect walks and field observations

Transect walks and physical observations were used to conduct subjective and qualitative assessments of the development and management conditions of green spaces within the town. This method facilitates on-the-ground evaluation of the physical environments being studied.

2.3.6 Data analysis

To analyze the socioeconomic characteristics and their awareness of the benefits of urban green spaces, multiple linear regression models were employed (Equation 3). Before linear regression analysis, nominal or categorical variables were transformed into dummy or binary variables using SPSS software. This transformation simplified the regression analysis and ensured that the assumptions of the regression were met. The multiple linear regression equation used in this study is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + \epsilon$$

Where:

- Y = dependent variable, i.e., the awareness level of the community regarding the benefits of urban green spaces.
- β_0 = a constant indicating the intercept of the regression equation.
- β_1 to β_n = independent variable coefficients.
- ϵ = error term.
- X_1 to X_n = independent variables, i.e., respondents' socio-economic characteristics.
  - X_1 = Age of respondent (years)
  - X_2 = Education of the respondent (years)
  - X_3 = Gender of the respondent (M=1, F=2)
  - X_4 = Annual income (the ET Birr)
  - X_5 = Marital Status
  - X_6 = Occupation (types of occur)
  - X_7 = Household Family Size (Numbers)
  - X_8 = HH access to information.
  - X_9 = Household year of stay (years)

3 Results and Discussion

3.1 Challenges in the development and management of urban green space practices

The development of urban green spaces requires the collaborative involvement of all stakeholders to be effectively realized. However, as indicated in Table 1, there is a significant shortfall in urban green space availability within the town. A substantial 92.9% of respondents reported a lack of physical connectivity among green spaces, while 81.1% noted insufficient integration with existing urban infrastructure. This lack of connectivity and integration significantly hampers the effectiveness of green spaces, underscoring a disconnect between their planning and actual functionality (Alberti, 2016).

3.1.1 Maintenance and quality issues

The quality and maintenance of urban green spaces are also pressing concerns. The survey revealed that 76.4% of respondents believed the quality of these areas was very poor. This deterioration is often associated with a lack of expertise, insufficient community awareness, and inadequate commitment from local leadership to manage and develop urban green spaces appropriately (Benedict & McMahon, 2006). Additionally, 66.1% of the respondents indicated inadequate access to urban green space infrastructure, illustrating a systemic issue that limits community engagement and the utilization of these areas (Zhou et al., 2020).

3.1.2 Policy and Land Allocation

Despite Urban Development Policy, which emphasizes the careful planning and integration of green space within urban settings, the current study found that only approximately 2.99 ha (0.24%) of the town's total land area is designated as planned green space. Surprisingly, only 33.9% of respondents reported the availability of green space within their locality. This discrepancy reveals a failure in policy implementation or land management practices, where governmental and nongovernmental entities have not adequately developed or managed urban green spaces (Kearney, 2006).

Unfortunately, these objectives have yet to be realized due to low levels of awareness regarding urban green space benefits among community members. Both the key informants and focus group discussion participants echoed that local communities had not been adequately involved in the planning, development, and ongoing management of urban green spaces in the area (Bhowmik & Hossain, 2021).

Thus, the development and management of urban green spaces in the study area face considerable challenges stemming from inadequate planning, poor policy frameworks, limited community involvement, and insufficient maintenance. Addressing these challenges requires a concerted effort from all stakeholders to enhance the quality and availability of urban green spaces, ultimately benefiting the community and the environment.

3.2 Correlation between challenges in the development and management of urban green space

3.2.1 Rapid Urban Population Growth

Approximately 69.29% of the sample households, as indicated in Table 2, confirmed that such growth leads to the degradation of green areas, as evidenced by illegal settlements, informal markets, and waste dumping. This illustrates that as the population of a town increases, so does the demand for land, inevitably fostering illegal activities that adversely affect urban green spaces. Urban population growth has been identified as a primary driver of change in global land use and land cover (Ferreira et al., 2019). Chi-square test results further revealed a significant association between rapid population growth and urban green space development and management at a 5% significance level ($\chi^2 = 3.327$; $p = 0.048$). This finding indicates that the expansion of urban populations directly impacts the effectiveness of green space management. Specifically, the proliferation of unplanned settlements makes greenspace one of the most threatened ecosystems in urban environments (Teimouri & Yigitcanlar, 2018; Puplanpu & Boafo, 2021).

Table 1: Communities' responses to the existing development and management of green space.

No	Variables	Yes		No		Total
		No	%	No	%	
1	Development, availability, and accessibility of urban green space	43	33.9	84	66.1	127
2	Poor legal, policy, and institutional frameworks on urban green space development and management	72	56.7	55	43.3	127
3	Deteriorated quality and maintenance of green space in the town	97	76.4	30	23.6	127
4	The destruction of green space in urban environments is extremely high	103	81.1	24	18.9	127
5	Limited protection and conservation activities of green infrastructure	84	66.1	43	33.9	127
6	Lack of integration among stakeholders (GS integrate with other infrastructure organizations)	103	81.1	24	18.9	127
7	Lack of community involvement in GS management	99	78.0	28	22.0	127
8	There are no continuous follow-up and maintenance activities (fencing)	112	88.2	15	11.8	127
9	Lack of connectivity (GS interlinking different functionally and physically)	118	92.9	9	7.1	127

Table 2: Challenges in the development and management of urban green space

No.	Challenges	Yes		No		χ^2	P-value
		No.	%	No.	%		
1	Rapid Urban Population Growth	88	69.29	39	30.7	3.327	0.048*
2	Poor implementation of government policies	97	76.4	30	23.6	14.276	0.000**
3	Political Instability	110	86.6	17	13.4	11.198	0.001**
4	Lack of Clear Standards and Standards	100	79	27	21.3	19.328	0.000*
5	Nature of a Town's Topography	48	37.8	79	62.2	0.020	0.887
6	Urbanization complexity	89	70.1	38	29.9	5.646	0.017**
7	Inadequately Skilled and Motivated Employees	77	60.6	50	39.4	6.495	0.011*
8	Information and Knowledge Gaps in UGSI	67	52.8	60	47.2	7.258	0.007**
9	Weak institutional arrangements and capacity	85	66.9	42	33.1	28.417	0.000**
11	Weak accountability and commitment of stakeholders	112	88.2	15	11.8	12.279	0.002**
12	Land Use Planning System	83	65.4	44	34.6	11.775	0.001**

NB: ** and * indicate statistical significance at the 1% and 5% levels, respectively.

3.2.2 Poor implementation of government policies

The development and management of urban green spaces are severely affected by the lack of direct government policies, strategies, and guidelines. Although some indirect regulations exist, as noted in Table 2, 76.4% of respondents reported experiencing poor implementation of government policies related to urban green spaces. This problem stems from a lack of public awareness and inadequate political commitment by local leaders. The data indicate that poor policy implementation leads to a decline in green space development and an increase in illegal activities in these areas. Additionally, chi-square analysis demonstrates a strong statistical association between the implementation of government policy and urban green space management at a 1% significance level ($\chi^2 = 14.276$; $p = 0.000$). Several studies have underscored that the absence of a cohesive policy framework for green space development and the ineffective application of existing policies represent the main challenges in establishing recreational parks and enhancing urban greenery (Gezahegne, 2014; Mersal, 2017). Supporting this view, Girma (2019) stated that the inadequacy of policy and legal frameworks results in insufficient quality green spaces for increasingly urbanized populations. This aligns with Puplanpu and Boafo (2021) findings that urban green space functions and values often receive minimal attention in research and policy discussions, especially in many developing countries.

3.2.3 Political Instability

The findings reveal that political instability significantly impacts the development of urban green spaces, with 86.6% of respondents indicating it as a challenge (Table 2). Stability to political and peace conditions is crucial for any development initiative, including urban green space management. A stable political environment fosters stakeholder engagement and community participation in developing green spaces. As shown in Table 2, a statistically significant association between political instability and urban green space management at a 1% significance level ($\chi^2 = 11.198$; $p = 0.001$). Mensah (2014) attributed these challenges to rapid urbanization, limited resource capacity of green space institutions, lack of prioritization for green spaces, corruption, uncooperative local attitudes, and political unrest (Yeshitela, 2019). Key informant interviews and focus group discussions confirmed that ongoing political instability leads to illegal actions that result in damage to street trees, reduced budget allocations, and decreased stakeholder involvement in urban green space development.

3.2.4 Lack of Clear Standards and Standards

Approximately 79% of respondents indicated that a lack of clear norms and standards for the development and management of urban green spaces adversely affects their overall effectiveness. The chi-square test revealed a statistically significant association between the presence of clear norms and standards and urban green space management at a 1% significance level ($\chi^2 = 19.328$; $p = 0.000$). Breed et al. (2014) argued that the absence of operationalized social norms and values negatively impacts green space development. Similarly, research conducted by Artmann (2014) shows that urban residents' norms and standards significantly influence green space management practices through their choices, which can either facilitate or hinder the greening of urban areas (Chang et al., 2013).

3.2.5 Urbanization Complexities

As indicated in Table 2, approximately 70.1% of respondents confirmed that the complexities of urbanization significantly affect the development and management of urban green spaces. Rapid infrastructure development, population growth, and increased socioeconomic activities exert significant pressure on green space development in developing countries like Ethiopia. The chi-square test shows a strong statistical association between urbanization complexities and urban green space management at a 5% significance level ($\chi^2 = 5.646$; $p = 0.017$). This finding correlates with research highlighting that accelerating urbanization and socioeconomic development present substantial challenges to effective green space management in cities (Raffaele et al., 2009; Shah, 2011; Woldegerima et al., 2016; Teferi & Abraha, 2017), where urban sprawl and densification lead to a decline in available green areas.

3.2.6 Inadequately Skilled and Motivated Employees

Effective management of urban green spaces heavily relies on skilled and motivated workforce. Approximately 60.6% of respondents reported an inadequate number of trained professionals responsible for green space management in their area, which hindered development efforts. The quality and appeal of a town's green spaces are ultimately dependent on the capabilities and dedication of its workforce (Woldegerima et al., 2016). Furthermore, the chi-square test indicates a significant association between access to skilled employees and effective management of green spaces at a 1% significance level ($\chi^2 = 6.495$; $p = 0.011$) (Table 2). Various studies have shown that efficient management of green infrastructure cannot be achieved without qualified and committed professionals, adequate funding, and enhanced public awareness (Kefelew and Lika, 2015).

3.2.7 Information and Knowledge Gaps

The results revealed that 52.8% of respondents identified a lack of information and knowledge regarding urban green space management as a major obstacle (Table 2). Insufficient expertise contributes to poor species selection and inadequate planning for green areas and recreational facilities. The chi-square test demonstrates a significant association between information and knowledge gaps and urban green space management, with a 5% significance level ($\chi^2 = 6.495$; $p = 0.011$) (Table 2). A deficient understanding of urban green space development often results in improper management and destructive development practices. Research by Alberta Community Development (2000) emphasized that a lack of information is a significant barrier to the use of urban green spaces.

3.2.8 Weak Institutional Arrangement and Capacity

According to Table 2, 66.9% of respondents believe that weak institutional arrangements and capacity contribute to ineffective urban green space management. The chi-square test supported this claim, indicating a strong statistical association between institutional weaknesses and urban green space management at a 1% significance level ($\chi^2 = 28.417$; $p = 0.000$). Key informants and focus group discussions revealed substantial deficiencies in human resource capacity, financial resources, and equipment related to green space management. Inadequate staffing, limited funding, and insufficient equipment restrict the ability to implement effective management practices. The existing literature widely recognizes institutional challenges as significant impediments to urban green space planning (Haaland & van den Bosch, 2015).

3.2.9 Poor Stakeholder Accountability and Commitment

Table 2 reveals that 88.2% of the respondents noted poor stakeholder accountability and commitment to urban green space management in the town. This lack of engagement results in a limited community understanding of the benefits associated with urban green spaces, leading to low participation and mobilization efforts. Consequently, many green areas are encroached upon by illegal settlers and temporary markets. The absence of robust stakeholder accountability undermines the overall effectiveness of urban green space initiatives. Julie et al. (2016) highlighted that community participation is often a crucial element in green space planning and management, yet it frequently fails to reach its potential, resulting in missed opportunities to enhance urban livability. Additionally, the chi-square test indicates a significant association between stakeholder accountability and urban green space management at a 1% significance level ($\chi^2 = 12.279$; $p = 0.002$). Observations and field assessments confirm that inadequate leadership commitment results in the neglect of green spaces, culminating in damage to facilities and vegetation. Smith (2009) emphasized that effective stakeholder participation, collaboration, and communication significantly enhance urban green space development and management (Azadi et al., 2011).

3.2.10 Land use planning system

As shown in Table 2, most respondents (65.4%) indicated that the urban land-use planning system plays a crucial role in shaping the

development and management of green spaces. However, the chi-square test revealed an insignificant association between land-use planning practices and urban green space management at a 5% significance level ($\chi^2 = 11.775$; $p = 0.001$). UN-Habitat (2011) and Kefelew and Lika (2015) highlighted the significant loss of urban green areas due to inappropriate land-use policies and illegal settlements in urban environments.

3.3 Resident's perceptions toward the benefit of urban green space

This study employed multiple linear regression analysis with nine predictor variables to assess residents' perceptions of the benefits of urban green spaces. The analysis revealed a moderate association between demographic factors such as age, occupation, marital status, and distance from home, confirming an overall preference for urban green spaces among residents. The predictive model accounted for 49.9% of the variance in residents' perceptions of these benefits ($R^2 = 0.499$, Adjusted $R^2 = 0.489$). Notably, seven out of the nine independent variables demonstrated significant influence on residents' perceptions of urban green space benefits, with differences in variables such as household age, educational status, family size, income, access to information, and years of residence being statistically significant at $p < 0.05$.

3.3.1 Age of households

Demographic variable influencing perceptions of urban green spaces. The regression model indicated a significant association at $p < 0.05$, highlighting the strong correlation between age and perception (Table 3). Specifically, older residents tend to have lower perceptions of the benefits of urban green spaces than their younger counterparts. This trend was supported by field observations and focus group discussions, which revealed that younger individuals often engage more actively in recreational green spaces. Previous studies have suggested that older populations may prefer tranquil nature-based activities, such as walking in parks or forests, reflecting different levels of engagement with urban greenery (Hillsdon et al., 2006; Abdul, 2012; Young-Chang & Keun-Ho, 2015; Mikias et al., 2017a).

3.3.2 Educational status of households

Multiple regression analysis revealed a significant correlation between educational status and perceptions of urban green spaces ($\beta = 0.176$, $t = 2.635$, $p = 0.010$; Table 3). Higher levels of education correspond to improved understanding and appreciation of the benefits provided by urban green spaces, suggesting that educational attainment enhances individuals' skills, abilities, and capacity to recognize the value of these areas (Mikias et al., 2017a). Thus, educational status serves as a crucial predictor of positive perceptions, aligning with the expectation that more educated individuals are likely to be more aware and supportive of urban greenery (Mikias et al., 2017b).

The analysis indicated that family size significantly influenced perceptions of urban green spaces, showing a negative correlation ($\beta = -0.088$, $t = -2.040$, $p = 0.044$; Table 3). This confirms that as the size of a household increases, perceptions of the benefits of urban green space tend to decline. Larger families appear to have less appreciation for green spaces than smaller families, consistent with findings that indicate smaller family units often prioritize and recognize the value of recreational activities in green areas (Young-Chang & Keun-Ho, 2015).

3.3.3 Access to Information

Access to information plays a critical role in shaping residents' perceptions of urban green space benefits. The multiple regression results ($\beta = 0.410$, $t = 2.954$, $p = 0.004$; Table 3) confirmed a strong positive association, indicating that areas with better access to urban greenery significantly enhance residents' understanding and appreciation of these spaces. Residents equipped with adequate information are more likely to recognize and utilize the benefits of urban green spaces effectively (Beyerl et al., 2016).

Income of Households

The influence of household income on urban green space perception is notable. The regression analysis revealed a positive relationship between higher household income and a greater appreciation of urban green spaces ($\beta = 7.998$, $t = 2.246$, $p = 0.027$; Table 3). This indicates that as household income increases, perceptions of urban green space benefit. Households with higher incomes tend to demand more recreational opportunities in green spaces. Research indicates that wealthier households often reside in areas with abundant, well-maintained green spaces and have greater access to public recreational areas (Neynen et al., 2006; Landscape Institute, 2009; Sister et al., 2010). Conversely, lower-income households report limited access and fewer visits to such spaces (Jonathan et al., 2015).

Household Years of Stay

The tenure of residence also contributes to perceptions of urban green spaces. The regression analysis revealed a significant positive association between duration of residence and perception of urban green benefits ($\beta = 0.021$, $t = 4.037$, $p = 0.000$; Table 3). Longer-term residents are more likely to recognize and appreciate the benefits offered by nearby urban green areas, corroborating findings that suggest prolonged exposure leads to increased awareness and valuation of local green spaces (Raffaele et al., 2009; Mikias et al., 2017b).

Table 3: Multiple regression analysis of socioeconomic factors on perceptions of the benefits of urban green spaces

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
(Constant)	2.789	.448		6.220	.000		
Gender	-.065	.137	-.032	-.476	.635	.932	1.073
Age at the HH	-.037	.009	-.311	-4.258	.000**	.802	1.246
Marital Status	-.033	.085	-.045	-.629	.530	.831	1.203
Educational level	.176	.067	.214	2.635	.010**	.650	1.537
Occupation	-.065	.066	-.081	-.988	.325	.639	1.564
Family size	-.088	.043	-.145	-2.040	.044*	.849	1.178
Annual Income	7.99	.000	.186	2.246	.027*	.626	1.598
Access to Information	.410	.139	.199	2.954	.004**	.943	1.060
Household Years of Stay	.021	.003	.271	4.037	.000**	.954	1.048

Source: Survey Results, 2020

* p ¡ 0.05, ** p ¡ 0.01

Insignificant Predictors

In contrast, the multiple regression analysis identified sex, marital status, and occupation of household members as insignificant predictors of residents' perceptions of urban green space benefits. Each of these variables yielded non-significant results ($\beta = -0.065$, $t = -0.476$, $p = 0.635$; $\beta = -0.033$, $t = -0.629$, $p = 0.530$; and $\beta = -0.065$, $t = -0.998$, $p = 0.325$, respectively; Table 3). These findings reveal that demographic variables have negligible influence on perceptions in the context of the study area compared with the significant predictors discussed. In general, the study highlights the multifaceted influences on residents' perceptions of urban green spaces, demonstrating that factors such as age, educational status, and family size, access to information, household income, and tenure significantly shape how these spaces are valued. These insights contribute to understanding urban green space dynamics and underscore the importance of targeting educational and informational initiatives to enhance community engagement with green infrastructure.

4 Conclusion

Management and development of urban green areas necessitate coordinated efforts involving human, institutional, and financial resources. This study highlights the pressing challenges faced by urban green spaces in Debre Tabor, where the inadequate allocation of green space (0.24% of the total urban area) directly hampers residents' ability to access and enjoy these essential resources. The legal, policy, and institutional frameworks designed to support green space management are notably deficient, characterized by high levels of degradation and neglected infrastructure. Furthermore, the limited conservation efforts and poor maintenance of existing green spaces underline the urgent need for enhanced management practices. The analysis indicates a notable disconnect among stakeholders and a lack of community engagement, further compounded by the insufficient connectivity between the different functional and physical aspects of green areas. Although the town administration has set aside a budget of 20,927,829.40 birr for green space initiatives, there is an absence of financial contributions from local communities and private entities, which are crucial for sustainable development. Political and administrative challenges, including poor policy implementation and instability, have significantly hindered effective green space management. Contributing factors include a shortage of skilled personnel, information gaps, limited institutional capacity, ineffective decision-making processes, inadequate stakeholder accountability, and unclear standards. Of the six predictor variables influencing residents' perceptions of the benefits of urban green spaces, educational status, income, and access to information emerged as positive contributors, while age and family size had negative effects. Despite these substantial challenges, the Debre Tabor situation is not without hope. By strategically addressing the identified issues and leveraging existing opportunities, the town can foster a more sustainable and vibrant environment that promotes healthy and accessible green spaces. Key recommendations include: Actively involve local residents in the planning, development, and maintenance of green spaces to foster a sense of ownership and encourage stewardship. Develop clearer policies that outline norms and standards for green space management and conservation, ensuring they are effectively implemented. Encourage public-private partnerships and seek financial contributions from local businesses and community organizations to supplement government funding. Invest in training programs for local employees to enhance their skills in urban planning, landscape management, and community engagement. Conduct outreach efforts to inform residents of the environmental, social, and health benefits of urban green spaces, thereby increasing demand and support for such initiatives. Develop a long-term strategic plan that integrates various stakeholders, addresses connectivity issues, and prioritizes the development and rehabilitation of green spaces.

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Conflicts of interest/Competing interests

The authors declare no potential conflicts of interest regarding the publication of this work.

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