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Title, Green Spaces and Property Prices: The Economic Benefits of Urban Parks through Land Value and Carbon Storage in Addis Ababa, Ethiopia.

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I.ABSTRACT

This study examines the economic impact of urban parks in Ethiopia, focusing on carbon sequestration, property values, and revenue generation. The research surveyed 561 visitors, revealing that 95.88% have at least a high school education, with 65.05% holding some college education or higher. Analysis of six urban parks showed significant variations in their economic contributions. Entoto Park emerged as the highest revenue generator, contributing 42,224,000 in entrance fees, while Shegre Park generated the least at 1,816,000. The study found that properties near urban parks commanded a 20.8% price premium compared to those farther away. Carbon sequestration analysis of Gullele Botanical Garden (GBG) revealed a total carbon stock of 690,140.49075 tons, with 99.85% stored in biomass and 0.15% in soil—the monetary value of this carbon stock calculated at USD 3,315,834.39. Job creation varied significantly among parks, with Entoto Park creating 1,442 jobs and Shegre Park only 57. The research also projected that over 99 years; the carbon stock value of GBG could increase to USD 8,879,276.15, surpassing its current land value of USD 8,151,548.73.

Keywords: *Carbon Sequestration, Urban Parks, Economic Impact, Land Value, Job Creation, Property Enhancement, Climate Mitigation.*

1. INTRODUCTION

1.1. Urbanization and Loss of Green Infrastructure

The global rise in population has led to a substantial increase in the urban population. In 1960, only 34 % of the world's population resided in cities, whereas by 2022, this number had almost doubled to 57 %. The World Bank (2023) projects that this trend will continue, with an estimated urban population of 70 % by 2050 [1]. The European Union has already reached this level, as evidenced by the fact that 75 % of its population resided in urbanized areas in 2022 [1]. Urbanization is a major driver of socio-economic changes that not only affect land use but also have additional impacts on multiple layers of the Earth's surface, significantly affecting urban core zones (UCZs)[2]. Urbanization is a major catalyst for land use change worldwide, accelerating the expansion of impermeable surfaces and causing catastrophic loss of natural and agricultural lands [3]. This rapid urbanization trend has numerous negative consequences for the environment. Urban green spaces like parks, forests, and wetlands play a crucial role in mitigating climate change by absorbing and storing carbon dioxide. However, the loss of these areas diminishes their capacity to sequester carbon, exacerbating global warming. Research indicates that urban trees are particularly effective carbon sinks, with storage capacities varying from 25 to 400 metric tons per hectare. As these natural carbon capture systems disappear, the Earth's ability to counteract greenhouse gas emissions significantly reduced [4]. Green spaces are being marketed as efficient urban cooling solutions as cities struggle with the growing problems of urban heat and its effects on vulnerable groups, especially elderly individuals [5]. Their absence has negative impacts on human health and energy consumption, especially during heat waves, due to rising temperatures. Studies have shown that urban heat island effects can increase temperatures by several degrees Celsius, leading to increased heat-related deaths and illnesses [6]. Green spaces play a vital role in maintaining healthy and resilient ecosystems by providing habitat for a variety of plants and animals [7]. Their loss leads to loss of biodiversity, disruption of food chains, and potentially impacts food security and resource availability. The Convention on Biological Diversity estimates that urban sprawl is the leading cause of biodiversity loss worldwide [8]. City dwellers rely on green spaces for relaxation, exercise, and stress relief. Their absence can have a significant impact on mental and physical well-being, leading to increased healthcare costsand reduced qu ality of life. Studies have shown that having green spaces improves mental health, reduces stress levels, and increases physical activity levels [9].

In the rapidly urbanizing landscape of Addis Ababa, Ethiopia, the role of green spaces and urban parks is undergoing a profound reevaluation. Once viewed

primarily through the lens of recreation and aesthetics, these verdant pockets within the city now recognized for their substantial economic contributions, particularly in terms of their impact on property values and their capacity for carbon storage. This shift in perspective is not only reshaping urban planning strategies but also offering innovative solutions to the dual challenges of economic development and environmental sustainability faced by many developing cities. The economic benefits of urban parks in are most immediately evident in the real estate market. Properties in close proximity to well-maintained green spaces observed to command higher prices, a trend that mirrors findings from cities around the world[10].This price premium not only benefits individual homeowners but also contributes to the city's fiscal health through increased property tax revenues. In a city where land is at a premium and development pressures are intense, the ability of parks to generate economic value provides a powerful counterargument to those who view green spaces as unproductive land use. Beyond their impact on property values, the urban forests of Addis Ababa serve as crucial carbon sinks, playing a vital role in the city's efforts to combat climate change. Recent studies have revealed that the carbon sequestration potential of urban green areas is remarkably high, with some forests demonstrating carbon storage capacities that exceed global averages for urban areas [11]. This ecological service not only contributes to Ethiopia's national climate action goals but also positions Addis Ababa as a model for sustainable urban development in Africa. The intersection of these two economic benefits enhanced land values and carbon storage creates a compelling narrative for the preservation and expansion of urban green spaces in Addis Ababa. As the city continues to grow and evolve, policymakers and urban planners are increasingly recognizing that investments in parks and green areas yield multifaceted returns. By quantifying these benefits, stakeholders more informed decisions about land use, balancing the immediate pressures of urban development with the long-term goals of creating a livable, sustainable city.

1.2. Economic Contributions of Urban Parks

1.2.1. Ecosystem Services

Urban green spaces play a vital role in improving the quality of life in cities and provide a range of benefits to residents. They serve as natural sanctuaries in the concrete landscape of urban environments and provide a tranquil refuge from the fast-paced urban lifestyle [12]. Urban trees make a significant contribution to Goal 3 of sustainable development related to promoting good health and well-being, Goal 11 focused on creating sustainable cities and communities, and Goal 13 centered on taking action to combat climate change (United ations, 2015)[13]. This contribution stems from their ability to generate a multitude of ecosystem services. Urban green spaces, such as parks and forests, are crucial for addressing environmental challenges in cities. These areas help regulate climate by providing shade and releasing moisture through evapotranspiration, resulting in cooler temperatures. Additionally, they enhance air quality, making them an essential component of sustainable urban ecosystems and overall environmental health [14]. Urban green spaces promote outdoor activities, improve safety, and strengthen social ties between neighbors, reducing social disorder, anxiety, and depression. These areas help alleviate mental fatigue and stress [15]. Trees and shrubs can effectively act as sound barriers, reducing noise pollution. When space allows, thick vegetation strips combined with landforms or solid barriers can decrease highway noise by 6 to 15 decibels [16]. Park users visit these spaces for fresh air, stress relief, relaxation, and social interaction. The absence of noise and improved air quality in green spaces contribute to users' relaxation in both small and large areas [17]. Urban parks serve as critical ecological sanctuaries, offering essential habitats that support diverse wildlife populations and contribute to maintaining biodiversity within city environments [18]. Improved public health: Park access encourages physical activity, reduces stress, and promotes mental well-being [19].

1.2.1. Property Value Enhancement.

Urban parks significantly enhance property values, offering both direct and indirect economic advantages to nearby areas [20]. These green spaces improve neighborhood aesthetics, making them more appealing to potential homebuyers. Properties close to parks often see value increases of up to 20%, as they provide recreational opportunities, scenic views, and healthier environments. Additionally, parks attract businesses and tourism, stimulating local economies [21]. They also promote physical activity and mental well-being, which can further elevate property values by fostering a healthier community. Thus, investing in urban parks not only improves quality of life but also yields substantial returns for property owners and urban planners. Parks and public gardens provide a welcome opportunity to ‘escape’ from urban life, delivering a wide range of so-called landscape services (Termorshuizen & Opdam, 2009; Vallés-Planells et al., 2014) that include recreation opportunities and aesthetic views [22].

2. METHODOLOGY

2.1. Study Area: -

The research conducted within Addis Ababa, Ethiopia, the nation's capital and a burgeoning metropolis exceeding 4.7 million inhabitants. Situated at an elevation of 2,355 meters in the Ethiopian central highlands, Addis Ababa has undergone rapid urbanization in recent decades, resulting in a significant decline in urban green spaces. This study specifically focuses on Green Spaces and Property Prices: The Economic Benefits of Urban Parks through Land Value and Carbon Storage" in Addis Ababa , primarily in the central and inner city areas.

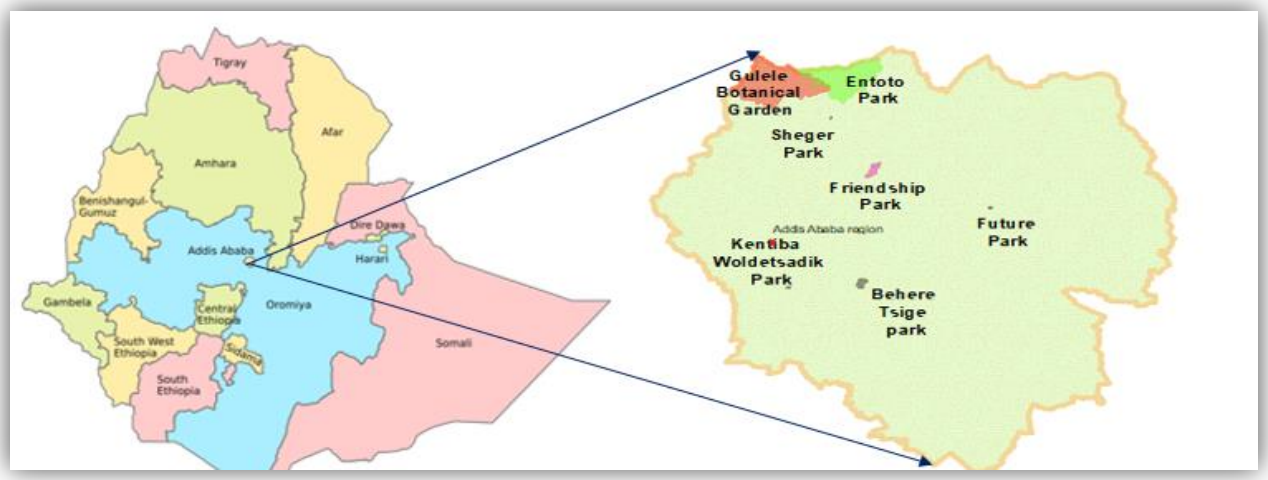

Fig- 1: *Study Area.*

2.2. Data Collection

2.2.1. Visitor surveys in six parks

The six parks chosen with purposive selection, guaranteeing a varied representation of park kinds and visitor experiences. The method used to gather information for visitor surveys in Friendship, Kentiba, Shegre, and Future, Entoto, and Beheretsige six parks specifically chosen. Create a standardized survey that addresses the most important economic factors. To ensure unpredictability, choose participants via systematic random sampling, approaching each nth visitor. One hundred surveys distributed to each park for guests to fill out. At several points in each park, including entrances, well-known attractions, and rest spots, trained surveyors will approach guests. To gather a wide variety of visitors, surveys carried out on weekdays and weekends, as well as at various times of the day. The questionnaire likely cover topics such as Visitor demographics, Trip characteristics, Activities undertaken in the park, Visitor satisfaction and experiences, Suggestions for improvement

2.2.2. Land value assessment of one park

Used Comparative Property Method (COMP Method): This method compares the subject property to similar, recently sold properties that have undergone similar conversions. The value is adjusted based on characteristics such as location, condition, utility access, and current zoning.

2.2.3. Carbon stock measurement and valuation

Measurement of carbon stocks in soil and forests requires aboveground biomass, Tree dimensions sampled in the field using allometric equations. Using root-to-shoot ratios derived from aboveground biomass, belowground biomass estimated. Soil carbon, Laboratory analysis and sampling of soil cores. Using the proper carbon fractions, carbon computed by converting biomass to carbon. Carbon stocks are usually valued by monetizing them using market-pricing cost of carbon.

2.2.4. Park entrance fee

Data obtained directly from the administrative office's management teams of the seven selected parks.

2.2.5. Real estate value comparison near and far from parks

Select ten residential properties for analysis: five located within 0.5 km of major urban parks (near properties) and five more than 1.5 km away (far properties). All properties chosen to have similar characteristics, such as size and type, ensuring comparable value per/m2.

2.3. Techniques for Statistical Analysis

Descriptive statistics like means, percentages, and frequencies used to examine the visitor survey data from six parks to compile information about visitor demographics, attitudes, and usage trends. Visitors' characteristics and park impressions compared using chi-

square tests, and visitor satisfaction compared across parks using a one-way ANOVA and Origin for graphical analysis.

The comparative property method evaluated GBG Park's land worth by contrasting recent sales information of neighboring properties. Using soil sampling and standard allometric equations, the carbon stock in forest biomass and soil is measured, and its value is determined using carbon market prices. Descriptive techniques used to examine entrance fee data from seven parks including GBG Park in order to identify income trends. Paired sample t-tests used to assess differences in property values per square between properties close to and far from parks.

3. Results

3.1. Visitor Survey Findings

A survey of five hundred sixty one visitors revealed that the majority (95.88%) have at least a high school education, with 65.05% holding some college education or higher. The largest group (38.14%) comprised visitors with some college education, followed by high school graduates (30.83%) and college graduates (24.42%). Postgraduates were the smallest group, at 2.49%, while only 4% of visitors had less than a high school education.

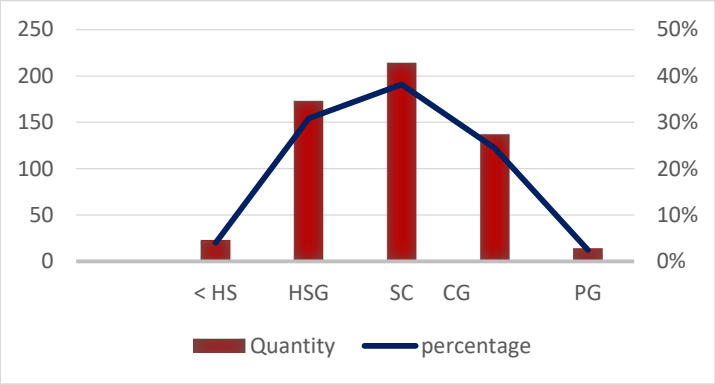

Fig- 2: *Educational background of respondents.*

The survey findings in the overall economic impact of parks highlight a predominantly educated audience, with significant representation at the college and high school levels. The majority of responders (more than 93%) agree or strongly agree that Entoto, Beheretsige, and Friendship Parks have a considerable economic impact. With 95% of the vote, Entoto Park has the most positive rating, followed by Beheretsige (93%) and Friendship (94%), all of which show broad agreement about their financial advantages and little dissent. In comparison to the top three parks, Kentiba Park has strong but somewhat lower perceptions, scoring 89% of the responses favorably. Shegre Park, on the other hand, has the lowest perception, with just 72% of respondents expressing a favorable opinion and the greatest levels of dissent (13% disagreement and 8% extreme disagreement), suggesting a significant degree of skepticism. Though it lags behind the top parks, Future Park has a moderately good 82% rating, indicating room for development. Although the majority of parks have a positive economic impact on the community, the results show that specific measures to improve Shegre and Future Parks could increase their economic impact and community perception.

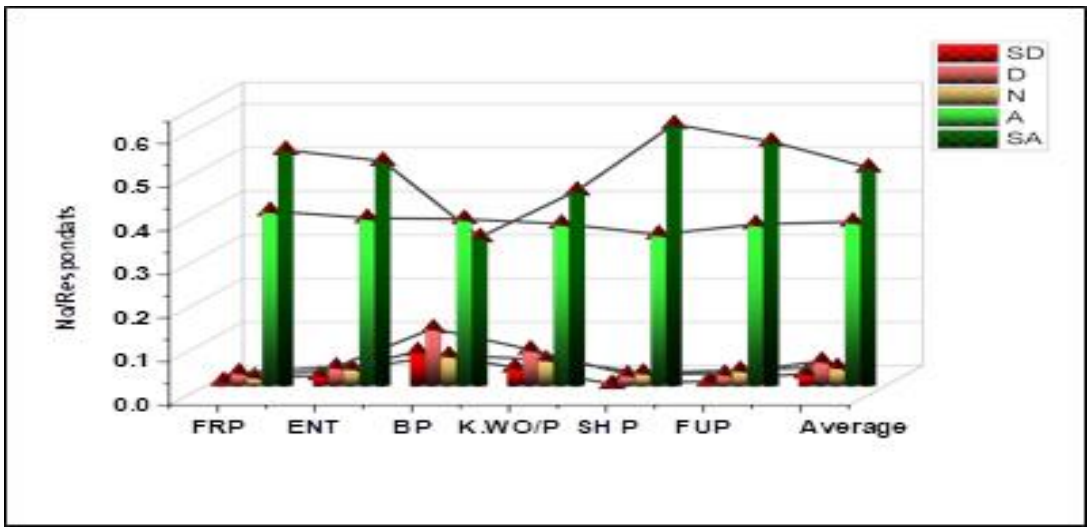

Fig- 3: Overall economy perceptions

3.2. Land Value Assessment

Table- 1: *Land value assessment data*

No	Rank of area	The rank of a specific place	GBG Specific place Rank	Quantity in hectare	Cost in m²
		Rank 1/1	Rank 2 /1	117.896	2213.25
		Rank 1/2	Rank 2/ 2	175.236	2165.47
1	Rank 1	Rank1/3			1900.19
		Rank 1/4			1552.93
		Rank1/5			1531.91
		Rank 2/1			1327.39
		Rank 2/2			1221.18
2	Rank 2	Rank 2/3			1191.17
		Rank 2/4			1074.39
		Rank 2/5			1027.84
		Rank 3/1			994.71
		Rank 3/2	Rank 3/ 2	154.273	960.21
3	Rank 3	Rank 3/3			927.84
		Rank 3/4	Rank 3/4	154.913	904.77
		Rank 3/5	Rank 3/ 5	103.288	873.74
		Rank 4/1			814.06
4	Rank 4	Rank 4/2			786.45
		Rank 4/3			748.8

Source: - Gullele sub city Land management office, Addis Ababa, Ethiopia.

3.3. Carbon Stock and Economic Value

3.3.1. Soil Carbon Stocks

The total carbon stock of the park has been assessed by calculating both biomass and soil carbon contributions. For soil carbon, calculations performed at three depths: 10cm, 20cm, and 30cm. The formula used incorporates soil carbon content, bulk density, and depth, converting these into tons of carbon per hectare. Results show that the soil carbon stock for 10cm, 20cm, and 30cm depths is 0.54945 t/ha, 0.42525 t/ha, and 0.52245 t/ha, respectively, leading to a total soil carbon stock of 1.49715 t/ha. Given the park's area of 705 hectares, the total soil carbon stock across the entire park calculated at 1,055.49075 tons.

Table- 2: *Soil lab results of sampled plots.*

parameters		Strata 1	Strata 2	Strata 3	Strata 4	Strata 5	Average
Average Bulk Density of all strata	S1	2.08	1.09	2.32	3.1	1.33	1.98
	S2	2.22	1.22	2.53	2.31	3.8	2.42
	S3	2.33	1.32	4.83	2.84	2.72	2.81
Average Ph. Result %	10cm	2.21	1.21	2.44	4.93	3.21	2.8
	20cm	5.06	4.9	4.2	2.14	3.42	3.94
	30cm	2.6	2.36	3.82	3.36	3.12	3.05

Average Carbon content %	10cm	4.49	4.01	4.62	4.85	2.37	4.07
	20cm	4.05	3.76	2.13	1.7	4.09	3.15
	30cm	4.84	4.74	3.67	2.76	3.35	3.87
Average SOM %	10cm	2.29	2.07	3.47	4.88	3.55	3.25
	20cm	3.94	3.55	4.46	1.33	2.01	3.06
	30cm	3.69	3.45	1.75	2.05	3.46	2.88

3.3.2. Above ground biomass(AGB) & Below ground biomass(BGB) carbo stock

Finally, the total carbon stock of the forest calculated by adding the AGB and BGB. The carbon content of AGB and BGB was obtained by multiplying the biomass value by 47% [23]. The 47% is usually used because it was recommended by IPCC guidelines chapter 2 indicates it. The carbon stock changed into a monitory value by using the formula:

Monetary value (USD) = Carbon stock (tons/hectare) * Area (hectares) * Carbon Price (USD/ton CO2 equivalent).

Table- 3: *AGB and BGB carbon stock.*

Name of strata	Area (ha)	No of trees	AGB(kg)	BGB(kg)
ow altitude strata	225	1362	128,998.15	25,799.60
Mid-altitude strata	187	1304	115,462.80	23,092.50
High-altitude strata	100	823	62,891.45	12,578.29
Recreational area strata	86	351	61210.1529	12,242.03
Eucalyptus woodland strata		1958	205,674.62	41,134.92
Sum	**705**	**5798**	**574,237.17**	**114,847.34**

3.4. Park Revenue from Entrance Fees

The Income Contribution Index (ICI) reveals significant disparities in revenue generation among urban parks. Entoto Park stands out as the highest contributor, generating 42,224,000, followed by Friendship Park with 21,938,400. Beheretsige Park (6,579,980) and GBG (6,232,572) show moderate contributions, while K. WO/P (4,569,362) reflects a smaller but notable economic impact. These parks demonstrate the importance of strategic development and popularity in driving revenue. On the other hand, Shegre Park has the lowest ICI fee at 1,816,000, indicating minimal economic contribution. Future Park, privately owned, does not charge an entrance fee.

3.5. Real Estate Value Comparison

When comparing real estate prices near and far from urban parks, properties near urban parks show a significant premium. The price for properties near urban parks ranges from 70,361 ETH Birr per square meter (Ovid Real Estate) to 110,000 ETH Birr per square meter (Amibara Real Estate). The average price in this group is 97,672 ETH Birr, which is 20.8% higher than the average price of properties located farther from urban parks, which stands at 80,819 ETH Birr. Simultaneous with introducing green infrastructure, brownfield land is experiencing some of the greatest and most rapid land cover changes in many post-industrial cities (Wong and Schulze Bäing, 2010)[24]. Outlines how official, City land value data utilized to assess the economic value of parkland.

4. Discussion

4.1. Economic Benefits of Urban Parks

4.1.1. Parks contribute local economies.

According to the Ministry of Commerce, as reported on December 28, 2023, China's 230 national economic development zones achieved a GDP of 14 trillion yuan (approximately 1.97 trillion U.S. dollars) in 2022[25]. The Income Contribution Index (ICI) reveals significant disparities in revenue generation among urban parks. Entoto Park stands out as the highest contributor, generating 42,224,000, followed by Friendship Park with 21,938,400. Beheretsige Park (6,579,980) and GBG (6,232,572) show moderate contributions, while K. WO/P (4,569,362) reflects a smaller but notable economic impact. These parks demonstrate the importance of strategic development and popularity in driving revenue.

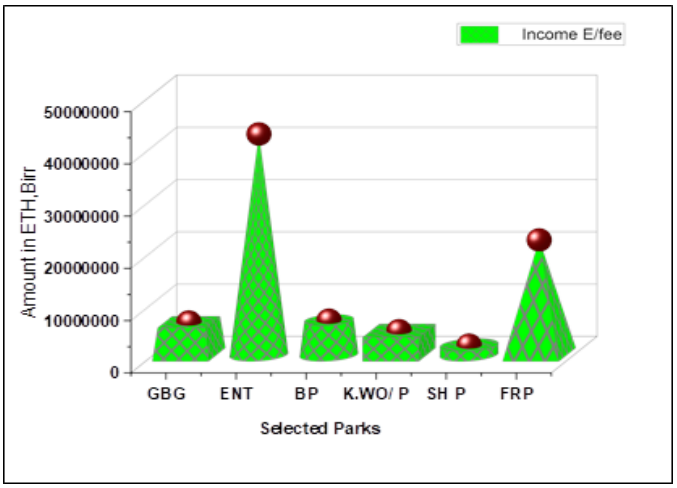

Fig- 4: *entrance fee of parks*

4.1.2. Urban parks contribute to the creation of job opportunities in the community.

The job creation data across various parks shows significant variation in employment opportunities, with some parks contributing notably more than others. Entoto Park stands out as the largest job creator, with 1,442 positions, of which 1,246 are temporary and 196 are permanent. This reflects the park's capacity to provide both short-term and long-term employment, likely due to its popularity and the scale of its operations. Friendship Park (FRP) follows with 744 total jobs, including 325 temporary positions and 65 permanent jobs, demonstrating its strong role in local employment, particularly in temporary roles.

On the other hand, parks like Shegre Park (SH P) and Kentiba wo/Tsadqe park, (K.WO/P) show relatively lower job creation, with only 57 and 47 total positions, respectively. Shegre Park offers a small number of permanent (54) and temporary (3) roles, while K.WO/P provides 21 permanent and 26 temporary jobs. Beheretsige Park (BP) also has fewer employment opportunities, with 160 total jobs, 102 of which are

On the other hand, Shegre Park has the lowest income contribution index (ICI) fee at 1,816,000, indicating minimal economic contribution. Future Park, privately owned, does not charge an entrance fee, instead leveraging free access to attract more visitors.in this case the park has 900 customers average a day. While this approach may boost visitation, it limits direct revenue generation. Overall, Entoto and Friendship Parks emerge as major economic drivers, while parks like Shegre and Future Park highlight the need for innovative strategies to balance accessibility with financial sustainability. The factors that motivated greenspace users to access a greenspace were not identical to the benefits they derived[26].

permanent. This data suggests that while parks like Entoto and Friendship have a larger economic impact through job creation, others may need further development or strategic planning to boost employment outcomes. The value obtained from ecosystems services divided into three types use, option, and non-use values. The sum of all these values called the Total Economic Value (TEV)[27].

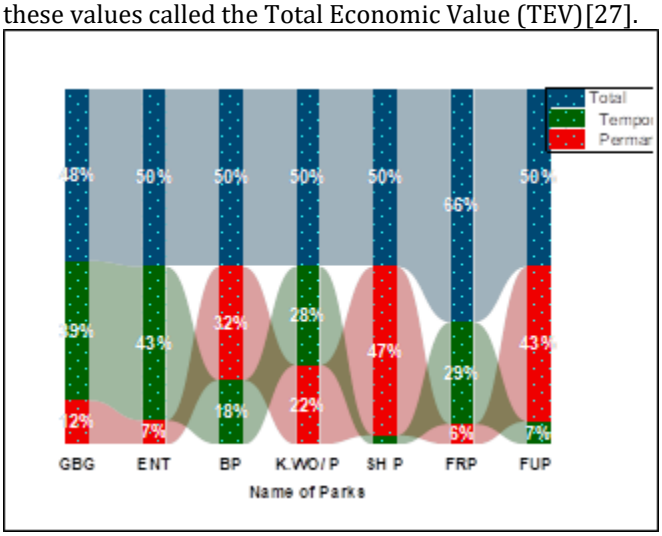

Fig- 5: *Job Opportunities of parks*

4.1.3. Carbon Sequestration and Climate Change Mitigation

Urban green infrastructure serves as an effective strategy for microscale, mesoscale, and even macroscale climate change mitigation and adaptation because vegetation can capture and securely store carbon through biotic sequestration[28]. Across various strata, the data highlights significant Above Ground Biomass (AGB) and Below Ground Biomass (BGB), with the Eucalyptus woodland strata contributing the most. 205,674.62kg. AGE and 41,134.92 kg BGB. This reflects the high carbon storage potential of dense woodland areas, underscoring their ecological importance. Other strata, such as low- and mid-altitude areas, also demonstrate substantial

contributions, collectively accounting for significant carbon sequestration within urban landscapes.

High-altitude and recreational area strata, though smaller in tree density and biomass, still contribute meaningfully to overall carbon storage. Recreational areas, with 351 trees, store 61,210.15 kg AGE and 12,242.03 kg BGB, demonstrating that even parks with a primary focus on leisure can serve as carbon sinks. Urban parks have a higher degree of variation in carbon sequestration (CS) than forest carbon sinks, and their carbon sink mechanisms are comparatively more intricate[29]. This dual function highlights urban parks' ability to balance ecological contributions with recreational purposes, making them valuable in mitigating urban carbon emissions and improving air quality[30].

4.1.4. Carbon Market Value of GBG

Since the carbon, market and traditional financial markets share many traits, numerous financial market models, used to characterize the carbon market[31]. The total carbon stock of the park calculated by combining biomass and soil carbon storage. Biomass carbon accounts for 689,084.52 tons, while soil carbon, calculated using soil carbon content, bulk density, and depth across 10cm, 20cm, and 30cm, totals 1,055.49075 tons. Together, the park's carbon stock amounts to 690,140.49075 tons, with the majority (99.85%) stored in biomass and a smaller portion (0.15%) in soil. These findings underscore the park's significant role in carbon sequestration, primarily through its vegetation, with soil contributing a smaller yet important share to the overall carbon storage. Finally, the carbon stock changed into a monitory value by using the formula:

Monetary value (USD) = Carbon stock (tons/hectare) * Area (hectares) * Carbon Price (USD/ton CO2 equivalent). According to the EU Emissions Trading System (EU ETS) report, the average global carbon market price in 2023 varied throughout the year[32]. The average prices for 2021, 2022, 2023, and 2024 are $47–50, $75–$85, $85–$90, and $90-$100, respectively. However, for safety, the lowest price of $85 per ton of CO2 equivalent used in this study. Monetary value (USD) = (51.6226(t/ha) + 1.49715 (t/ha)) * 705ha *85USD/ton CO2 equivalent = 3,183,201.01875USD. This amount of carbon dioxide sunk into the plants and the soil from the atmosphere into which cars and industries release the gas.

4.1.5. Economic Importance of Parks and Long-term Carbon Value.

Quantified emissions and sinks in forest ecosystems and climate change in the Western Ghats were used in a study on carbon budgeting. This will help develop appropriate mitigation strategies to reduce the effects of global warming and promote sustainable forest management. According to Sun et al. (2020), the forest area's overall storage and sequestration value would reach US$9,775 million by the end of 2050[33]. This analysis underscores how parks like GBG provide substantial long-term economic benefits through carbon sequestration. Beyond their immediate monetary worth, they contribute to climate mitigation and ecological balance, offering a compelling case for conservation-focused land management strategies. The economic analysis of GBG's 707-hectare area highlights the long-term value of natural parks, considering both land value and carbon sequestration potential.

4.1.5.1. Current Land and Carbon Values

Land Value: - The current real estate market value for a 99-year lease of GBG's land estimated at USD 8,151,548.73.

Carbon Market Value: -

- From entrance fees in 2023: USD 49,860.57.
- From soil and forest carbon stock (excluding leaf and dead wood): USD 3,315,834.39.

Total initial carbon stock value: USD 3,365,694.96

4.1.5.2. Projected Carbon Sequestration Value

Assuming a conservative 1% annual increase in carbon stock, the future value of carbon sequestration over 99 years is calculated

Future Value=3,365,694.96 x (1.01)99 = 8,879,276.15 USD

Future Value = 3,365,694.96 × (1.01)99=8,879,276.15USD.

This projection indicates that the carbon stock value could more than double over the next century.

4.1.5.3. Comparison of Economic Values

- Current Land Value: $8,151,548.73 USD.
- Projected Carbon Stock Value (after 99 years): $8,879,276.15 USD.
- The projected carbon stock value surpasses the current land value, emphasizing the long-term economic importance of preserving GBG's natural ecosystem.

4.2. Property Value Enhancement

This indicates a clear market preference for the added benefits of proximity to green spaces.

In the group of properties located farther from urban parks, the pricing is more moderate, ranging from 67,907.13 ETH Birr (Ovid Real Estate) to 97,246 ETH Birr (DMC Real Estate). The average price of these properties is 80,819 ETH Birr. Among the listed developers, Ayat Real Estate, Gift Real Estate, and Phison Homes's Real Estate, all have similar prices of around 79,000 ETH Birr. These properties reflect reduced perceived value from being located further from urban parks.

The comparison in percentage terms shows that properties near urban parks generally priced about 20.8% higher on average compared to those located farther away. This premium highlights the added that proximity to urban parks provides in terms of desirability and potential benefits to residents, including better access to green spaces and a more pleasant living environment. While the price variation within each group exists, the overarching trend remains clear: urban park-adjacent properties command a significant price premium.

The presence of parks significantly enhances neighborhood property values, as reflected in varying levels of positive perceptions across six parks. Friendship Park enjoys one of the highest positive ratings, with 90% of respondents agreeing or strongly agreeing with its impact on property values. Similarly, Kentiba Park follows closely with 85% positive responses, emphasizing its strong contribution to property value appreciation. Future Park, while moderately perceived, achieves 76% positive responses, indicating potential for improvement in its perceived value. Shegre Park, with 70% positive perception and higher neutral (12%) and disagreement (18%) responses, reflects a comparatively weaker impact.
Entoto Park and Beheretsige Park stand out as top contributors to property value enhancement. Entoto Park garners 93% positive responses, while Beheretsige Park achieves the highest rating with 94% agreement, indicating strong consensus on their significant neighborhood impact. Overall, the findings emphasize the critical role of urban parks in increasing property values. In urban settings, differences in land prices are indicative of the locational and geographical benefits of specific sites, alongside local external factors and government policies that govern land use. Regulations surrounding land use in cities play a vital role in shaping urban forms, influencing the spatial distribution of development and occupancy, as well as affecting residents' housing and transportation expenses and their overall economic well-being[34].

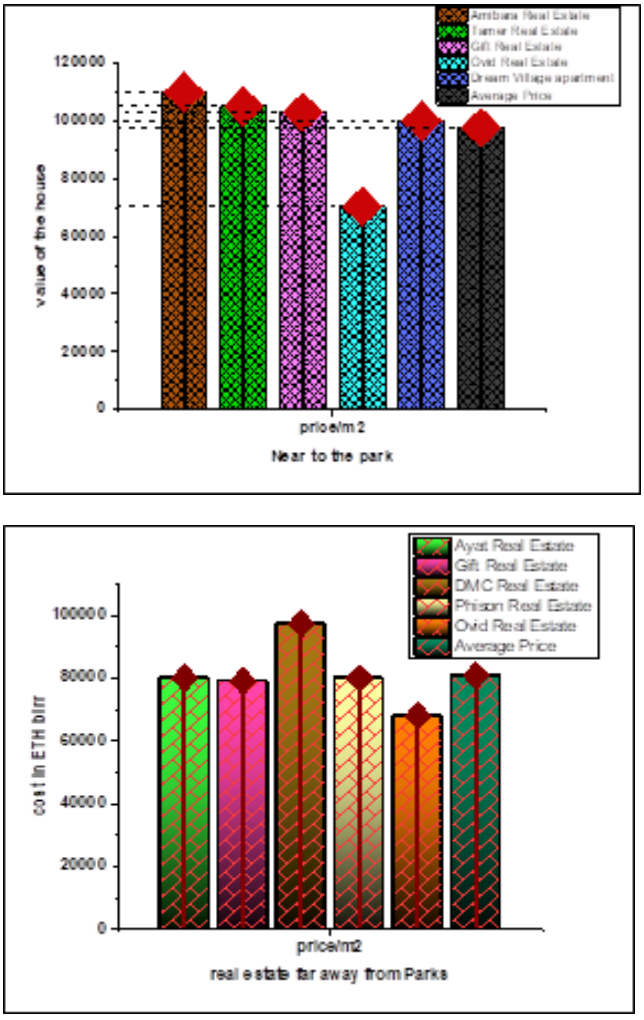

Fig 6: *Property Enhancement of parks indifferent locations*

5. Conclusion

Urban parks offer significant economic benefits through their contribution to local economies, job creation, and carbon sequestration. For example, Entoto Park generates substantial revenue of 42,224,000, while also providing 1,442 jobs. Gullele Botanic Garden (GBG) has a carbon stock valued at $3,183,201.02 USD, which could increase by 1% annually, potentially reaching $8,879,276.15 USD over 99 years, surpassing its current land value. This highlights the long-term economic benefits of preserving and managing green spaces for their carbon storage capabilities.

The carbon sequestration value of urban parks is a powerful argument for conservation efforts. GBG's projected future carbon value significantly outpaces its current land value, reinforcing the idea that ecological

preservation can have substantial financial returns. In addition to environmental benefits, urban parks play a critical role in enhancing property values, with properties near green spaces typically priced 20.8% higher than those farther away. This illustrates the economic value of green spaces in increasing real estate attractiveness and contributing to overall urban livability.

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Based on these findings, it recommended that city planners invest in the development of urban parks, prioritize their long-term conservation, and integrate them into urban planning strategies. Policies should designed to incentivize the economic and environmental benefits of these parks, fostering both job creation and sustainable development while enhancing the quality of life in urban areas.

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