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A Comparative Study on Green Space Management in High- and Low-Income Residential Neighbourhoods: The Case of Nhyiaeso & Ayigya, Ghana

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A B S T R A C T

Green space" an area of grass, trees, or other vegetation set aside in an otherwise urban environment for recreation or aesthetic reasons is an emerging area of interest in research which plays an integral role in residential areas. Most of urban residence are facing urban heat island due to the depletion of the ozone layer whiles ways on enhancing urban resilience and encouraging healthy lifestyles, improving both health and the well- being of urban residents has become a headache (World Health Organization, 2017). The aim of this study is to contribute to the improvement of residences through the involvement of green spaces. The research strategy included the transformative approach with an emphasis on qualitative data.

The data was gathered using case studies, which were conducted in two different residential areas in Ghana's Ashanti Region (Nhyiaeso a high-income residential area and Ayigya a low-income residential area). In this study, purposive sampling was used to evaluate specific professionals that manage these green areas in communities as well as convenience sampling for the residents of these neighborhoods. Thematic and content analysis were used to analyze data. The findings address the objectives of the study and stated that green spaces in both neighborhoods were in good state even though Nhyiaeso had a lot of green spaces and Ayigya had little to none of these green areas. It was suggested that the public should be educated on the benefits of green spaces in residential areas to encourage its efficient use.

Keywords: Green space, Urban areas, Residential areas,

1. Introduction

A growing proportion of the population living in cities results in urbanization. In Europe, about three quarters of the population is projected to live in urban settings by 2020 (World Health Organization, 2017). Living in urban areas restricts access to nature and can increase the exposure of certain threats to the environment, such as air and noise pollution (Wang et al., 2018). In urban neighborhoods, the lack and poor quality of green space can be a significant restriction on the well-being of the inhabitants as it does not encourage the creation of healthy lifestyles (Lestan, Eržen and Golobič, 2014). Ecologically, Economically and Socially, the provision of urban green space and its associated benefits are vital for sustainable urban growth (Baycan-Levent, Vreeker and Nijkamp, 2009; James, et al., 2009).

A broad variety of international agreements and commitments are available to strengthen and sustain the creation of green spaces in urban areas, as these are considered to provide a variety of advantages for the urban population (World Health Organization, 2016). However, little is known about the most successful methods of delivering urban green space initiatives and how to ensure that while optimizing the financial, social and health benefits (World Health Organization, 2016).

Lucy Taylor and Dieter F. Hochuli (2016) reveal that greenspace publications were discovered as early as 1975 and that it is an emerging field of study that has increased publication over the past decades. Member states committed to both the new Urban Agenda and the Habitat III, pledge to providing each child with access to safe and secure environments in which they can walk or bike to kindergartens and schools, as well as to green spaces where they can play and engage in physical activities by 2020, at the WHO European Region's Fifth Ministerial Conference on Environment and Health in Parma, Italy. Goal 11 of the United Nations Sustainable Development Goals ("By 2030, provide universal access to safe, inclusive, and open green and public spaces, especially for women and children, the elderly, and people with disabilities").

This essay intends to determine the current state of green spaces in residential areas, discover the theories used in the management of these spaces as well as exploring the implications in designing green spaces in residential areas. This essay answers questions such as:

a. What is the current state of green spaces in residential areas?

b. What are the theories used in green space management?

c. What are the implications for designing green spaces in residential areas?

1.1 The concept of green spaces.

The word "green space" is a more modern term that can be traced back to the urban nature conservation movement and European thinking of green space design that began in the United Kingdom (Mensah, 2014b). Green space is frequently mistaken for different terms in urban planning, including open space and public open spaces. By and large, these words are utilized conversely or comprehensively.

According to (Sousa, 2003) the city has now established green space as four distinct types of land:\

- **parkettes**: small parks that provide passive recreational amenities (e.g., sitting areas, walking paths, etc.) for the surrounding neighborhoods.
- **local parks**: small parks that provide a variety of passive and active recreational amenities (e.g., sports facilities, biking trails, etc.) for neighborhoods.
- **district/city parks**: enormous parks that give uninvolved what's more, dynamic sporting conveniences for occupants from across the city.
- **natural heritage areas**: green grounds that contain truly and tastefully significant ecological highlights that require preservation and conservation.

A few researchers built up the accompanying implications to clarify the definition of green space and separate it from different terms in the urban environment (Swanwick, Dunnett, and Woolley, 2003). Green spaces are any vegetated land or construction, water, or geographical highlights situated in an area. Green spaces have additionally been set up to incorporate all green infrastructure present in an environment, like a network of natural, semi-natural, and ecological frameworks (Campbell associates 2001). “Urban green spaces” are described by (World Health Organization, 2016) as any urban area that is protected by vegetation of any kind. This encompasses smaller green space elements (such as street trees and roadside vegetation); green spaces that are not open to the public or for outdoor usage (such as green roofs and facades, or green space on private grounds); and wider green spaces that have a variety of social and recreational purposes (such as parks, playgrounds, or greenways).

Figure 1: Parkette (WHO, 2016)

Figure 2: Local Park (WHO, 2016)

Figure 3: District Park (WHO,201)

Figure 4: Natural Heritage (WHO, 2016)

To summarize, urban green spaces can be considered a branch of urban open spaces. Although urban green spaces are restricted to the vegetative portion of the urban landscape, primarily the soft fields (Mensah, 2014b).

1.2 History of green space

The fuse of natural components into spatial plans is a critical element of the advancement of urban planning. Different analysts have proposed ideas that advocate for the fuse of green spaces into the physical environment of urban surroundings to improve the day-to-day conditions here. A portion of the early urban idealistic thoughts that underlined the security of urban regular habitats (open spaces) include Charles Fourier's imaginary towns known as

"phalansteries," Ernest Carlebach's novel "Ecotopia," and the most famous Ebenezer Howard's "Garden City," the two of which are huge benchmarks of green city crusades. George Cadbury's "Bourneville Village" likewise had an impression Dunnett et. al. (2002).

The importance of urban green spaces in improving the urban climate and quality of life was formally recognized in a policy sense in the Urban Task Force Report (Urban Task Force, 1999) and the government's response (Urban White Paper, Department of the Environment, Transport and Regions 2000). Recommendations in these findings resulted in the formation of an Urban Green Spaces Taskforce, which was tasked with educating the government on recommendations for enhancing the efficiency of urban parks, play fields, and green spaces – with play areas gaining new attention because of lobbying from children's play organizations. The need for further studies on urban green space was explicitly defined in both the Urban White Paper and the Town and Country Parks survey (DETR, 1999).

Although a variety of green spaces exist in Africa, it came to the fore that among the various forms of urban green spaces much emphasis is given to urban trees. The governments of most African countries in cooperation with environmental organizations also embark on tree planning exercises in urban areas to promote the greenery and air quality of those areas. According to the 2011 African Green City Study, cities such as Durban and Johannesburg (South Africa), Lagos (Nigeria), Maputo (Mozambique), Nairobi (Kenya), and Cairo (Egypt) placed a greater focus on tree growth than other types of green spaces. According to the survey, various governments have seriously embarked on tree planting activities over the last five years, planting approximately 62000, 500000, and 2800 trees, respectively. Trees in the cities of Durban, Lagos, and Maputo. Trees commonly found in African cities, especially West African cities, included Azadirachta indica, Eucalyptus species, Acacia species, Terminalia catapa, Gmelina arborea, and Tectona grandis (teak), and Mangifera indica (Mango tree) were among the most common tree species found in Ghana's urban areas (Mensah, 2014b).

1.3 History of Green Spaces in Kunasi

Kumasi is a city in Ghana, which is situated in Western Africa. It is in Ghana's middle belt. It is about 270 kilometers north of Accra, Ghana's capital. It has a gross land area of 254 square kilometers, extending between latitude 6o35N– 6o40N and longitude 1o30 W– 1o35W, with an elevation ranging from 250 to 300 m elevation above sea level (Kumasi Metropolitan Assembly, 2010). According to Fynn (1971), King Osei Tutu established Kumasi in the 1680s to serve as the capital of the then Asante Kingdom. In 1890, it fell under British colonial rule and control. Kumasi has a geographical position as well as political supremacy. The area was once known as the "Garden City of West Africa" because of its stunning architecture and abundance of greenery. In front of suburban neighborhoods, it had a range of trees and flowers. Along the various lakes, there were also trees and greenery. Windbreaks were generated by some of these green patches. It was also well-endowed with trees of various shapes and sizes, which adorned its streets. These trees developed canopies, which provided natural shade and ample protection against inclement weather for both residents and tourists. The Adehyeman Parks, immediately opposite the Kejetia, were several green fields and 'gardens' in the city during the 1960s.

The Asafo Tennis Court, which has now been converted into a lorry terminal, and the Kumasi Children's Park, which is situated behind the SDA Church along the N6, Amakom (National Road 6). As far as rezoning entertainment grounds and green areas into commercial centers in the Kumasi Metropolis is concerned, this could be the only garden that seems to have withstood the test of time and has yet to be reached. (Arku, 2013). Findings from (Mensah, 2014a) states that the current situation of parks and gardens in Kumasi has majority of its public parks and gardens either non-existent or considerably encroached upon for commercial and infrastructure development. According to Asare (2013), several parks in Kumasi have been transformed into commercial centers.

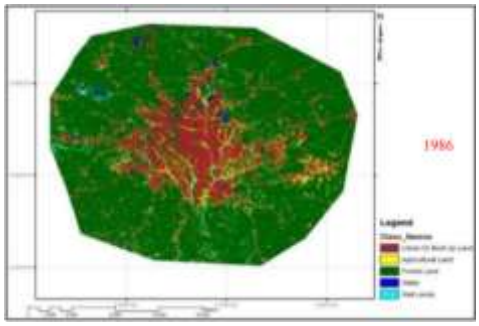

Figure 5: Landsat satellite images showing land cover change of Kumasi 1986, from Tontoh (2017).

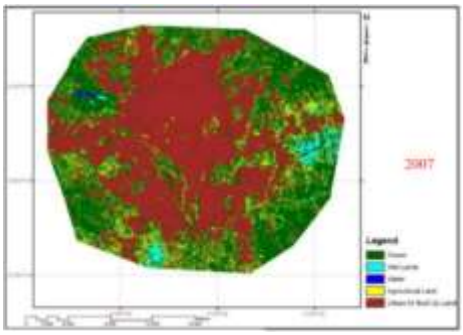

Figure 6: Landsat satellite images showing land cover change of Kumasi 2007, from Tontoh (2017).

Park/Garden	**Location**	**Status**
Para Gardens	South Suntreso Neighborhood	Not in existence
Prince of Wales Park	Adjacent the Kumasi Zoological Gardens	Not in existence, now used as a lorry park

Adehyeman Gardens	Near Methodist Bookshop, Mbrom	In operation but large portions have been. encroached for commercial activities
Kumasi Zoo	Adjacent Kejetia lorry terminal	In operation
KNUST Botanical Garden	KNUST campus	In operation
Parks and Gardens	Patasi Neighborhood	Not opened for public use
Kumasi Children's Park	Amakom Neighborhood	Abandoned to lose all its facilities
Abbey's Park	Ash Town Neighborhood	In operation
Jacksons Park	Close to Prempeh Assembly Hall	No more a natural park
Fante Newtown Park	Fante Newtown Neighborhood	Encroached upon for commercial activities

Table 1: Current state of some parks in Kumasi, from Asare (2013).

The declining and deplorable condition of the parks and gardens was discovered to be due to factors such as poor enforcement of development controls by city authorities, uncooperative attitudes of the public, a lack of a comprehensive plan for green spaces, a lack of priority given to green spaces, and conflicting land ownership rights over green spaces (Adjei Mensah, 2014; Oduro-Ofori & Braimah, 2013; Taylor 2010).

1.4 Importance of green spaces

Garden city, green belt, green fingers, and greenways are planning ideas that emphasize the need to conserve the natural environment of urban areas by including various green spaces into city design. This is due to the enormous benefits that these places provide to cities. Green spaces have been proven to increase social contact and cohesiveness by creating land uses that give avenues for recreation, enhance child development, and enhance social contact and cohesiveness (Mensah, 2014b).

• Environmental benefits

Amelioration of the physical urban environment through lowering pollutants, moderating urban climatic extremes, contributing to cost-effective sustainable urban drainage systems, and some influence as carbon dioxide sinks. Green spaces also provide various environmental education possibilities, with such programs frequently led by park rangers and watch groups (children's environmental clubs connected with Wildlife Trusts), which are generally situated in urban parks.(Swanwick, Dunnett and Woolley, 2003).

• Economic benefits

Contain both on-site advantages, such as direct employment and off-site advantages, such as revenue generation, as well as the impact on adjacent property values, contributions to recruiting and keeping enterprises in a region, and a significant role in drawing visitors (Zhang and Xie, 2014). There have been few studies of these broader economic advantages in the UK, and further study would be beneficial in informing the public on the importance of green space in supporting successful urban economies (Jansson, 2014)

• Health benefits

One proposed method by which green space impacts physical health is through its effect on physical activity levels. The creation of green space in the urban environment provides chances for healthy 'green exercise' such as walking (Griffin, et al.). The presence of green space has been observed to be independently related with prolonged survival in older populations. Another study found a favorable relationship between reduced stroke mortality and higher levels of greenness in the environment (Lee, 2010).

• Social benefits

Colors, forms, textures, and noises are all diverse in green spaces, and these senses vary with the seasons, weather, and even time of day. These are used as ornaments or decorations for personal or public delight which creates an atmosphere conducive to social interaction (Taylor, 2010).

1.5 Concept of green space management

One of the most serious threats to world biodiversity is urbanization (Seto et al., 2012). Surprisingly, cities can be crucial for native biodiversity conservation (Ives et al., 2016), mostly through urban green space planning, protection, and management. The provision of sustainable ecosystem services is dependent not only on the availability of green areas, but also on the management of the ecosystems that house them (McGranahanet al., 2005; Randrup and Persson, 2009). In Sweden, nearly 17 billion SEK (1.8 billion Euros) are spent each year to manage urban green spaces (Persson et al., 2014), and green space management is shared by at least 40,000 people, including those in local governments, public and private housing companies and organizations, estate companies, and regional authorities. So, despite widespread recognition of the importance of green space management to sustainable development, (Council of Europe, 2000; James et al., 2009), green space management is fragmented and frequently viewed as a subset of other management routines, such as housing and roads. The European Landscape Convention (Council of Europe, 2000) defines management as any activity taken to maintain the regular care of a landscape because of social, economic, and environmental processes.

Landscape management was defined by Jansson and Lindgren (2010) as "the activities performed by a management organization to maintain and develop existing urban green space for users," while Dempsey and Smith (2014) defined it as "maintaining and enhancing a place and its quality to maximize the benefits for users." According to Randrup and Persson (2009), “long-term management” comprises both operational maintenance and long-term planning. distinct green areas are administered by various stakeholders (public vs. non-public, city vs. districts), and they are defined by different degrees of accessibility by the public, and many other varying administrative qualities (Feltynowski et al., 2018). Neal (2016) proved that there are several issues in managing public green areas. The current situation of green spaces is characterized by decreasing maintenance budgets and capital that will be less accessible for renovations (Randrup, Östberg and Wiström, 2017). While park utilization is rising and local communities are getting more involved in the real administration of green spaces, these facilities are becoming more expensive to use, and some parks may simply be sold or transferred to the care of others (Neal, 2016).

1.6 Public and non-public green space management

Green spaces can be administered in two (2) forms. They might be supervised by the public (government) or a group of volunteers living in communities with outdoor green areas. Green space management can also be done in a non-public (partnership) or private (individual) capacity.

• Public green space management

Over the last few decades, there has been a rise in public Involvement (PI) in green space management efforts. Several (possible) advantages of PI have been identified. Denmark, on the other hand, has no set tradition for such activities, despite its long history of volunteerism. Local governments have historically been the sovereign institution in charge of public green space management, representing a hierarchical style of governance. Nonetheless, an increased need for new forms of local democracy and alternative governance modalities has resulted in greater interest in PI practices. As a result, more knowledge is required, such as current changes in governance arrangements for municipal green space. With UNCED's Local Agenda 21 (UNCED, 1992) as a landmark, political focus has shifted to involve local citizens in decision-making regarding their surroundings (including urban greenspaces). Aside from the immediate benefit of enhancing the local environment (Jones, 2002a; Van Herzele and Denutte, 2003), research has shown that well-designed engagement procedures provide a variety of paybacks. These include better, more generally supported decisions and increased emotions of ownership, which might, in turn, help prevent vandalism and other forms of abuse (VanHerzele and Denutte, 2003; Ohmer et al., 2009). Positive social connections and a sense of community are also connected to ownership (Ohmer et al., 2009). Another suggested advantage is increased public knowledge of green space concerns, which can influence public comprehension of larger global environmental challenges (Van Herzele and Denutte, 2003; Speller and Ravenscroft, 2005; Ohmer et al., 2009). Finally, accommodating public budget cuts through volunteer participation has been highlighted as a possible advantage (Moskell et al., 2010).

However, research has shown several difficulties associated with public participation procedures (PI). The first is the problem of representation. According to studies of collaborative urban forestry planning methods in Finland, the number of participants is frequently limited, and there is a danger that citizens with the loudest voices will have the most influence. Furthermore, participatory techniques need more time than standard planning procedures, and individuals have high expectations that must be handled to avoid disappointment (Sipilä and Tyrväinen, 2005). These findings corroborate the concerns voiced by public workers in British local governments (Lowndes et al., 2001).

• Non-public green space management (partnership)

Geddes (1915) stressed the importance of urban green spaces as he wrote, "The case for the protection of nature and the expansion of our access to her must be stated more seriously and firmly than is usual." Not merely pleaded for on all reasonable grounds of amenity, recreation, and repose, but insisted on. In what basis? In terms of life maintenance and development” (Wilson, 2008). Incorporating nature into our towns, as well as conserving and maintaining cityscapes, have occurred since the dawn of urban development.

1.7 Concept of green spaces in residential neighborhoods

Residential neighborhood refers to any section of the City zoned for residential use or, if not so zoned, any street segment bordered by intersecting streets in which more than fifty (50) percent of the structures are used for residential purposes. Metropolitan green spaces are important elements of every urban setting, and their role in preserving environmental quality and sustainability is well recognized. Parks, gardens, and leisure areas are examples of urban

green spaces (UGS). UGS provide various advantages to city dwellers by functioning as urban lungs - collecting pollutants and releasing oxygen providing clean air, water, as well as soil, and maintaining the city's natural urban environment (Nijkamp 2004). These spaces serve as a panel, act as buffer zones, and help avoid too much spatial homogeneity (Dole, 1989). Many studies have shown that green spaces aid in the recovery of people from high levels of stress.

At the neighborhood level, the availability of green spaces influences environmental quality, aids in stress reduction, improves feelings of social safety (Maas et al., 2009), increases social interaction and property values (Jim & Chen, 2009), and serves as a play space for children's physical and mental development. The preservation of green spaces and trees inside urban areas is now widely acknowledged as one of the major options accessible to urban planners to promote urban ecology and frequent human interaction with nature for physical and psychological health (Louv, 2006). This might include both public and private green space.

Private green space is made possible when residential site sizes are big enough to allow residents to create and maintain productive or beautiful gardens. In locations where residential plot sizes are insufficient or the housing stock is dominated by multi-story structures, public green space is critical. Despite the significance of public green spaces to urban communities, several studies have found that urban green space is seldom dispersed equally across a city or town (Barbosa et al., 2007]. Some suburbs have a disproportionate amount of public green space, whilst others have far less.

1.8 Case study: The impact of urban green space on neighborhood satisfaction

Significant evidence has been collected in recent decades indicating that green space in residential areas may favorably add to the overall quality of life of urban dwellers (Zhang,2015). Most of the measures of green space quality have focused on usage, such as accessibility, upkeep, perceived safety, the availability of facilities, and the lack of trash (Van Herzele,2012). Recently, a larger range of green space quality indicators, such as perceived restorative capacity and other positive affordances, has begun to be recognized and researched. The theoretical basis for this research is that people's views of green space's favorable affordances for their health and well-being may drive their positive reactions to green space

• Methods

A stepwise method was used to identify two urban areas in Groningen that were equivalent in terms of green space quantity, socioeconomic and demographic status, but differed in terms of accessible and useable green space (Zhang et al., 2017).

According to GIS studies and field observations, De Hoogte has a low availability of completely accessible and useful green spaces (46 percent), but Corpus-Noord has a high availability of readily accessible and functional green spaces (75 percent).

Across June 2014, data were collected using paper-mailed questionnaires that were randomly distributed in the two communities. The questionnaire asked about respondents' demographics (e.g., age, gender, income level, etc.) and the green areas in their neighbourhood, as well as satisfaction and other quality of life facto Neighbourhood satisfaction, well-being, perceived green space quality, and perceived green space affordances were the four major variables chosen for the current studies.

A single-item survey asked respondents to identify their level of satisfaction with their neighborhood on a five-point scale ranging from ‘very unhappy' to ‘very satisfied.' Well-being was assessed using a single item in which respondents were asked to score their current state of happiness on an 11-point scale, with 0 being severely miserable and 10 representing extremely pleased. The perceived quality of green space was assessed using a six-item scale like those used in other studies in prior research. Respondents were asked to rate the availability of six usage factors. Utilizing a list of facilities, amenities, natural features, incivilities, accessibility, and upkeep, on a five-point scale, 1 represents strongly disagree and 5 represents strongly agree. The scale indicated that there was enough. Cronbach's alpha = 0.78, indicating dependability. Perceived beneficial affordances were evaluated using a self-developed four-item scale that asked participants to rate the extent to which the green spaces in their neighborhood promote quality of life, health, recreation, and social interaction, again on a five-point scale with 1 being strongly disagree and 5 being strongly agree. Cronbach's alpha = 0.86, indicating high dependability.

SPSS version 20 was used for statistical analysis (IBM, Armonk, NY, USA). All differences between the two neighborhoods were evaluated using one-way ANOVAs with neighborhood as the independent variable. The mediation studies were conducted out using a linear regression analysis, as outlined by Baron and Kenny (2007).

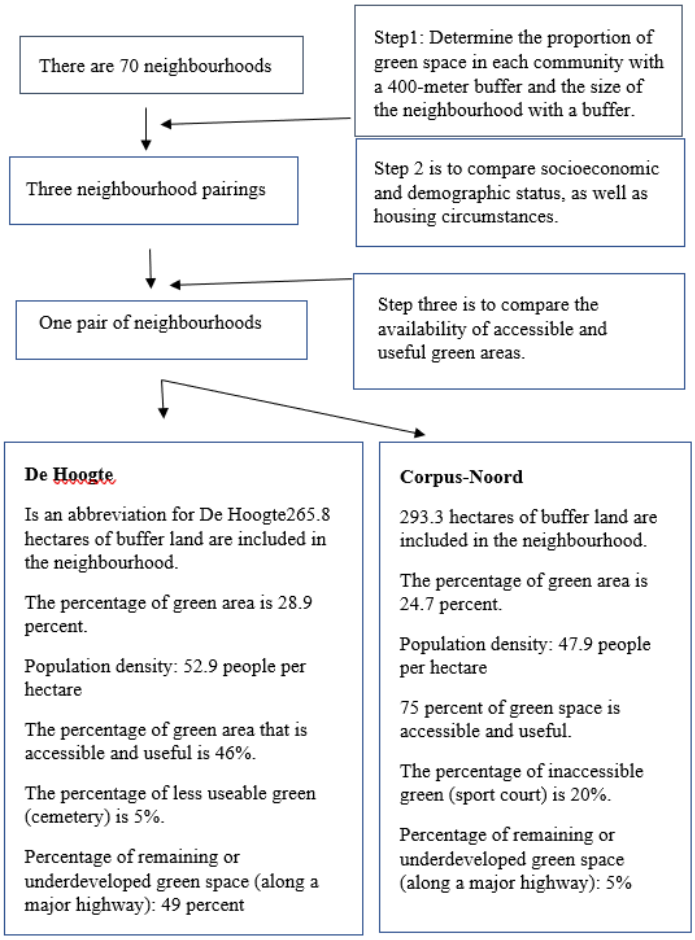

Figure 7: A summary of the neighborhood selection (zhang et al.,2017).

• Results

Residents in Corpus-Noord, where there is a high availability of accessible and useful green spaces, were substantially happier with their neighborhood than residents of De Hoogte, where there is a low availability of accessible and usable green spaces. Contrary to popular belief, there were no statistically significant variations in happiness between the two areas. Neighborhood satisfaction, on the other hand, was strongly connected to happiness, indicating the importance of neighborhood satisfaction as a place-based component of overall well-being**.**

• Conclusion

The connection between the availability of accessible and useable green space and community happiness was statistically mediated by perceived green space quality. This study shows that, contrary to some earlier findings, objective measures of green space quality might accurately reflect inhabitants' subjective judgments. As a result, researchers and policymakers must pay close attention to the quality of local green areas, which may be an essential welfare-enhancing strategy.

1.9 Case study: The impact of urban green space on neighborhood satisfaction

Spending time outdoors appears to be beneficial to human health, according to a growing body of data (Heynen, 2002). Higher levels of physical activity are typically associated with living in greener settings. Exposure to green space may help prevent or alleviate stress, anxiety, and depression in both children and adults, particularly in urban areas where green space provides respite and opportunities for interactions among neighbors that build social cohesiveness and collective efficacy (Heynen, 2002).

2. Methodology

The descriptive research approach is used in this study to identify and collect information on the characteristics of a certain group of persons. It provides answers to the following questions: what, who, and why, when, where, and how Akhtar (2016). Outdoor green areas utilized for recreational and social reasons were researched and evaluated in Kumasi's Nhyiaeso, a high-income district, and Ayigya, a low-income neighborhood.

This study used a mixed method approach, which involves engaging with the sample population and analyzing qualitative data (Borrego et al, 2009). The study likewise included both careful examinations of case studies and strict study of behavioral patterns and attitudes based on the researcher's ideas and specialization, as well as interviews with some of the respondents.

The target population includes managers, staff and users of outdoor green spaces used for recreation (Royal Gulf Park and Rattray Park at Nhyaieso. The study employs the non-probability sampling approach, in which the likelihood of each instance being chosen from the target population is unknown. To satisfy the research criteria, an in-depth study focusing on a small number of instances is chosen for a specific purpose. This sample will give a detailed case study (Saunders et al, 2015). Purposive sampling was utilized for managers staff of outdoor recreational green spaces whereas snowballing was employed for users of the space.

Primary data for this study were obtained through semi-structured interviews with managers, personnel, and users of outdoor green spaces for recreational purposes, as well as case studies of outdoor green spaces. These were used to gather information on the current state of selected outdoor green spaces. Secondary sources of data were obtained, however, from a literature study, publications on green spaces, and green space management, among others.

No	Research Objectives	Data Required	Data Source	Method of Data Collection
1	To determine the current state of green spaces in residential areas.	Current land size, availability of facilities and accessibility.	Existing outdoor green space in residential area. Journals, review papers, articles, published research work.	Literature review, observation, Interview.
2	To discover the theories used in green space management.	Sustainable management approach for outdoor green spaces in residential areas.	Journals, review papers, articles, published research work.	Literature review, case study.
3	To explore the implications for designing green space management.	Effects of neighborhood green spaces on its residents.	Residents of neighborhood, users of green space, review papers, journals.	Literature, review, interviews, case study.
4	To make proposals on how to improve green space management in residential areas.	Established theories for sustainable green space management.	Parks and gardens department, case study, recommendations from research.	. Literature review, analyzed data and recommendations of research, research conclusion, case study

Table 2: Data requirement and resources, (Author's construct 2021).

Semi-structured interviews were used for managers and administrators of green spaces owing to their understanding of the managing and running of outdoor green spaces. Direct observations, note-taking, and the usage of photos were all used to conduct field observations. Rattray Park, Gulf-park and the CCC premises were investigated to aid in the discovery of complete green space conditions and management.

Thematic analysis, which seeks to discover patterns of themes in interview data, was employed to analyze semi-structured interviews (Mortensen, 2019).

3. Results and discussions

Nhyiayeso

Nhyiaeso is a residential neighborhood inside the Kumasi Metropolitan Assembly. It is located 2 kilometers north of the center of the neighboring capital. The city serves as both a residential and business company location. The city is bounded to the north by Santasi, to the south and east by Kejetia - Adum, and to the west by Danyame. The city has a population of 40,000 people (Ghana Statistical Service).

Figure 8: Location of Kumasi-Ashanti region of Ghana, from Associated consultants (2012).

Figure 9: Kumasi sub metro map showing Nhyiaeso municipal, from World Atlas (2021

Figure 10: Base map of Nhyiaeso, from Google Earth Maps (2021).

Ayigya

Ayigya is located inside the Oforikrom Sub-Metro of the Kumasi Metropolis. It is a dormitory metropolis located 10 kilometers from Kumasi's center. To the north is Maxima, to the west is Bomso, to the east is Asokore Mampong, and to the south is Kentinkrono. The population of Ayigya is 55,476

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Figure 8: Location of Kumasi-Ashanti region of Ghana, from Associated consultants (2012).

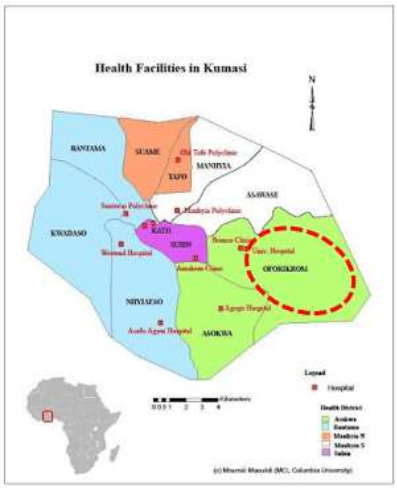

Figure 9: Kumasi sub metro map showing Nhyiaeso municipal, from World Atlas (2021)

Figure 13: Base map of Ayigya, from Google Earth Maps (2021).

An observation guide was employed to access the current condition of outdoor green spaces in Nhyiaeso a high-income neighborhood. Rattray Park and the Royal Gulf Club were the main outdoor green spaces selected for the purpose of the study. Below are the findings from the observational study for Rattray Park.

Case Study 1: Rattray Park (Nhyiaeso

The Park is an outdoor greenspace used for recreational purpose. It was built by the KMA as part of its efforts to reestablish Kumasi as West Africa's Garden City.

• Spatial structure

The Park is rectangular in form and contains both soft and hard landscape. The use of concrete, wood, glass, and steel gives variety to the materials used in the space. As a result, the park contains two water features: a fountain and a swimming pool.

Figure 14: Spatial structure of Rattray Park, (Field survey 2021).

The Park used both natural and artificial features, an example is the soft landscape. Some areas of the park with soft landscape are covered in grass which are naturally grown as other parts are covered with artificial grass. For variety, the park has walkways with different materials. Some walkways use pavement blocks whiles others use tiles. The swimming pool looks well maintained whereas on the other hand, the fountain looks abandoned. There were complaints with the functioning of the six (6) squared meter dancing water fountain which is the first of its kind in the country. The park's main attraction was shut down when a USB drive holding its operational software was stolen. The administration created a manual method of controlling the fountain, however the dancing fountain appears to be dormant now.

Figure 15: Current state of dancing fountain at Rattray Park, (Field survey 2021

• Way finding/signage.

The Park has signages that provide information about the space. However, the space is designed in a way such that there's no obstruction to night vision. The power source used in the space is the national grid with an alternative power source which is a generator. There's the presence of streetlight which illuminates the path of travel at night.

Figure 16: Signages present at Rattray Park, (Field survey 2021

The Park features a signage displaying the space's block plan, which helps visitors and users make their way through the park. However, some of these signs provide guidance on what to do and what not to do when visiting the park. Most of the park's lighting were discovered to be inoperable at night, making use of the area impossible. However, the park's signages are not lighted, making nighttime reading difficult.

• Path of travel

The Park features a barrier-free travel route that is approximately 3000mm wide and has no drains on each side. The traffic route and curbs have been intended to be highly inclusive. The Park does not have any ramps, but the architecture of the park employs a single level to make it inclusive and accessible to all. The restaurant, on the other hand, has a ramp. The travel routes are quite broad and constructed in such a way that they may be utilized as a vehicle route. The Park has walkways in very good condition.

Figure 17: Travel paths at Rattray Park, (Field survey 2021).

• Furniture

The park has a variety of street furniture, which includes benches, bins, streetlights, PA (Public Address) systems and signage, among other things. All seating has a level and firm ground adjacent to it that can accommodate a wheelchair or a trolley. Available street furniture makes the park lively as the PA systems give a musical interlude throughout ones stay on the park. Bins available also prevents littering around the park.

Figure 18: street furniture at Rattray Park, (Field survey 2021**).**

The Park has a variety of seating options, the majority of which are anchored to the ground. These seats are strategically placed throughout the park to provide clear views of the activities taking place. The park's seating areas are all shaded from the sun.

Figure 19: street furniture at Rattray Park, (Field survey 2021).

Case study 2: Royal Gulf Club (Nhyiaeso)

The Royal Golf Club, Kumasi is without a doubt one of Ghana's largest and most active golf clubs, with a course covering 93 acres of lush evergreen and an additional 9 acres of built area. It is bounded by Lesley Opoku Ware Drive, John Owusu Addo Close, the Regional Minister's Residency, SK Mainoo Street, and Harper Road. His Majesty, Otumfuo Osei Tutu II, Paramount and Divisional Chiefs, Top Corporate Executives, and the general golfing public from across the country and sub-region all patronize the course. The 18-hole 72-standard scratch score golf course is home to the sub-most region's prestigious golf open tournament, The Asantehene Open Golf Championship, which attracts over 300 amateur and professional golfers

- **Spatial structure**

The Park has an irregular form without many varieties in materials used since the place is almost covered in green. The Royal Golf Club has the main golf course and a club house, these are the two main areas present in the space. The space is covered in soft landscape with little areas of hard landscape. The presence of a water feature harmonizes the atmosphere and makes the game interesting

Figure 20: Spatial structure of the Royal Golf Club, (Field survey, 2021).

From figure 20, it can be observed that there are no defined walkways thus hard landscape. The only existing walkway is around the club house leaving the golf course all green and this is due to the nature and rules of the golf game.

- **Way finding/signage**

The golf course has signages that provides information and helps golfers find their way around the park. The main source of power supply in this facility is the national grid, however there's a generator which serves as a secondary source of power

Figure 21: Way finding signage at Royal Golf Club, (Field survey 2021).

These signs provide information on the various locations of golf holes on the golf course. However, signages on the course are not illuminated, making it difficult to read at night**.**

- **Path of travel**

The golf course has no defined path of travel or walkways nor the presence of cart paths. The whole course is covered in green (grass); this is due to the nature and rules of the golf game and golfers know how to find their way on the course. The only existing walkway is one in front of the club house. There are no existing drains as well as curbs or ramps on the golf course. The golf course however has a single level which makes it inclusive and accessible to all

Figure 25: Path of travel CCC, (Field survey 2021**).**

- **Furniture**

The church has a variety of street furniture, which includes benches, bins, streetlight among other things. All seating has a level and firm ground adjacent to it that can accommodate a wheelchair or a trolley. Seats are shaded from the sun with trees.

Figure 26: Path of travel CCC, (Field survey 2021).

FACILITY CONDITION ASSESSMENT	**Rattray park**	**Remarks**	**Royal golf park**	**Remarks**	**C.C.C Ayigya**	**Remarks**
Exterior						
Is the outdoor green space location close to the main road or a landmark?	↘	**Directly opposite Lancaster**	↘		↘	
Are exterior lights in working order?	↘			**There are no lights on the golf course**	↘	
Are concrete drives and parking lots in good working condition?	↘		↘		↘	
Are concrete sidewalks, steps, and landings in good working condition?	↘		↘		↘	
Are trees and plantings trimmed and alive?	↘	**Trees are well trimmed**	↘		↘	
Are sewers clean out with caps in place?	↘		↘		↘	
Is roof in good working condition (with clear access and no evidence of leakage)?	↘		↘		↘	
Are exterior walls free from cracks and damages?	↘		↘		↘	

Are doors operating safely and securely?	↘		↘		↘	
Are door locks functioning properly?	↘		↘		↘	
Are windows free from cracks and broken panes?	↘		↘		↘	
Interior						
Are floor and ceiling finishes in good working condition?	↘		↘		↘	
Are seats and tables available in good working condition?	↘		↘		↘	
Are there any cracks and other damaged walls?						
Are doors in good working condition?	↘		↘		↘	
Are door locks and latches working properly?	↘		↘		↘	
Electrical system						
Are all lights working properly with their accompanying switches?	↘		↘		↘	
Are all electrical panels well secured?	↘		↘		↘	
Plumbing system						
Are all lavatory faucets working properly?	↘		↘		↘	
Are all sinks and toilets working properly?	↘		↘		↘	
Mechanical ventilation systems						
Are all ceiling fans and accessories in good working condition?	↘		↘		↘	
Is the Air Condition System functioning properly (without any condensation leakages and faulty air handling filters)?	↘		↘		↘	

Table 5: Table 4.1: Facility condition assessment of green areas in neighbourhoods (Author's construct, 2021)

97% of questions had yes as their response and the remaining 3% answered no. It can be concluded that most of the features that contribute to Rattray Park's efficient use as an outdoor green space are in good shape. 95% of questions had yes as their response and the remaining 5% answered no. It can be concluded that most of the features that contribute to the Royal Golf Club's efficient use as an outdoor green space are in good shape even though there are no existing lights on the golf course. 97% of questions for the facility assessment check of CCC premises answered yes and the remaining 3% answered no. The assessment shows that the CCC's landscape facility, which serves as a green space in the neighborhood, is in good condition.

Findings from interviews

Four distinct sets of interviews were carried out and coded as follows

A. Interview with the management of green spaces = XX

B. Interview with the workers at green spaces = YY

C. Interview with users of green spaces = C

D. Interview with residents in neighborhoods = D

Findings from XX (management of green spaces)

Four (4) respondents were interviewed for XX, the first two (2) respondents are the management for Rattray Park, the third from the Royal Golf Club and the last respondent is the management from CCC premises. The results of the interviews will be documented. For ease of understanding and assessment, the findings are presented in table 4.1 below. Variables were coded as follows

a. Respondents = R(n)x, where n is the respondent number and 'x' are the case study areas

b. Years of work Experience = YOE

c. Management Type = MT

d. How are Funds for the upkeep of the space Generated = FG

e. How often is Maintenance Culture practiced within the space = MC

R(n)^{X}	**YOE**	**MT**	**FG**	**MC**
R1^{c1}	**7**	Management type adapted by the park is the non-public (partnership). The Park is managed by both the government and a private entity whereas all managerial duties are left under the care of the private body.	Funds for the upkeep of the park are generated internally revenue made from the park is used for workers salary as well as maintaining the space.	Maintenance culture is practiced at least every three months. At least during this period, the grass and hedges in the space are trimmed and unwanted branches from trees are cut off.
R2^{c1}	**3**	The restaurant at Rattray Park is managed separately from the park itself, but the management of the park supervises that of the restaurant.	Funds are generated internally not only from the restaurant but the park as well.	There's no specific time frame as to when maintenance culture is practiced but rather, tools and equipment's are maintained when they go faulty.
R3^{c2}	**3**	The management type used at the Royal Golf Club is non-public (private). The golf club is managed by a private entity.	The golf club runs by funds generated both internally and externally by sponsorship from cooperate bodies.	Per the nature of the golf course, maintenance is practiced every day to achieve a healthy course all year round. Maintenance mostly takes place during the weekdays
R4^{C3}	**5**	The green areas of the church which serves as green spaces is managed by a committee set up by the church leaders. This means the space uses the public management style.	Since there's no revenue generated from this space, funds are generated externally from the church to keep the space.	Maintenance is practiced once every two months during this period, hedges are properly trimmed, and the grass and trees are well kept promoting the effective functioning of the space.

Table 5: Findings from XX, (Author's construct***)***

From table 5, it can be deduced that all the various green spaces use different management styles. 50% of the respondents stated that the non-public (partnership) management style is used whereas funds are generated internally with a maintenance schedule of three (3) months. Another 25% indicated that non-public (private) management is adapted with funds generated both internally and externally as maintenance is practiced every other weekday. The remaining 25% of the respondents described the management style used as public where funds are generated externally with a maintenance schedule of two (2) months

Findings from YY (workers at green spaces)

Thirty (30) people were interviewed from three different green spaces in two neighborhoods. All respondents are represented by the function r(n)x, where n is the number of respondents and 'x' are the case study areas. Most of the questions focused on the number of years of work experience and the level of happiness. The following variables were coded for the worker's interview**:**

a. Years of working experience = YOE

b. Days of work = DW

c. Running of shifts = RS

d. Scale of happiness of workers = HL

$R(n)^X$	YOE	DW	RS
$R1^{C1}$	4	Mondays - Sundays	Shifts apply
$R2^{C1}$	5	Mondays - Sundays	Shifts apply
$R3^{C1}$	3	Mondays - Sundays	Shifts apply
$R4^{C1}$	2	Mondays - Sundays	Shifts apply
$R5^{c2}$	7	Mondays - Sundays	Shifts do not apply
$R6^{c2}$	2	Mondays - Sundays	Shifts do not apply
$R7^{c2}$	5	Mondays - Sundays	Shifts apply
$R8^{C3}$	3	Fridays - Sundays	Shifts do not apply
$R9^{C3}$	4	Fridays - Sundays	Shifts do not apply
$R10^{C3}$	1	Fridays - Sundays	Shifts do not apply

Table 6: Findings from YY, (Author's construct 2021)

40% of the respondents work from Monday-Sunday with shifts applied. 30% of workers also work from Mondays-Sundays with shifts for some. However, another 30% of the respondents work from Fridays-Sundays without shifts

HL	Very unhappy	Unhappy	Neutral	Happy	Very happy
R(n)	-	5	4	14	7

Table 7: Findings from YY, (Author's construct)

None of the respondents were very unhappy to be working. However, 5 respondents (16.7%) rated their level of happiness as unhappy. 4 respondents (13.3%) rated their level of happiness as neutral; 14 respondents (46.6%) rated their level of happiness as happy and lastly 7 respondents (23.3%) rated their level of happiness as very happy.

Findings from c (users of green space)

A total of thirty (30) respondents were interviewed from three different green spaces in two neighborhoods. Respondents are represented by the function r(n)x, where n is the number of respondents and 'x' are the case study areas. Questions focused on how often users visit these green spaces and their level of satisfaction upon usage. The following variables were coded for the user's interview:

a. How often space is visited = SV

b. Whether or not they were residents of the neighborhood = NR

c. Level of satisfaction on using the space = SL

d. Perceived quality of space with respect to amenities, natural features, accessibility, and maintenance = PQ

R(N)X	SV	NR
$R1^{C1}$	Visits Park only when the management of the park is hosting programs for the public.	Is not a residence of the neighborhood.

$R2^{C1}$	Visits the park every weekend with kids to release stress after a long week.	Is not a residence of the neighborhood but lives close to the neighborhood.
$R3^{C1}$	Visits the restaurant at the park every other weekday during lunch hours.	Is not a residence of the neighborhood but works in the neighborhood.
$R4^{C1}$	Visits the park occasionally for picnics with family and friends.	Is a residence of the neighborhood.
$R5^{C2}$	Visits the golf club every weekend to play as a member of the club.	Is a residence of the neighborhood.

Table 8: Findings from C, (Author's construct**)**

From the findings in table 8 above, 60% of respondents visit these green spaces often whiles the remaining 40% visit the spaces occasionally. However, 50% of these respondents are residents of the neighborhoods in which the green spaces are located whiles the remaining 50% are not.

SL	Highly unsatisfied	Unsatisfied	Neutral	Satisfied	Highly satisfied
R(n)	2	5	3	15	5

Table 9: Findings from the level of satisfaction of users, (Author's construct)

2 respondents (6.6%) made it known that they were highly unsatisfied. 5 respondents (16.6%) also described their level of satisfaction as unsatisfied, however, 3 respondents (10%) were neutral, 15 respondents (50%) indicated they were satisfied, and 5 respondents (16.6%) stated they were highly satisfied..

From the table, only a respondent (3.3%) stated they strongly disagree to the perceived quality of the space. 2 respondents (6.7%) indicated they disagree, 4 respondents (13.3%) are neutral, and 15 respondents (50%) agree. However, 8 respondents (26.6%) strongly agree

Findings from D (residents in neighborhoods)

Residents of Nhyiaeso and Ayigya were interviewed to find out how important these outdoor green spaces for recreational purposes are to them and how satisfied they are with the quantity of green spaces available as well as the effects these spaces have on them. The variables for this interview are coded as follows:

a. Importance of green spaces in residential area = IM

b. Satisfaction level of the quantity of green spaces in neighborhood = S

c. Effects of green spaces on the health of residents = ER

IM	Not important	Less important	Neutral	Important	Very important
R(n)	-	9	4	26	54

Table 8: Findings from Importance of green spaces in Nhyiaeso, (Author's construct)

Responses from residents in Nhyiaeso. according to the table above states that 54 respondents (56.2 percent) agree that green spaces play a very important role in residential areas, 26 respondents (27%) also stated that it is important to have green areas in residential neighborhoods. 4 respondents (4.1%) indicated they did not know whether green spaces were important in residential areas. However, 9 respondents (9.3%) stated green spaces in residential areas are less important. None of the respondents thought it not important to have green spaces in residential areas**.**

IM	Not important	Less important	Neutral	Important	Very important
R(n)	2	22	31	23	18

Table 9: Findings from Importance of green spaces in Ayigya, (Author's construct)

For Ayigya, respondents shared their views on the importance of green spaces in residential areas as follows, 2 respondents (2%) stated it was not important to have green areas in residential neighborhoods, 22 respondents (22.9%) also made it clear that green spaces in residents were less important while 31 (32.2%) people said they did not know if green spaces are important or not. However, 23 respondents (23.9%) indicated that green spaces in neighborhoods are important, and 18 respondents (18.7%) said green spaces were very important

SQ	Highly unsatisfied	Unsatisfied	Neutral	Satisfied	Highly satisfied
R(n)	2	5	25	41	23

Table 10: Findings from the satisfactory level of green spaces in Nhyiaeso, (Author's construct)

Responses from the satisfaction level of the quantity of green spaces in Nhyiaeso showed that 2 respondents (2%) were highly unsatisfied with the number of green spaces available in the neighborhood. 5 respondents (5.2%) were unsatisfied with the quantity of available green space, 25 respondents (26%) were not affected by the quantity of green space existing. 41 respondents (42.7%) were satisfied with the quantity of green space available and the remaining23 respondents (23.9%) were highly satisfied with the green spaces available

SQ	Highly unsatisfied	Unsatisfied	Neutral	Satisfied	Highly satisfied
R(n)	-	12	34	18	32

Table 11: Findings from the satisfactory level of green spaces in Ayigya, (Author's construct)

32 respondents (33.3%) answered as highly satisfied with the green spaces available in the neighborhood. 18 respondents (18.7%) indicated they were satisfied with green space, 34 respondents (35.4%) were not affected by the quantity of green space available, and 12 respondents (12.5%) were unsatisfied with the quantity of green space available and none of the respondents were highly unsatisfied.

ER	Very false	False	Neutral	True	Very true
R(n)	2	14	4	35	41

Table 12: Findings from the effect of green spaces on residents in Nhyiaeso (Author's construct)

From table 12 above, respondents from Nhyiaeso shared their opinion on how green spaces affects their health 41 respondents (42.7%) answered it was very true how green spaces in their neighborhood affects their health. Most of the respondents justified their response saying when they visit these green areas, some of them play golf which serves as a form of exercise and affects their health positively. Others also justified their answer saying these green areas in their neighborhoods have lots of trees that provide the neighborhood with unpolluted air. However, 35 respondents (36.4%) answered true. 4 respondents (4.1%) did not know if these green areas had effects on their health, 14 respondents (14.5%) answered it was false that green spaces in their neighborhood had any effect on their health and 2 respondents (2.1%) answered very false to the question.

ER	Very false	False	Neutral	True	Very true
R(n)	14	19	32	21	10

Table 12: Findings from the effect of green spaces on residents in Ayigya (Author's

Respondents from Ayigya also shared their opinion on the effects of green spaces in the table 4.15 above. 10 respondents (10.4%) answered very true saying green spaces had effects on their health positively because when they were sick, they could use leaves from tree branches to prepare concoctions which healed them from their illness and so, they believed green spaces affect their health greatly. However, 21 respondents (21.8%) answered true to the question, 32 respondents (33.3%) said they did not know green spaces could affect their health in anyway, 19 respondents (19.7%) answered it was not true (false) green spaces had effects on their health and 14 respondents (14.5%) said it was very false green spaces influenced their health.

4. Conclusion and recommendations

Based on the findings in the previous chapter, it is possible to conclude that, existing outdoor green spaces in selected neighborhoods are in good shape. Nhyiaeso a high-income residential area had quite several green spaces from which Rattray Park and the Royal Golf Club were selected for the purpose of the research. However, Rattray Park met almost all the standards used as a check for the observational study and it was noticed that a water feature in the park (dancing fountain) was no longer functioning, and few workers complained about how salaries were delayed but looking at the number of years the park has been in existence, 6 years (2015-2021), the management has fallen short and extra attention needs to be paid to that area. On the other hand, the Royal Golf Club didn't meet some of the standards for the observational guide, and this was due to the nature and rules governing the game of golf. However, looking at the number of years the golf club has been in existence, 100 years (1921-2021), the management of the space can be commended to be effective and residents in the neighborhood are somewhat satisfied with the quantity of available green spaces.

Ayigya a low-income residential area had little to none outdoor green space for recreational activities because areas set aside for outdoor green spaces were converted into portable structures used for small scale business activities by the residents but for the purpose of the research, the CCC church premises was selected since it had features of an outdoor green space and served as a source of recreation to users who held gatherings at the church premises due to its serene environment. However, looking at the years it has been in existence 10 years (2011-2021) the management of the green area at the church premises is effective and residents are not satisfied with the quantity of green spaces available in the neighborhood.

Based on the research conducted, recommendations that can be made from findings are as follows;

a. The government should pass mandatory rules and policies to ensure that outdoor green spaces for recreational activities are considered in neighborhood planning.

b. Appropriate authorities and stakeholders should enforce the adherence to planning policies and guidelines.

c. Qualified and skilled personnel must be employed to manage labor at green spaces efficiently.

d. The public should be educated on the benefits of green spaces in residential areas to encourage its efficient use.

Design Proposal

To design a Local Park in Ayigya to suit their way of life as a low-income residential neighborhood and to help generate revenue for the development of the community.

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References

A.C.K. Lee, R. Maheswaran Journal of Public Health, Volume 33, Issue 2, June 2011, Pages 212–222, https://doi.org/10.1093/pubmed/fdq068 Published: 10 September 2010

Braimah, I. and Osei, K. (2014) 'Promoting Green Infrastructure in Kumasi: Challenges and Strategies', 4(26), p. 110. Available at: www.iiste.org.

Day, B. H. (2020) 'The Value of Greenspace Under Pandemic Lockdown', Environmental and Resource Economics, 76(4), pp. 1161–1185. doi: 10.1007/s10640-020-00489-y.

Feltynowski, M. et al. (2018) 'Challenges of urban green space management in the face of using inadequate data', Urban Forestry and Urban Greening, 31(December 2017), pp. 56–66. doi: 10.1016/j.ufug.2017.12.003.

Jansson (2014) 'Green space in compact cities'. Available at: https://www.researchgate.net/publication/270572048_Green_space_in_compact_cities_the_benefits_and_values_of_urban_ecosystem_services_in_planning.

Li, F. et al. (2019) 'Urban Green Space Fragmentation and urbanization: A spatiotemporal perspective', Forests, 10(4). doi: 10.3390/f10040333.

Mensah, C. A. (2014a) 'Is Kumasi Still a Garden City? Land Use Analysis between 1980-2010', Journal of Environment and Ecology, 5(2), p. 89. doi: 10.5296/jee.v5i2.5968.

Mensah, C. A. (2014b) 'Urban Green Spaces in Africa: Nature and Challenges', International Journal of Ecosystem, 2014(1), pp. 1–11. doi: 10.5923/j.ije.20140401.01.

Randrup, T. B., Östberg, J. and Wiström, B. (2017) 'Swedish green space management – The managers perspective', Urban Forestry and Urban Greening, 28(August), pp. 103–109. doi: 10.1016/j.ufug.2017.10.001.

Suomalainen, S. (2009) 'A COMPARATIVE STUDY OF URBAN GREEN AREA PLANNING Sari Suomalainen University of Helsinki Plant Production Science A Comparative Study of Urban Green Area Planning', Plant Production Science, (October).

Swanwick, C., Dunnett, N. and Woolley, H. (2003) 'Nature, role and value of green space in towns and cities: An overview', Built Environment, 29(2), pp. 94–106. doi: 10.2148/benv.29.2.94.54467.

Wang, Y. et al. (2018) 'Local variation of outdoor thermal comfort in different urban green spaces in Guangzhou, a subtropical city in South China', Urban Forestry and Urban Greening, 32(December 2017), pp. 99–112. doi: 10.1016/j.ufug.2018.04.005.

World Health Organization (2017) 'Urban green spaces: A brief for action', Regional Office For Europe, p. 24. Available at: http://www.euro.who.int/__data/assets/pdf_file/0010/342289/Urban-Green-Spaces_EN_WHO_web.pdf?ua=1.

Zhang, B. and Xie, G. (2014) 'The Effects of Public Green Spaces on Residential Property Value in Beijing The Effects of Public Green Spaces on Residential Property Value in Beijing', (May 2012). doi: 10.5814/j.issn.1674-764x.2012.03.007.

Zhang, Y. et al. (2017) 'Quality over quantity: Contribution of urban green space to neighborhood satisfaction', International Journal of Environmental Research and Public Health, 14(5). doi: 10.3390/ijerph14050535.