

Residents' Perception of Green Spaces for Urban Sustainability:  
A Case Study in Dhaka City

A Dissertation  
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## **Declaration**

This is Sultana Razia bearing ID: 15262018, student of Master of Development Studies, BRAC University, hereby state that this study has never been submitted for the fulfillment of any other academic purposes such as accomplishment of degree or certification. I am assuring that this thesis paper is solely completed by me with the help of my respected supervisors. Hence, I am declaring again that this is an original academic research paper.

Sultana Razia  
Student ID: 15262018

## **Certification**

It is my pleasure to certify the original thesis work entitled “Residents” Perception of Green Spaces for Urban Sustainability: A Case Study in Dhaka City”, completed under my supervision. To the best of my knowledge, this work is not joint work and I am confirming that this thesis is solely completed by Sultana Razia with her own effort. I would like to assure, this thesis is acceptable for submission to BRAC Institute of Governance and Development (BIGD), BRAC University for partial fulfillment of Masters in Development Study (MDS).

**Professor Dr. Niaz Ahmed Khan**  
Department of Development Studies  
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**Sultana Razia**

## **Abstract**

Urban green space reduces noise pollution and improves air quality in the cities and thus, contributes to urban sustainability. The concept of urban sustainability is gaining attention to the city side stakeholders across the world. This study aims to examine city dwellers' perception about green spaces and explore the relationship between green space and urban sustainability. Based on a social survey, conducted among 78 residents from Dhaka North and South City Corporations, this study found that current state of green space was not in satisfactory condition at all. It further revealed city dwellers' low level of satisfaction with the existing utilization of green space in Dhaka. City dwellers' perception of inadequate green spaces has negative social implications. Insights from this study may assist city authorities and national government to create more green spaces and formulate policies for better utilization of these green spaces towards enhancing urban livability in Dhaka city.

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## Chapter One: Introduction

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This chapter is organized in to seven interrelated sections. In the first section, background of the study has been introduced where the key terms like urban sustainability; green space and social implication are explained by giving literature reviewed, articles, and newspapers information and so on. After that, Second part of this study has found out research gap of green space for urban sustainability in Dhaka city. Why green space is needed for the every stakeholders of Dhaka city like city planners, government, academicians and as well as researchers which is discussed in third part. In this study, fourth part is the prime focus on that paper which is research objectives. Mainly, three objectives have been selected for this study. Another major part has discussed, where research study area has been identified by giving various information in Dhaka north and south city corporation. Methodology is the core part for any research paper thus; seventh part has revealed a clear methodological outline.

### 1. 1 Background of the study:

In last couple of decades, it is commonly accepted amongst researchers that most of the cities are struggling with dilemma of pollution, development and urban sustainability. The cities are facing many challenges, for instance, air, water and noise pollution; lack of green field and space for physical exercise and relaxation; inefficient household waste management; unexpected fluctuation of urban calamities; which forced city dwellers to undergo additional mental stress along with city life pressure. In this context, urban development and sustainability have become critical issue to the stakeholders of city –from regulators to city inhabitants. City authorities have prime responsibility to keep balance between urban development and sustainability for the present and future generation. The provision of adequate green spaces also is considered as key element for ensuring urban sustainability. Green spaces are known as „green lungs“ of the city which help to provide mental and physical health among the people(Khan, 2014). More specifically, green spaces provide walking, cycling, socializing opportunities that help to mitigate daily stress. According to Chowdhury and Faruqui (1989), residents get the social benefits of urban green space in terms of recreational opportunity, mental well-being, aesthetic enjoyment, and social bonding. Thus, urban green space is playing a vital role on social issues in the mega cities. According to Wheeler and Beatley (2014), urban green space provide residents economical, ecological and social equity benefits that turn the city into sustainable.

Generally, green spaces are not only used for ecological and environmental balance but also social facts like balanced mental growth of city dwellers. Green space is a combination of garden, parks, green grounds, natural vegetation, roof top gardening, playing field, green corridors(Verdú-Vázquez, Fernández-Pablos, Lozano-Diez, & López-Zaldívar, 2017). Sustainability focuses on meeting the needs of present without compromising the ability of future generations to meet their needs(Santillo, 2007). According to Alberti (1996),urban sustainability is essential where a city uses natural resources and release emissions and wastes.

Dhaka is one of the fastest expanding cities where more than 17 million people are living. The city has grown with rapid deforestation, unexpected flooding and air pollution because of imbalanced urbanization M Islam, A Mahmud, and Islam (2015). State of Global Air Report 2017 ranked Dhaka city 2<sup>nd</sup>air polluted city in the world. Pollution and mismanagement are decaying the city's sustainability. The provision of green spaces can prevent this decay and improve the quality of urban dwelling.

## **1.2 Research gap:**

Although green space has always been an important component for urban sustainability, it is not getting the research focus in Bangladesh. Moreover, some researchers have examined the economic and environmental aspects of green spaces where social implications were ignored. In this context, this study plans to fill in the gaps by investigating residents' perceptions with regards to social implications of green spaces for urban sustainability.

## **1.3 Significance of the study:**

The findings of this research have significance for Dhaka city dwellers for several reasons. This study identifies some ecological, social and financial facts that city dwellers need to consider for improving urban green space, resulting in standardized living atmosphere for city dwellers. Also, academics and researchers will get a clear idea about current trend of citizen's perception on urban green space and urban sustainability. Likewise, city authorities and the national government will have evidence to formulate specific policies and develop management strategies to widen the green space in Dhaka city.

## **1.4 Structure of the report:**

This research report is organized into four (04) chapters. Backgrounds of the study, research gaps and significance have already been presented in the introduction chapter. Chapter 2 describes about literature review, finding and analysis have explained in Chapter 3. Consequently, Chapter 4 presents conclusion and summary of this research. Finally, the report concludes with the clear perception of respondents about green space and its necessities for urban sustainability.

## **1.5 Research Objectives:**

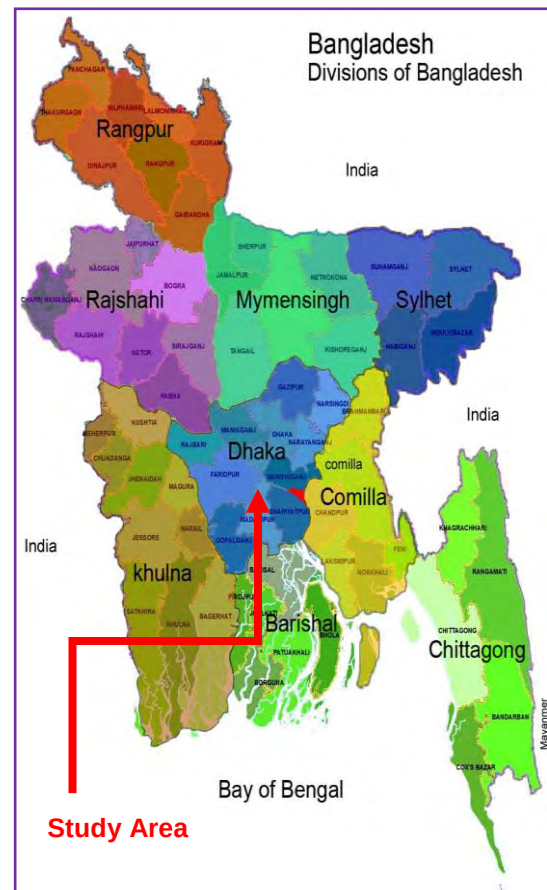
The prime objective of this study is to examine the residents' perception of the study area about green space for urban sustainability with specific focus on social implications of green space. In order to achieve this objective this study is to

- Review the conceptual linkage between green space and urban sustainability.
- Examine the respondents' perceptions about current status of the green space and level of utilization of the green space in urban areas.
- To find out the wider social implications of green space for urban sustainability based on respondents' perception.

## 1.6 Description of Study Area:

The name of Bangladesh came through a long political evolution. This area has been ruled by several external rulers, started from Moghel Empire in the early 1700s which was ended by battle of plassey in 1757 and then British east India Company became ruler of this area. During the separation of Bengal and India in August 1947, this area was identified as an East Pakistan under State of Pakistan. Bangladesh became an independent country in 1971 through the establishment of ethnic, political, economic and linguistic rights. In terms of population, Bangladesh is one of the highest density countries in the world with approximately 160 million population in total Dhaka is the capital of Bangladesh, which stands on the Buriganga River and it is also commonly known as a city of Mosque. Dhaka (Known as Dacca) has a long history as it was established in 1772. Modern Dhaka consists of two City Corporations (North & South) with 130 wards.

Table 1 present's population growth in Dhaka city from 1941 to 2011 and the study area is depicted in Figure 1.



**Fig 1: Divisional Map of Bangladesh**

Source:(Chandan, 2015; Infobase (2007); Mundi, 2018; Review, 2018)

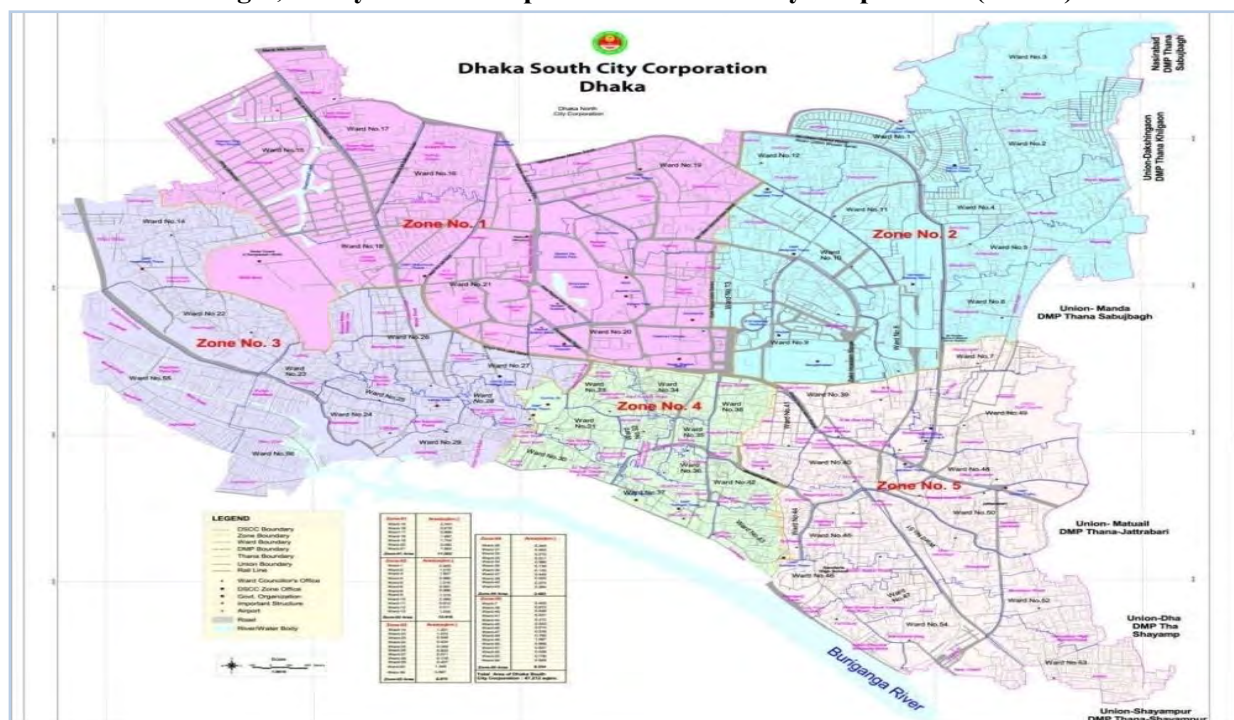
**Table: 1 The population trend in Dhaka city.**

| Population trend in Dhaka city |             |                          |
|--------------------------------|-------------|--------------------------|
| Year                           | Population  | Growth Rate (% per year) |
| 1941                           | 2,39,728    | 4.14                     |
| 1951                           | 4,11,279    | 1.28                     |
| 1961                           | 7,18,766    | 5.18                     |
| 1974                           | 20,68,353   | 9.32                     |
| 1981                           | 34,40,147   | 9.94                     |
| 1991                           | 71,24,730   | 7.55                     |
| 2001                           | 1,02,53,992 | 3.7                      |
| 2011                           | 1,51,23,293 | 3.96                     |
| Source: RAJUK (2016a)          |             |                          |

However, the historical Dhaka metropolitan city was split into two city corporations on 01 December 2011, known as Dhaka South City Corporation (DNCC) and Dhaka North City Corporation (DNCC). DSCC has 57 wards with the areas of Azimpur, Maghbazar, Malibagh, Motijheel, Jatrabari, Kotwali, Sutrapur, Bangsal, Wari, Gendaria, Lalbagh, Hazaribagh, Dhanmondi, Shahbagh, NewMarket, Khilgaon, Kamrangirchar & some others. Similarly, DNCC consists of 36 wards which cover Mirpur, Mohammadpur, Sher-E-Bangla Nagar, Pallabi, Adabor, Kafrul, Dhaka Cantonment, Tejgaon, Gulshan, Rampura, Banani, Khilkhet, Vatara, Turag, Badda, Uttara, Uttarkhan, Dakkshinkhan & some others. Areas of DSCC and DNCC are illustrated in Figure 2 and 3. This study has been conducted in the areas of both city corporations.

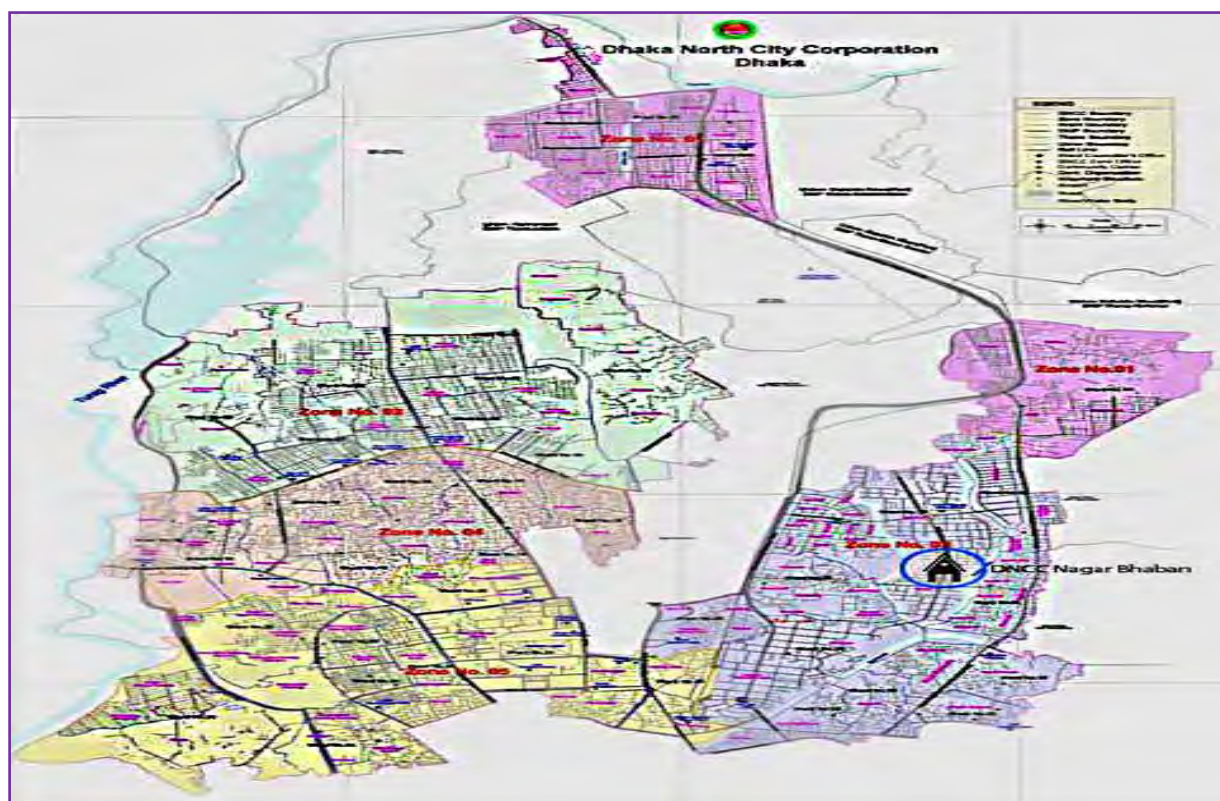


**Fig-2, Newly Divided Map of Dhaka South City Corporation (DSCC)**



Source: Hasan (2011)

**Fig-3, Newly Divided Map of Dhaka North City Corporation (DNCC)**



Source: Hasan (2011)

Dhaka is one of the 20 most populous cities in the world (Cox Wendell, 2012). In this city 18.3 million people are currently living in just 125 square miles (325 square kilometers), meaning 115,000 people live in a square mile (ibid). However, Dhaka ranked 230<sup>th</sup> among 231 mega cities in terms of providing quality of living (Mercer, 2018). For instance, the city has 5% green land, as opposed to standard 25% of a city's total land, to keep the city livable and healthy for dwellers.

## **1.7 Methodology:**

### **1.7.1 Sampling of the respondents:**

100 respondents have been selected from Dhaka City Corporation (both North and South) through purposive and snowball sampling. Those who have been living in Dhaka for long and are capable to compare changes over the years were given priority. Moreover, since this research aims to find out the social implications of green space on urban sustainability, those who have knowledge about this issue were purposively chosen.

Survey questionnaire was sent to 100 respondents; of them, 78 respondents provided complete responses (response rate was 78%). Finally, the responses of these 78 respondents have been used in this study.

### **1.7.2 Data collection tools:**

- i. A structured questionnaire was administered among 100 purposively chosen respondents.
- ii. A number of secondary sources such as peer reviewed journal articles, book chapters, working papers of international organizations were reviewed. This review was instrumental to present research context and have a clear understanding of concepts such as green space, sustainability and their linkage in urban areas.

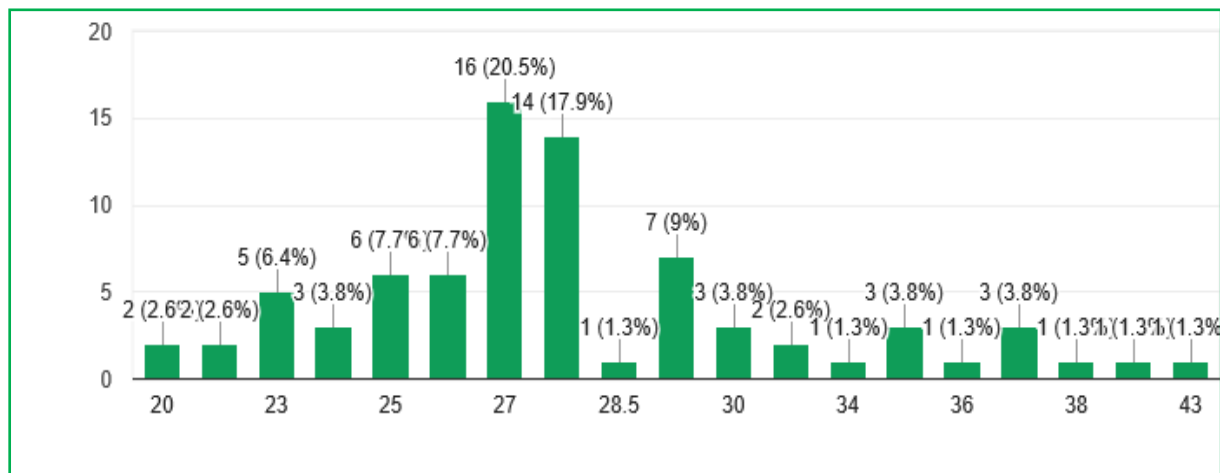
### **1.7.3 Data Analysis:**

Data collected from survey were analyzed using a statistical package for social science (SPSS) versions 20 to enhance the accuracy of the result. This study used 5.00 point scale to find out citizens' perception about preferred structured and probable utilization conditions and used

descriptive statistics with weighted average score to find out rank of the most expected tools for enhancing green space. Additionally, a cross checking mechanism was introduced to ensure the quality of data.

Fig-04 portrays the age of 78 respondents from sample areas (Dhaka City both North and South). The respondents' ages are limits between 20 to 43 years.

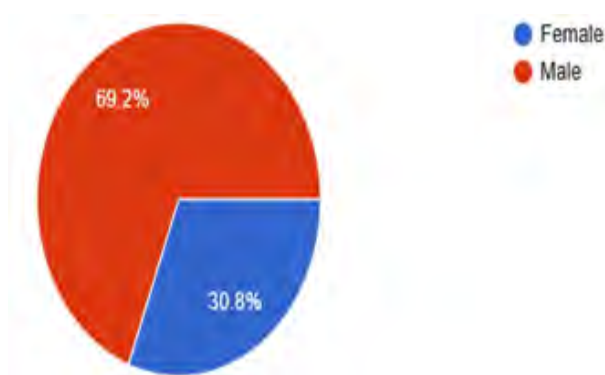
**Figure -4, Overview of respondents' age**



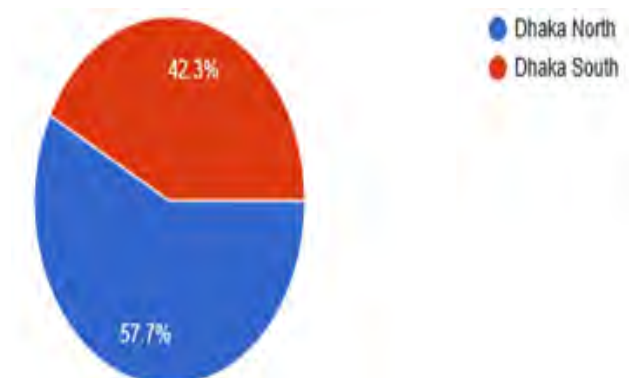
Source: Based on the author's fieldwork

Amongst 78 respondents, 69.2% were male and the remaining (30.8 %) were female (Figure 5). Furthermore, 57.7% respondents were from DNCC and 42.3% were from DSCC (Figure 6).

**Figure – 5 Percentage of respondents'**



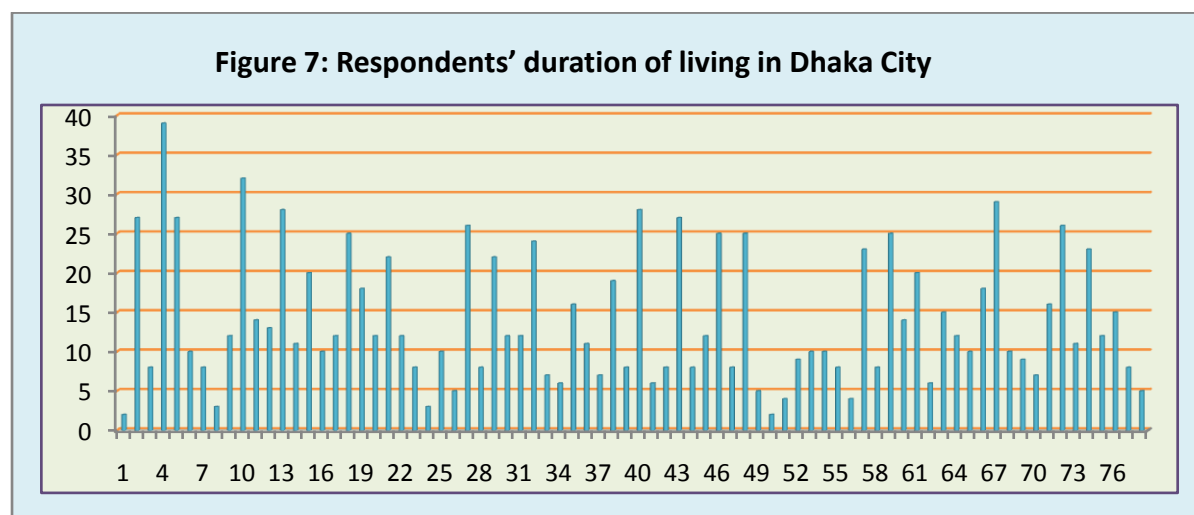
**Figure – 6 Area of living**



Source: Based on the author's fieldwork'



Figure 7 presents the respondents' duration of living in Dhaka City with minimum 2 years and maximum 39 years. As stated earlier that the study purposively emphasized the city dwellers that have been living for long; in reality, approximately 50% were living in Dhaka city for more than 10 years.



Source: Based on the author's fieldwork

In conclusion, this research has figured out the background of some vital issues of urban sustainability such concept of green space, explanation of the indicators of urban sustainability and importance of people perception on green space for urban sustainability in Dhaka city dwellers. In consequence, this study has clearly illustrated that sample size and area which is selected from the north and south city corporation. Moreover, this study has discussed common statistical tools for data analysis and social survey used to collect data that help to accumulated peoples' perceptions.

## Chapter Two: A Review of Selected Literature

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This chapter clarifies conceptual issues related to urban green space, urban sustainability and its social implications with appropriate reference to Dhaka City.

### 2.1 Defining Green Space:

Developing countries are facing many tangible and intangible effects on the urban areas such as lack of balancing atmospheric oxygen, emission of carbon dioxide, lack of flood control, and lack of cleansing of return water flow, and physical and mental stress (Jim & Chen, 2006). Green space is the key component for any urban sustainability.

There are differences around defining „green space“; however, scholars agree on defining green space as those lands which include both cultivate land such as agricultural areas, crop fields, fallow lands and vegetation cover like deciduous forest, mixed forest lands, palms, conifers, shrubs, and others in the context of Bangladesh (Byomkesh, Nakagoshi, & Dewan, 2012).

The provision of green space is a human desire for getting the better urban ecosystems, sustainable development, environment quality and healthy life as well (Jim & Chen, 2006). According to Shuvo and Hakim (2013), urban greening is not only important for the healthy life but also city dwellers get benefited economically, socially and environmentally. For the urban sustainability, city policy maker should take the comprehensive policies including public involvement in green space planning and design (Qureshi, Breuste, & Jim, 2013).

However, in many developing countries, citizen desire has been ignored by the location, design and management aspect (Jim and Chen (2006). Sometimes green space has failed to meet citizens“ expectations.

Moreover, Rashid, Ahmed, and Khan (2010) stated that green space was displaced by the pollution as well as lack of building structured, total management of construction process, energy consumption and air pollution from unplanned incineration plant in the cities.

### 2.1.1 Green Space in Dhaka city:

Dhaka is the capital of Bangladesh which is one of the fastest growing cities in the world (M Islam et al., 2015). Approximately 17 million people live in the area of 350 square kilometers. The rapid urbanization led to the gradual demolition of open space like parks, vacant lands and green areas (Byomkesh et al., 2012; Chowdhury & Faruqui, 1989; Infobase, 2007) which created undesired environmental reactions like rising temperature in surface noticeably, over raining, acid raining, and extreme dust in air. Table 2 shows the gradual reduction of green space over the years of 1975-2017. The green space was lost to the highest rate in Dhaka during 2000-2005 i.e. 20.8%. . At present, Dhaka city has 54 registered parks and 11 playgrounds under Dhaka City Corporation (DCC) as opposed to Dhaka structure plan's suggestion that, open space should be at least 20% of total city area. Figure 8 illustrates the current land use in Dhaka for various purposes. In order to reverse the trend and serve the purpose of visual relief and buffering from building, the Dhaka Metropolitan Development Plan (DMDP) proposed to create urban forestry, parks, playgrounds, domestic gardens, roadside open spaces and urban vegetation (M Islam et al., 2015).

RAJUK has taken some steps such as introduction of „compensative greening“ (RAJUK, 2016b). It is also observed that building models are emphasizing on the restoring physical greening in Dhaka city.

| Table : 2 Loss of green areas in Dhaka               |                               |                        |
|------------------------------------------------------|-------------------------------|------------------------|
| Year                                                 | Loss of Green area (hectares) | Rate of green loss (%) |
| 1975                                                 | 18,626                        | -                      |
| 1988                                                 | 14,818                        | 20.4%                  |
| 1999                                                 | 12,966                        | 12.5%                  |
| 2005                                                 | 10,009                        | 22.8%                  |
| 2012                                                 | 8805                          | 12.03%                 |
| 2017                                                 | 7768                          | 11.78%                 |
| Source: Byomkesh et al., (2012: 53) and Mundi (2018) |                               |                        |

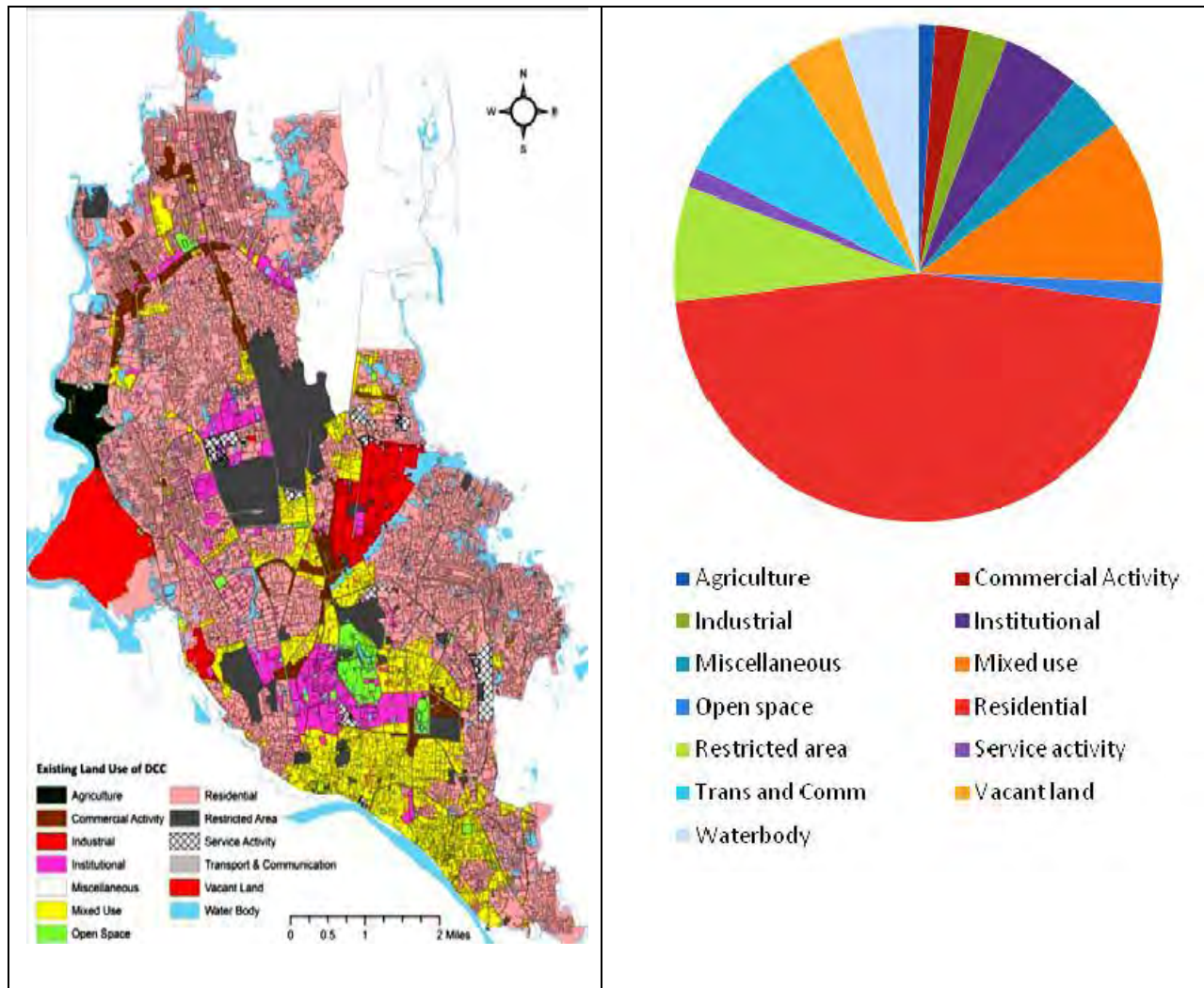


Figure: 8 Status of land uses in Dhaka city Source: (Jerin and Ishtiaque (2015); Shuvo & Hakim, 2013)

## 2.2 Urban Sustainability:

More than 60% of the world's population is estimated to be living in cities by 2050. It appears to be challenging for the governments across the universe to ensure good quality of life in cities. Many cities have focused on the urban development policy for urban sustainability and sustainable urban development (Shen, Jorge Ochoa, Shah, & Zhang, 2011).

The concept of „urban sustainability“ has various dimensions and it is come out from the term “ecology”, meaning to meet long term needs of the inhabitants. Policy and planning is the important manifestation for urban structure to address sustainable issue (Alberti, 1996). This

study uses sustainability as a long term relationship between human and environmental system, which also requires meeting citizens' needs of the current generation without compromising the ability of the future generation to meet their demands. According to Shen et al. (2011), a new sustainable urban development plan focuses on the decision making processes.

### 2.2.1 Urban Sustainability and Dhaka city:

Urban sustainability is useful for urban inhabitants for two reasons (Khan, 2014). First, it provides quality of air, water and waste management; second, it creates environmental and ecological balance in the cities. The quality of city life in Dhaka has decreased and citizens are suffering from lack of fresh air, lack of environment quality and so on. Once upon a time, Dhaka city was known as „Venice of the Orient“ for its wider open space, but the scenario has changed over the decades (Khan, 2014). Table and Figure provides six major urban green spaces and their geographical areas in Dhaka.

| NO                                                  | Name of the Open Space                             | Area (acre) |
|-----------------------------------------------------|----------------------------------------------------|-------------|
| 1                                                   | SohrawardyUdyan                                    | 55          |
| 2                                                   | Ramna Park                                         | 58          |
| 3                                                   | North and South Plaza of NationalAssembly Building | 95          |
| 4                                                   | ChandrimaUdyan                                     | 77          |
| 5                                                   | National Parade Square                             | 120         |
| 6                                                   | Botanical Garden                                   |             |
| Table: 3 Name of the Open Space Source: Khan (2014) |                                                    |             |



1. Sohrawardy Udyan
2. Ramna Park
3. North and South
4. Plaza of National Assembly Building
5. Chandrima Udyan

Figure : 9 Well known green spaces in Dhaka city Source: Khan (2014)

RAJUK has initiated some policy measures such “*Compensative Greening*” and „Long-Term Greening“, but failed to bring them into the light because of insufficient monitoring. Many illegal structures also created problem to implement urban greening(Shuvo & Hakim, 2013).

### 2.3 Green Space for Urban Sustainability in Dhaka City:

Literature on urban sustainability suggests that green space is essential element for the urban environment and has greater impact on life of city dwellers. In the Dhaka city, urban green areas haveshrunk day by day and thereby, residents are facing unhealthy life. Due to lack of open or green space, the city has become unsustainable to a great extent (Khan, 2014).

### 2.4 Social implication of Green Space for urban sustainability:

The current situation of green space in Dhaka city is not up to the mark for healthy living. The less provision of green areas than the standard has social implication on health, mental satisfaction, domestic violence, and socialization. It also affects urban sustainability.

In the final point, it is more focused based on literature discussed that sustainability is always an issue of future where green space not only important issue around the world but also sustainable issue for the future generation. In order to establish the significant relationship between utilization condition of green spaces and social impact, most of the available research papers which are highly related with the research topic have been reviewed.

## Chapter Three: Major Findings, Observations and Discussion

---

Chapter three presents the results and interprets the findings. First, it talks about conceptual linkage between green space and urban sustainability based on the literature review. Second, respondents' perceptions about current status of the green space in urban areas, based on the analysis of survey data, will be discussed. The chapter also illustrates wider social implications of green space for urban sustainability based on respondents' perception in Dhaka city.

### 3.1 Conceptual Relationship between Green Space and Urban Sustainability:

Green space is a significant issue around the world. Most of the cities around the globe are facing environmental pressure, poor air quality, extreme noise and traffic congestion. The situation is becoming worse in developing countries where unplanned urban expansion is very common. No country can avoid urbanization because of strong connection between urbanization and development. It is predicted that by 2050 urban population will rise to 70% of the total population in the world (Gren & Andersson, 2018). Along the rapid urbanization, citizens and government will have to face more challenges to provide a good quality of life. This requires managing urbanization sustainably which aims to meet current needs with proper use of natural resources and keep reserve for the future generations. Here, urban sustainability indicators trigger undertaking activities for achieving sustainable urbanization such as green space (Shen et al., 2011). Urban green space contributes to the reduction of noise, the improvement of air quality and social well-being, and thus ensures sustainability in the cities (Kagan, Hauerwaas, Holz, & Wedler, 2017).

According to Alberti (1996), urban planners in developing countries face difficulties to maintain natural capital (natural resources). Although the countries focus on the sustainable issue mainly in terms of economic and environmental sustainability; little attention is given on green space and urban sustainability. Thus, it is important to establish a linkage between urban patterns and the state of natural resources in order to make the city sustainable.

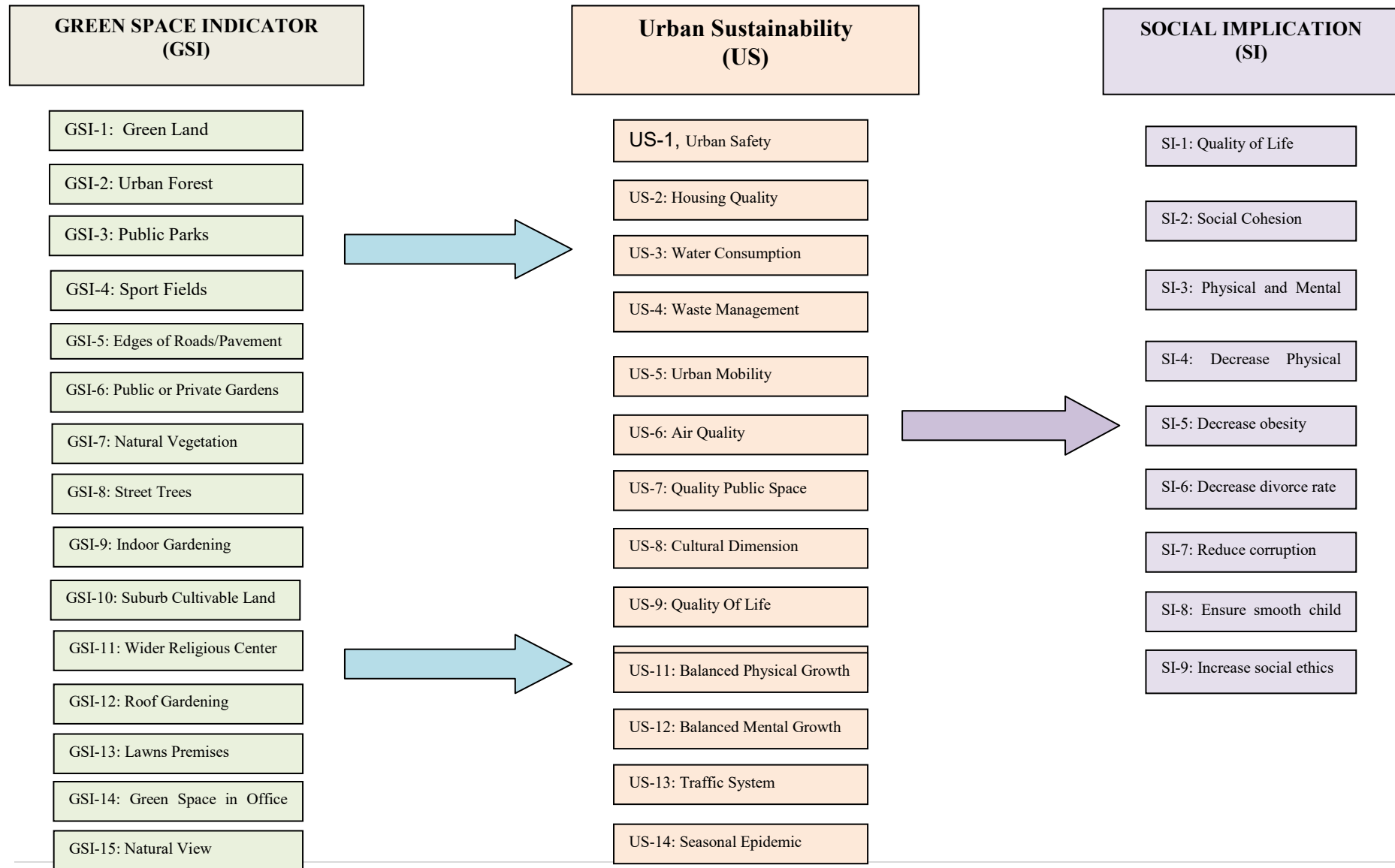
Urban green space is a core component of a sustainable city. Urban sustainability mainly depends on economic, environmental and social sustainability (Kagan et al., 2017). Urban sustainability helps to provide quality of life, sustainable and livable cities (Krajter Ostoić et al.,



2017). More specifically, urban green space can deliver positive health, increase social and environmental outcomes for the inhabitants of the cities (Miller, Hauer, & Werner, 2015). Zhou, Tam, and Qin (2018) stated that affection and attachment of residents with green activities in leisure can lead them more relaxed even with higher physical and mental stability. Improved quality of life and residents' well-being fosters urban sustainability (Rashid et al., 2010). Therefore, the effects of green space noticeably influence life style of urban citizen, mental well-being and social interaction. However, the benefit of green space is very hard to measure in a monetary term (X. Zhou & Parves Rana, 2012).

Green infrastructure and urban sustainability can be provided through the proper planning of cities (Ehnert et al., 2018; Fastenrath & Braun, 2018; McDonald, Malys, & Maliene, 2009; Zhang & Li, 2018). The more concerning matter is that the long term investment by the local government is required for the provision of green spaces. In addition, general people need to be participating in order to improve the situation. Proper participation of every stakeholder (both government and citizen) makes the city more planned with green space (Infobase, 2007).

Fig 10: Relationship between Urban Sustainability and Green Space, Source: [Author's Explanation based on Literature]



Scholars explained how the green space indicators are related to the urban sustainability and its implications on some social issues in the urban family life and/or urban society. Figure-10 shows the relationship between green space and urban sustainability and its social implications among the urban dwellers. For example, some green space indicators such as green land, urban forest, public parks, sport fields, edges of roads, public or private gardens, natural vegetation, street trees lead to the achievement of urban sustainability like quality of life, quality of air, water and waste management, environmental and ecological balance (Gren & Andersson, 2018; Khan, 2014; Qureshi et al., 2013; Wheeler & Beatley, 2014; Zhang & Li, 2018; Zhou & Parves Rana, 2012), which further produce social benefits.

### **3.2 Respondents' Perceptions about Current Status and Level of Utilization of the Green Space in Urban Areas:**

It has been established from the foregoing discussion that green space is importantly required for quality urban livability. The provision of green spaces has been a key component of urban ecosystems. This sub-section, based on survey data, presents the citizens' perceptions about current status and level of green space in Dhaka.

#### **Importance of green space for urban sustainability in Dhaka City:**

All the survey edrespondents have said that green space is important for urban sustainability in Dhaka city. They consider green space important ingredient to boost up the mental and physical health of city dwellers as well as make the urban areas more sustainable. Green Space is needed for healthy breathing. Although they are currently surviving without green space in their surrounding areas, they strongly recommend well planned, eco-household infrastructure for better healthy life especially for the children and elderly members of their family. Air quality of Dhaka city is highly toxic with carbon dioxide gasses which cause various health problems. Poor air quality put the urban residents to be addicted with indoor entertainment rather than outdoor enjoyment. Green spaces can provide important opportunities for promoting healthy living including exercise, fresh air, and relaxation and engagement in outdoor activities.

### Adequacy of Green Space in Dhaka City:

Although the respondents acknowledge the importance of green space for sustainable urban living, they reported inadequate provision of green space for meeting the standard living atmosphere in Dhaka City. Approximately two-third of the respondents reported existing green space facilities inadequate for standard living condition in Dhaka city while around 28% of the respondents said the opposite. Figure 11 shows the details.

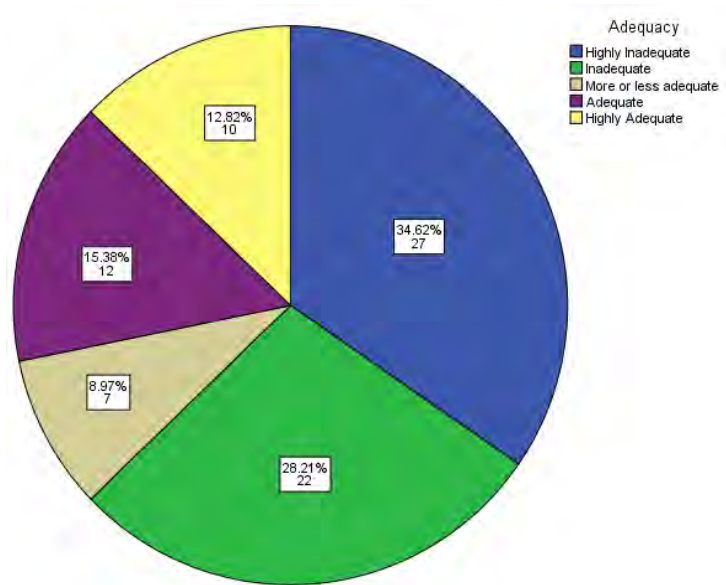


Fig: 11 Adequacy of Green Space in Dhaka City  
Source: Based on the author's fieldwork"

### Necessities of basic elements of green space to maintaining sustainability in Dhaka city:

Based on literature, the respondents were asked to find out the basic elements and necessities of green space to maintain sustainability in Dhaka city. Table4 portrayed the respondents' perception with Weighted Average Score (WAS) and rank ( $R_k$ ). According to the opinion of city dwellers required number of trees is highly necessary to maintain urban sustainability with weighted average score 4.85 out of 5.00 point scale. This is followed by structured parks with 4.69 weighted averages. Then, educational institutions with wider open space and open space for social interaction are placed 3.5<sup>th</sup> with 4.58 weighted average score. Moreover, natural views and lawns attached with household premises stood 5<sup>th</sup> and 6<sup>th</sup> with weighted average score 4.49 and 4.24 respectively. Flower garden has been the last position among the nine basic elements placed before the respondents in structured questionnaire. It reveals that citizens of Dhaka city are struggling for lack of natural atmosphere to live rather focusing on amusing landscape like flower garden. Finally, all the nine basic elements of green space in questionnaire, drawn from the literature, are rated as „significant“ since all the elements scored more than 4.00 in 5.00 point scale where 5.00 is denoted „Most Important“.

| Table : 4, Necessities of basic elements of green space to maintaining sustainability in Dhaka city |                                                |       |                |     |      |                |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------|-------|----------------|-----|------|----------------|
| SL                                                                                                  | Elements of green space                        | Scale | F <sub>r</sub> | %   | WAS  | R <sub>k</sub> |
| 1                                                                                                   | Educational institutions with wider open space | NAI   | 2              | 2.6 | 4.58 | 3.5            |
|                                                                                                     |                                                | UI    | 0              | 0   |      |                |

|                                                                                                                                                                                                       |                                                                   |       |    |       |      |     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------|----|-------|------|-----|
|                                                                                                                                                                                                       |                                                                   | LI    | 5  | 6.4   |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 15 | 19.2  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 56 | 71.8  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 2                                                                                                                                                                                                     | Structured parks                                                  | NAI   | 0  | 0.0   | 4.69 | 2   |
|                                                                                                                                                                                                       |                                                                   | UI    | 1  | 1.3   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 3  | 3.8   |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 15 | 19.2  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 59 | 75.6  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100   |      |     |
|                                                                                                                                                                                                       |                                                                   |       |    |       |      |     |
| 3                                                                                                                                                                                                     | Required number of trees                                          | NAI   | 1  | 1.3   | 4.85 | 1   |
|                                                                                                                                                                                                       |                                                                   | UI    | 0  | 0     |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 3  | 3.8   |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 2  | 2.6   |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 72 | 92.3  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 4                                                                                                                                                                                                     | Lawns attached with household premises                            | NAI   | 0  | 0     | 4.24 | 6   |
|                                                                                                                                                                                                       |                                                                   | UI    | 2  | 2.6   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 15 | 19.2  |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 23 | 29.5  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 38 | 48.7  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 5                                                                                                                                                                                                     | Religious concentration center with secured walk path ( Pavement) | NAI   | 0  | 0     | 4.22 | 7   |
|                                                                                                                                                                                                       |                                                                   | UI    | 1  | 1.3   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 17 | 21.8  |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 24 | 30.8  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 36 | 46.2  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 6                                                                                                                                                                                                     | Office premises with green areas                                  | NAI   | 1  | 1.3   | 4.18 | 8   |
|                                                                                                                                                                                                       |                                                                   | UI    | 4  | 5.1   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 12 | 15.4  |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 24 | 30.8  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 37 | 47.4  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 7                                                                                                                                                                                                     | Open space for social interaction                                 | NAI   | 0  | 0.0   | 4.58 | 3.5 |
|                                                                                                                                                                                                       |                                                                   | UI    | 2  | 2.6   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 4  | 5.1   |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 18 | 23.1  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 53 | 67.9  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 8                                                                                                                                                                                                     | Natural views                                                     | NAI   | 0  | 0.0   | 4.49 | 5   |
|                                                                                                                                                                                                       |                                                                   | UI    | 4  | 5.1   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 5  | 6.4   |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 18 | 23.1  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 51 | 65.4  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| 9                                                                                                                                                                                                     | Flower garden                                                     | NAI   | 0  | 0.0   | 4.14 | 9   |
|                                                                                                                                                                                                       |                                                                   | UI    | 4  | 5.1   |      |     |
|                                                                                                                                                                                                       |                                                                   | LI    | 14 | 17.9  |      |     |
|                                                                                                                                                                                                       |                                                                   | IM    | 27 | 34.6  |      |     |
|                                                                                                                                                                                                       |                                                                   | MI    | 33 | 42.3  |      |     |
|                                                                                                                                                                                                       |                                                                   | Total | 78 | 100.0 |      |     |
| Note: 5=Most Important (MI), 4=Important(IM), 3= Less Important(LI), 2= Unimportant(UI), 1= Not at All Important (NAI), F <sub>r</sub> =Frequency, Weighted Average Score (WAS), R <sub>k</sub> =Rank |                                                                   |       |    |       |      |     |

Source: Based on the author's fieldwork'

## Level of satisfaction regarding the current status of green space in Dhaka city:

This study tried to understand residents' level of satisfaction about current status of green space in Dhaka city. Table 5 presents the respondents' views. Among the nine elements of green space, sampled respondents are showing their highest level of satisfaction on „educational institutions with wider open space“ where weighted average score 2.44 out of 5.00 point scales with rank one. In contrast, „flower garden „stood the last on satisfaction scale. The 2<sup>nd</sup> and 3<sup>rd</sup> were structured parks and natural views with weighted average 2.32 and 2.31 out of 5.00 point scale respectively. After that, open space for social interactions has been rated 3<sup>rd</sup> on satisfaction scale with weighted average score 2.27. Moreover, office premises with green areas and required number of trees are placed 6<sup>th</sup> and 7<sup>th</sup> rank with weighted average score 2.14 out of 5.00 point scales. Figure 12 shows 4 most satisfactory elements of green space which exist around respondents' houses.

Furthermore, all the green space elements are scored below 3.00 of 5.00 point weighted average score where 5.00 is denoted highly satisfactory and 1 is for unsatisfactory. This makes it clear that the current status of green space is not satisfactory to the City's residents.

| Table:5 Respondents' level of satisfaction regarding the current status of green space |                                                |       |                |       |      |                |
|----------------------------------------------------------------------------------------|------------------------------------------------|-------|----------------|-------|------|----------------|
| SL                                                                                     | Current status of green space                  | Scale | F <sub>r</sub> | %     | WAS  | R <sub>k</sub> |
| 1                                                                                      | Educational institutions with wider open space | UNS   | 22             | 28.2  | 2.44 | 1              |
|                                                                                        |                                                | MAS   | 27             | 34.6  |      |                |
|                                                                                        |                                                | SAT   | 12             | 15.4  |      |                |
|                                                                                        |                                                | MOS   | 7              | 9.0   |      |                |
|                                                                                        |                                                | HST   | 10             | 12.8  |      |                |
|                                                                                        |                                                | Total | 78             | 100.0 |      |                |
| 2                                                                                      | Structured parks                               | UNS   | 25             | 32.1  | 2.32 | 2              |
|                                                                                        |                                                | MAS   | 27             | 34.6  |      |                |
|                                                                                        |                                                | SAT   | 12             | 15.4  |      |                |
|                                                                                        |                                                | MOS   | 4              | 5.1   |      |                |
|                                                                                        |                                                | HST   | 10             | 12.8  |      |                |
|                                                                                        |                                                | Total | 78             | 100.0 |      |                |
| 3                                                                                      | Required number of trees                       | UNS   | 33             | 42.3  | 2.14 | 6.5            |
|                                                                                        |                                                | MAS   | 25             | 32.1  |      |                |
|                                                                                        |                                                | SAT   | 7              | 9.0   |      |                |
|                                                                                        |                                                | MOS   | 2              | 2.6   |      |                |
|                                                                                        |                                                | HST   | 11             | 14.1  |      |                |
|                                                                                        |                                                | Total | 78             | 100.0 |      |                |
| 4                                                                                      | Lawns attached with household premises         | UNS   | 34             | 43.6  | 2.09 | 8              |
|                                                                                        |                                                | MAS   | 24             | 30.8  |      |                |
|                                                                                        |                                                | SAT   | 7              | 9.0   |      |                |
|                                                                                        |                                                | MOS   | 5              | 6.4   |      |                |
|                                                                                        |                                                | HST   | 8              | 10.3  |      |                |
|                                                                                        |                                                | Total | 78             | 100.0 |      |                |

|                                                                                                                                                                                                                                    |                                                                      |       |    |       |      |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------|----|-------|------|-----|
| Mea<br>5                                                                                                                                                                                                                           | Religious concentration center with secured walk<br>path ( Pavement) | UNS   | 26 | 33.3  | 2.19 | 5   |
|                                                                                                                                                                                                                                    |                                                                      | MAS   | 28 | 35.9  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | SAT   | 14 | 17.9  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | MOS   | 3  | 3.8   |      |     |
|                                                                                                                                                                                                                                    |                                                                      | HST   | 7  | 9.0   |      |     |
|                                                                                                                                                                                                                                    |                                                                      | Total | 78 | 100.0 |      |     |
| 6                                                                                                                                                                                                                                  | Office premises with green areas                                     | UNS   | 33 | 42.3  | 2.14 | 6.5 |
|                                                                                                                                                                                                                                    |                                                                      | MAS   | 23 | 29.5  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | SAT   | 9  | 11.5  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | MOS   | 4  | 5.1   |      |     |
|                                                                                                                                                                                                                                    |                                                                      | HST   | 9  | 11.5  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | Total | 78 | 100.0 |      |     |
| 7                                                                                                                                                                                                                                  | Open space for social interaction                                    | UNS   | 30 | 38.5  | 2.27 | 4   |
|                                                                                                                                                                                                                                    |                                                                      | MAS   | 23 | 29.5  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | SAT   | 11 | 14.1  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | MOS   | 2  | 2.6   |      |     |
|                                                                                                                                                                                                                                    |                                                                      | HST   | 12 | 15.4  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | Total | 78 | 100.0 |      |     |
| 8                                                                                                                                                                                                                                  | Natural views                                                        | UNS   | 29 | 37.2  | 2.31 | 3   |
|                                                                                                                                                                                                                                    |                                                                      | MAS   | 22 | 28.2  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | SAT   | 13 | 16.7  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | MOS   | 2  | 2.6   |      |     |
|                                                                                                                                                                                                                                    |                                                                      | HST   | 12 | 15.4  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | Total | 78 | 100.0 |      |     |
| 9                                                                                                                                                                                                                                  | Flower garden                                                        | UNS   | 34 | 43.6  | 2.08 | 9   |
|                                                                                                                                                                                                                                    |                                                                      | MAS   | 23 | 29.5  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | SAT   | 10 | 12.8  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | MOS   | 3  | 3.8   |      |     |
|                                                                                                                                                                                                                                    |                                                                      | HST   | 8  | 10.3  |      |     |
|                                                                                                                                                                                                                                    |                                                                      | Total | 78 | 100.0 |      |     |
| Note: 5= Highly Satisfactory (HST), 4= Moderately (MOS), 3=Satisfactory (SAT), 2= Marginally satisfactory (MAS),<br>1=Unsatisfactory (UNS), F <sub>r</sub> =Frequency, ā=Weighted Average Score (WAS), σ= SD, R <sub>k</sub> =Rank |                                                                      |       |    |       |      |     |

Source: Based on the author's fieldwork'

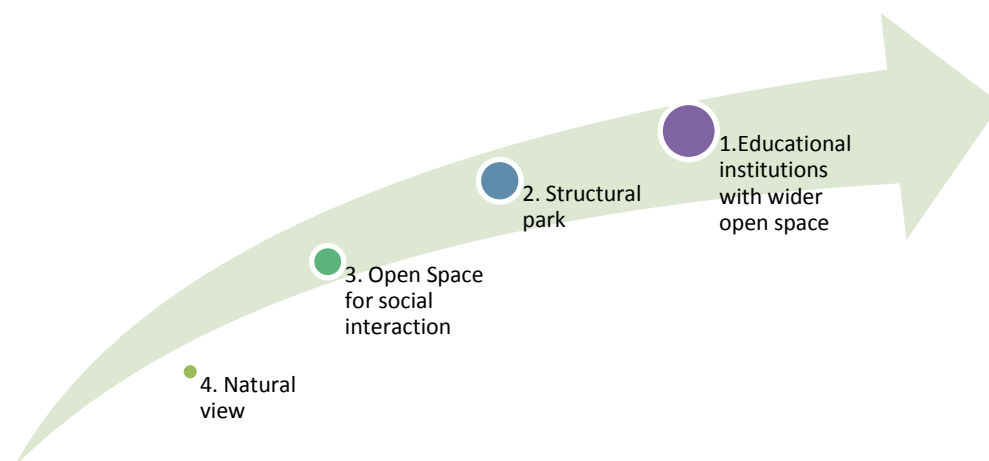


Fig: 12 Most satisfactory current green space in respondent's locality.

Source: Developed by the author

To sum up the respondents' preferences and satisfaction about the elements of green space it can be said that the city dwellers are expecting educational institutions with wider open space for better growing up of their children. One of the most expected elements structured parks where they can do physical exercise, enjoy green space, and take deep breath. However, many people cannot use structured parks because of long distance from home/office and lack security in the early morning and evening. Some of the respondents prefer open space for social interaction, where they can spend their quality time with friends and family members. In addition, natural views also contribute to refreshing mind among the people.

### Level of utilization of the stated green spaces in Dhaka city:

The respondents were asked about the expected level of utilization of green space in Dhaka city and their preferences were in wide variance (Table 6). Among 11 levels of utilization condition of green space elements, according to the respondents, „place for prayer“ is highly usable with the weighted average score 3.51 out of 5.00 and it ranked the first. Lighting in the park and road also preferred where weighted average is 3.21 with the 2<sup>nd</sup>. Moreover, the residents of Dhaka city think that they can use rides/utilities for sports/playing for their refreshment and which is ranked 3<sup>rd</sup> with weighted average score 2.62. Moreover, path for exercise and clean areas are also preferred; however they cannot use it. Similarly, lay-by and seating places, which are most needed for spending quality time, are missing in this city. The city dwellers are facing serious problem with separate toilets for disabled people. Fountains with leisure bench are not in usable condition at all and this received weighted average score of 2.10 out of 5.00 scales. Furthermore,



the city dwellers are not satisfied with the existing utilization level of green space because each element got below 3.00 point weighted on average, which is very low on 5.00 point scale. However, only prayer place/religious Centre received highest level of satisfaction among all elements with weighted average score of 3. Respondents' feedback highlights the importance to improve the current status of green space in Dhaka city to make their life less stressful.

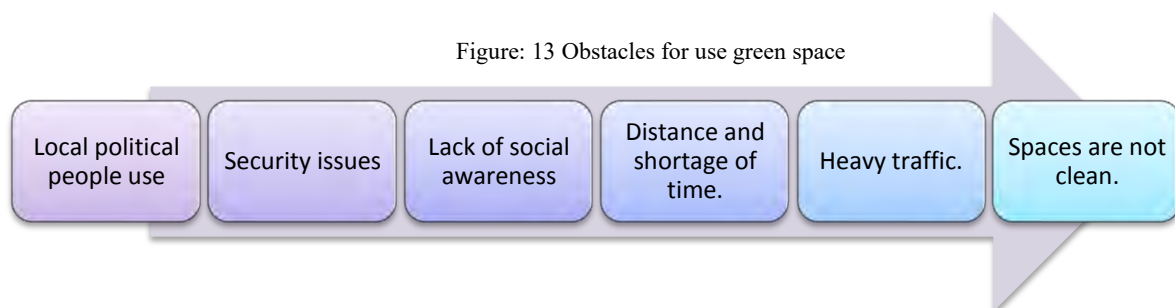
| Table:6 Respondents opinion about the level of utilization of the stated green spaces |                                    |       |                |       |      |                |
|---------------------------------------------------------------------------------------|------------------------------------|-------|----------------|-------|------|----------------|
| SL                                                                                    | Elements of utilizing green space  | Scale | F <sub>r</sub> | %     | WAS  | R <sub>k</sub> |
| 1                                                                                     | Paths for exercise                 | NAU   | 22             | 28.2  | 2.59 | 4              |
|                                                                                       |                                    | UNU   | 22             | 28.2  |      |                |
|                                                                                       |                                    | SIU   | 12             | 15.4  |      |                |
|                                                                                       |                                    | USA   | 10             | 12.8  |      |                |
|                                                                                       |                                    | HIU   | 12             | 15.4  |      |                |
|                                                                                       |                                    | Total | 78             | 100.0 |      |                |
| 2                                                                                     | Rides/utilities for sports/playing | NAU   | 21             | 26.9  | 2.62 | 3              |
|                                                                                       |                                    | UNU   | 22             | 28.2  |      |                |
|                                                                                       |                                    | SIU   | 14             | 17.9  |      |                |
|                                                                                       |                                    | USA   | 8              | 10.3  |      |                |
|                                                                                       |                                    | HIU   | 13             | 16.7  |      |                |
|                                                                                       |                                    | Total | 78             | 100.0 |      |                |
| 3                                                                                     | Foot message pavement              | NAU   | 25             | 32.1  | 2.29 | 8              |
|                                                                                       |                                    | UNU   | 25             | 32.1  |      |                |
|                                                                                       |                                    | SIU   | 12             | 15.4  |      |                |
|                                                                                       |                                    | USA   | 12             | 15.4  |      |                |
|                                                                                       |                                    | HIU   | 4              | 5.1   |      |                |
|                                                                                       |                                    | Total | 78             | 100.0 |      |                |
| 4                                                                                     | Path and road free areas           | NAU   | 25             | 32.1  | 2.45 | 7              |
|                                                                                       |                                    | UNU   | 22             | 28.2  |      |                |
|                                                                                       |                                    | SIU   | 11             | 14.1  |      |                |
|                                                                                       |                                    | USA   | 11             | 14.1  |      |                |
|                                                                                       |                                    | HIU   | 9              | 11.5  |      |                |
|                                                                                       |                                    | Total | 78             | 100.0 |      |                |
| 5                                                                                     | Lighting in the park and road      | NAU   | 4              | 5.1   | 3.21 | 2              |
|                                                                                       |                                    | UNU   | 17             | 21.8  |      |                |
|                                                                                       |                                    | SIU   | 29             | 37.2  |      |                |
|                                                                                       |                                    | USA   | 15             | 19.2  |      |                |
|                                                                                       |                                    | HIU   | 13             | 16.7  |      |                |
|                                                                                       |                                    | Total | 78             | 100.0 |      |                |
| 6                                                                                     | Lots of lay-by and seating places  | NAU   | 16             | 20.5  | 2.50 | 6              |
|                                                                                       |                                    | UNU   | 33             | 42.3  |      |                |
|                                                                                       |                                    | SIU   | 10             | 12.8  |      |                |
|                                                                                       |                                    | USA   | 12             | 15.4  |      |                |

|                                                                                                                                                                                                    |                                        |       |    |       |      |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------|----|-------|------|----|
|                                                                                                                                                                                                    |                                        | HIU   | 7  | 9.0   |      |    |
|                                                                                                                                                                                                    |                                        | Total | 78 | 100.0 |      |    |
| 7                                                                                                                                                                                                  | Barbecue and fire places               | NAU   | 26 | 33.3  | 2.26 | 9  |
|                                                                                                                                                                                                    |                                        | UNU   | 19 | 24.4  |      |    |
|                                                                                                                                                                                                    |                                        | SIU   | 21 | 26.9  |      |    |
|                                                                                                                                                                                                    |                                        | USA   | 8  | 10.3  |      |    |
|                                                                                                                                                                                                    |                                        | HIU   | 3  | 3.8   |      |    |
|                                                                                                                                                                                                    |                                        | Total | 78 | 100.0 |      |    |
| 8                                                                                                                                                                                                  | Clean areas                            | NAU   | 24 | 30.8  | 2.56 | 5  |
|                                                                                                                                                                                                    |                                        | UNU   | 24 | 30.8  |      |    |
|                                                                                                                                                                                                    |                                        | SIU   | 9  | 11.5  |      |    |
|                                                                                                                                                                                                    |                                        | USA   | 4  | 5.1   |      |    |
|                                                                                                                                                                                                    |                                        | HIU   | 17 | 21.8  |      |    |
|                                                                                                                                                                                                    |                                        | Total | 78 | 100.0 |      |    |
| 9                                                                                                                                                                                                  | Separate toilets for disabled dwellers | NAU   | 39 | 50.0  | 2.18 | 10 |
|                                                                                                                                                                                                    |                                        | UNU   | 16 | 20.5  |      |    |
|                                                                                                                                                                                                    |                                        | SIU   | 3  | 3.8   |      |    |
|                                                                                                                                                                                                    |                                        | USA   | 7  | 9.0   |      |    |
|                                                                                                                                                                                                    |                                        | HIU   | 12 | 15.4  |      |    |
|                                                                                                                                                                                                    |                                        | Total | 78 | 100.0 |      |    |
| 10                                                                                                                                                                                                 | Fountains with leisure bench           | NAU   | 34 | 43.6  | 2.10 | 11 |
|                                                                                                                                                                                                    |                                        | UNU   | 21 | 26.9  |      |    |
|                                                                                                                                                                                                    |                                        | SIU   | 9  | 11.5  |      |    |
|                                                                                                                                                                                                    |                                        | USA   | 9  | 11.5  |      |    |
|                                                                                                                                                                                                    |                                        | HIU   | 5  | 6.4   |      |    |
|                                                                                                                                                                                                    |                                        | Total | 78 | 100.0 |      |    |
| 11                                                                                                                                                                                                 | Place for prayer                       | NAU   | 6  | 7.7   | 3.51 | 1  |
|                                                                                                                                                                                                    |                                        | UNU   | 14 | 17.9  |      |    |
|                                                                                                                                                                                                    |                                        | SIU   | 12 | 15.4  |      |    |
|                                                                                                                                                                                                    |                                        | USA   | 26 | 33.3  |      |    |
|                                                                                                                                                                                                    |                                        | HIU   | 20 | 25.6  |      |    |
|                                                                                                                                                                                                    |                                        | Total | 78 | 100.0 |      |    |
| 5= Highly Usable (HIU), 4= Usable (USA), 3= Situational Usable (SIU), 2= Unusable (UNU), 1= Not at All Usable (NAU), F <sub>r</sub> =Frequency, Weighted Average Score (WAS), R <sub>k</sub> =Rank |                                        |       |    |       |      |    |

Source: Based on the author's fieldwork'

### Obstacles to use green space by city dwellers:

Distance between houses and green space is the common barrier to use green space by the residents surveyed. Most of the green spaces are far away from their office/houses with average distance of around 2.66 kilometer and with the highest distance of 12 kilometers. Some other important obstacles include use of green space by local political people, lack of security and social awareness, traffic congestion and unclean condition of space (Figure 13). These obstacles result in least utilization of green spaces available in the city.



Source: Developed by the author'

### 3.3 Wider social implications of green space for urban sustainability based on respondents' perception in Dhaka city:

The study has a prime objective to find out the social implications of green space for maintaining urban sustainability in Dhaka City. Table7 shows the extensive social implications on human life because of green spaces. In order to measure the social implications, this study has placed nine possible social implications to the respondents and asked them to rate on 4-point important scale. Social implication elements include

- i) Increase social interaction within the society
- ii) Create strong family bondage
- iii) Increase awareness to make the city clean
- iv) Ensure smooth child growth
- v) Improve mental health condition

- vi) Decrease divorce rate
- vii) Decrease obesity (reduce weight)
- viii) Reduce corruption
- ix) Increase social ethics.

Among these 9key implications, „increase awareness to make the city clean“ is ranked 1<sup>st</sup>with 4.69 weighted mean, followed by „ensure smooth child growth“ with 4.64 weighted mean. „Improve mental health condition“ and „increase social ethics“ have been ranked 3<sup>rd</sup> and 4<sup>th</sup>. On contrary, „divorce rate decrease“ and „corruption reduction“ received the lowest ranks with WAS of 3.78 and 3.71 respectively which were lower than other elements.

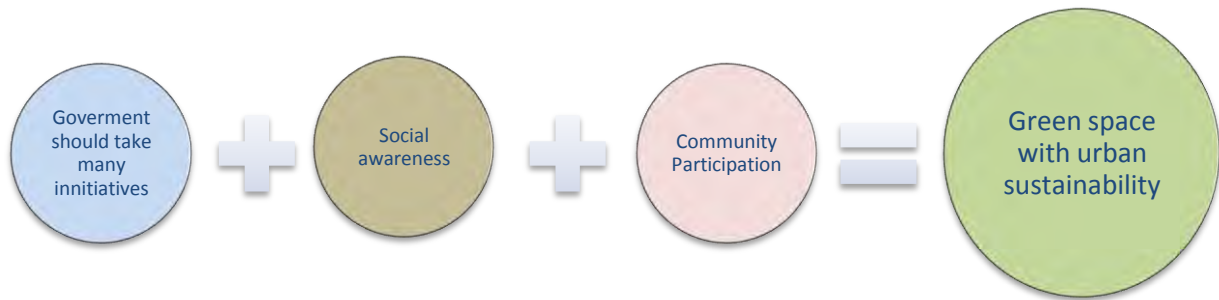
| Table: 7 Social implications of green space for urban sustainability (Selected Example) |                                                |       |                |       |      |                |
|-----------------------------------------------------------------------------------------|------------------------------------------------|-------|----------------|-------|------|----------------|
| SL                                                                                      | Social implications of green space             | Scale | F <sub>r</sub> | %     | WAS  | R <sub>k</sub> |
| 1                                                                                       | Increase social interaction within the society | NAI   | 0              | 0.0   | 4.27 | 5              |
|                                                                                         |                                                | UI    | 7              | 9.0   |      |                |
|                                                                                         |                                                | LI    | 8              | 10.3  |      |                |
|                                                                                         |                                                | IM    | 20             | 25.6  |      |                |
|                                                                                         |                                                | MI    | 43             | 55.1  |      |                |
|                                                                                         |                                                | Total | 78             | 100.0 |      |                |
| 2                                                                                       | Create strong family bondage                   | NAI   | 2              | 2.6   | 4.22 | 6              |
|                                                                                         |                                                | UI    | 4              | 5.1   |      |                |
|                                                                                         |                                                | LI    | 10             | 12.8  |      |                |
|                                                                                         |                                                | IM    | 21             | 26.9  |      |                |
|                                                                                         |                                                | MI    | 41             | 52.6  |      |                |
|                                                                                         |                                                | Total | 78             | 100.0 |      |                |
| 3                                                                                       | Increase awareness for make city clean         | NAI   | 0              | 0.0   | 4.69 | 1              |
|                                                                                         |                                                | UI    | 1              | 1.3   |      |                |
|                                                                                         |                                                | LI    | 3              | 3.8   |      |                |
|                                                                                         |                                                | IM    | 15             | 19.2  |      |                |
|                                                                                         |                                                | MI    | 59             | 75.6  |      |                |
|                                                                                         |                                                | Total | 78             | 100.0 |      |                |
| 4                                                                                       | Ensure smooth child growth                     | NAI   | 0              | 0.0   | 4.64 | 2              |
|                                                                                         |                                                | UI    | 3              | 3.8   |      |                |
|                                                                                         |                                                | LI    | 3              | 3.8   |      |                |
|                                                                                         |                                                | IM    | 13             | 16.7  |      |                |
|                                                                                         |                                                | MI    | 59             | 75.6  |      |                |
|                                                                                         |                                                | Total | 78             | 100.0 |      |                |
| 5                                                                                       | Improve mental health condition                | NAI   | 0              | 0.0   | 4.60 | 3              |
|                                                                                         |                                                | UI    | 2              | 2.6   |      |                |

|                                                                                                                                                                                                    |                                  |       |    |       |      |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------|----|-------|------|---|
|                                                                                                                                                                                                    |                                  | LI    | 6  | 7.7   |      |   |
|                                                                                                                                                                                                    |                                  | IM    | 13 | 16.7  |      |   |
|                                                                                                                                                                                                    |                                  | MI    | 57 | 73.1  |      |   |
|                                                                                                                                                                                                    |                                  | Total | 78 | 100.0 |      |   |
| 6                                                                                                                                                                                                  | Decrease divorce rate            | NAI   | 3  | 3.8   | 3.71 | 9 |
|                                                                                                                                                                                                    |                                  | UI    | 10 | 12.8  |      |   |
|                                                                                                                                                                                                    |                                  | LI    | 20 | 25.6  |      |   |
|                                                                                                                                                                                                    |                                  | IM    | 17 | 21.8  |      |   |
|                                                                                                                                                                                                    |                                  | MI    | 27 | 34.6  |      |   |
|                                                                                                                                                                                                    |                                  | Total | 78 | 100.0 |      |   |
| 7                                                                                                                                                                                                  | Decrease obesity (Reduce Weight) | NAI   | 1  | 1.3   | 4.17 | 7 |
|                                                                                                                                                                                                    |                                  | UI    | 6  | 7.7   |      |   |
|                                                                                                                                                                                                    |                                  | LI    | 10 | 12.8  |      |   |
|                                                                                                                                                                                                    |                                  | IM    | 26 | 33.3  |      |   |
|                                                                                                                                                                                                    |                                  | MI    | 35 | 44.9  |      |   |
|                                                                                                                                                                                                    |                                  | Total | 78 | 100.0 |      |   |
| 8                                                                                                                                                                                                  | Reduce corruption                | NAI   | 9  | 11.5  | 3.78 | 8 |
|                                                                                                                                                                                                    |                                  | UI    | 9  | 11.5  |      |   |
|                                                                                                                                                                                                    |                                  | LI    | 11 | 14.1  |      |   |
|                                                                                                                                                                                                    |                                  | IM    | 9  | 11.5  |      |   |
|                                                                                                                                                                                                    |                                  | MI    | 39 | 50.0  |      |   |
|                                                                                                                                                                                                    |                                  | Total | 78 | 100.0 |      |   |
| 9                                                                                                                                                                                                  | Increase social ethics           | NAI   | 2  | 2.6   | 4.29 | 4 |
|                                                                                                                                                                                                    |                                  | UI    | 4  | 5.1   |      |   |
|                                                                                                                                                                                                    |                                  | LI    | 10 | 12.8  |      |   |
|                                                                                                                                                                                                    |                                  | IM    | 19 | 24.4  |      |   |
|                                                                                                                                                                                                    |                                  | MI    | 43 | 55.1  |      |   |
|                                                                                                                                                                                                    |                                  | Total | 78 | 100.0 |      |   |
| 5=Most Important (MI), 4=Important (IM), 3= Less Important (LI), 2= Unimportant (UI), 1= Not at All Important (NAI), F <sub>r</sub> =Frequency, Weighted Average Score (WAS), R <sub>k</sub> =Rank |                                  |       |    |       |      |   |

Source: Based on the author's fieldwork"

In order to create positive social implications for promoting urban sustainability, the respondents suggest government should take initiatives with proper planning and policies. Additionally, need to create social awareness within the society and involve community participation to improve green space were also recommended for make the city greener. These recommendations were portrayed in Figure.

Figure 14: Respondents' recommendations to improve green space



Source: Developed by the author"

To conclude, this study found conceptual linkage between green space and urban sustainability based on previous studies. From the literature, it was proved that urban green space helps to deduction of noise, develop air quality, and improve social well-being which ensured urban sustainability in the cities where Dhaka is not an exception. The study intended to measure the level of satisfaction regarding the current status of green space in Dhaka city and found that current status of green space is not satisfactory which is alarming for the city dwellers as well as all the indicators are scored below the satisfactory level which is denoted with „Marginally Satisfactory“. Moreover, this research amid to identified level of utilization of the stated green spaces in Dhaka city where city dwellers were found below the satisfaction level with the existing utilization level of green space.

## Chapter Four: Summary and Conclusion

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Sustainability has been the burning issue for last few decades amongst the academicians and policy makers across the world and no exception is in case of Bangladesh. This study examined the citizens' perception on different aspects of urban sustainability like green space, utilization condition and social implication. Although the core concept of sustainability and urban sustainability are abundant in literature, social implications of green space for urban sustainability are yet to be explored widely. This study tried to bridge the gap by examining the relationship between green space and social implications to make the Dhaka City sustainable.

The study has explored some vital conceptual and empirical findings based on previous literature and respondents' experiences and perceptions on necessities of green space and urban sustainability. The study has established conceptual linkage between green space and sustainability in urban areas, current status and level of utilization of the green space and wider social implications of green space for urban sustainability based on respondents' perception in Dhaka city. The study can be summarized in the following points.

Firstly, it is clear that green space is an important component for the urban sustainability. From the literature review, urban green space helps to deduce noise, develop air quality, and improve social well-being which ensures sustainability in the cities.

Secondly, all the surveyed respondents realized that green space was important for urban sustainability in Dhaka city. However, they rate the current status of green space unsatisfactory. All the elements have been scored poorly with weighted average score 3.00 out of 5.00 point scale except for prayer place. Moreover, it has been clear that city dwellers utilization level of green space is not up to mark because most of the indicators are scored below the 3.00 out of 5.00 point scale. The study also reveals that the city dwellers emphasize the improvement of the green space conditions by introducing more leisure bench, clean areas, and separate toilet for disable person and so on.

Thirdly, this study has a prime objective to find out the social implications of green space for maintaining urban sustainability in Dhaka City. Social implications were measured through 9 possible social benefits. The result of this study has revealed that most of the green space and utilization conditions have strong influence on social issues. More specifically, it is evident that

all the current social implications mentioned in questionnaire are highly influenced through green space with the exception of divorce rate decrease and corruption rate reduction.

The main limitation of this study is size of the respondents which is only 78 out of more than 18 million people. But this study has tried to overcome this limitation by considering the biographic characteristics like higher educational qualification and longer period of living in Dhaka city. As this study is not funded by any organization, thus, the study faced a problem to collect data from the respondents. Moreover, there was a good opportunity to compare the citizens' perception with the perception of government regulators or city planners but because of the time constraint and lack of easy access to regulators or city planners, the study failed to incorporate this issue and keep it for future research aspects. Likewise, the study has the scope to measure the level of urban sustainability with some new indicators by using widely accepted sustainability indices which may be considered as a future research scope.

Nonetheless, this study is significant for the all stakeholders of Dhaka city who are actually facing problem with lack of green space. Consequently, citizen will be benefited through some positive changes like reducing trend of mental stress, decreasing obesity of citizen (especially women and child), improving the health condition and quality living conditions. Finally, academicians and researchers will get an idea about current trend of citizens' perception on urban green space and urban sustainability. Likewise, city regulators and government will be motivated to formulate the specific policy to widen the green space and then create social benefits in Dhaka city.



## References:

- Alberti, M. (1996). Measuring urban sustainability. *Environmental Impact Assessment Review*, 16(4), 381-424. doi: [https://doi.org/10.1016/S0195-9255\(96\)00083-2](https://doi.org/10.1016/S0195-9255(96)00083-2)
- Byomkesh, T., Nakagoshi, N., & Dewan, A. M. (2012). Urbanization and green space dynamics in Greater Dhaka, Bangladesh. *Landscape and Ecological Engineering*, 8(1), 45-58.
- Chandan, M. S. K. (2015). REMINISCING DHAKA'S LEGACY, The Daily Star. Retrieved from <https://www.thedailystar.net/star-weekend/heritage/reminiscing-dhakas-legacy-80994>
- Chowdhury, A., & Faruqui, S. (1989). Physical growth of Dhaka city. Dhaka: past, present and future, 43-61.
- Dewan, A. M., & Yamaguchi, Y. (2008). Effect of land cover changes on flooding: example from Greater Dhaka of Bangladesh. *International Journal of Geoinformatics*, 4(1).
- Ehnert, F., Kern, F., Borgström, S., Gorissen, L., Maschmeyer, S., & Egermann, M. (2018). Urban sustainability transitions in a context of multi-level governance: A comparison of four European states. *Environmental innovation and societal transitions*, 26, 101-116.
- Fastenrath, S., & Braun, B. (2018). Ambivalent urban sustainability transitions: Insights from Brisbane's building sector. *Journal of Cleaner Production*, 176, 581-589.
- Gren, Å., & Andersson, E. (2018). Being efficient and green by rethinking the urban-rural divide—Combining urban expansion and food production by integrating an ecosystem service perspective into urban planning. *Sustainable cities and society*, 40, 75-82.
- Hasan, S. L. a. R. (2011). JS splits DCC in 4 minutes, The Daily Star. Retrieved from <https://www.thedailystar.net/news-detail-212277>
- Infobase, L. C. (Cartographer). (2007). Map of Bangladesh: Districts and Division. Retrieved from <http://www.mediabangladesh.net/map-of-bangladesh/>
- Jerin, T., & Ishtiaque, A. (2015). Groundwater Depletion in Dhaka City, Bangladesh: A Spatio-temporal Analysis. Paper presented at the AGU Fall Meeting Abstracts.
- Jim, C., & Chen, W. Y. (2006). Perception and attitude of residents toward urban green spaces in Guangzhou (China). *Environmental management*, 38(3), 338-349.
- Kagan, S., Hauerwaas, A., Holz, V., & Wedler, P. (2017). Culture in sustainable urban development: Practices and policies for spaces of possibility and institutional innovations. *City, Culture and Society*.
- Khan, M. (2014). Study of open spaces in the context of Dhaka city for sustainable use: A syntactic approach. *International Journal of Engineering and Technology*, 6(3), 238.

- Kong, F., & Nakagoshi, N. (2006). Spatial-temporal gradient analysis of urban green spaces in Jinan, China. *Landscape and urban Planning*, 78(3), 147-164.
- Krajter Ostoić, S., Konijnendijk van den Bosch, C. C., Vuletić, D., Stevanov, M., Tivojinović, I., Mutabdtić-Bećirović, S., . . . Pezdevšek Malovrh, Š. (2017). Citizens' perception of and satisfaction with urban forests and green space: Results from selected Southeast European cities. *Urban Forestry & Urban Greening*, 23(Supplement C), 93-103. doi: <https://doi.org/10.1016/j.ufug.2017.02.005>
- M Islam, A Mahmud, & Islam, S. M. D. (2015). Open Space Management of Dhaka City, Bangladesh: A Case Study on Parks and Playgrounds. *International Research Journal of Environment Sciences*, 4(12), 118-126.
- McDonald, S., Malys, N., & Maliene, V. (2009). Urban regeneration for sustainable communities: A case study. *Technological and Economic Development of Economy*, 15(1), 49-59.
- Mercer. (2018). Mobility Exchange: QUALITY OF LIVING CITY RANKING. from <https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings>
- Miller, T. R. (2011). Constructing Sustainability A Study of Emerging Scientific Research Trajectories: Arizona State University.
- Mundi, I. (2018). Bangladesh Demographics Profile 2018. from [https://www.indexmundi.com/bangladesh/demographics\\_profile.html](https://www.indexmundi.com/bangladesh/demographics_profile.html)
- Qureshi, S., Breuste, J. H., & Jim, C. Y. (2013). Differential community and the perception of urban green spaces and their contents in the megacity of Karachi, Pakistan. *Urban Ecosystems*, 16(4), 853-870. doi: 10.1007/s11252-012-0285-9
- RAJUK. (2016). Dhaka Structural Plan (2016-2035). Dhaka, Bangladesh: Retrieved from <http://www.rajukdhaka.gov.bd/rajuk/image/slideshow/5.Chapter%2002.pdf>.
- Rashid, R., Ahmed, M. H. B., & Khan, M. S. (2010). Green roof and its Impact on Urban Environmental sustainability: The Case in Bangladesh. *World Journal of Management*, 2(2), 59-69.
- Review, W. P. (2018). Dhaka Population 2018. <http://worldpopulationreview.com/world-cities/dhaka-population/>
- Santillo, D. (2007). Reclaiming the Definition of Sustainability (7 pp). *Environmental Science and Pollution Research-International*, 14(1), 60-66.
- Shen, L.-Y., Jorge Ochoa, J., Shah, M. N., & Zhang, X. (2011). The application of urban sustainability indicators – A comparison between various practices. *Habitat International*, 35(1), 17-29. doi: <https://doi.org/10.1016/j.habitatint.2010.03.006>
- Shuvo, F. K., & Hakim, S. S. (2013). A Proposed Framework for Regenerating Urban Green in Dhaka City. *Journal of Bangladesh Institute of Planners* ISSN, 2075, 9363.

- Verdú-Vázquez, A., Fernández-Pablos, E., Lozano-Diez, R. V., & López-Zaldívar, Ó. (2017). Development of a methodology for the characterization of urban and periurban green spaces in the context of supra-municipal sustainability strategies. *Land Use Policy*, 69(Supplement C), 75-84. doi: <https://doi.org/10.1016/j.landusepol.2017.08.040>
- Wheeler, S. M., & Beatley, T. (2014). *Sustainable urban development reader*: Routledge.
- Zhou, X., & Parves Rana, M. (2012). Social benefits of urban green space: A conceptual framework of valuation and accessibility measurements. *Management of Environmental Quality: An International Journal*, 23(2), 173-189.
- Alberti, M. (1996). Measuring urban sustainability. *Environmental Impact Assessment Review*, 16(4), 381-424. doi: [https://doi.org/10.1016/S0195-9255\(96\)00083-2](https://doi.org/10.1016/S0195-9255(96)00083-2)
- Byomkesh, T., Nakagoshi, N., & Dewan, A. M. (2012). Urbanization and green space dynamics in Greater Dhaka, Bangladesh. *Landscape and Ecological Engineering*, 8(1), 45-58.
- Chandan, M. S. K. (2015). REMINISCING DHAKA'S LEGACY, *The Daily Star*. Retrieved from <https://www.thedailystar.net/star-weekend/heritage/reminiscing-dhakas-legacy-80994>
- Chowdhury, A., & Faruqui, S. (1989). Physical growth of Dhaka city. *Dhaka: past, present and future*, 43-61.
- Ehnert, F., Kern, F., Borgström, S., Gorissen, L., Maschmeyer, S., & Egermann, M. (2018). Urban sustainability transitions in a context of multi-level governance: A comparison of four European states. *Environmental innovation and societal transitions*, 26, 101-116.
- Fastenrath, S., & Braun, B. (2018). Ambivalent urban sustainability transitions: Insights from Brisbane's building sector. *Journal of Cleaner Production*, 176, 581-589.
- Gren, Å., & Andersson, E. (2018). Being efficient and green by rethinking the urban-rural divide—Combining urban expansion and food production by integrating an ecosystem service perspective into urban planning. *Sustainable cities and society*, 40, 75-82.
- Hasan, S. L. a. R. (2011). JS splits DCC in 4 minutes, *The Daily Star*. Retrieved from <https://www.thedailystar.net/news-detail-212277>
- Infobase, L. C. (Cartographer). (2007). Map of Bangladesh: Districts and Division. Retrieved from <http://www.mediabangladesh.net/map-of-bangladesh/>
- Jerin, T., & Ishtiaque, A. (2015). *Groundwater Depletion in Dhaka City, Bangladesh: A Spatio-temporal Analysis*. Paper presented at the AGU Fall Meeting Abstracts.
- Jim, C., & Chen, W. Y. (2006). Perception and attitude of residents toward urban green spaces in Guangzhou (China). *Environmental management*, 38(3), 338-349.
- Kagan, S., Hauerwaas, A., Holz, V., & Wedler, P. (2017). Culture in sustainable urban development: Practices and policies for spaces of possibility and institutional innovations. *City, Culture and Society*.

- Khan, M. (2014). Study of open spaces in the context of Dhaka city for sustainable use: A syntactic approach. *International Journal of Engineering and Technology*, 6(3), 238.
- Krajter Ostoić, S., Konijnendijk van den Bosch, C. C., Vuletić, D., Stevanov, M., Tivojinović, I., Mutabdt ija-Bećirović, S., . . . Pezdevšek Malovrh, Š. (2017). Citizens' perception of and satisfaction with urban forests and green space: Results from selected Southeast European cities. *Urban Forestry & Urban Greening*, 23(Supplement C), 93-103. doi: <https://doi.org/10.1016/j.ufug.2017.02.005>
- M Islam, A Mahmud, & Islam, S. M. D. (2015). Open Space Management of Dhaka City, Bangladesh: A Case Study on Parks and Playgrounds. *International Research Journal of Environment Sciences*, 4(12), 118-126.
- McDonald, S., Malys, N., & Maliene, V. (2009). Urban regeneration for sustainable communities: A case study. *Technological and Economic Development of Economy*, 15(1), 49-59.
- Mercer. (2018). Mobility Exchange: QUALITY OF LIVING CITY RANKING. from <https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings>
- Miller, R. W., Hauer, R. J., & Werner, L. P. (2015). *Urban forestry: planning and managing urban greenspaces*: Waveland press.
- Mundi, I. (2018). Bangladesh Demographics Profile 2018. from [https://www.indexmundi.com/bangladesh/demographics\\_profile.html](https://www.indexmundi.com/bangladesh/demographics_profile.html)
- Qureshi, S., Breuste, J. H., & Jim, C. Y. (2013). Differential community and the perception of urban green spaces and their contents in the megacity of Karachi, Pakistan. *Urban Ecosystems*, 16(4), 853-870. doi: 10.1007/s11252-012-0285-9
- RAJUK. (2016a). *Dhaka Structural Plan (2016-2035)*. Dhaka, Bangladesh: Retrieved from <http://www.rajukdhaka.gov.bd/rajuk/image/slideshow/5.Chapter%2002.pdf>.
- RAJUK. (2016b). *Dhaka Structure Plan 2016-2035*.
- Rashid, R., Ahmed, M. H. B., & Khan, M. S. (2010). Green roof and its Impact on Urban Environmental sustainability: The Case in Bangladesh. *World Journal of Management*, 2(2), 59-69.
- Review, W. P. (2018). Dhaka Population 2018. <http://worldpopulationreview.com/world-cities/dhaka-population/>
- Santillo, D. (2007). Reclaiming the Definition of Sustainability (7 pp). *Environmental Science and Pollution Research-International*, 14(1), 60-66.
- Shen, L.-Y., Jorge Ochoa, J., Shah, M. N., & Zhang, X. (2011). The application of urban sustainability indicators – A comparison between various practices. *Habitat International*, 35(1), 17-29. doi: <https://doi.org/10.1016/j.habitatint.2010.03.006>
- Shuvo, F. K., & Hakim, S. S. (2013). A Proposed Framework for Regenerating Urban Green in Dhaka City. *Journal of Bangladesh Institute of Planners ISSN*, 2075, 9363.

- Verdú-Vázquez, A., Fernández-Pablos, E., Lozano-Diez, R. V., & López-Zaldívar, Ó. (2017). Development of a methodology for the characterization of urban and periurban green spaces in the context of supra-municipal sustainability strategies. *Land Use Policy*, 69(Supplement C), 75-84. doi: <https://doi.org/10.1016/j.landusepol.2017.08.040>
- Wheeler, S. M., & Beatley, T. (2014). *Sustainable urban development reader*: Routledge.
- Zhang, X., & Li, H. (2018). Urban resilience and urban sustainability: What we know and what do not know? *Cities*, 72, 141-148.
- Zhou, X., & Parves Rana, M. (2012). Social benefits of urban green space: A conceptual framework of valuation and accessibility measurements. *Management of Environmental Quality: An International Journal*, 23(2), 173-189.

## Appendix-Survey Questionnaire:

### *The Questionnaire*

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#### **Demographic Profile Questions:**

- Name :
- Age :
- ☐ 0-20
  - ☐ 21-30
  - ☐ 31-40
  - ☐ 41-50
  - ☐ 50<sup>+</sup>
- Gender :
- ☐ Male
  - ☐ Female
- Marital Status :
- ☐ Married
  - ☐ Unmarried
  - ☐ Single
  - ☐ Others
- Religion :
- ☐ Muslim
  - ☐ Hindu
  - ☐ Others
- Educational Qualification:
- ☐ S.S.C
  - ☐ H.S.C
  - ☐ Honors
  - ☐ Masters
  - ☐ Others
- Year of Living in Dhaka City:
- ☐ 0-5
  - ☐ 6-10
  - ☐ 11-15
  - ☐ 15<sup>+</sup>
- Area of Living in Dhaka:
- ☐ South
  - ☐ North

### Subject-Specific Questions

**Q.1: Do you think/realize that green space is important for urban sustainability in Dhaka City?**

- ☐ Yes  
☐ No

**Q.2: Why green space is needed for urban sustainability?**



**Q.3 What is your opinion about the adequacy of green space for standard level of living in Dhaka city? (Please tick (✓) your preference in the scale below)**

|                                                                                              | 1 | 2 | 3 | 4 | 5 |
|----------------------------------------------------------------------------------------------|---|---|---|---|---|
| <b>Level of Adequacy of Green Space</b>                                                      |   |   |   |   |   |
| 5=Highly Adequate, 4=Adequate, 3= More or less adequate, 2= Inadequate, 1= Highly Inadequate |   |   |   |   |   |

**Q.4. Please tick (✓) your preference in the scale below.**

| <b>Basic elements of green space to maintaining sustainability in Dhaka city</b>          | 1 | 2 | 3 | 4 | 5 |
|-------------------------------------------------------------------------------------------|---|---|---|---|---|
| I. Educational institutions with wider open space                                         |   |   |   |   |   |
| II. Structured park                                                                       |   |   |   |   |   |
| III. Adequate trees to make the city greener                                              |   |   |   |   |   |
| IV. Lawns attached with household premises                                                |   |   |   |   |   |
| V. Religious concentration centre with secured walk path ( Pavement)                      |   |   |   |   |   |
| VI. Office premises with green areas                                                      |   |   |   |   |   |
| VII. Open space for social interaction                                                    |   |   |   |   |   |
| VIII. Natural views                                                                       |   |   |   |   |   |
| IX. Flower garden                                                                         |   |   |   |   |   |
| 5=Most Important, 4=Important, 3= Less Important, 2= Unimportant, 1= Not at All Important |   |   |   |   |   |

**Q.5. Please tick (✓) your preference in the scale below.**

| <b>Indicate your level of satisfaction regarding the current status of green space</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
|----------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| I. Educational institutions with wider open space                                      |          |          |          |          |          |
| II. Structured park                                                                    |          |          |          |          |          |
| III. Adequate trees to make the city greener                                           |          |          |          |          |          |
| IV. Lawns attached with household premises                                             |          |          |          |          |          |
| V. Religious concentration centre with secured walk path ( Pavement)                   |          |          |          |          |          |
| VI. Office premises with green areas                                                   |          |          |          |          |          |
| VII. Open space for social interaction                                                 |          |          |          |          |          |
| VIII. Natural views                                                                    |          |          |          |          |          |
| IX. Flower garden                                                                      |          |          |          |          |          |

**Q. 6. Please choose the most satisfactory current green space in your locality (from the listed mentioned above – i.e. Q.5.) and explain why?**

- Mention Green Space:
- Reasons for why:

**Q.7. Please tick (✓) your preference in the scale below.**

| <b>What is your opinion about the level of utilization of the stated green spaces</b>   | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
|-----------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| i. Paths for exercise                                                                   |          |          |          |          |          |
| ii. Rides/utilities for sports/playing                                                  |          |          |          |          |          |
| iii. Foot message pavement                                                              |          |          |          |          |          |
| iv. Path and road free areas                                                            |          |          |          |          |          |
| v. Lighting in the park and road                                                        |          |          |          |          |          |
| vi. Lots of lay-by and seating places                                                   |          |          |          |          |          |
| vii. Barbeque and fire places                                                           |          |          |          |          |          |
| viii. Clean areas                                                                       |          |          |          |          |          |
| ix. Separate toilets for disabled dwellers                                              |          |          |          |          |          |
| x. Fountains with leisure bench                                                         |          |          |          |          |          |
| xi. Place for prayer                                                                    |          |          |          |          |          |
| 5= Highly Usable , 4= Usable, 3= Situational Usable , 2= Unusable, 1= Not at All Usable |          |          |          |          |          |



**Q.8.How far (in kilometer) is those aforesaid green spaces located from your home/Office?**



**Q.9 Please mention any other reason(s) for not being able to utilize of above mentioned green spaces.**

**Q.10. Please tick (✓) your preference in the scale below.**

| <b>Wider social implications of green space for urban sustainability<br/>(Selected Example)</b> | <b>1</b> | <b>2</b> | <b>3</b> | <b>4</b> | <b>5</b> |
|-------------------------------------------------------------------------------------------------|----------|----------|----------|----------|----------|
| i. Increase social interaction within the society                                               |          |          |          |          |          |
| ii. Create strong family bondage                                                                |          |          |          |          |          |
| iii. Increase awareness for make city clean                                                     |          |          |          |          |          |
| iv. Ensure smooth child growth                                                                  |          |          |          |          |          |
| v. Increase mental health                                                                       |          |          |          |          |          |
| vi. Decrease divorce rate                                                                       |          |          |          |          |          |
| vii. Decrease obesity                                                                           |          |          |          |          |          |
| viii. Reduce corruption                                                                         |          |          |          |          |          |
| ix. Increase social ethics                                                                      |          |          |          |          |          |
| 5=Most Important, 4=Important, 3= Less Important, 2= Unimportant, 1= Not at All Important       |          |          |          |          |          |

**Q.11 Please elucidate further your views on that subject:**

***(Thank you very much for your kind cooperation)***