MEASURING PUBLIC PERCEPTION ABOUT TRANQUILITY OF URBAN PARK: A SURVEY ON PARK USE IN DHAKA CITY

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Abstract - In urban contexts, the quality of a park can have a psychological and physical impact on its users. People are used to go to parks for comfort, relaxation, and recreation. Parks are typically thought to give tranquility due to the presence of natural elements such as greenery, trees, water bodies, birds etc. Such tranquil landscapes and soundscapes are expected, potentially well suited to the needs of citizens of metropolitan areas as the stress of everyday city life. In the scenario of Dhaka City, Bangladesh, a densely populated urban area in the world with less urban parks than it requires. The little amount that still alive in the city is also in a very deprived condition which affected their tranquil quality. Therefore, preserving and improving the tranquil quality of park is one of the most important issues for city planners. Ramna Park, Dhaka, Bangladesh has been selected for this study. Visitor's viewpoint about the park's tranquility -on the perception of the sonic environment was investigated in this study through questionnaire survey. Study has confirmed that the soundscape approach can provide information useful for planning effective strategies aimed at preserving and improving the quality of urban parks. Since they are even more exposed to pollution and surrounded by extending urban areas, preserving, and hopefully improving, their essential health-promoting function is a challenge but also a need.

Keywords - Urban, Park, Tranquility, Soundscape

I. INTRODUCTION

Most humans have a need to connect with nature. Being in nature, or even viewing scenes of nature, reduces anger, fear, and stress and increases pleasant feelings. Exposure to nature not only makes feel better emotionally, it contributes to physical wellbeing, reducing blood pressure, heart rate, muscle tension, and the production of stress hormones. The presence of green space is particularly necessary in areas where people are more divorced from natural ecosystems, such as cities. Today, a significant part of urban green space is created in the parks. City parks contribute to a higher quality of life by offering both social and psychological benefits [1]. One of the most important phenomena of recent times is urbanization and urban growth and Every society battling its consequences therefore cities are getting congested. Green spaces like urban parks are getting diminishing due to rapid unplanned urbanization. According to experts, a city needs to devote 25 per cent of its area for greeneries and parks. But the Dhaka city has less than 10 per cent. There are about 54 registered parks under Dhaka City Corporation (DCC). But these parks make up only an average of 14.5% of the total land area (17% in north and central part and 12% in old town) where as any city requires 25% for fresh environment and to maintain a sustainable land ecosystem. At present the local planning experts recommend that there should be at least 1 acre of parks or open spaces per 1000 population for cities of Bangladesh. If, this standard is to be applied in Dhaka, then the city needs approximately 6 sq. miles of area for recreation purpose [2]. Most of the areas of Dhaka city are so unplanned that there is very little scope for creating a new park or open space to meet the needs of the growing population. In this case it is inevitable that the existing parks need to be improved or developed therefore. Dhaka needs a huge stock of open spaces for urban sustainability as well as improving citizen physical and mental health. Ramna Park is one of the largest parks in Dhaka and the location of this park is in middle of the city. This Park is one of the most beautiful parks with lot of natural resources like trees, lakes, birds, squirrels, insects, etc. It's serving as a leisure area of surrounding habitats. People of surrounding residential, commercial areas, office zone are used to visit this park. Most of the visitors of this park usually visit in the morning time for walking and exercise. But unfortunately lack of appropriate design and negligence system has resulted unpleasant quality of the environment as well as tranquil quality. Planning, designing, and management of urban parks are important issues since these parks are one of the main spaces of urban life, especially with the rapid population growth in recent years. To enhance the quality of parks more natural features should be included, meet the needs of different age group, opportunities for social interaction should be increased and level of annoyance should be reduced. This will increase the amount of outdoor activity especially among older generation The study has considered the users perception towards the tranquil quality of urban park also focuses on the influence of the viewpoints or beliefs related to tranquility and the way they affect the perception of the sonic environment. Visitors could experience spaces differently depending on the meaning they assign to the concept of tranquility. A questionnaire survey has been performed to understand the people's observation of the tranquil value. The study investigates the existing tranquil quality of Ramna park and visitor's perception in order to achieve guidelines for designing and running urban parks. By explaining these cases, the tranquil quality

and its impact on citizens' behavior appears more and ever on us and on these cases, if urban administrators of sustainable spaces and environments want, it is necessary to consider evaluations of people to urban areas in the focus of its planning and use people preferences in kinds of urban designs

A. Urban parks and direct and indirect health effects:

Nature and green spaces contribute directly to public health by reducing stress and mental disorders, increasing the effect of physical activity, reducing health inequalities, and increasing perception of life quality and self-reported general health [3]. Indirect health effects are conveyed by providing arenas and opportunities for physical activity increasing satisfaction of living environment and social interactions and by different modes of recreation [4]. All these indicators correspond well to the definition of health established by the World Health Organization (WHO), including both physical, mental, and social components in the health concept. In addition, the definition of public health even further emphasizes the efforts by society and communities for promoting health and preventing diseases. Thus, to support and improve public health varied actions are required by local administrators and policy makers. Within this field creating healthy urban environments is an important contribution. Considering the high level of global urbanization urban parks are imperative for maintaining and improving public health. Beside those there has specific value of urban park in case of environment, social and economic:

1. Environment Value
2. Social Value
3. Economic Value
4. Environment Value: Urban parks play a vital role to improve the quality of urban environment by stabilizing microclimate and preserving natural resources. Urban parks mitigate urban heat, where the heat can radiate out at night and cool the city following hot weather.it can be act as a space of large canopy trees to grow and provide shade. Presence of permeable surface which hold the moisture and cool the environment.
5. Social Value: Green spaces have a direct impact on the urban environment and general physical, mental and social health of the urban dwellers. Parks contribute to physical health by providing opportunities for exercise, jogging walking. Parks benefit mental health by providing healing natural influences. Parks can contribute to social sustainability by making citizens lives liveable, providing social, emotional and physical well-being and "providing people with satisfactory living conditions so that they can identify positively with their values and environment" [5].
6. Economic Value: Parks economic value involves with air purification by trees that reduce costs of pollution prevention, promotion of city as a tourist destination and commercial event, as well as increasing property values and tax revenues. Also, urban parks can serve as a main factor in the location of new business and neighbourhood economics through attracting tourists and investments to the area. Consequently, this could provide employment opportunities for people who develop, manage and maintain the sites [6].

B. Urban Park scenario in Dhaka city:

Dhaka city is changing rapidly, which is known as densely populated urban areas in the world where urban park is demanded area for improving the mental and physical condition of city people. In order to create a balanced and sustainable urban environment, experts suggested that up to 75% of urban area is retained for open spaces. Ideally this should be about 40-50%, of the total area, but in a compact or dense situation like Dhaka recommended lower margin is about 25% of urban space. Dhaka structure plan suggests that, all type including, the open space should be at least 20% [7]. But in Dhaka urban greenery, park greenery or tree covered spaces constitutes less than 15% of the city landscape. According to the Dhaka Metropolitan Development Plan (DMDP 1995), old Dhaka (unplanned development, that grow organically without following any pattern) has only 5% and new Dhaka (which has some planned development, that followed a gridiron pattern with a land use as prescribed in the master plan) has about 12% open space. According to a survey conducted in 1999 open spaces spanning an area of 196.82 acres under the jurisdiction of the Dhaka City Corporation — 71 parks and 21 play grounds. The city corporation authorities said the corporation has 41 parks and the total area of parkland is 68.18 acres. The estimated population within the corporation area in 2005 was 12 million, which means 1.6 acres of land for one lakh people. The research shows that all the open spaces are concentrated to only 38 of the 90 city wards [8].

C. Tranquillity of Urban Park:

The concept of tranquillity has been studied in various research areas closely related to soundscape [9]. Tranquillity implies a quiet as well as a natural setting so it goes beyond the concept of “quiet areas” which has been the subject of recent developments in European legislation e.g., the European Directive on the Assessment and Management of Environmental Noise (END). There are a number of studies which indicate that such tranquil places may be beneficial to human health and well-being and it is considered that providing, protecting or improving tranquil spaces should be seen as key goals in urban planning.

D. Factors affecting tranquillity:

Quiet and natural environments are key features of tranquil spaces. Previous research at the University of Bradford has shown that it is possible to predict with reasonable accuracy the perceived tranquillity on a

rating scale using two factors: the average noise level from man-made noise sources and the percentage of natural features in the landscape such as vegetation, water and geological features, exposed rock outcrops [10]. The perceived tranquillity was influenced by a number of things. Subjects were asked to note on a questionnaire any features in the scenes they were shown that either increased or decreased tranquillity. The factors increasing tranquillity in order of frequency of mention were: sound of water, trees, shrubs, flowers, grass, quiet, peace, low noise, open space, views, old buildings, wind in trees, sunshine, bird song. The factors decreasing tranquillity in order of mention were: traffic noise, noisy people (including music), litter, sound of water (recorded), ugly buildings, paths, signs, vehicle noise (reversing alarms, ice-cream chimes, building site view, dirty conditions (exclude litter), excessive wind noise in trees, sound of water (natural), construction noise. Without further controlled experiments it is not possible to quantify the effects of all these factors [10].

E. Creating Tranquil space:

To boost the tranquility of an area, the first step is to reduce man-made noise. Obviously on a city scale this could be done by things like rerouting traffic, lorry bans and low-noise road surfacing, as well as noise barriers. But in terms of parks, higher and longer fences and walls next to the road can help here. As can creating a small quiet area with perhaps a natural-sounding water feature close by. Increasing through "greening" can also help to boost the tranquility of an area. Introducing more trees, shrubs, or trellising to "hide" building facades, makes people feel less stressed and calmer in their surroundings – so go wild with the greenery. Having "natural" sounds can also help to make a place feel more tranquil. This could be done by installing a water feature or pond. This which will not only help in terms of relaxation but it will also encourage water fowl and birds [11].

II. METHODOLOGY

The main purpose of this study is investigating the visitor's perception about tranquil environment of urban park. Initially this study intended select multiple different type of urban park of Dhaka. But it proved very broad to analysis in a short time. Therefore, only one park has been selected for investigation. Visitors' activity and perception, socio-demographics data were collected through questionnaire survey and mapping using satellite image. Measures of the park's environment variables were collected via desktop survey and direct field observation.

Ramna Park has been selected for this study. Ramna Park is a huge open space located at the center of Dhaka city. In 1908, this area was developed as a park with 68.5 acres of land around the Ramna lake. However, the park has been swallowed partly by different buildings along its periphery. At present the open green area of 58 acres, including the lake and the nursery. The huge park is organic in its shape taking the form of a lung of a human body.

Except the west side, it is surrounded by vehicular roads. The entry is controlled by seven defined gates from the surrounding roads. Inside, the park is crisscrossed by pedestrian walkways. The lake in its natural shape covers almost one fourth of the area. This vast green area with the water body works as the lungs of the city for its environmental and ecological balance.

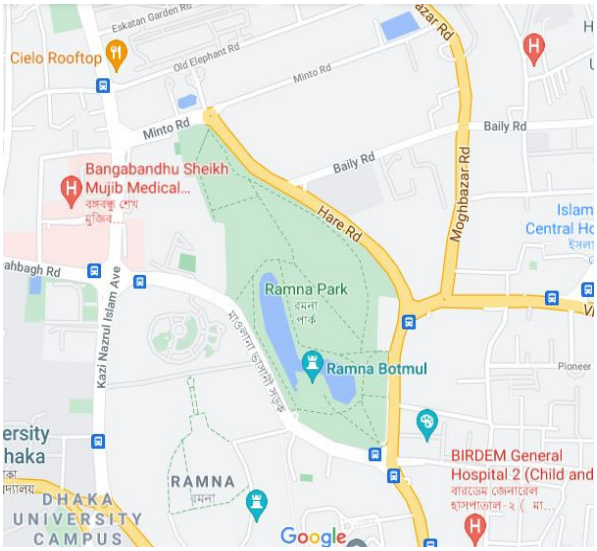


Fig. 1: satellite image of Ramna park with surrounding area; Source: Google

The land uses of the surrounding areas are residential and institutional in use and are in general low-density built-up areas. Two main leisure activities are taking place in Ramna Park area; those are Recreation and Physical Exercise. In addition to these regular activities, occasional festivals like the traditional Bangla New Year program of Pahela Baishak at Ashathmul (previously known as Batamul); and various cultural and commercial fairs take place in Ramna Park. During these seasonal and occasional programs thousands of people from all cross-section of the life participate. But unfortunately, due to some mismanagement and lack of coordination of physical planning activities within the city, has resulted into an unpleasant quality of the environment of few zones of Ramna park. Moreover, a designed and proper maintenance park can play an important role to develop and enrich the quality of life.

During the survey campaign 43 participants were interviewed inside the investigated park. The age of the participants was between 20-50 years. most of them are living the surrounding residential area like -Shantinagar, Ramna, Baily Road, Kakrail. Most of the people use this park for relief and exercise.



Fig. 2: photographs of selected park; Source: Field Survey, 2020

A. Data collection method

Data collection method were used to collect data related to visitor's experience, motivation, perception, concern about parks tranquil environment. Mapping with satellite image was one of the most integral part of the data collection. Face to face survey question was conducted to random visitors. Data were collected from 27 September 2020 to 3rd October 2020.



Fig. 3: Mapping with Satellite Image

The satellite image of park has carried with field survey. The questionnaire was administered. The location of the interviewees has marked and identifying 4 different zones.4 zones have divided in a manner where most of the visitors were found

B. Questionnaire survey

The questionnaire consisted of some questions covering the following items:

- interviewee's personal data (age, gender, occupational status);
- presence in the park: (i) preferred days to visit the park (weekdays or weekends), (ii) weekly frequency (once, twice, all days, or occasionally), (iii) average duration of visit (less than one hour, between one and two hours, or more than two hours);
- main reason for frequenting the park selected among some answer options (reading, children, sport, walking, sport, nature, or tranquility)
- importance of certain aspects of a park that affect its pleasantness, namely, vegetation, clean air, cleanliness, security and quietness (explained to interviewees as the absence of "disturbing" sounds)
- rating the quality of the above aspects for each surveyed park, given on a scale from 1 (bad) to 5 (very good);
- sounds expected to be heard in the park (human voices, road traffic, building construction sound, or hawker) and annoyance due to these sounds given on a scale from 1 (not at all annoyed) to 5 (very much annoyed);
- perceived quality of the area as a whole (explained to interviewees as the total environment) and of its soundscape (explained to interviewees as the perception of the acoustic environment), given on a 5-point scale from 1 (bad) to 5 (very good)

III. RESULT AND ANALYSIS

The Ramna park can be considered the city park of Dhaka city. This Park is located in the middle of the capital. Therefore, the traffic going to and from the city has a big impact on the urban sound environment and presence of poor tranquil quality can affect decreasing the visitors' number

A. Characteristics of Participant

The interviewees were selected randomly, and data were collected from 43 respondents. The characteristics of the interviewees are summarized (see Table I), where the percentage in reference to the overall sample is also given. Most of the interviewees are male and the maximum age is between 30-50 years.

Sex	Number	Percentage		Sex	Age	Number
Male	26	61%		Both male and Female	<30	9
Female	17	39%			30-50	23
Total	43	100%			50>	11

Table I: Characteristics of the interviewer:

B. Purpose, frequency and time of visiting park

Most of participants use urban parks for "seeking tranquility" and for "Exercise and walking" (see Table II). Visitors are less likely to visit urban parks for "study" and meeting other people". The majority of visitors used to come to this park once a week.19%

people came here monthly. About 35% people came to the park in the morning for walking and exercise only 16% came at noon.

Purpose of visit	Number	Percentage
Tranquility	17	40%
Exercise and walking	15	35%
Sport	4	9%
Meet with other people	5	12%
Reading	2	5%

Table II: Purpose of visiting park:

Frequency	Num	%		Time	Num	%
Once in a week	15	35%		Morning	15	35%
Daily	13	30%		Noon	7	16%
Monthly	8	19%		Afternoon	12	28%
Occasionally	7	16%		Evening	9	21%

Table III: Frequency and Time of visiting park:

C. Evaluating Urban Parks Quality in Terms of soundscape

In particular, the questionnaire inquired about the noticing of sound sources during the park visit. The three groups of sounds were listed as "human sounds", "natural sounds" and "mechanical sounds". The general sound sources of this park can divide into three categories: human, mechanical and natural sources (see Table IV)

Human sources	Mechanical sources	Natural sources
Human Voice, Human step, Children sought, hawkers sound	General traffic, vehicle, airplane, building construction, music from cars, car parking	Birds crimping, dogs barking, waters sound from lake, wind, insects sound, squirrels sound

Table IV: Different sources of sound:

Participants were asked to rank hearing sounds in these categories on a 5-point ordinal category scale with categories: "not at all", "a little", "moderately", "much" and "very much". They were asked to ranking those in four different zone of this park.



Fig. 4: Hearing rank of Human Sources sound in four different zone of park

The above figure is showing that most of the people hearing the human sources sound "very much" in zone 4 and most response of zone 3 are less noting human sources sound.

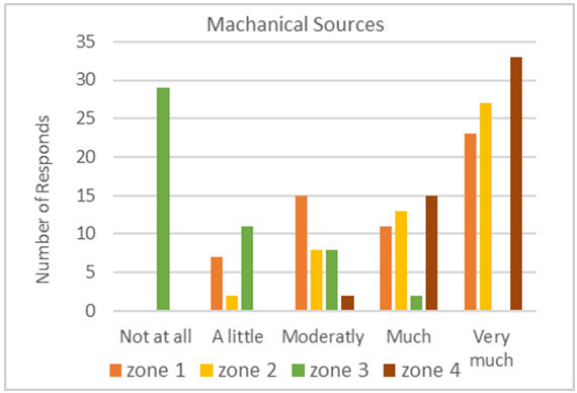


Fig. 5: Hearing rank of Mechanical Sources sound in four different zone of park

The above figure is showing that zone 4 are mostly affected by mechanical sources sound (46% of the total responds) most of the people hearing the human sources sound ranking as "very much" in zone 4 and most response of zone 3 are less noting human sources sound and they rank "Not at all". Zone 4 and zone 2 is closely related with outside busy traffic road. Therefore, mechanical sound sources like car horn, traffic noise come with high noise level. Hence natural sound is less noticed in those zones.

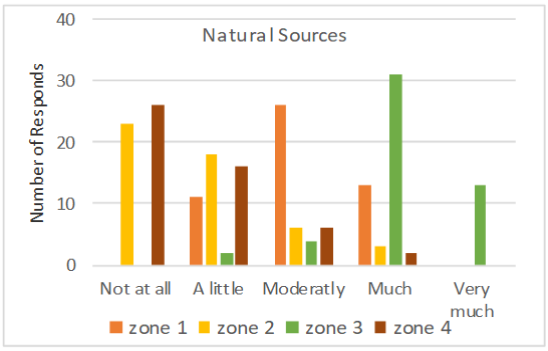


Fig. 6: Hearing rank of Natural Sources sound in four different zone of park

The above figure is showing that most of the respond are noticing natural sources sound and ranking as "much" in zone 3 on the other hand no respond has noticed the natural sources sound in zone 4 and zone 2 as they ranking the noticing natural sound "not at all". Zone 3 is located in the middle position of the park and this zone is free from traffic noise. Therefore, natural sound is much pay attention here.

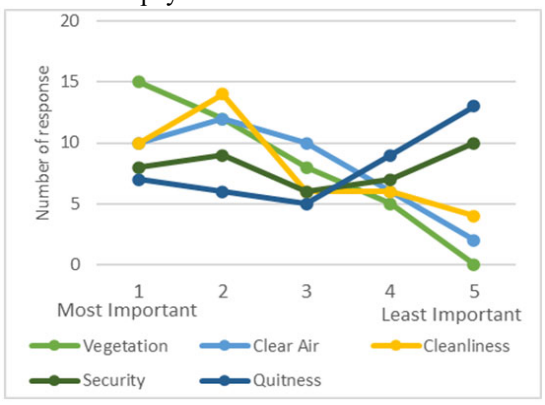


Fig. 7: Importance of certain aspects for parks pleasantness

For the pleasantness of a park, the aspects considered most and least important are reported in Figure 7. As shown, 35% of the respondents reported vegetation as the most important aspect, whereas quietness was rated the least important by 30% of the subjects. For respondents going to the park for tranquility, quietness was rated the most and least important aspect by 16% and 39% respectively. From this outcome, the feeling of tranquility appears to be influenced not only by quietness, but also by other non-acoustic features, such as the visual feature.



Fig .8: Perceived quality of certain aspects of the park

The quality of the above five aspects in the surveyed park was largely judged positively by the interviewees. For instance, vegetation and quietness were rated "good" by 44% and 28% of subjects, respectively. 16% of the total sample (see Figure 8) who rated quietness as the most important aspect of a park for its pleasantness,28% judged these aspects as "good" but no one said its "very good" in the survey.

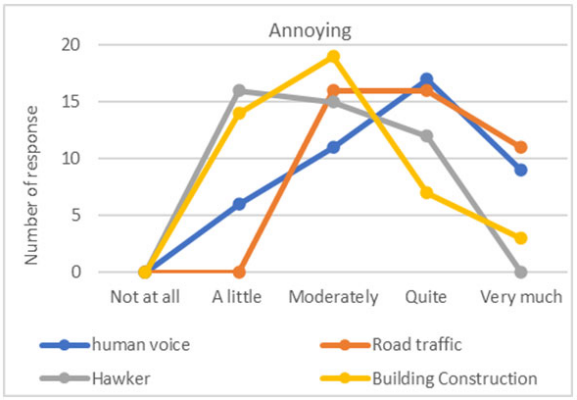


Fig. 9: Responds annoyance of sound heard in the park

Human Voices and road traffic were the sounds most expected in the park (36% and 39% of respondents. respectively), but noise from building construction and Hawker was also expected (36% and 38%, respectively) because of the social context within which the parks are located. 25% of visitors reported road traffic sound as "highly annoying" by 25% (road traffic) percentages much higher than those observed for human voice and building construction as shown in. Visitors also reported that natural sound like human voice produce less annoyance than technological sounds (road traffic and building construction-overs in the present study) mentioned in figure 9.

Natural sound like Birds chirping, sound of water, sound of air can observe in zone 3. Visitors observe those sound and reported as most likely and soothing sound for relief.

Figure 10 and Figure 11 showing the reports about perceived quality of the soundscape and perceived the quality of quietness in terms of the number of. Most of the respondents reported the quality of quietness and soundscape is "Fair" in zone 3.

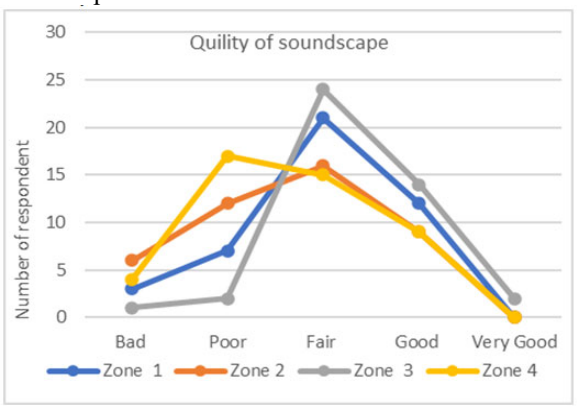


Fig. 10: Perceived the quality of soundscape considering four different zone of the park

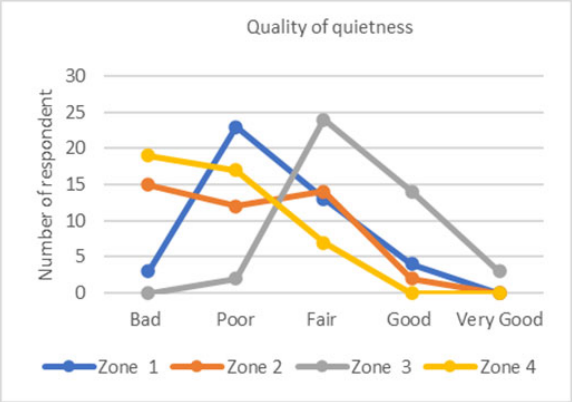


Fig. 11: Perceived the quality of quietness considering four different zone of the park

Some people judged the quality of quietness better than the soundscape. Some judged the soundscape is better than quietness on zone 1 and 2. on the other hand zone 4 is rating as "poor" and 'Bad" for both judgements.

This result confirms that soundscape has a wider meaning than quietness, the latter being more directly related to either no loud or unwanted sounds. Because sound levels within urban parks are frequently not low, it seems more appropriate to evaluate them from the point of view of "acoustic quality" rather than of "quietness" only.

IV. DISCUSSION

Visitor's viewpoint about the park's tranquility -on the perception of the sonic environment was investigated in this study. Persons associating tranquility to hearing natural sounds do not tend to notice natural sounds more during their visit to a park.

The survey carried out in the Ramna park has shown that the acoustic environment of most of the zones of this park may reduce, or even lose, the feeling of quietness, in part because of the several sound events observed in the ambient noise produced by numerous sources, from natural to technological. Thus, the important function played by parks in preserving or promoting the health of users can be deteriorated and less efficient. Zone 3 is located in the middle position of this park which can be considered quit and well soundscape environment. This zone is free from traffic noise therefore visitors perceiving natural sound sources and human voice appears not annoying. Among the several results obtained from the subjective ratings, the most frequent reason for visiting the park was to seek tranquility (40%); quietness was the least important aspect for the pleasantness of a park (35%). In the surveyed parks, the quality of the proposed aspects of the park (vegetation, clean air, cleanliness, security and quietness) was mainly judged "good" by the interviewees. Natural sounds like human voice were less annoying than technological sounds (road traffic and aircraft fly-overs).

It could be said that soundscape has a broader meaning than quietness, the latter being more directly related to no loud or unwanted sounds and being only one aspect of the soundscape. On the other hand, the perceived quality of the total environment was rated better than the soundscape.

V. CONCLUSION

This study shows that there is a diversity in opinions on the meaning of tranquility. In addition, it was shown that this tranquility view point is a personal factor that influences the sounds that are notice during a park visit, the degree to which these sounds match expectations and the overall perceived quality of the soundscape. This conclusion, however, only holds for specific viewpoints that might be associated with more critical listening.

VI. LIMITATIONS

The study is conducted in only one urban park of Dhaka city. Due to the COVID-19 pandemic situation the park is remain close from time to time and the number of visitors is fewer than to the normal situation, therefore, the results are limited and they cannot be straightforwardly extended to other environments and green areas. Tranquility rating prediction tool (TRAPT) didn't practice here, statements are derived from questionnaire survey, analysis and observation. Observation Confirmations and more insights can be obtained from further investigations in order to increase the sampling dimensions. Notwithstanding these limitations, the applied methodology has confirmed that the soundscape approach can provide information useful for planning effective strategies aimed at preserving and improving the quality of urban parks

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