A Pragmatic Study of Accessible Neighborhood Greens of Old Dhaka through Mapping Physical and Psycho-Pocial Environment to Address the Quality of Life

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Abstract: The accessible neighborhood greens (ANGs) of Dhaka are increasingly vanishing due to ravenousness and manipulative concentration of the private sector in involvement with the municipality authorities. Thus the demand of ANGs with constructive spatial pattern becomes the major concern to develop and improve quality of life and livability of the metropolis. This paper makes a pragmatic study of the performances of selected ANGs of Old Dhaka to observe and reorganize the configuration of physical and psycho-social environment to evoke frequency of neighbors' understanding for better livability which will improve our quality of life. An extensive survey has been conducted including participant observations and in-depth interviews to assess the performances of four ANGs of Old Dhaka which included: Bangladesh Maath, Sikkatuli Children's Park, Samsabaad Eidgah Maath and Sirajuddaula Park. At the end, this paper represents a rational archetypal layout, emphasizing on the spatial pattern of ANGs which is at present deficient in megacity Dhaka.

Keywords: Accessible neighborhood greens (ang), physical and psycho-social environment, old dhaka neighborhood

Introduction

Dhaka is ranked as the second least liveable city in the world for the third consecutive year, according to the economist intelligence unit's 2015 global liveability ranking. Tremendous population growth has negatively affected its socio-economic and physical structure of the green areas of Dhaka. Many of city people do not have adequate access to green spaces. Study shows accessible neighborhood greens (ANG) at a reasonable distance ensures visual breaks between and within residential areas and can contribute to create user friendly opportunities for social interaction and enhance quality of life of the neighborhood people. ANG have a great ecological importance in urban environment – from microclimate control to biodiversity but spatially many ANG are mainly neglected in national nature resources management activities and have undergone human-derived changes that have increased threat of pollution (Bashneeen et al., 2013). Every neighborhood of Dhaka does not have such ANGs of different sizes which can be used as numerous resources. Therefore, this research focuses on the users of ANG in order to identify their needs and understand what attract users in terms of physical and psycho-social environment and examines performance of ANG to enhance users' satisfaction and improves the relationship among people; built and natural environment for better quality of life.

Objectives and Methodology

The objectives of this study are:

1. To investigate and portray the quality of physical environment and the frequency of neighbors' spatial experiences with ANG

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2. To evaluate the spatial performances of selected ANG of Old Dhaka in terms of accessibility, users' perceptions & needs, frequency of uses, comfort and sociability
3. To create an integrated rational archetypal layout emphasizing on the spatial pattern of ANG, for better quality of life currently deficient in Dhaka city.

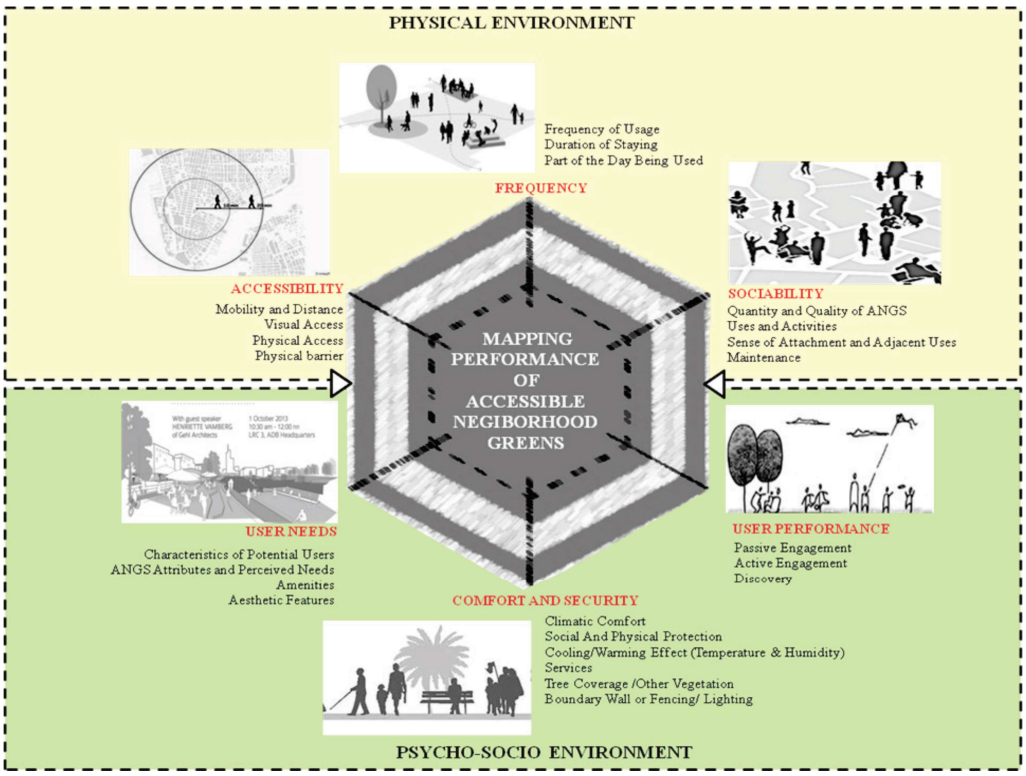

Figure 1. Checklist for performance of ANGs of Old Dhaka Area

For the above objectives, an extensive survey has been conducted on four selected ANGs of Old Dhaka from year 2013 to year 2017 including observational surveys and in-depth interviews of 140 residents. The Figure 1 shows the checklist for analysis the spatial performances of ANGs in terms of social & functional dimensions of the spatial environments of those ANGs. 'Accessible neighborhood green performance' (ANGP) of Old Dhaka on the basis of a comparison of seven selected spots will be defined in four categories: (1) very successful, (2) successful, (3) moderately successful and (4) marginally successful. Here the spatial performance of ANGs is discussed in two aspects as social dimension comprising the physical environment and functional dimensions comprising the psycho social environment.

Theoritical Background: Accessible Neighborhood Greens [Ang]

Accessible green space is considered to be that which is located close to residents' homes, easy to walk to, physically accessible, safe to use, and provides well maintained facilities that is defined by Public Health England. Neighborhood green spaces are the spaces where facilities will tend to attract a significant proportion of their users and will relate not only to a physical issue but also to the social context. Depending on their location, people will travel by foot if they live close to the green space or by car or public transport if they live further. Example: play grounds, play fields, medium sized parks

(Islam, Kawsar and Ahmed, 2002). Such neighborhood green spaces are involved for either active or passive recreation or creating a positive impact on the urban environment, available for the users to use free of charge and without time restrictions within walking distance. According to World Health Organization (WHO) there should be 9 sq. meter green space per city dweller for ensuring better life. In developed countries, normally, they have more trees (more than 20 sq. meter green spaces per city dweller) to meet the ecological balance for human well-being compared to cities in developing countries, which often fall below the minimum standard of open green spaces set by WHO. The DMDP suggests that Dhaka City had 0.50 square meters of green space per capita in 1995 (RAJUK, 1995). In 2009, a critical review of the Detailed Area Plan (DAP) suggested that there were only 0.052 square meters of green space per capita, a full order of magnitude less than the number put forward in the DMDP (Bari and Efroymson, 2009). Table 1 conveys the area/size of green spaces according to various authorities of Dhaka. Christopher Alexander (1977) in PATTERN 60 has stated that people use greens most when they are in close proximity to their residences or work places. Distance and accessibility are the main physical factor influencing the use of green space (e.g. Coles and Bussey, 2000; Van Herzele and Wiedemann, 2003; Giles-Corti et al., 2005), and a distance of 300–400 meters is seen as a typical threshold value after which the use frequency starts to decline (Grahn and Stigsdotter, 2003; Nielsen and Hansen, 2007).

Table 1: Area/Size of green spaces according to various authorities

<table>
<tr><td colspan="3">Space requirement and size of open spaces (Islam, Kawsar and Ahmed,2002)</td><td>1995 master plan
The present guideline, worked out in 1995 earmarks four acres of land as open spaces for an area of 25,000 people (0.16 acres for 1000 people).</td></tr>
<tr><td>Open spaces</td><td>Areas</td><td>Area/ 1000 pop.</td><td rowspan="2">DCC Annual Report, 2006(list of parks)
Size of Neighbour hood or Local park ranging from 0.030acres to 8.700 acres. Most of the parks have an area of 1.5 acres -2.0acres.</td></tr>
<tr><td>Play ground</td><td>100 sq ft/child [6-14 yrs]</td><td>1.5 acre</td></tr>
<tr><td>Play field</td><td>600 sq ft/person [15+]</td><td>1.5 acre</td><td rowspan="2">Detailed Area Plan (DAP)
Proposes that only 0.13 acres of parks and open space for 1,000 persons in the main Dhaka City, which is significantly lower than the World Health Organization’s recommendation of 4.23 acres /1,000 persons for, parks and open space.</td></tr>
<tr><td>Neighbourhood or Local park</td><td>300 sq ft/person</td><td>2.0 acre</td></tr>
</table>

These green spaces could involve different networks of people such as residential neighbors, workmates, and parents as well as people from other activities those who live and work in the area. Good quality green open space promotes biodiversity, nature conservation, habitat and heritage, as well as enhancing the local community’s quality of life. The social benefits comprise of active lifestyle, safe play areas for children, closer friendships, as well as reducing crime and disorder, stress, aggressiveness and violence.

Physical and Psycho-social Environment

Accessible green spaces posses two environment: physical environment and psycho-social environment (Table 2) which provides opportunities for active and passive recreation. Green spaces not only promote a healthy environment, but also provide spaces for wildlife, involve community learning and social development.

Table 2: Attributes of Physical and Psycho-social environment

PHYSICAL DIMENSION		
Accessibility	**Frequency of uses**	**Sociability**
Accessibility is the distance necessary for access to the green space and way users arrives to it. Two aspects of access – having a space nearer and being easier to access – were clearly identified as issues that would encourage greater use of ANGs.	Frequency of use concerns the number of times a person visits the nearby accessible green and the time spent there, peak hours of visit and the frequency of use during which days of the weeks. Distance decay also affects the frequency of use.	Sociability deals with the different functions that occur inside the ANGs and in the surrounding areas and perception of the users towards other users of the green. This attribute contain uses and activities pattern and what activities and uses attract people to the field and explores how social interaction took place in the ANGs.
PSYCHO-SOCIAL DIMENSION		
Users' need	**Users' performance**	**Comfort & security**
In order to understand the users and create a user profile participants were asked their age, gender and occupation (*Bashneen S., 2013*). Asking this information also allowed knowing the users need and preferences in the public settings with what type of green they prefer in their area.	Spatial Behavior means to investigate pedestrian movement and the ease of access to the ANGs, identify the more used and less used spaces, type and intensity of activities, relations between physical distinctiveness and intensity of use, their experiences, behavior and preference with the ANGs	Comfort in this particular study will be related to climatic conditions and security factors of the green (*Bashneen S., 2013*)

Other spatial factors such as size of the green space, presence of facilities and possibility for activities are also thought to have an influence on the use of neighborhood green space (Van Herzele and Wiedemann, 2003; Bedimo-Rung et al., 2005; Giles-Corti et al., 2005, Jasper and Stigsdotter, 2010). Coley, Kuo, and Sullivan (1997) found that natural elements, such as trees, in semipublic spaces surrounding urban housing promote increased use by, and interaction among, residents. Saelens et al. (2003), the aesthetics of the neighborhood (i.e. attractive natural sights) is one environmental characteristic which supports physical activity. Despite all of its positive attributes, Dhaka's tremendous population growth has negatively affected its socio-economic and cultural life as well as its physical structure and green areas and has decreased spatial performance (Table 2). There is a growing recognition of the multi-functional values of green spaces in urban areas.

Quality of Life

Quality of life has been defined as a combination of life conditions and satisfaction (Felce and Perry, 1995). Felce (1996) classified quality of life as being influenced by six broad elements: physical, material, emotional, social, productive, and rights/civic wellbeing. According to the World Health Organization (WHO), quality of life is "an individual's perception of their position in life in the context of the culture and value systems in which they live, and in relation to their goals, expectations, standards and concerns" (The WHOQOL Group, 1995). The availability of accessible, safe and attractive green spaces is an integral part of urban quality of life (Van Herzele and Wiedemann 2003). Jim and Chen (2006) argue that 'green space provision is probably as old as settlements'. Access to green spaces linked to better quality of life and less stress. A community's quality of life is directly tied to both the quantity and quality of parks and green spaces in the area.

Study Areas

Dhaka has two distinct parts - Old and New Dhaka. The historic part of Old Dhaka has an organic settlement and it retains many traditional features. The pattern that exists in the old historic city is the winding and intricate street network, continuously twisted in and out, and were tortuous to an extreme degree in some places. Like many organic cities, the urban pattern of old Dhaka reflects the community spirit and the aspiration of its inhabitants. The organic character of the old part of Dhaka is particularly distinctive because of the density of its built-up areas.

Figure 2. Selected ANGS of Old Dhaka

The selected ANGS (Figure 2) are placed at Dhaka South City Corporation (DSCC) (Figure 2). In the present study selected areas possess different characteristics in terms of background of establishment, physical layout of built up[covered] and natural green spaces[open], residential pattern that enhances social interaction among neighbours and outsiders, their capacity to accommodate new functions with flexibility; their location and accessibility; their layout and size and their function .

01. Bangladesh Maath
02. Sikkatuli Shahid Khalek Shardar Children's Park
03. Samsabaad Eidgah Maath
04. Sirajuddaula Park

Table 3 (a, b, c, d): Functional and physical Characteristic of ANGS of Old Dhaka

ANGS 01:Bangladesh Maath		
Internal Street layout	Green space	Commercial uses
Major Road	Tree cover	Ward commissioner office
Circulation	Entry internal walkway	Residential area
Special features Gallery Seating	Water pump Club BLDG Mazar Tea Stall Chotpoti/food stand	
Ward 33 **Area: 2.64 acres**	Local sporting club since 1973 maintains the field. Condition of the field is good .But authority concerned intentionally neglecting to do any development works on the field. WASA pump was set up at the south-eastern side of the field.	
Shape: Trapezoidal	**Major Activity**	Playing, walking, resting
	Most Active hour	Evening/weekend

Table 03(a)

ANGS 02: Sikkatuli Shahid Khalek Shardar Children's Park		
Internal Street layout	Green space	Commercial uses
Major Road	Tree cover	
Circulation	Entry Internal walkway	Residential area
Special features	Pond Police Fari Waste Dumping Ground Tea Stall Chotpoti/food stand	
Ward 34 **Area: 0.5 acres**	Sikkatuli Children's Park also known as Nazira Bazar Park, Opposite to this park there is Sikkatuli pocha Pukur.	
Shape: Trapezoidal	**Major Activity**	Relaxing, walking, waiting, playing
	Most Active hour	All the day/weekend

Table 03(b)

ANGS 03: Samsabaad Eidgah Maath		
Internal Street layout	Green space	Commercial uses
Major Road	Tree cover	Residential area
Circulation	Entry Internal walkway	
Special features	Pond Mosque	
Ward 32 **Area: 0.640 acre**	This field is in very compact neighborhood which is composed of single unit apartment of 5-6 stories.Bangshal pond is near to this playfield.	
Shape: Trapezoidal	**Major Activity**	Playing, walking
	Most Active hour	Morning and evening

Table 03(c)

ANGS 04: Sirajuddaula Park		
Internal Street layout	Green space	Commercial uses
Major Road	Tree cover	Residential area
Circulation	Entry Internal walkway External walkway	
Special features	Pond Minar Water pump	
Ward 32 **Area: 0.85 acre**	Generally residents of Koshaituli, Jindabahar, Tantibazar, Bashabari Lane, and Syed Awlad Hossain Lane in the city come to the park every day. People coming to do physical exercise every day, formed an organisation named Bhorer Otithi, of which Haji Mohammad Yousuf is the vice-president.	
Shape: Trapezoidal	**Major Activity**	Waiting,walking(physical exercise),resting
	Most Active hour	Morning, afternoon, evening

Table 03(d)

Findings and Comparative Analysis of ANGs of Old

Analysis and synthesis of the case studies include various attributes under which different measures are taken to investigate liveability. In the present study, selected areas possess different characteristics in terms of physical layout of built up and natural green spaces, residential pattern that enhances social interaction among neighbours and outsiders, their capacity to accommodate new functions with flexibility; their location and accessibility; their layout and size and their function (Table 4 to 7 and Figure 3).

Table 4: Observational findings of Bangladesh Maath

ANGS 01: BANGLADESH MAATH		
PHYSICAL DIMENSION		
Accessibility -Visual access – no(except south side ,surround by shops and gallery)-Physical Access: (from north and south side)-Absence of Footpath	**Frequency of uses** -Morning: Old people walks -Noon: Student plays	**Sociability** - Moderate rate of passive activities -High rate of Active activities. -High rate of people come to meet friends and some to watch games.
PSYCHO-SOCIAL DIMENSION		
Users' need -Places to sit-Provision for more soft green surface and more experience of nature-Feeling safe (increase visual accessibility and lighting)-Restriction on unwanted contact by implementing good security system.-Good maintenance (Proper drainage system)-Encouragement of community events and activities	**Users' performance** -Central spaces for Active activities (children and young people)- Young people and children practice cricket and football at the center of the field-East and south periphery for passive activities (students and adults)-Informal vendor at south Entry	**Comfort & security** -Comparatively High Temperature (avg. 32.3°c in the center of the field) -Less Comfortable, though moderate comfort one east side due to presence of trees

Table 5: Observational findings of Sikkatuli Khalek Shardar Park

ANGS 02: SIKKATULI KHALEK SHARDAR PARK		
PHYSICAL DIMENSION		
Accessibility -Visual access :Yes-Physical Access: (from north and east side)- Absence of Footpath	**Frequency of uses** -Morning: Old people walks-Afternoon: Playing, Gossiping, relaxing under trees-Evening : Relax, eating snacks	**Sociability** -High rate of passive activities(jogging, walking, kite flying)-Good rate of Active activities(playing)-High rate social activity (relax, gossip)
PSYCHO-SOCIAL DIMENSION		
Users' need -Provision for pavilion all age people -Maintenance of playing space for children -Specific space for women -Feeling safe (increase lighting facilities)-Removal of the dustbin and proper maintenance of the Pocha pond-Provision for toilet facilities	**Users' performance** - Spaces for passive activities (children and young people)-Adults jog and exercise -Women gossip and relax at the periphery while the kids play-Many informal vendors at the adjacent north road.	**Comfort & security** -Moderate Temperature (avg. 29.3°c)-Considerate Comfortable due to presence of various tree coverage

Table 6: Observational findings of Samsabaad Eidgah Maath

ANGS 03: SAMSABAAD EIDGAH MAATH		
PHYSICAL DIMENSION		
Accessibility -Visual access :Yes-Physical Access: (from south side main entry)-Absence of Footpath	**Frequency of uses** -Morning: Internal walkway for morning walk-Afternoon: Playing, Gossiping-Evening : Relax, talking, eating snacks	**Sociability** - Moderate rate of passive activities-High rate of active activities.- Good rate social activity (relax, gossip, study)
PSYCHO-SOCIAL DIMENSION		
Users' need -Playing equipments and designated space for children and women -Pavilion-Feeling safe (increase lighting facilities)-Encouragement of community events and activities	**Users' performance** -Central spaces for Active activities (children and young people)-West and East periphery for passive activities like exercise by adults-Parents bring their children, either relax or play with them at afternoon at the periphery or under trees.-Few informal vendor at east entry	**Comfort & security** - Good Temperature (29.9°c)-Comfortable as the field is surrounded by trees

Table 7: Observational findings of Sirajuddaula Park

ANGS 04: SIRAJUDDAULA PARK		
PHYSICAL DIMENSION		
Accessibility -Visual access :Yes-Physical Access: (from north side main entry from east and south side secondary entries)-Footpath on north and east side	**Frequency of uses** -Morning: neighborhood People (walk)-Afternoon: Relaxing, Gossiping-Evening : Relax, waiting	**Sociability** - High rate of passive activities-Good rate of active activities.- Good rate social activity (relax, gossip, waiting)
PSYCHO-SOCIAL DIMENSION		
Users' need	**Users' performance**	**Comfort & security**
- Provision of playing equipments for children - Restriction on unwanted contact by implementing good security system though 'Bhorer Otithi' is doing their level best to maintain the park well.- Provision for drinking water.	-Outside users use the park -Young people and children practice cricket in the practicing pitch at the corner of the field- Parents bring their children, either relax or play with them at afternoon at the periphery or under trees.-Informal vendor at just at entry gates	-Moderate Temperature (31.2°c) -Comfortable due to tree coverage -Sudden Discomfort due to be beside major road (noise pollution)

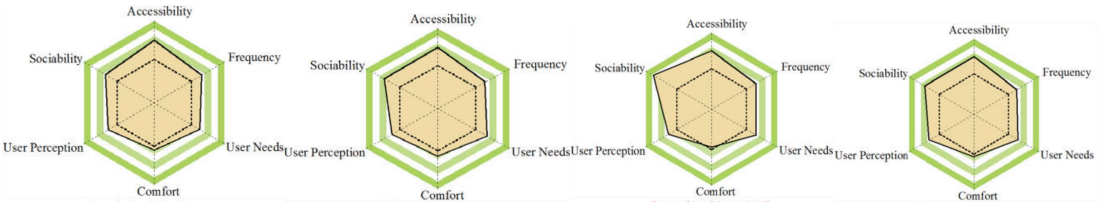

Figure 3. Comparative analysis of ANGS through spider net diagram

Following findings are according to the observation that has been done to the seven ANGs of Mohammadpur.

Accessibilility: For study areas being unplanned, it takes 3-5 minutes of majority users come from 2-4 blocks radius distances (500ft-1000ft) on foot to their accessible green spaces (Figure 4 and Table 8).

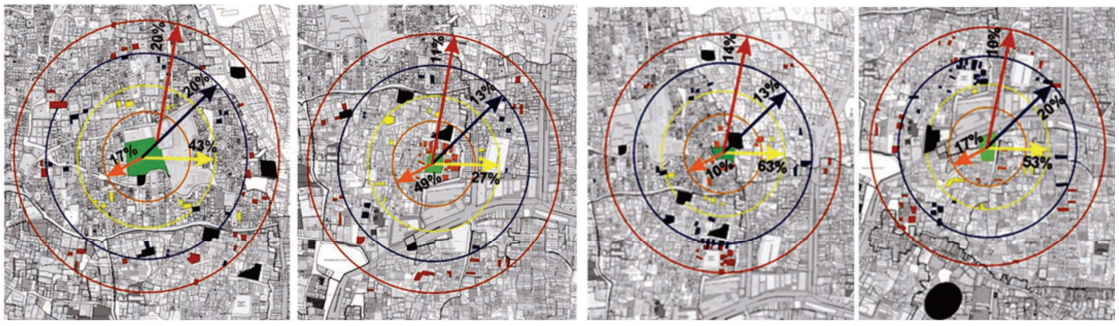

Figure 4. Distance & frequency diagrams of Bangladesh Maath, Samsabaad Lane Maath, Sikkatuli & Sirajuddaula parks

Table 8: People and distance

Distance	Unplanned area(150)	
	No of People	%
Less than 1 blocks or 1block radius (150-250 feet)	46	31
2to 3 blocks radius (500-750 feet)	**84**	**56**
3-less than 5 blocks radius (750-1000 feet)	15	10
Far (above1250 feet)	05	03

Frequency: The participants who were users visited urban green spaces on a daily or weekly basis. Observation detected peak hours for the greens were morning, afternoon and evening hours which during weekends have higher intensity of use. The constant presences of the users (aged 8yrs-18yrs) are seen in the morning and afternoon for ½ hour to 1 hour.

Sociability: Users come to their accessible green spaces for sociable reasons that mean these greens act as a place for interaction which can influence the livability. Many users said that active events are important in green spaces which can uplift sociability. In the focus groups, many people mentioned fair, music events and some, though far fewer, mentioned the desirability of theatre.

Comfort and Security: It is observed that more or less temperature varies from 32.6°c to 27°c and humidity from 32% to 22%. People tend to visit in morning, afternoon and evening hours when temperature and humidity is low during the day and often prefer to occupy space under tree to relax. When asked about security while visiting the ANGs most users mentioned that they feel secure being in the green space but some users said they feel insecure to go to the field at evening hours because the absence of night lighting.

Table 9 (a and b): Users' Preferences/Accessible green matrix & Activity/Accessible green matrix

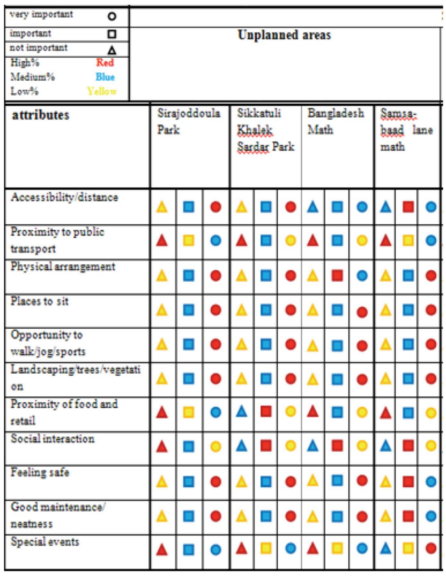

Figure 5. Spatial behavior during afternoon at selected ANGs of Old Dhaka

User's Needs: Users prefer socially interactive, diversify and secure green spaces with good physical arrangement and maintenance which are in close proximity to their home. They need accessible green that follow a high intensity function and commence to be a vital element in their neighborhood life.

User Performance: All the ANGs users have the tendency to use the central spaces for active activities *(Table 9a-9b and Figure 5)*. The internal perimeters are used for passive activities like walking, exercising, social gathering which increases during weekends.

Due to absence of visual accessibility Bangladesh Maath has a moderate success among the four ANGS. In contrast though Sikkatuli Park is smaller in size than other ANGS it contains a good balance between the environment and quality of life of the neighborhood people. Both Samsabaad Maath and Sirajuddaula Park are nearby and adjacent to Nawab Yosuf road of Old Dhaka.

Table 10: Comparative analysis of performance of physical and psycho-social environment of ANGS of Old Dhaka

	ANGS	ANGS 01: Bangladesh Maath	ANGS 02: Sikkatuli Khalek Shardar Park	ANGS 03: Samsabaad Eidgah Maath	ANGS 04: Sirajuddaula Park
Physical Environment	Accessibility				
	Frequency of Uses				
	Sociability				
Psycho-Social Environment	Users' Need				
	Users' Performance				
	Comfort & Security				

Marginally Successful | Moderately Successful | Successful | Very Successful

Even though Sirajuddaula Park has a good accessibility but the privacy of the neighborhood people is hampered by the presence of outsiders whereas Samsabaad Maath is midst of Samsabaad area near Bangshal Pond and it is less accessible than Sirajuddaula Park but serves the neighborhood people better than Sirajuddaula Park. Comparative analysis of performance of physical and psycho-social environment of ANGS of Old Dhaka has been showed in table 10.

Recommendations

From the above discussion, it is evident that the provision of ANGs with favorable spatial pattern becomes the primary function to enhance quality of life of the city dwellers and livability of the city. An extensive survey with a pragmatic analysis of the spatial

performances of selected ANG of Old Dhaka has been examined and a rational archetypal configuration of physical environment has been suggested including participant observations and in-depth interviews to evoke frequency of neighbors' experiences for better quality of life. So to enhance and accelerate the quallity of life of neighborhood peopele we need to take the following measures in importance.

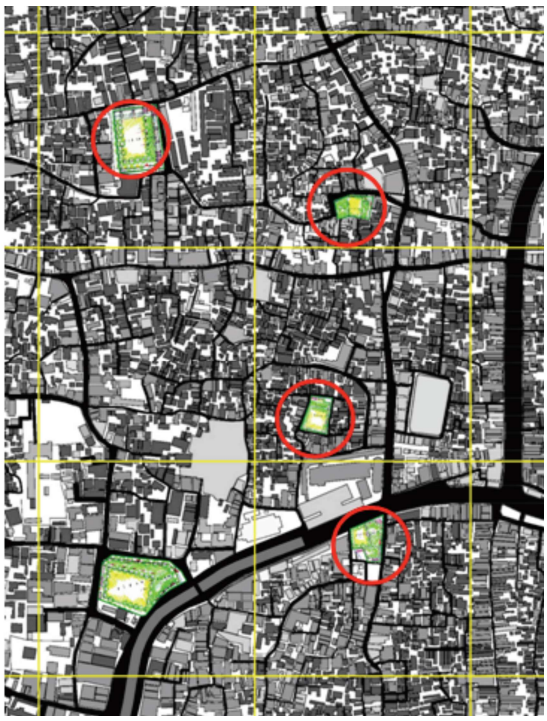

Figure 6a. Accessible greens of Old Dhaka within 1000 feet X1000' feet grid and

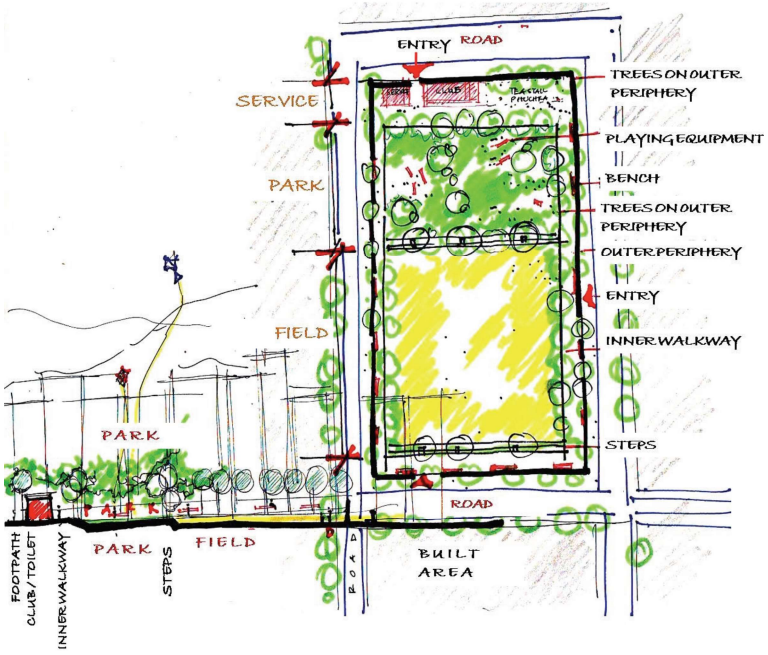

Figure 6b. 2D sketches "multifunctional green" for Dhaka

- To create a pattern in macro scale for the extension of Dhaka as well as accelerate the PERFORMANCE of each ANGS those are studied and prior to be studied to enhance QUALITY of life of Dhaka people
- To form a small list of regarding users' need and preferences to generate a simple VOCABULARY of ARCHETYPAL ELEMENTS and can be combined in various permutations to create different types of ANGS throughout each neighborhood of Dhaka.
- To engage community people and promote DESIGN AWARENESS IN THE MAKING OF HUMAN SPACES those enhances users' experiences and enjoyment in the ANGS and assure quality of life.

At the end, these ANGs will act as a piece of "multifunctional green" to its neighbourhood that will portray the characteristics and qualities of parks and playfields in same ground that will meet the preferences and need of the users.

Conclusion

The synopsis of this paper demonstrates that the availability of usable ANGs as well as users' perceived quality of ANGs are extensively related with neighborhood satisfaction, apart from the amount of green spaces. Thus, findings suggest provision of quantitative ANGs in close proximity of the users and distribution of ANGs in each cluster of planned-unplanned neighborhood with appropriate ratio in between size and density of population should be addressed. More the positive attributes more accessible green becomes livable and enjoyable for people. These greens will thus contribute to positive attitudes and behavior, social tolerance, dialogue, connection, and liveability. Researchers and policy makers, therefore, need to pay attention to the quality of the ANGs, which may be an important to uplift the quality of neighborhood peoples' lives.

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