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## Chapter

# Role of Green Spaces for Maintaining Well-Being in Residential Community Development

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## Abstract

The planned green spaces are the most significant social spaces for people to interact on a daily basis and also considered as one of the sustainability indicators for maintaining the well-being in residential Communities. The benefits of green space for wellbeing are extensively recognized and progressively more documented. Due to increasing urbanization and housing demand, Residential communities are growing in suburbs and few in the urban core. Due to which depletion in per capita green space is recorded. This book chapter intends to look into the challenges of the residential communities and how Green Spaces (Passive and Active) within the communities helping in bringing back the quality of life and well-being. Further, it discusses the benefits of green spaces at the community level, through case studies. Conceptually this entire study propels the belief that the residential communities usually comprise of the varied age user group and all of them have the right to led a better quality of life. It can be possible only when they are accessible to green space and avail maximum perceived benefits like safety and security concerns, healthy environment, and social cohesion. Housing environments should enable residents to have positive experiences through the allocation of diverse green environments, which lead to physically and mentally happy, healthy living. Such positive experiences affect their happiness level, thus leading to sustainable lives.

**Keywords:** accessibility, green space, quality of life, residential communities, well-being

## 1. Introduction

The planned green spaces are the most significant social spaces for people to interact on a daily basis and also considered as one of the sustainability indicator for maintaining the well being in residential Communities. The benefits of green space for wellbeing are extensively recognized and progressively more documented. Much of this work focus on the potential of natural environments to provide opportunities to enhance wellbeing in different ways:

- Physical wellbeing through physical activity and fresh air.
- Mental wellbeing through stress reduction and attention restoration.

- Social wellbeing through social integration, engagement and participation.

These residential communities should enable residents to have positive experiences through the allocation of diverse green environments, which lead to physical, mental happiness and healthy living. Such positive experiences affect their happiness level, which is an important component of well being thus leading to sustainable lives. The immediate ecological benefits of green spaces are reduction in the urban heat island effect, cleaner air, and reduced noise pollution, which have been shown to improve health-related quality of life, and reduce both morbidity and mortality. However, most of the residential communities when designed have been excessively focused on their economic and iconic value, while the importance of residents' experiences has been ignored in the living environment. On the other hand, the standards and bye-laws reflect variation in the provision of Green Spaces based on criterion like area and accessibility. Accessibility to Green Spaces is a complex concept, as it depends upon the age group and pace of mobility of the user, i.e. low mobility and high mobility. In terms of psychological comfort, the definition of accessibility changes from physical accessibility to visual accessibility (safe place for use) for few user groups. Conceptually this entire study propels the belief that the residential communities usually comprise of varied age user group and all of them have right to led a better quality of life. It can be possible only when they are accessible to green space and avail maximum perceived benefits.

### **1.1 Importance of green environments for residential communities**

In many countries like England, Australia, Germany and Belgium the concept of the green environment is popular they explored healthy city planning and defined it as an effective tool for achieving sustainable health and well-being in humans. It had been observed in many empirical studies that the varied types of green environment influences and helps in improving the overall life satisfaction of residents, including their well-being, amenity, sociality, health, and comfort. It is important that these types of green environments are publicly accessible to provide spaces of social interaction for residents. The green spaces have diverse classifications, and each provides its own values and benefits. Thus, further exploration of green environments is critical to ensure higher accessibility, usability, and functionality of green environments for future residents. In many residential communities green spaces are buffers between Built and Exterior surroundings. In addition, Multi unit residential developments have focused on branding value and esthetic aspects and ignored the importance of natural spaces within the living environment. However, the importance of green spaces in residential communities has been recognized by residents and in some communities they are developed and protected voluntary. Hence it is essential to understand the importance of green spaces for sustenance of the well being of residential communities and their overall development.

## **2. Understanding terminologies**

### **2.1 Green spaces**

The presence of green spaces is considered as one of the important components for good quality of life in urban areas. For this reason, it is important to understand the scale, functions and benefits of green spaces ranging from regional to local scales/levels. In this context, a few definitions are discussed below. Green spaces is a broad terminology, which may be used for both macro level and micro level spatial

scales. This is the definition of urban green spaces in the European context, which is concurred with among a majority of ecologists economists, social scientists and planners.

Urban Green [s] are green space[s] located in urban areas mainly covered by vegetation, which are directly used for active or passive recreation, or indirectly used by virtue of their positive influence on the urban environment, accessible to citizens, serving the diverse needs of citizens and thus enhancing the quality of life in cities or urban regions [1].

Whereas, in context of the United Kingdom planning documents, Green spaces are an area of grass, trees, or other vegetation set apart for recreational or esthetic purposes in an otherwise urban environment. Green spaces are the 'green lungs' of our towns and cities which contribute to improving people's physical and mental health by providing places for informal recreation – walking, cycling, sitting, socializing and children's play – and 'breathing spaces' to take time out from the stresses of modern life. They include not only areas to which the public have physical access, but also visual access, for example, in the way green spaces provide setting for building, communities, and everyday activities.

Yet in the Indian context, green spaces of the residential areas are termed as planned open spaces, which come under the local open space system. Detailed layout of residential sectors will have to give due consideration to the provision of formal and organized second level open space corresponding to the local open spaces forming an integral part of the built form. Local open space system is envisaged to be linearly structured establishing continuity engulfing the recreational and community based social facilities, the third level of open space corresponds to system of open spaces provisions made within sectors and neighborhoods consisting of neighborhood consisting of neighborhood parks linearly inter-linked with an overall open space network.

The above green spaces definitions clearly state that in the European context, the green space definition includes the function, user category, accessibility and its impact on quality of life. Whereas the definition in context of the United Kingdom elaborates green spaces in terms of its physical characteristics, function performed, perceived benefits availed and about physical and visual accessibility. However, in the Indian context green space is considered for provision in the terms of accessibility and connectivity. According to above discussion the green space might be understood as.

Green spaces are those planned open spatial layouts with visual and physical.

Accessibility in a residential community, which are committed to guarantee services including passive and active recreation. As an impact interface they can enhance social cohesion, feelings of safety–security as also other perceived benefits to all users.

## 2.2 Well being

**Well-being** is the experience of health, happiness, and prosperity. It includes having good mental health, high life satisfaction, a sense of meaning or purpose, and ability to manage stress. More generally, well-being is just feeling well (Take this quiz to discover your level of well-being.) Well-being is a positive outcome that is meaningful for people and for many sectors of society, because it tells us that people perceive that their lives are going well. Good living conditions (e.g., housing, employment) are fundamental to well-being. Tracking these conditions is important for public policy.

Wellbeing is important because it effects both physically and mentally, and is the essence of living. Our perception and our ability to observe our thoughts and

feelings is what makes us human and separates us from other creatures. We owe it to ourselves to live our lives to the fullest while we have the chance.

There is no consensus around a single definition of well-being, but there is general agreement that at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfillment and positive functioning. In simple terms, well-being can be described as judging life positively and feeling good. For public health purposes, physical well-being (e.g., feeling very healthy and full of energy) is also viewed as critical to overall well-being. Researchers from different disciplines have examined different aspects of well-being that include the following

- Physical well-being.
- Economic well-being.
- Social well-being.
- Development and activity.
- Emotional well-being.
- Psychological well-being.
- Life satisfaction.
- Domain specific satisfaction.
- Engaging activities and work.

### **3. Green space functions and benefits**

The Tangible and Intangible Benefits of Green Space functions and benefits are discussed below.

#### **3.1 General benefits**

The functions and benefits of green space are plenty in number. Green Space symbolize peace, minimal stress and a cleaner environment for many people, which are considered as important factors in making a city livable, pleasant and attractive for its citizens and guests. The primary functions performed by Urban Green Space are given in **Table 1** below.

The significant benefits obtained through urban green space, are categorized under two perspectives tangible and intangible. Tangible benefits include ecological benefits (absorbing pollutants, clean air, improve the urban climate, etc.), planning benefits (network linking, improving accessibility, noise barrier, visual screening and safe walking and recreational) and economic benefits (Comparing with other landscape elements, neighborhood parks induced the heaviest investment intention in the home buying behavior).

Likewise, the intangible benefits include social benefits (Opportunities for people of all age groups to interact, encourages volunteerism, promotes stewardship, help individuals with disabilities, enhance cultural life by providing venues for local

S No.	Type	Functions
1	Regulation functions	Regulates the chemical composition of atmosphere and purifying the local air Controls the runoff and flooding Regulates the hydrological cycles Supports biological diversity in the city Prevents the soil erosion and sediments Regulates the local and global climate
2	Carrier functions	Conserves the energy in the city through control of the micro climatic variations Help recreation and tourism Integrates urban man to nature.
3	Production function	Recharging the ground water table Providing medical resources Providing Raw material for some of the human activity
4	Information function/ dissemination	Esthetic information Spiritual and religious information Cultural and artistic inspiration Scientific and educational information sources

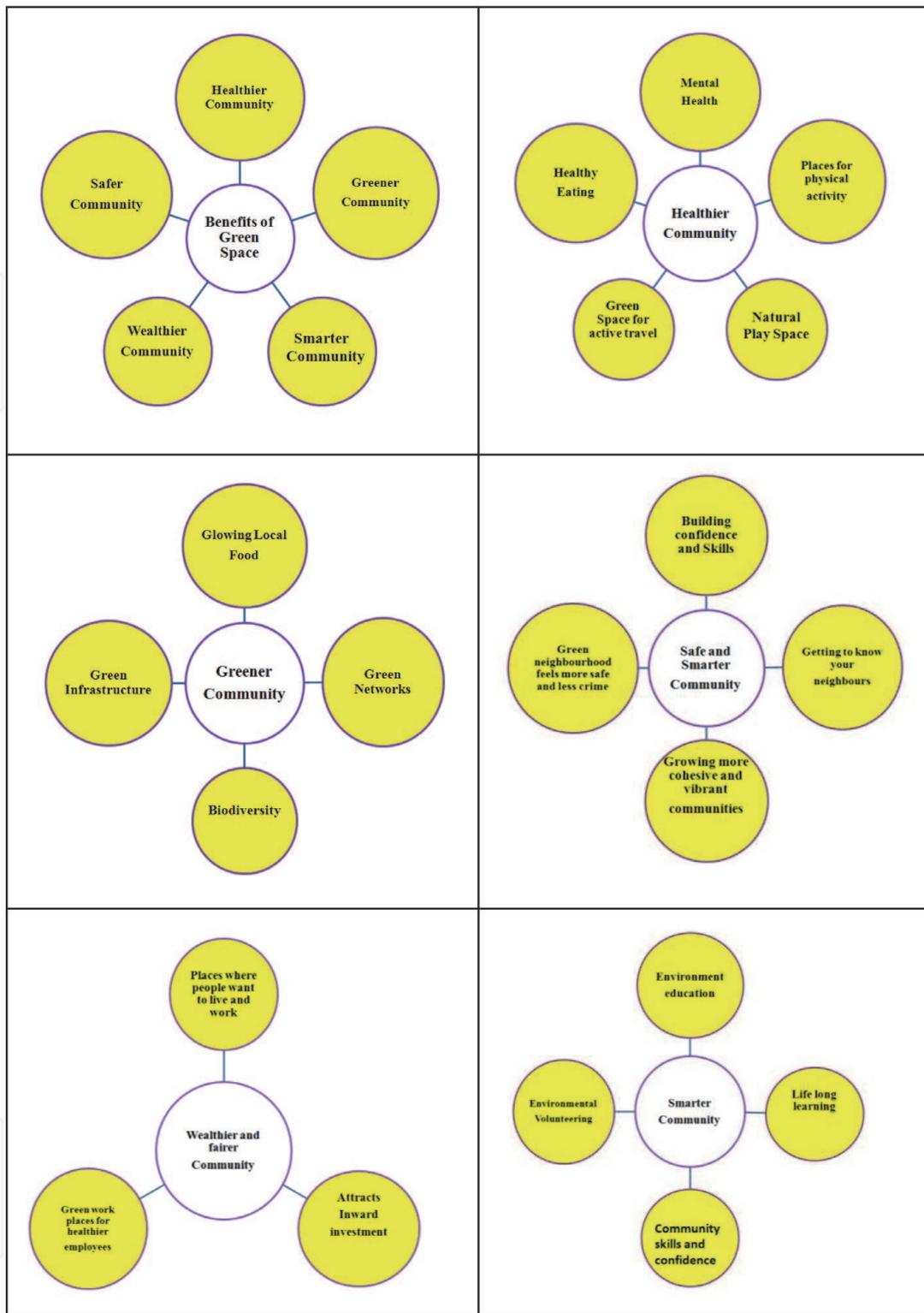
*Source: Rao, P, 2017 from Ph.D thesis of SPA, Bhopal.*

**Table 1.**  
 Showing various functions of green spaces.

festivals, civic celebrations, and theatrical performances, reduces crime, strengthens community by reflecting the different communities they serve and meeting their varying needs) as shown in **Figure 1** were discussed by Grahn P and Stigsdotter U A, [2] P Jain, [3].

#### **4. Understanding green space usability and user characteristics (residential community)**

Both green space and housing research are broad fields of study. The paradigm shift observed understands the relationship between green space and its usability in the residential area. In green space research, there is an increasing number of studies that concern people's experience and use, but it has been pointed out that more research is needed due to increasing urbanization issues like safety and security [4, 5]. Many previous models and theories substantiate that the usability of green space is directly associated with its accessibility. The usability of green space differs due to different spatial arrangements within the residential communities and variation in the provision of it with respect to quantity and quality. Physical accessibility and the connection is a major research area in the field of green space use in the residential area because people are associated with the green space usage. Hence, place accessibility and people accessibility represent different research foci in accessibility research [6]. While by 'place accessibility' researchers conceive geographical access as a location attribute, with people accessibility—researchers, on the other hand, focus on the ability of different groups of individuals to access the



**Figure 1.**  
*The benefits of green at community level. Source: Grahn P and Stigsdotter U A, 2003 [2].*

open space [6]. This suggests, that place and people accessibility are different representational frameworks that provide different operational definitions for accessibility.

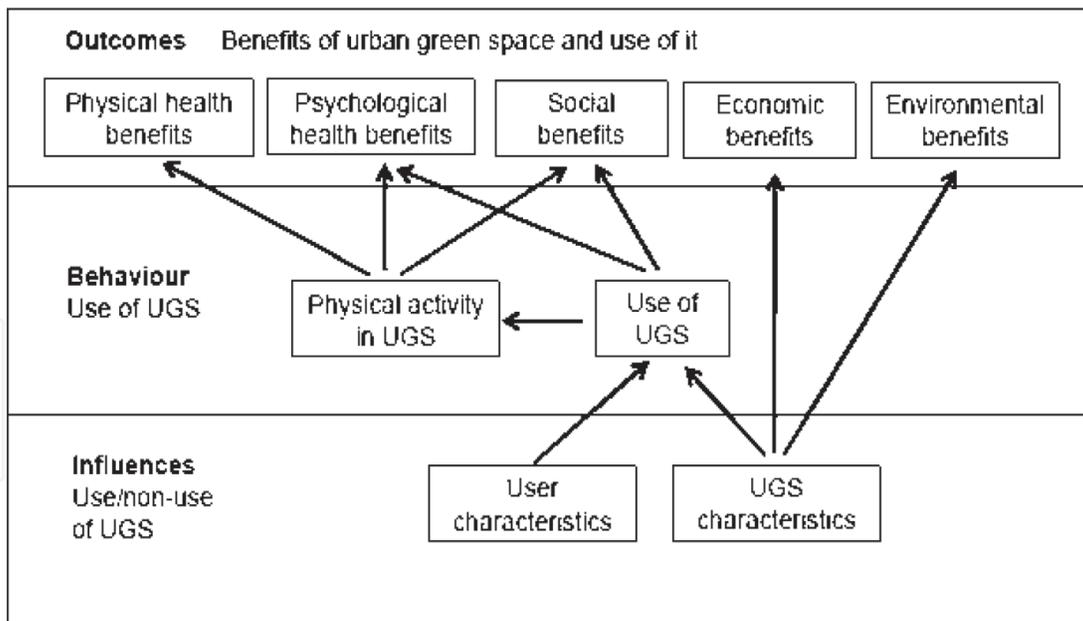
#### 4.1 Impact of accessibility, connection and recreation in green space use and impact on well being

Many empirical studies have been attempted to understand the purview of green space with respect to accessibility and connection in residential and city level, in the

UK and European cities. A few of them as illustrated below attempt to understand the needs of users. Two empirical studies, one in the UK and the other in Canada had been conducted to explore the modern meaning of open spaces and for the quality of green space for walk-able community areas respectively. The study by Burgess, J, carried an empirical research in local and neighborhood level park in UK with a sample size of 406 to explore modern meaning and values for open spaces in the city. According to their findings, the major physical factors to impact park use were accessibility and connection while the rest are natural elements required for active and passive activities. In this study, apart from recreational needs and maintenance, other attributes also impact the use value of local and neighborhood level parks. These were the natural environment, sensitivity to the change of seasons, wild patches of land and woods., Varied topography and plants, were also addressed for creating an appealing environment – yet it strongly implied proximity to the residential area as significant. A similar study conducted was theory-based qualitative research conducted in the urban community of Canada. The study tried to explore a framework for understanding the quality of an urban community in the relationship between quality and physical form. The physical attributes strongly advocated by the researcher were outdoor amenities, adequate seating, barrier-free environment to achieve the quality for the walk able community. In other words, recreational facilities should be placed in the accessible distance and connected with other essential street furniture. Therefore, both these studies emphasize on outdoor amenities and physical characteristics of GS enhancing the sense of community. There are several studies, which indicate the high demand of GS at the spatial level. In this purview, conducted the survey in few European cities at neighborhood and city level and strongly advocated regarding the spatial needs for GS for all. The report produced by them stated an observation given below., Where one GS site cannot accommodate all users or serve a full range of purposes, the wider spread of GS provision in an area as a whole is required. Similarly, Sullivan et al. [7] found the relation between GS and involvement of individuals in social activity. Their study states that 83% more individuals engaged in social activity in GS as opposed to sparsely vegetated or concrete ones.

The recent model for the benefits of urban green space as shown in **Figure 2** suggested by Bedimo-rung et al. [8] describes the relationships between park benefits, park use, and physical activity, and the antecedents/correlates of park use. In this classification scheme, the discussion focuses on park environmental characteristics that could be related to physical activity, including park features, condition, access, esthetics, safety, and policies which is responsible for well being of residents. In another study by Giles-Corti et al. [9, 10] tested three models of accessibility: simple distance from respondent's home to all public open spaces in the study area, distance and attractiveness. Here the attractiveness of public open space scored over the distance and attractiveness or size of the POS. However, when the size of green space is considered, those with excellent access to large attractive public open space were more likely to use them, suggesting that after distance was taken into account, size was more important than attractiveness in encouraging use. The above discussion during this period strongly indicates that the most of the studies related to green space are exploring various other aspects apart from its importance of physical proximity. Later on, many studies suggested the relation between the accessibility and quality of green space are not different perspective when usability of green space is considered. Both these aspects impact equally upon green space usability.

The concept of *accessibility for all* was also tested in various studies which is responsible for developing the well being for the residents in which it was observed that to induce diversity in the usage of green space, diversity in amenities is also required. The study conducted by Croucher et al. [11] does not encourage



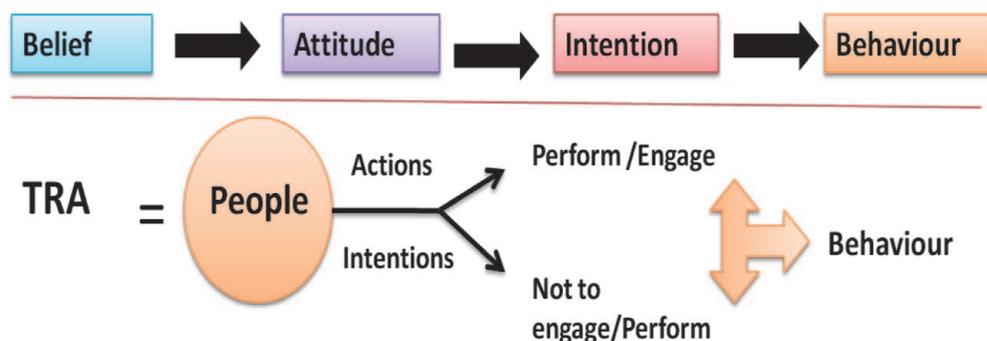
**Figure 2.**  
A model for the benefits of urban green space (re modified by author) source: Bedimo-rung et al. [8].

undedicated use unless there is diversity in facilities. Further studies distinguished between the tangible and intangible benefits as an exploration of individual and neighborhood shows that the perceived benefits enhanced due to increased green space, recreation activities and accessibility to all persons. Thus, both studies emphasize the quantity, as well as the quality of green space. The study reveals that these are the two most important considerations for the diverse users across individuals to communities.

#### 4.2 Impact of perceived psychological comforts (social cohesion, safety, perceived benefits) on green space usability

Some studies, as discussed below show the resident’s perception or urge for green space usability. In this the primary emphasis is on social interaction spaces along with accessibility, aesthetical design consideration, and maintenance factors. The theory of reasoned action states that of the two perspectives of individual psychological comfort for using the green space (as shown in **Figure 3**), one is personal in nature, and the other reflects social influences. One particular factor is the individual’s positive or negative evaluation of performing the behavior.

That’s why usage of green space depends on personal reasoning or following others aspiration. On the contrary, the socio-ecological model developed by Giles-Corti et al. [10] gives a comprehensive model, which explains in detail the various



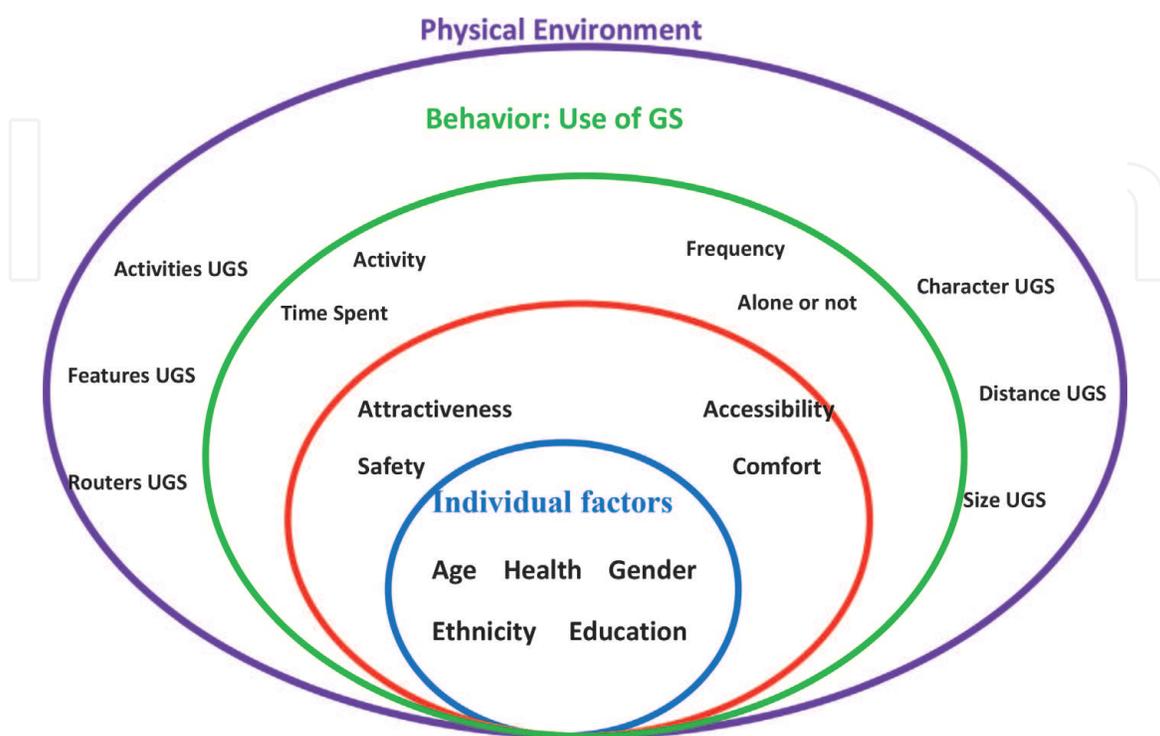
**Figure 3.**  
Theory of reasoned action. Source: redrawn by author.

environments required for any green space usage including user characteristics as shown in **Figure 4**. The facilities available within green space also impacts on perceived environment like safety, accessibility and comfort. Green Space with a variety of attractive attributes such as landscaped features, ponds, trees, and lakes can encourage higher levels of use.

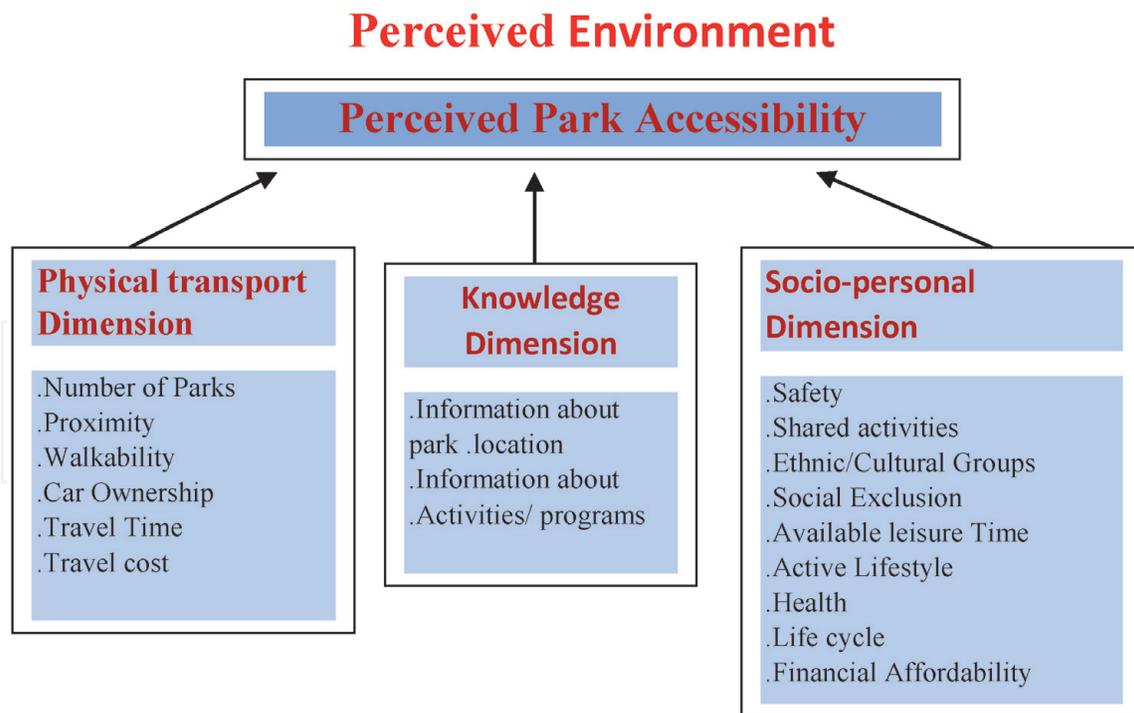
Similar views have been projected by Cohen et al. [12] in which primary emphasis is given to social cohesion and safety factors in a green space. The initial research was developed into a manual for addressing social and ecological concerns. It further emphasizes the positive association between neighborhood features and the ability of residents to interact positively. Another study investigate three parameters, i.e. human-nature interaction, human–human interaction and perceived benefits.

The result shows the major indicators under all the three parameters were; contact with nature, esthetic preference, recreational and play, social interaction, citizen participation, sense of community unity with nature, solidarity with myself and freedom. All the three studies above show the parallel approach as also validate the socio-economic model. Peeping into the evidence-based studies about accessibility to residential green space clearly state that only physical proximity is not sufficient for proper usage of it. Arguably, accessibility to urban green space, including parks, is said to contribute to community well-being and a healthier city lifestyle. Past studies reveal that accessibility variable is not much beneficial when measured with quantitative spatial measures.

The theory of urban park indicates that both distance and green space size exert an impact on the diverse usability. Yet when empirically tested, the theory found a relatively weak relation between distance and park value. It indicated that accessibility is a much more complex construct. Similar studies also suggested the difference between geographical and subjective accessibility and its impact on green space usability. The geographical accessibility showed poor consistency with subjective-measured accessibility. It recommends that green space planning should



**Figure 4.**  
 A socio-ecological model for the use of urban GS. Source: Giles-Corti et al. [10].



**Figure 5.** Conceptual model for perceived park accessibility extended planned behavior framework to explain open space use. Source: Dong Wang, 2013 [14] (redrawn by author).

go beyond physical indicators to gain more understanding about the diversity of users' preference [13].

A conceptual model for perceived park/green space accessibility as shown in **Figure 5** depicts that the socio-personal dimension, i.e. accessibility to for people's green space is one of the important factors. Out of which, factor of safety is the prime indicator. Increasing fear and crime in urban areas arouse the importance of security while accessing any green space by residential users. Hence a need is felt for spatial location criteria to be addressed as a serious concern, to offer green space under natural surveillance or visual access. A few past studies also substantiate the above said fact. Maas, J et al. [15] study investigated upon the fact that how green space in living environment associated with people's feeling of social safety in a closed and open green space and later discussed on Safety on parks and recreation. The recent studies by Xiaoping Li et al. [16], states that visibility of green vegetation also plays a major role in increasing perceived safety in urban areas. The above discussion shows that two parallel constructs for green space exists in theory, one emphasizing the physical accessibility and characteristics of green space for its use and the other emphasizing physical and VA along with green space characteristics for its use in general.

## 5. Paradigm shift in concept of accessibility

Accessibility, however, is a complex concept. It is difficult to define and more difficult to measure. While accessibility has now evolved into a multidimensional construct, current open space planning models still use physical proximity to an open space area as proxy variable to evaluate 'accessibility.' This approach, however, tends to overlook the complexity of the 'accessibility' concept [14].

The dependency on quantitative standards in planning practices for the provision of green space had developed a few limitations in its usability. This approach is unable to address the complexity of the accessibility concept. These quantitative

measures are relatively easy in operational and practice level, but inadequate to address the complex nature of people's perception regarding green space accessibility.

Almost all prevailing space standard models comprises of quantitative measures, which indicate relation between population sizes in the target area. And these quantitative measures provide the minimal amount of green space for the target population. This model is accepted worldwide due to its simplicity in operation, but later on has been criticized for its disregard of complex social systems. The park system model brought new approach, i.e. systems approach towards green space planning. The park system model holistically considers the interrelationship of parks and gardens that supports continuous movement within the system. Beyond quantitative standards, park system model emphasizes proximity to users and the variety of user experiences in different types of urban open spaces, from small community gardens to large metropolitan parks. On the contrary, contemporary green space models address the question of how much, what type of and where to provide green space should be given. (See **Table 2** for the comparative summary of the key criteria used by the three models). However, in present context, due to increasing crime and fear, there is an urge for safety, which these standards were unable to address. Hence, it reveals that quantitative measures like population size, spatial location, and distance are the most common parameters considered. But somehow in present context only these variables failed to address the people's perspective like social cohesion and perceived benefits etc. Thus it generates demand to analyze other factors which are responsible for enhancing people's need with respect to their green space. Hence need to examine qualitative aspects which needed to be incorporated in regulatory framework.

## **6. Empirical study to understand the impact of physical and visual access to green space in residential communities for obtaining benefits of physical, social and psychological well being by varied user age groups**

The observational studies for green space were conducted for three selected colonies under each housing typology, Row housing-1, Group housing-2 and Multi unit residential housing-3 respectively. Observational data has been collected for morning and evening hours of weekends during the summer vacation (April to June month) to map the maximum usability of green space with respect to physical, social and psychological well being. And also to examine the impact of physical and visual accessibility to green spaces well being in residential communities. Data has been collected on the basis of physical verification of all activities happening during the selected time, i.e. morning 6:00 to 8:00 AM and evening 5:30 to 7:30 PM. Data has been collected to identify four major factors, i.e.

- What is the user age group and benefits they are availing?
- Issues of area and accessibility of green space impacting on wellbeing of residential community.

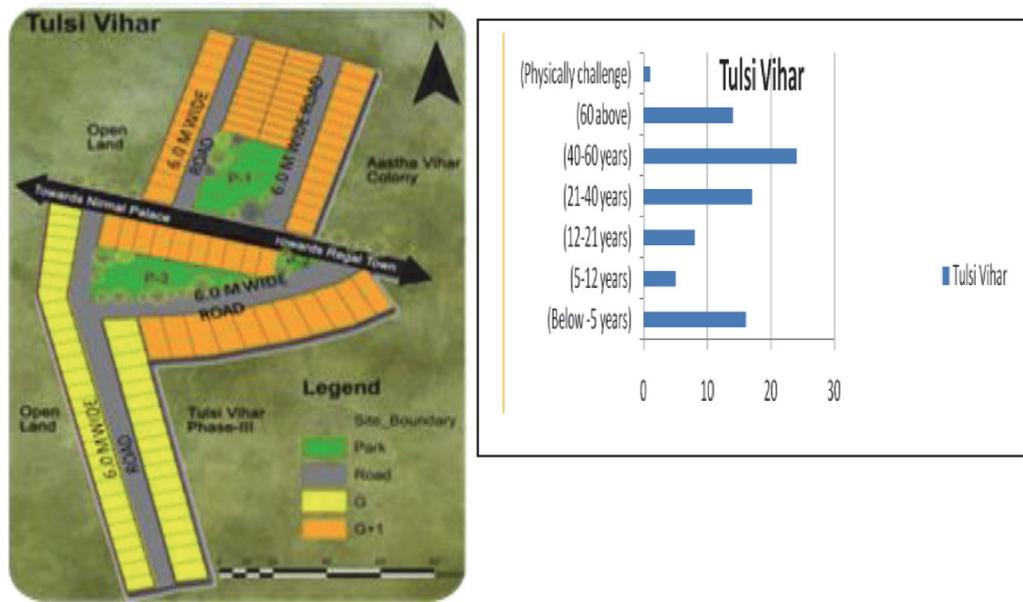
### **6.1 Case-1: row housing**

Row Housing comprised of 80 number household was selected for observational study. These residential communities have two green spaces (P1 and P2). As depicted in **Figure 6** the P-1 is regular in size and had both visual and physical

Urban open space planning models	Objectives	Open space variables	Population variables	Random or planning
<b>Opportunistic model</b>	Open space provision as a result of opportunities			Random model
<b>Space standards model</b>	Open space provision as units per capita of target areas	Open space size	Population size	Planning model
		Open space number		
<b>Park system model</b>	Open space provision interrelated system	Open space size	Population location	Planning model
		Open space type	Distance to users	
		Connectivity		

Source: Dong Wang [14].

**Table 2.**  
Key variables addressed in urban open space models.



**Figure 6.**  
Row housing typology and demographic profile. Source: Author.

access, where as P-2 is irregular in shape and had physical access. Apart from this density mapping has been done to understand the type of mobility users within and around the green space.

### 6.1.1 Physical characteristics of green space

The physical characteristics like number of entrances and width of roads along all the direction has been observed and tabulated in observation **Table 3** below.

The dot density mapping for identification of category of user group in P1-Green Space (Morning Hours 6:00 to 8:00 AM and Evening Hours 5:30 to 7:30 PM).

The dot density mapping for identification of category of user group in P2-Green Space (Morning Hours 6:00 to 8:00 AM and Evening Hours 5:30 to 7:30 PM).

S.no	Shape	Size in Meter	Area (sqm)	Accessibility
1.	Regular	30x24	720	Physically and visually
2	Irregular	—	225	Physically and Partially Visually

Source: Author.

**Table 3.**  
 The physical characteristics of the green space – P1 and P2.

The results depict that users around the green space are more compared to those inside the green space. It is reflected in both the case of morning and evening hour's observations for regular shape Green Space. The low mobility user group, mostly old age group are not using the inside space in spite of green space passive character. Dependent children along with the adults are more in numbers inside the green space because of availability of play equipments and benches inside the green space. These benches help them to sit and monitor their children while playing. On the contrary the irregular shape and partially visual green space benefits are availed by high mobility user. The types of benefits availed is depicted below in **Table 4**.

## 6.2 Group housing

Group Housing comprised of 200 number of household was selected for observational study. These residential communities have seven green spaces of regular size with different area and shape (P1, P2, P3, P4, and P5).

### 6.2.1 Physical characteristics

The physical characteristics of Regular shaped P3 has been observed and tabulated in observation **Table 5** below with physical and visual accessibility.

Benefits availed due to presence of Regular shape-physically and visually accessed green space-P1						
Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	yes	yes	yes	yes	yes	yes
High Mobility	yes	yes	yes	yes	yes	yes
Benefits Availed due to presence of Irregular shape -Physically and Partially Visually Accessed Green Space-P2						
Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	partially	partially	partially	partially	no	no
High Mobility	yes	yes	yes	yes	yes	yes

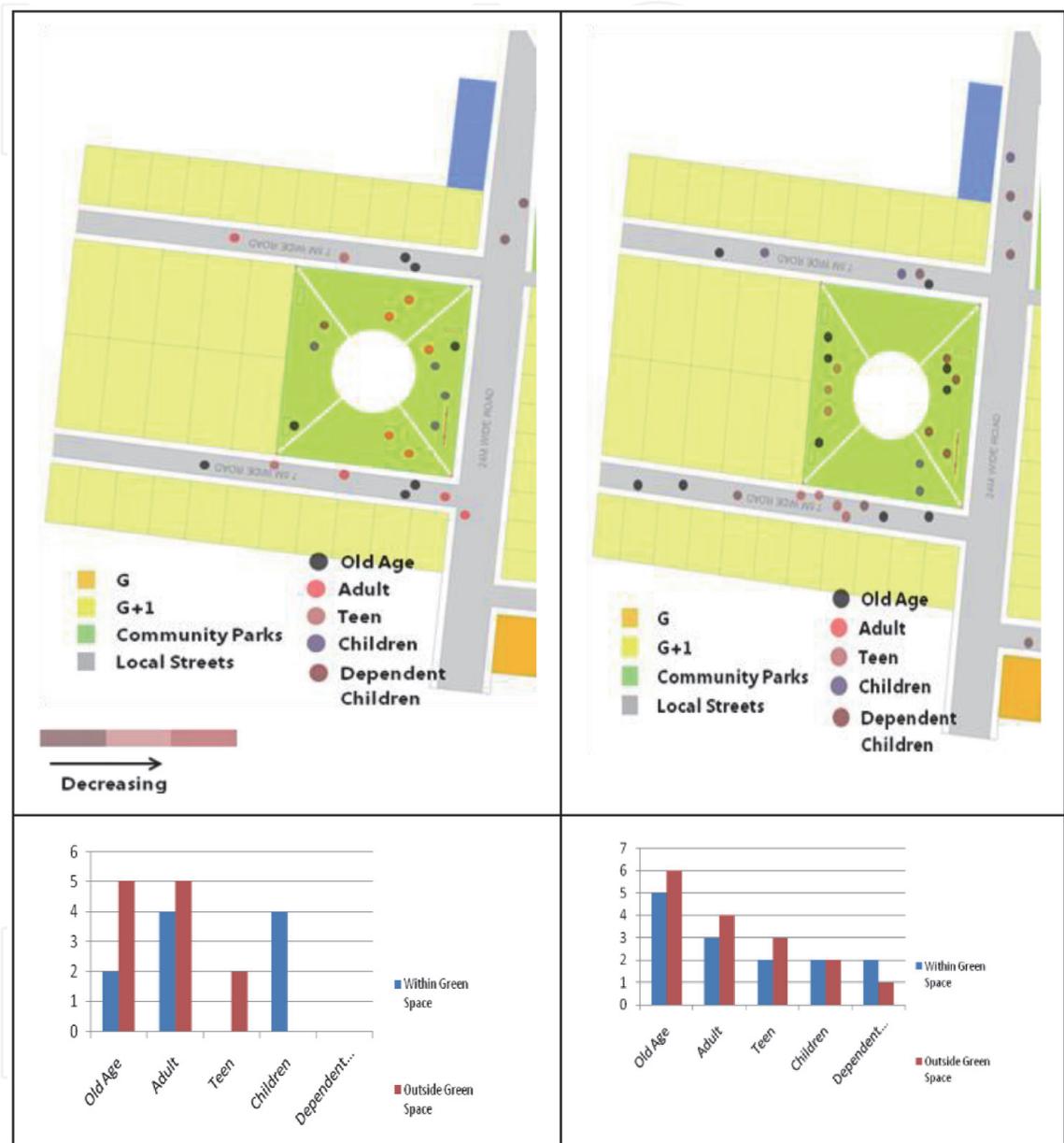
Source-Author.

**Table 4.**  
 Benefits availed due to presence of green space – P1 and P2.

S.no	Shape	Size in Meter	Area (sqm)	Accessibility
1.	Regular	33x 40	1320	Physically and visually

Source: Author.

**Table 5.**  
The physical characteristics of the green space.

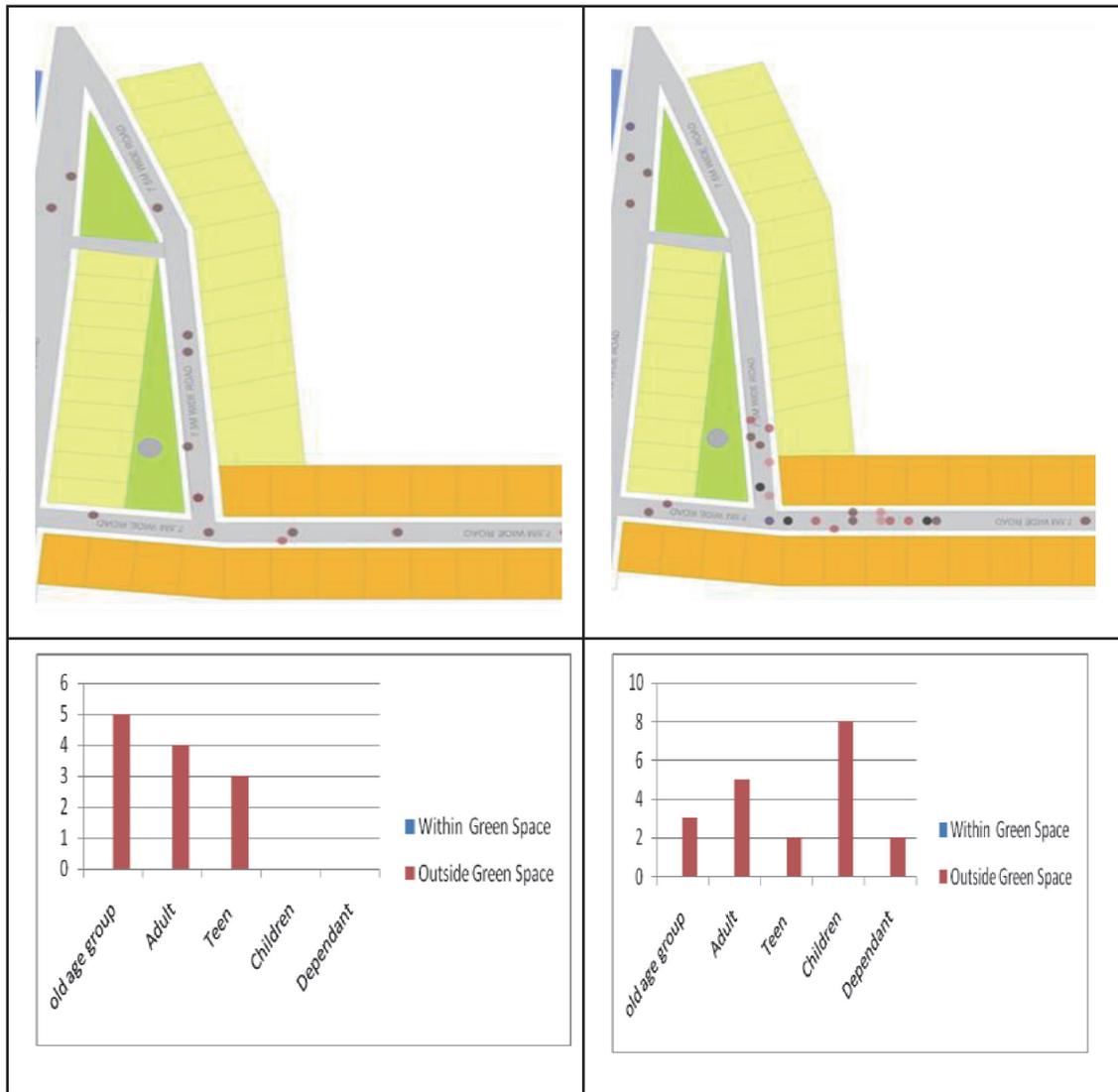


**Figure 7.**  
The dot density mapping for graphical representation of number of users and category of users with in and around green space in row housing communities. Source: Author.

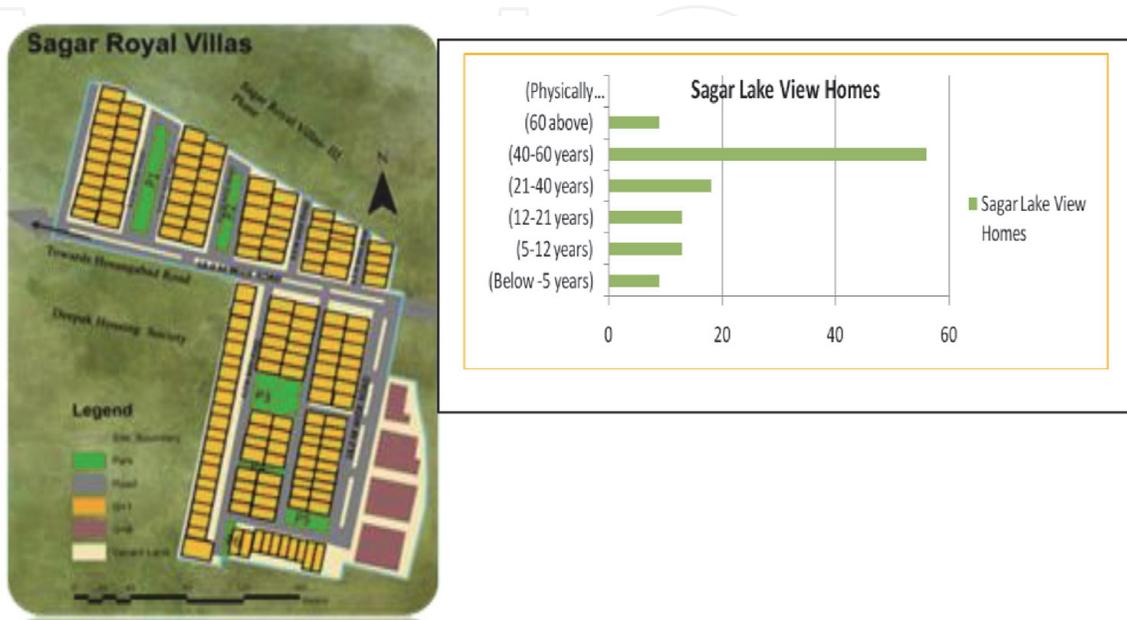
The dot density mapping technique for identification of category of users (Morning Hours 6:00 A.M to 8:00 A.M 2. Evening Hours 5:30 PM to 7:30 PM) (Figure 7).

The documented observation (as shown in Figure 8) is discussed below (Figures 9 and 10) (Table 6).

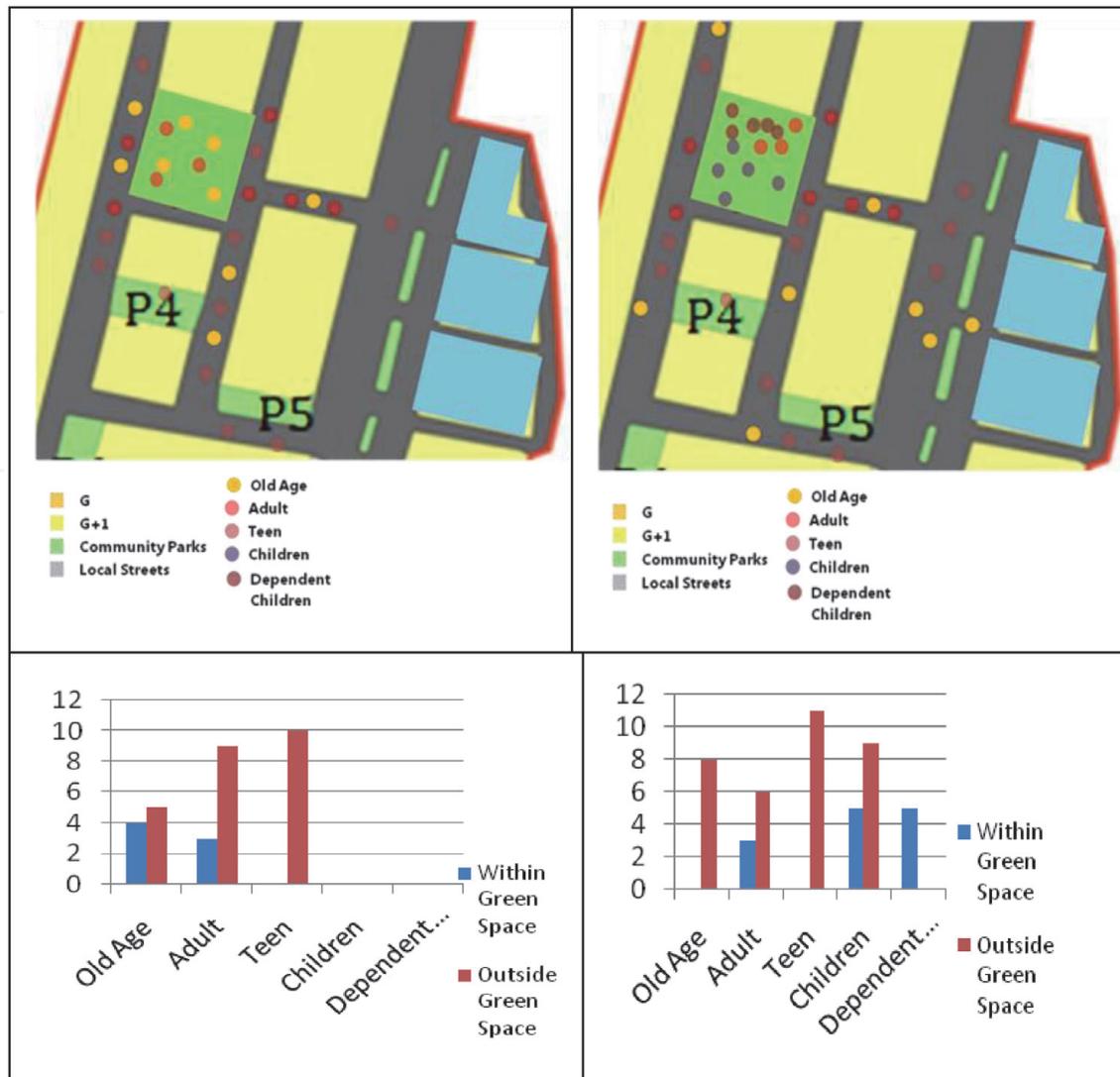
The users around the green space are more compared to those inside the green. It is reflecting in both the case of morning and evening hour's observation. The low mobility user group mostly old age group and children and high mobility user group



**Figure 8.** The dot density mapping for graphical representation of number of users and category of users with in and around green space in row housing communities. Source: Author.



**Figure 9.** Group Housing typology and demographic profile. Source: Author.



**Figure 10.** The dot density maps for graphical representation of number of users and category of users with in GS and around GS in group housing communities. Source: Author.

Benefits availed due to presence of regular shape-physically and visually accessed green space-P3						
Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	yes	yes	yes	yes	yes	yes
High Mobility	yes	yes	yes	yes	yes	yes

Source: Author.

**Table 6.** Benefits availed due to presence of green space – P3.

teenagers, adults are not using the inside space in spite of green space passive character. Dependent children, children along with the adults are more in numbers inside the GS because of availability of play equipments and canopy inside the green space.

### 6.3 Multiunit residential unit

The multi unit residential community comprises of 10 multi units of G + 6 structure having 8 flats on each floor in 4 units and 4 flats on each floor in remaining units. Having 4 patches of organized green spaces which is visually and physically connected (**Figure 11**).

#### 6.3.1 Physical characteristics

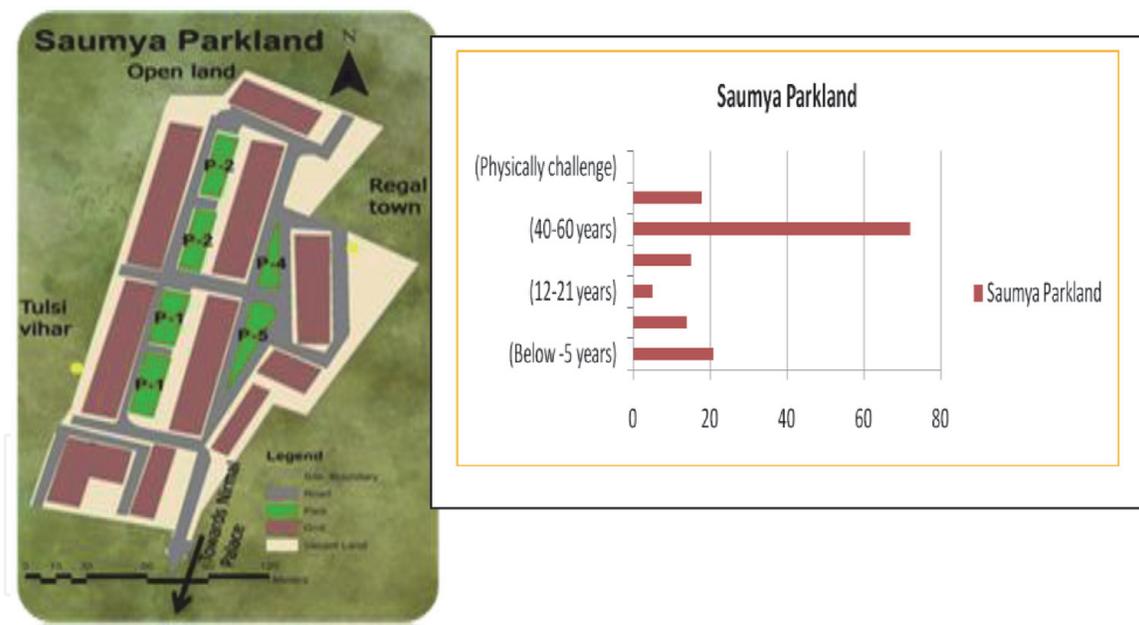
The physical characteristics of Regular shaped P1, P2 and Irregular shaped P3, P4 has been observed and tabulated in observation **Table 7** below with physical and visual accessibility.

The dot density mapping for identification of category of users (Morning Hours 6:00 to 8:00 AM and Evening Hours 5:30 to 7:30 PM).

The documented observation is discussed as shown in **Figure 12**.

The users inside the green space are more compared to those inside the green space. This is reflected in both the cases of morning and evening hour's observation (**Table 8**).

- Both the low and high mobility groups use the inside space because the green space has a passive and active characterizes within it.

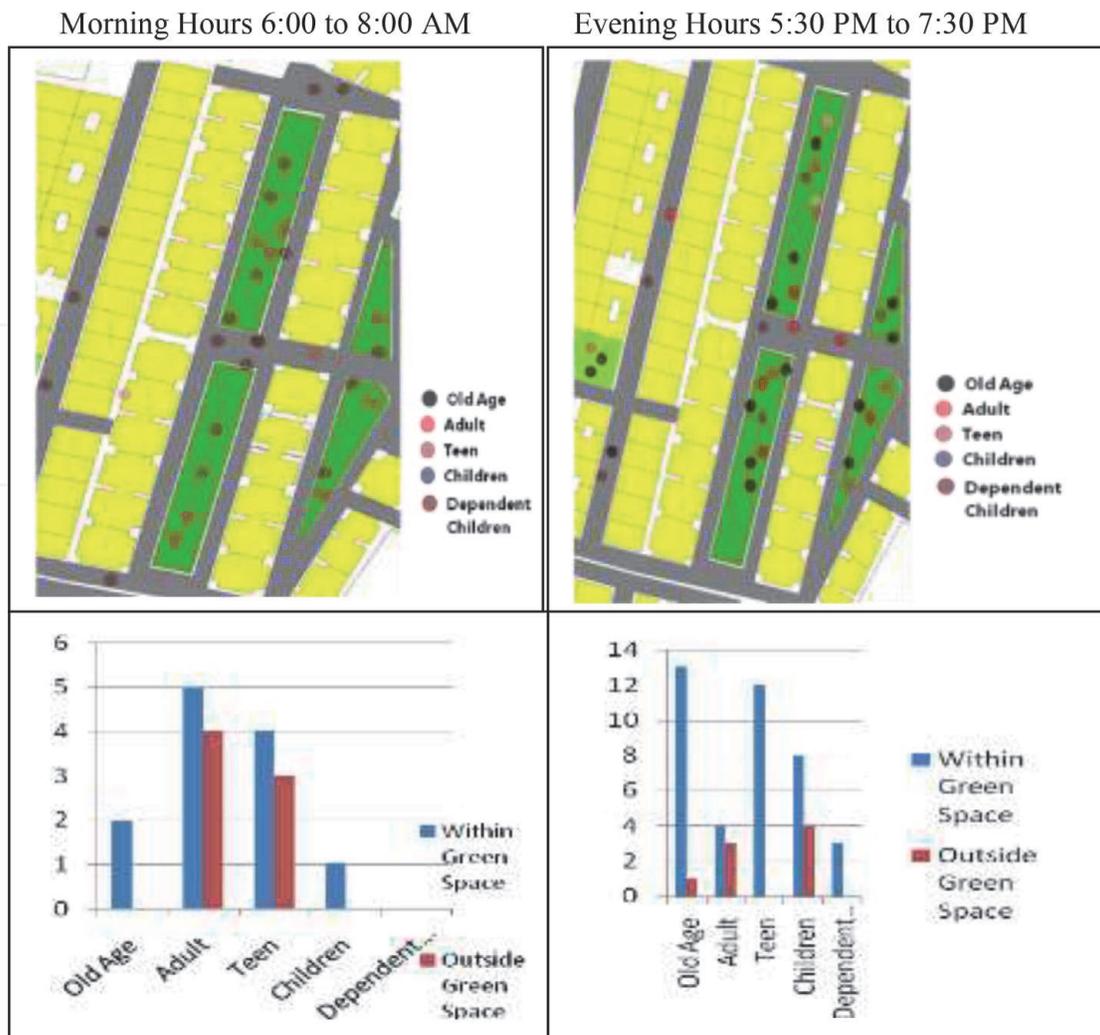


**Figure 11.** Multiunit housing typology and demographic profile. Source: Author.

S.no	Shape	Size in meter	Area (sqm)	Accessibility
1.	Regular –P1	18x60	1080	Physically and visually
2	Regular –P2	18x60	1080	Physically and visually
3	Irregular-P3		480	Physically and visually
4	Irregular-P4		285	Physically and visually

Source: Author.

**Table 7.** Shows the physical characteristics of the green spaces.



**Figure 12.** Maps of visual and physical accessibility of residents for their respective green space. Source: Author.

**Benefits availed due to presence of regular and irregular shape-physically, visually and partially visual accessed green space-P1, P2, P3 and P4**

Type of Mobility	Physical Wellbeing		Social Well being		Psychological Well being	
	Physical Activity	Health	Social Interaction	Sense of belonging to a community	Safety-Security	Happy feeling
Low Mobility	yes	yes	yes	yes	yes	yes
High Mobility	yes	yes	yes	yes	yes	yes

Source-Author.

**Table 8.** Benefits availed due to presence of green space – P1, P2,P3 and P4.

- Dependent children, children, teenagers along with the adults are more in numbers inside the green space because of availability of play equipments and canopy inside the green space.

All green spaces with Passive and Active amenities, providing the benefits of physical, social and psychological well being of varied user group.

## 7. Discussion and conclusion

Green Space is an umbrella term used to describe either maintained or unmaintained environmental areas, which can include nature reserves, wilderness environments and urban parks. It had been observed in all the three residential communities (Row, Group and Multi Unit) only presence of green spaces with physical, visual and partial visual access in spite of their irregular shape and size is responsible for bringing physical, social and psychological well being. Often, particularly in urban contexts, green spaces are purposefully designated for their recreational or esthetic merits. Global urbanization has reduced access to and engagement with green space, but there is good evidence of a positive relationship between levels of neighborhood green space and mental health and well-being. The experimental studies are carried out to examine and establish the link between the existing condition/status of the relation between identified components of wellbeing and green space for varied housing typology. Individuals have less mental distress, less anxiety and depression, greater wellbeing. A positive correlation between green space availability and physical activity level has been evidenced in systematic reviews. Indeed, physical activity at least partially mediates the positive relationship between neighborhood green space and well-being, Acute psychological outcomes of time spent in green spaces have also been reported; beyond green spaces functioning to promote pro-mental health behaviors, these environments have characteristics that can offer more positive experiences than equivalent time spent in other environments. Housing environments should enable residents to have positive experiences through the allocation of diverse green environments, which lead to physically and mentally happy, healthy living. Such positive experiences affect their happiness level, thus leading to sustainable lives.

### Conflict of interest

The authors declare no conflict of interest.

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