SPATIAL DISTRIBUTION OF URBAN GREEN SPACES IN LAHORE, PAKISTAN: A CASE STUDY OF GULBERG TOWN

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ABSTRACT: Urban green spaces are very important for a country to maintain its socio-environmental balance. But in most developing countries these UGSs were on the wane. Not only their count was decreasing, but it was even difficult to maintain and sustain the existing facilities. Pakistan as a developing country is facing the same problem. This study was carried out in Lahore; the 2nd largest city of Pakistan to address the same problem on micro scale. Gulberg Town with its 15 union councils was taken as a case study. The results produced by using GIS software showed that amount of urban green spaces present in Gulberg town were not sufficient to cater for the need of the people. The results also showed that areas in south was having more green spaces as the phenomenon of urban development is prominent in that part of the city. The northern areas, as a part of old city, were lacking in urban green spaces. The results exhibitis that the per capita green space was far less in Gulberg town-Lahore as suggested by international standards set forth for a sustainable city. This imbalance in our urban life poses a real challenge for the policy makers, city managers as well as for city dwellers.

Key words: Urban green spaces, Socio-environmental, GIS, Per capita green space, Population density

INTRODUCTION

City constitutes a system in which nature and human are working together. Excess of human activity in the city is disturbing its ecosystem. The fast pace urbanization is causing damage to urban ecosystem by ways of polluting the biosphere and resultant loss to biodiversity. To overcome these problems and sustain the urban ecosystem, the importance of urban green spaces have been recognized in the last few decades. Urban green spaces are considered as the lungs for the urban ecosystem and can be defined as the overall amount of planted outdoor spaces (with trees, bushes, ornamental plants, or grass) (Makhelouf, 2009). The multifarious functions performed by these urban green spaces for the ecosystem within a city, one way or the other, maintained a healthy environment (Tyrvainen*et al*., 2005; Haq, 2011; Bilgili and Gokyer, 2012). Another ecological and environmental benefit of UBGs is the provision of solutions to everyday problems faced in urban centers like urban heat island, air quality, biodiversity protection and reducing power energy usage (Bolound and Hunhammer, 1999; Bowler *et al.*, 2010; Konijnendijk, 2007; Bilgili and Gokyer, 2012; Fuller *et al*., 2007; Fuller and Gaston, 2009; Onder and Kocbeker, 2012).

The provision of urban green spaces is the top priority for a livable city. Sustainability of a city largely depends on the quantity of UGSs. The total amount of green spaces in an area is an important indicator of a sustainable urban ecosystem (CABE Report, 2010) and quality of urban life.The distribution of these spaces within a given area is also a very important for measuring their expected impacts (Aksoy, 2010; Kuo, 2011; CABE Report, 2010). An important standard of what quantity of parks is required to sustain an urban ecosystem can be gauged through its availability per person, or the green cover available to per person. According WHO standard 9 sq. m of a Green Space is a minimum benchmark per person (UN-Habitat, 2013). For planners and city managers, this bench mark is an important guideline for further planning or remedial measures.

Lahore, the second largest urban city of the country, enjoys the status of a fast growing city with a population of 5,443,495 persons (GOP, 2000) in 1998 and it has now increased to an estimated population of 9.3 million (GOP, 2013). Like all other cities of developing countries it is also having problems associated with rapidly increasing population. The phenomenon of urban development is very obvious in Lahore which resulted in more built environment than natural environment. The green areas (gardens/parks) of Lahore have been encroached by industrial, residential, or commercial developments leading to many environmental and ecological problems (Qadeer, 1983). Unfortunately like other developing countries the role of government agencies in maintaining UGSs and urban ecosystem has also been neglected in Pakistan. This study is being conducted in one of the towns (administrative unit) of Lahore to understand the distribution and provision of green spaces for a sustainable ecosystem. The Gulberg town has as many as 15 union councils. These mostly comprise of posh urban localities of Lahore. This town included some of the high-class residential areas of the city which have been developed after the creation of

Pakistan in 1947, while some union council are still part of the old city areas which are densely populated and lacking basic amenities of quality life due to densification.

MATERIALS AND METHODS

For this research secondary data for urban green spaces of 15 union councils of Gulberg Town was collected from Parks and horticulture Authority (PHA) and population data for the same area was collected from Statistics Bureau of the Punjab (As the last census was carried out in 1998 in Pakistan so estimated population data was used for year 2013). The Geographic Information System software the Arc GIS 9.3 was used to produce different maps for analysis.

The base map of Gulberg town was overlaid by different layers for the locations of different parks to understand the pattern for spatial distribution of these UGSs in Gulberg Town. To show the relationship between population density and urban green spaces, a map was produced in GIS environment by adding different layers. The total green space cover (square population density meter) and population data was over laid in layers to produce a map showing green space per person for each union council. Another map produced by adding layers to compare the green space cover present in Gulberg town and minimum standard set by WHO for green space per capita.

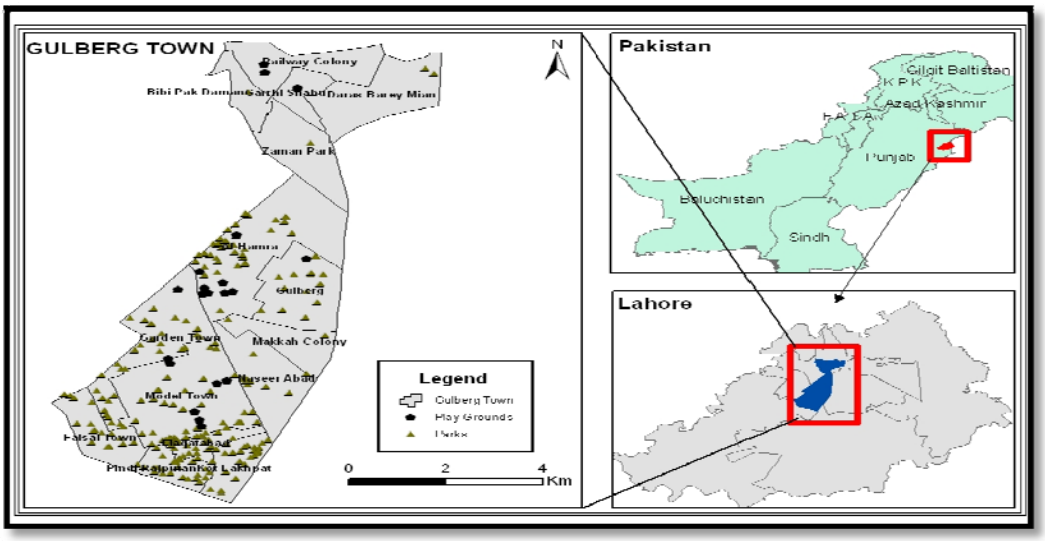

Fig.1 Distribution of Parks and Play Grounds in Gulberg Town Source: Alam, 2013

Table1: Showing population density and area covered by green spaces in Gulberg town

Sr. #	UC	UC. Name	Population (2013, Est.)	Population Density (person/sq. Km)	Green space (sq. meter)	Per person green space (sq. meter)
1	31	Railway colony	55392	14165	753.23	0.01
2	32	DarasBareyMian	60809	47138	1004.31	0.01
3	75	Bibi Pak daman	58754	29555	833.5	0.01
4	76	GariShahu	47821	59627	6020.15	0.12
5	95	Al-Hamra	52104	9712	27618.79	0.53
6	96	Zaman Park	57881	23051	8174.65	0.14
7	97	Gulberg	61436	15530	598935	9.74
8	98	Makkah Colony	56011	44278	2008.63	0.03
9	99	Naseerabad	53426	15170	32374.9	0.60
10	126	Garden Town	58739	16231	60259	1.02
11	127	Model Town	48215	8052	21994.6	0.45
12	128	Faisal Town	47355	22899	60702.8	1.28
13	129	Liaquatabad	59461	46094	32640	0.54
14	130	Kot Lakh pat	49200	48761	21853	0.44
15	131	PindiRajputan	579527	61651	35151.18	0.60

Source: GOP, 2010; GOP, 2011; GOP, 2013

RESULTS AND DISCUSSION

Distribution of Parks /grounds in Gulberg Town: Gulberg Town reflects all the hallmarks of an urbanized neighborhood of Lahorecity. It's all union councils are urban and showed a high growth rate of population. Some of these union councils are present in the heart of city while others acquired the status of comparatively new residential societies. As being highly urbanized entity, this town was facing all the problems that aplanned urban area has to be infested with including overcrowding and environmental degradation.

The Fig.1 shows the distribution of parks and sports grounds in union council of Gulberg town. Green spaces present in town were less in number to perform their function for the socio-environmental well-being of population. It clearly showed that old city areas (as Lahore is expanding in south direction) have less number of parks or even no parks to cater to the needs of the local people. The areas in north were highly conspicuous for lacking parks. It is visible in Fig.1 that in planning new residential schemes the role of green spaces be kept in mind by the planners where these green spaces were in greater supply. The reason for this unequal distribution in different union councils was the negligence and poor planning of administration. The negligence is also responsible for the vanishing of existing parks from the surface or encroached for other land uses in city's old areas. Secondly no attention is being paid for developing new parks or grounds in these areas. One reason for the paucity of green spaces is the focus of authorities on newly planned residential areas as it is being depicted in Fig.1 showing new areas are having comparatively far more parks and sports grounds.

Population Density and Green Spaces Distribution: The pattern exhibited in Fig. 2 was helpful to analyze the relation between population density and provision of green spaces. It clearly showed that areas with high population density had less green spaces as compare to areas with low or medium population density. Fig. 2 showed that areas having high population density and less green spaces were mostly those areas which were part of old city and remained a target of urbanization. The management has failed to keep pace with increasing urbanization or even cope with the phenomenon resulting in a consistent loss of green space which was a big socio-environmental issue for the people of that area. The localities developed on the fringe of the city were large in size so adjusting more number of people and also focused on the provision of green spaces for their locals although they were not sufficient according to international standards.

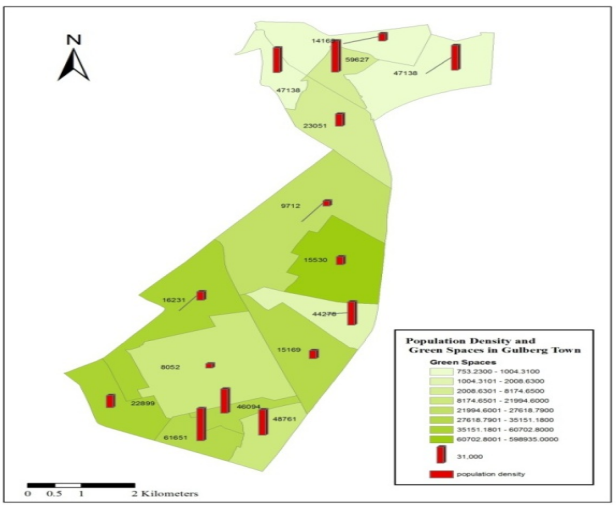

Figure 2: Population density and green spaces in Gulberg Town

Source: Alam, 2013

Per person Green space in Gulberg Town: Population of Gulberg town was increasing rapidly. According to 1998 Census it was 571,000 persons that has increased to 823,900 persons in 2013(estimated). Table 1 show the number of people in different union councils and the amount of green spaces available in these union councils respectively. On the basis of this information the green space cover for per person has been calculated. These calculations show that per person green space available was highest in Gulberg i.e. 9.74 sq. meter of Green space for one person. Faisal Town has1.28 sq. meter green space per person while Garden Town has1.02 sq. meter per person. The least amount of per person Green Space availability could be seen in Railway Colony, DarasBareyMian and Bibi Pak daman as 0.01 sq. meters.

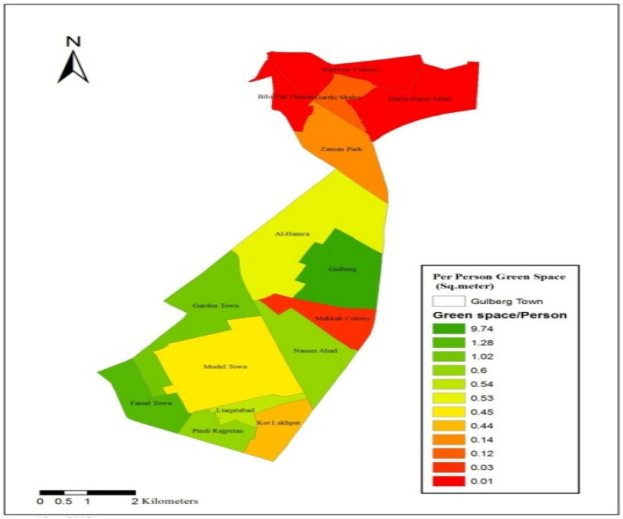

Figure 3: Showing availability of green space per person in Gulberg Town

Source: Alam, 2013

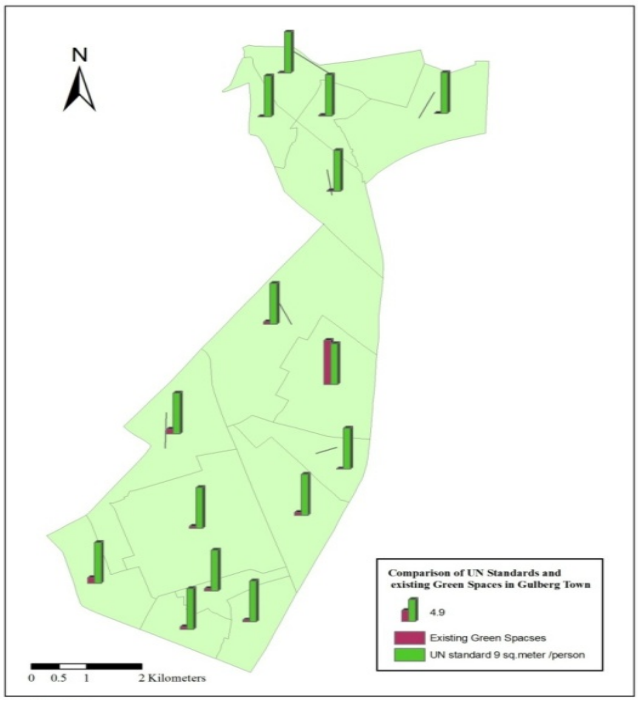

Figure 4: Showing comparison of UN standard and existing green spaces in Gulberg Town

Source: Alam, 2013

Comparison of Green Spaces in Gulberg Town with UN (WHO) minimum standard of Green Space per person: According to United Nation's health standard, the minimum standard for the availability of Green space per person that is essential for people's health is 9 sq. meter. In Gulberg town only the union council named Gulberg (UC97) is a locality that meets this standard while the rest of the union councils fall way short of the UN standard. In Gulberg per person available green space is 9.74 sq. meter.

Recommendations: In order to make these urban green spaces more beneficial for the society, here are some recommendations;

1. In urban areas, there is an acute shortage of green spaces. As a result there is more pressure on the existing facilities. The authorities might come up with ways and means to multiply these parks in such areas. The increase in number of these parks will make such facilities more accessible for the people and add to their quality of life.

2. There is a dire need to save the existing green spaces as they are becoming the target of urbanization. The concerned authorities need to examine and ascertain if green spaces are functioning at their full potentials and make amends for the lapses.

3. In planning the new residential scheme much attention should be paid on quantity and proper distribution of green spaces according to international criteria.

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