Provision of green spaces in public and private housing schemes of Lahore; Approved versus ground realities

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I certify that this research work titled "Provision of green spaces in public and private housing schemes of Lahore; Approved versus ground realities" is my own work. The work has not been presented elsewhere for assessment. The material that has been used from other sources it has been properly acknowledged / referred.

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ABSTRACT

Open spaces have significant importance in urban settlements. These green spaces can improve the urban climate, abate the urban heat-island effect by their ecological-balancer function and reduce environmental damages. During the approval stage of any private housing scheme, a certain percentage of land is designated for the open/green spaces in line with certain rules and regulations however due to certain circumstances, the on ground realities are somewhat different, and the result of this phenomenon is the loss of precious piece of land. This study will focus on identifying the causes and factors driving the conversion of open/green spaces, examining the standards of open/green spaces provision, and identifying the gaps in existing policy, which are responsible for weak implementation of approved plans private housing schemes. In the context of Pakistan, there have been numerous researches on the conversion of open/green spaces, yet there is limited research in the examination of open/green spaces in public/private housing schemes and the percentage of deviation from the original provision in approved plans and the causes and factors driving such changes. Therefore there is a need to conduct a study covering these gaps. Literature review reveals that due to certain factors the land development in the housing societies has driven conversion of open/green spaces to residential and commercial uses which shows that there has been a clear deviation to approved housing schemes plans. In this research the causes and factors driving such phenomenon will be explored as well as measures will be proposed to guard green spaces from intrusion, intensification and infilling to preserve both sites and conditions for plants, wildlife and ecological functions.

Keywords: Green spaces, land standards, parks, land conversion, housing schemes,

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CHAPTER 1

INTRODUCTION

1.1 Open Spaces

Research studies have shown that adequate percentage of green and open spaces transform the neighbourhoods, towns and cities alluring and striking. These open/green spaces have proven to be an important pillar of the public spaces networks. The word urban open/green space may have distinguished definitions and contain several land categories regarding the perspective in which it is being used. Like the professionals and experts, the common person is also confused about the term such as open/green spaces due to the absence of a certain definition of open/green spaces which happens to satisfy both the general public and professionals.

Also there are those who perceive that what's not covered by asphalt, concrete or asphalt is open space.

Shomon (1971) advanced the idea of open spaces on the as being natural and that too on many natural levels. According to him open spaces included those spaces in urban area that promote or have the ability to positively impact on the "natural environment". Using the term "natural environment" he meant an area whether reserved or not; being land, air and water, being a green area or a view that may help in positively impacting the natural scene can be classified as open space.

In terms of physical structures, traditionally, open space includes all the pieces of land as well as water bodies that are open and have no building on them. This type of view is largely supported by traditional urban designers.

Tankel (1963) has the same view of open space but in addition, he suggests that open space is not only the land or water where there is no building, but also the space with availability of light. It was Gold (1980), a recreational planner, who believed that open space was land or water, which is neither occupied by buildings nor by cars. Further, he understands that all the undeveloped land in urban areas, have value for park development and other recreational purposes, and can be brought under the category of open space. He also urges other planners to consider the openness or un-built character of open space whether it is land or water.

In the view of Heckscher (1977), open spaces are places which provide opportunity for pleasure, recreation, human encounter and communal celebration.

Lutley (1992), supports Heckscher and defines open space similarly. He recognizes open spaces, as land that can be used for outdoor recreation or spaces that have the community's amenity value. He includes, both private and public land in this category.

Morris (1984) defines open space on the basis of planning. She presented two separate definitions one for Britain and the other for America.

1.2 Problem Statement

Pakistan is urbanizing at an annual rate of 3% the fastest pace in South Asia (The Nation, 2008). Metropolitan cities are facing rapid urbanization as the population of Karachi alone has raised 80 % from 2000-2010, the biggest rise of any municipality in the world (Kotkin & Cox, 2013). The United Nations Population Division estimates that, by 2025, nearly half the country's population will be living in cities as compared to one third of the population at present. Other estimates state that the urban population has already reached 50% (Planning Commission of Pakistan, 2011). According to Burki, Pakistan is at the threshold of a major demographic transition", (Burki, 2011). Open spaces have significant importance in urban settlements. These green spaces can improve the urban climate, abate the urban heat-island effect by their ecological-balancer function and reduce environmental damages. But as a result of such massive rate of urbanization the open/green spaces conversion has also accelerated and resulted in shortage of this commodity contributing to adverse effect both socially and ecologically. Therefore, there is a huge need and responsibility to solve this issue.

Sims & Schuetz (2007)) therefore showing a lack of implementation of the original approved housing scheme plan and on-ground realities. During the approval stage of a housing society plan, a specific percentage of land is to be designated for Open/Green spaces. In the modification of sanctioned housing scheme, the public amenity sites like open spaces and public buildings shall not be changed in the revised layout plan (Local Government & Community Development, Government of Punjab, 2015). Due to the conversion of these Open/Green spaces to residential, commercial land uses, the land designated for Open/Green spaces is lost. Issues of concern emanating from open space conversion could be diverse and multi-faceted given the plethora of individual differences which could exist among residents in a neighbourhood.

Earlier on July 19', Dawn News reported that CDA had issued notices as a result of building by-laws irregularities carried out by nearly 340 housing societies in the vicinity of ICT regarding the profit-driven deviation from the original approved housing plans in terms of area allocated for non-residential and commercial use. "*The Capital Development Authority (CDA)*

has issued 340 notices to approved housing societies in zones II, IV and V for unauthorised construction, non-conforming use and other violations of building by-laws. CDA's media representative, Mr Shah said a number of societies have converted amenity plots into commercial and residential plots. A senior CDA media representative was quoted saying, "Every society is bound to allocate land for a graveyard, playgrounds, schools etc, but they have sold that land. We have decided to direct societies to approve their maps again, and those who fail to have their maps approved will have to face the consequences." (*Dawn, July 14th, 2019*).

Another recent activity in this lieu was reported in Dawn Jan 19', regarding the lack of implementation of recommendations given by the Senate on controlling the illegal societies growth and the irregularities caused by deviating from the original layouts as well as the conversion of public parks, graveyards into residential and commercial lands.

"*In one of the reports about the cooperative housing schemes, the Senate had recommended that the violations of layout plans committed by housing schemes may be accommodated by amending the regulations.*

However, the house had directed the civic agencies that no compromise should be made regarding public parks.

*After being informed that green areas and amenity plots had been sold out by housing societies, the Senate had recommended that any land adjacent to the housing schemes may be bought and utilised as public parks while space for graveyards should be acquired in the vicinities of the societies.***"** (Dawn, Jan 12th 2019).

Also seen in CBR town housing society where the residents reported a total lack of civic amenities and also a huge deviation from the original layout plans was observed and reported, as The Nation reported **"***It is worth mentioning that to get the map approved and attain NOC from the CDA, the concerned management of a housing society has to fulfil all the requirements of the civic body and it does the same but later the approved layout plan is often violated.*

Ahsan, a resident of CBR Employees Cooperative Housing Society, said that the administration of the society did not pay attention in providing basic facilities to the residents, as there was only one main mosque and park available for the whole community. The society was also found having violated the approved layout plan.

According to official documents, the society administration had in sheer violation of the approved plan converted almost 160 kanals of land out of a total of 189.48 kanals set aside for

open spaces or parks, public building areas and graveyard, into residential and commercial plots earning billions of rupees." (The Nation, Jan 09, 2018)

The situation in Rawalpindi is reported equally alarming with The Tribune reporting that in July 19' a departmental initiative was taken by RDA to scrutinize the existing private housing schemes in terms of the level of violations and deviations from the originally approved plans as the media outlet was claiming that a free at will environment for violations was being enjoyed by these housing scheme managements, they were quoted saying,

"*The Rawalpindi Development Authority (RDA) has decided to conduct a fresh survey of all private housing societies for the purpose of enhanced scrutiny.*

It is pertinent to note that most of the housing societies, at the moment, are freely operating with a clear violation of bylaws.

The sources said that a number of housing societies had carved more plots in open spaces and sold them. The illegal practice has created difficulty for land purchasers whose investments remain at risk.

The authority will inspect whether the housing schemes were operating with basic urban facilities such as roads, parks, mosques, commercial areas, a cemetery, hospitals and other facilities available according to approved the planning permission and layout plan". (The Tribune, July 10, 2019)

A JIT report presented by FIA to Supreme Court of Pakistan brought forward a staggering amount of ghost and false housing societies just used to funnel money out of common man as well as also reported on illegalities in terms of deviation from original approved layouts, conversion and shifting of graveyards and public parks land for profit purpose, **"***The Federal Investigation Agency (FIA) has told the Supreme Court that 6,000 'unregistered, illegal, ghost and paper' housing societies have been found in the country. It is also submitted that the JIT has conducted an audit of 695 Housing Societies, wherein it has been found that the numbers of societies have extended beyond their approved area without any prior approval. Graveyard land is being sold in the shape of plots to the general public. In case of extension of society, graveyard land is continuously shifted from one place to other without any approval."*https://www.dawn.com/news/1493937

To address this issue an analysis is required between what was approved and what current situations on ground are.

1.3 Research Aim

To assess the differences between the provisions of Open/Green spaces in approved public/private housing schemes and the on-ground realities.

1.3.1 Research Objectives

1. To examine the existing standards/criteria for provision of open spaces in housing schemes.
2. To analyse the existing status of open/green space in approved plans versus on ground realities.
3. To identify determinants of open-space use in selected housing schemes.
4. To identify causes driving the conversion of open/green spaces to other land uses in the selected housing schemes.
5. To recommend policy measures in mitigating the issue.

1.3.2 Research Questions

1. What are Open/Green spaces?
2. What are the different types of Open/Green spaces?
3. Why are Open/Green spaces important, especially in Public/private housing schemes?
4. How many types of Housing Schemes in Islamabad as defined by CDA, if any?
5. Are Open/Green spaces being converted to other land uses?
6. Are there differences between the provisions of Open/Green spaces in approved housing schemes plans and on ground realities?
7. What are the causes of open/green space conversion to other land uses?
8. What are the possible measures that can help solve this issue?
9. What are the possible policy implications?

CHAPTER 2

LITERATURE REVIEW

2.1 Open/Green spaces

No doubt, open space plays a crucial role in human social development. Francis (1989) understands these places as being for public and social interaction. He used the term public spaces for places such as parks and plazas. He argues that, public spaces provide the common ground where "civility and collectively sense of public- ness" are developed and expressed. Further, he explains that the public environment serves as a reflection or mirror of one's behaviour, social process and often conflicting public values.

On the other hand, Walzer (1986) understands that, open spaces are only for public. He comprehends, open space as a space where one can share with other not necessarily known to him. They may not be relatives, friends or work mats. In his thinking such space is for politics, religion, commerce, sports and spaces for peaceful coexistence and impersonal encounter.

From uses point of view, open space is the arena for undertaking various activities including optional and social activities (Gehi, 1987).

Dunnett et al. (2002) mull over open space as improving urban parks, play areas and green spaces as the urban areas with build environment and the outside environment between buildings. He further pointed out that outside environment mean, green space with predominantly permeable soft surfaces covered by grasses, trees and shrubs.

In the same write up, they give their final version of open space as the spaces including both soft and hard spaces with easily access of public. They understand that, although such spaces are for public but not necessarily public property or owner ship at any kind. Landscape architects tend to define open space on the basis of accessibility.

Eckbo (1969), a well-known landscape architect, considered open space as the land not occupied by buildings and cars as well as undeveloped land in urban areas. He advocates that these pieces of land are for everyone and further, explains that open means freedom of movement. Movement may be physical or visual and there should be no restriction. He believes that, space is the atmosphere in which the human beings and other creatures live just like the fish in water.

In Britain, open space is the land in which a building covers a small area and the rest of the land is out laid as a garden. In British society, it does not matter whether open space is enclosed

or not. In terms of ownership, the open spaces in Britain are either public open space or private open space.

In America, open spaces are treated as areas of land and water with the surface open to the sky. However, it is neither closed spaces nor to be confused with "vacant" or "unused" land.

Another group of planners includes Wohlwill (1983), who understand open space in a different way. All these planners have defined open space in terms of naturalness.

Little (1968), advocates the "natural" element of open space. He considered open space as the source of nature in cities.

Wohlwill (1983) looks at open space's landscape rather than the built environment. In landscape, he includes the world of rocks and sand of shoreline, desert, woods, mountains as well as the diverse and complicated lives of plants and animals.

In this school of thought, Beer (1990), a site planner in England, understands that green space means the natural environment in the city rather than man-made landscape. She expresses that most people are aware of the damage done to their habitats and the natural world that ensures the existence of humans' habitat, the more they appear to become "green" in their thoughts and action. As a site planner, she strongly stresses the importance of preservation and provision of nature on every site, or at least where it may be possible and appropriate, in the city to make these places as satisfactory habitat for human beings as is possible.

After reviewing the available literature regarding open space, two important schools of thought are emerging.

a) The first group of people, predominantly planners, and designers stress the two important characters of open space, such as openness, which means these spaces should be open to the sky, and publicness, which refers to the easy accessibility of the general public to such spaces.

b) Whereas, the present-day environmentalists and ecologists emphases on the provision of naturalness in urban open spaces. Both the environmentalists and ecologists advocate and support that 'naturalness' should be an integral part of the urban open spaces.

During the literature review (some of them quoted above), it was noticed that urban open spaces are defined and explained on the basis of **openness** and **publicness**. These sorts of view are mainly supported by planners and designers whereas, environmentalists and ecologists stressed on the presence of natural elements in urban open spaces. I understand that these characteristics

are very significant in order to have successful urban open spaces in terms of both their functions and roles.

"Open spaces mean those designed or leftover pieces of public or private land in the urban area, which are not built on, may be grassed, planted or paved and available with basic facilities for public use, such as children's play, collective games, passive activities as well as use for some traditional, political or cultural activities".

Different people and different cultures may have diverse concepts for their open space as it is an ambiguous concept, having different connotations in various contexts. Professionals might have differences in their perception of open spaces, but one thing is apparently common that all who are involved in the planning and management of open space cannot separate it from nature. Nature seems to be the fundamental part of open space irrespective of the quantity of the open space that has been provided in planning. On the basis of ownership, accessibility and function, open space can be divided into two major types, Private open space and Public open space. These types are further described in the following paragraphs so that researchers and students may not get confused.

2.1.1 Private Open Spaces:

As the name signifies, the private urban open spaces, mainly sport centers, gardens, playgrounds and children's play area, are owned by private individuals, groups of people or organizations. The use of these places is restricted to certain individuals, and as a result, these spaces are highly maintained and well organized.

The garden or park was conceived solely for the benefits of the owner, family, relatives and people belonging to the same economic class. The general public was not allowed to visit and enjoy these places. In early days, the same situation prevails in Pakistan where houses spread over in acres.

Additionally, the available literatures reveal that some parks were developed by the Mughal sovereigns for their own use and later on opened up for the general public. Afterwards, the Government starts developing parks particularly for general parks which are still maintained by various government departments. Apart from Government agencies, the private sector also seems active in provision of urban open spaces particularly in their own developed townships.

2.1.2 Public Open Spaces:

Public Open Space unlike private spaces, public urban open spaces are designed, built and maintained for use by the general public. Predominantly, the owners of such places are local

government. Most of these spaces (parks and playgrounds) are opened all year with free entry whereas some issue tickets for entry for specific timings and events.

The following names are most commonly used for public parks in the developed world:

- Municipal park
- Neighborhood park
- Community Urban Open spaces
- Auxiliary park

i Municipal parks:

Municipal parks are traditionally enclosed by iron railings and gates and provide an ideal landscape. Additionally, they also provide opportunities to refresh the spirit by contact with nature and the maintenance of good health by exercise. It also provides an environment, in which city dwellers may have a chance to refresh against the stressful life of the city. Due to the range of activities that a municipal park offers and the content the park has, it usually occupies a considerable number of acres of land and is located within the municipal limit.

ii Community Urban

Open Space Community urban open spaces, as compared to traditional urban open spaces, are small, having low cost in terms of initial investments and maintenance afterwards. These types of urban open spaces are usually controlled by local authorities and used by local communities. Community urban open spaces come into being as a result of the failure of large traditional parks, especially in the United States of America. Francis et al. (1984), reported on the basis of Taylor's (1979) and Hester's (1984) research findings that there is growing evidence that traditional urban open spaces are unable to satisfy the needs and requirements of people. He further unveiled that the majority of neighborhood parks that are designed by professionals and developed by city parks departments are either misused or not used at all.

The prime reason behind development of community parks was to encourage the concept of community participation. This may paved ways to produce an environment that is rich in cultural and more responsive to the local people's behaviour, economic and ecological needs.

iii Neighbourhood Park

As the name implies, this type of open space is available in the neighborhood for the use of the local community. Some people call it a neighborhood playground, most probably due to its location. Shivers and Hjelte (1971) understand Neighborhood Park as "the public space set apart for the habitual play of the residents of an urban area. Marcus and Francis (1990) believe

that today's neighborhood parks especially in America contain elements of all four periods of park history. This might mean that neighborhood parks should include all sorts of activities ranging from natural to actively used areas and from gardenesque to most technological landscape.

Neighborhood parks vary in size, character and facilities. It seems that there is no specific size and provision of facilities for these types of urban open spaces. Ivor and Seeley (1973) cited Butler's view of the neighborhood park, which summarised below:-

- Its size may be from one to twenty hectares
- It should contain trees, shrubs, grass
- It also should have quiet corners
- It should have facilities for children

In Pakistan, we have a network of small parks or park-like areas at the local level, but recent trends encouraged the provision of such spaces in almost all the housing schemes in big cities. Although these spaces provide the same facilities as neighborhood parks do but they are given other names such as “park or some time street park”. Mostly, such places are famous by the name of important celebrities, particular events or an organization that develops the area.

iv Community Park

The size of this type of park mainly depends upon the number of potential users. Researchers such as Shivers and Hjelte (1971) are of the view that, all those places that served as community parks should be of at least 20 acres (just above 8.00 hectares). Apart from the recommended size, these places should provide a diverse group of facilities. In other words, these places should contain all that one can expect in a local park.

Facilities, should be provided according to the aspirations of local people. Generally, the provision of facilities should be in a way that caters to all age groups' needs groups. Facilities, provided in these parks normally range from walking trails to a large indoor or outdoor swimming pool (Majid, 1994). In addition, to the above opportunities that a community park provides, it can also be an appropriate location for the range of other activities such as:

- Comprehensive community's recreational centre
- Teenagers' recreational centre
- Elderly recreational centre

If these spaces are provided with all the required facilities, then the problem of parking may arise, when particular events take place. So, it is mandatory to have provision of sufficient

parking spaces to accommodate the need of all the users, whether they are from nearby areas or distant.

v Auxiliary Park

Auxiliary parks refer to the pieces of land in the cities that have been left over in the process of subdivision. These spaces are usually odd-shaped and can be found in many cities of considerable size. These spaces are publicly owned or controlled and serve as a park.

Among, other important examples are triangular-shaped pieces of land at the intersection of streets and many small parcels of land in commercial and residential areas. The appearances of these types of spaces, mainly leftover, are just like parks. This is why some times they are called vest-pocket parks. The parks can also be distinguished on the basis of their size, range of facilities, types of users and level of functions provided for users.

Table 1 Type of Urban Open spaces

Type of Urban Open spaces	Approximate size	Distance from home
Regional parks and Urban Open Spaces	400 hectares	3.2-8 km
Metropolitan parks	60 hectares	3.2 km or more
District parks	20 hectares	1.2 km
Local parks	2 hectares	0.4 km
Small local parks and Urban Open spaces	Up to 2 hectares	Up to 0.4 km
Linear open space	Variable	Variable

Dower (1984) seems to have laid stress on the role of urban open spaces and stated that parks, urban open spaces, walkways, allotments, riversides, street trees and the urban fringe are all included in urban green spaces. Lynch (1982) presents several different types of urban open spaces including regional parks, urban parks, squares and plazas, linear parks, playgrounds, play fields, waste lands and adventure playgrounds. Morris (1979) classified urban open spaces based on their structures. According to her classification, open space includes soft materials such as grass, trees while hard materials include concrete, tar-macadam and other man-made surfaces. She categories open spaces from informal (cemeteries) to the most formal (adventure playgrounds). Fig 1.8 well-maintained green belt turns the road cool and pleases the users The

categorization of Francis (1987) is different from all the mentioned above. He classified urban open spaces into the following two major groups and each major group is further subdivided:

vi Traditional Urban Open spaces

- Public parks
- neighborhood parks
- playgrounds
- pedestrian mall
- plazas

vii Innovative Urban Open spaces

- community urban open spaces
- neighborhood urban open spaces
- schools grounds
- streets
- transit mall xli
- farmer's markets
- town trails
- vacant/undeveloped lands
- water fronts and found spaces.

Francis and Mcormach (1973) classification covers all the crucial characterizes such as park type, its size and required facilities, appropriate catchments area, visitor's types and its use. They are of the view that these facilities should be located on the peripheral location where less use can be justified and use can be controlled.

Urban open spaces can also be classified on the basis of local people value. Burgess et. al. (1988) categorized urban open spaces into two types keeping in mind the local people's value. These two types are: Formal Urban Open spaces: which consists of parks and gardens and Informal Urban Open spaces: which include riversides, sports pitches, golf courses, bowling greens, local greens, river sides, allotments, city farms and derelict lands. Urban open spaces can also be categorized based on the functions of these spaces. Shomon (1971) categorization of urban open spaces is based on their functions. He considered four kinds of urban open spaces in the urban area. These four types, with examples are Reserved land Including Parklands, Nature Centres, Wildlife Refuges and Sanctuaries, Arboretums, Rural Life Centres, Outdoor Laboratories, Outdoor Schools, Established Natural Areas and Reserved Flood Plains.

viii Semi-Reserved and Restricted Land

Semi-Reserved and Restricted Land Consisting of

- Military Reserved Land
- Airports
- Railroad
- Highways
- Reservoirs
- Parkways
- Roadsides
- Rights-of-way
- Golf Courses

ix Unreserved Lands

- City and suburban undeveloped lots
- Small to large family estates
- Historic sites
- Scenic areas
- Farm and range lands

x Undeveloped Natural Landscape

- Native forests
- Shorelines
- Rivers
- Bottoms
- Ridges
- Mountain tops
- Marshes
- Swamps
- Original prairies
- Deserts
- Sage lands
- Rain forest
- Arctic-alpine land

CHAPTER 3

METHODOLOGY

3.1 Open spaces provision standards:

In order to study the existing standards/criteria for provision of open spaces in housing schemes, the technique used was "Systematic Review" of research articles and research papers to extract the definitions as well as the standards used all over the world, mainly emphasising on the ones used in Pakistan especially Lahore. The keywords researcher used for searching the articles to achieve this objective were Open spaces, Land conversion, Open spaces standards, Availability of open space.

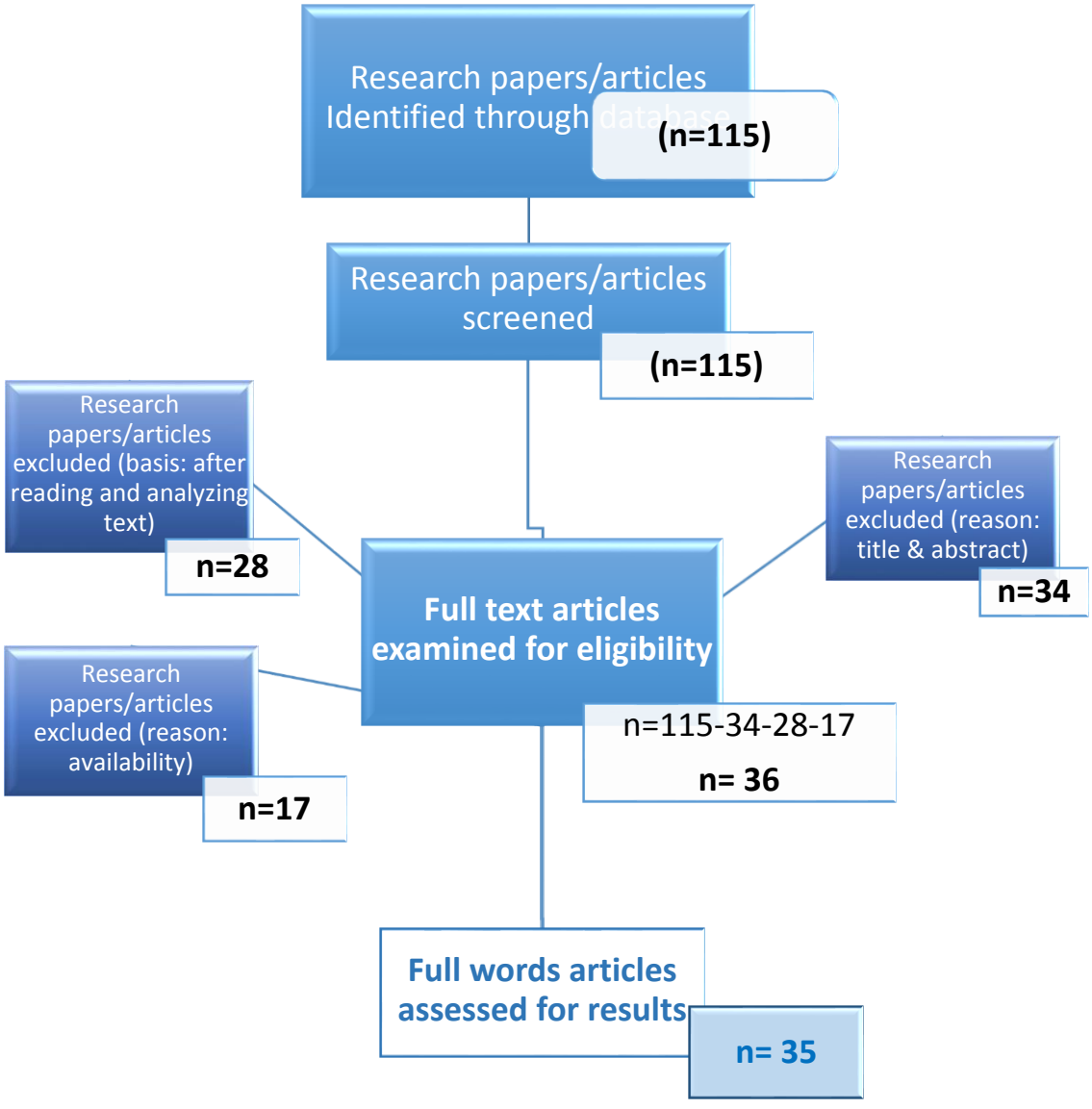


Figure 1 Method for reviewing of research articles

3.2 Difference between Satellite Imagery and approved plans:

To have a better understanding about the current and actual picture depicting the provision of OGS in approved housing plans versus what has actually been provided on the ground, it was needed to conduct an analysis to point out the actual difference. In this case as the researcher's background was of civil engineering, different tools were available but looking at the scope of required data, Google Earth was chosen as the analysis software. It was decided to obtain high-quality approved housing plans for selected housing societies directly from LDA for authenticity. As per LDA, there were a total of 58 approved public and 238 private housing societies in Lahore, from which 11 public and 29 private housing schemes were selected on the basis of adequate data availability, readability of the obtained approved plans while keeping in consideration the travel distance between the societies and their sizes, as the researcher faced limited budget constraints. It must also be noted that not all of the societies which had their plans approved were developed at the time this research was conducted. After the selecting the housing societies, they were then located on Google Maps using either the approved society name or the nearby landmarks, roads in case of changed names. Then the approved society plans were compared to the existing situation of provision of OGS. These differences were then recorded and turned into percentages for easy understanding. These differences would later paint a well-explained and backed picture of existing provision levels of OGS in LDA-approved housing societies.

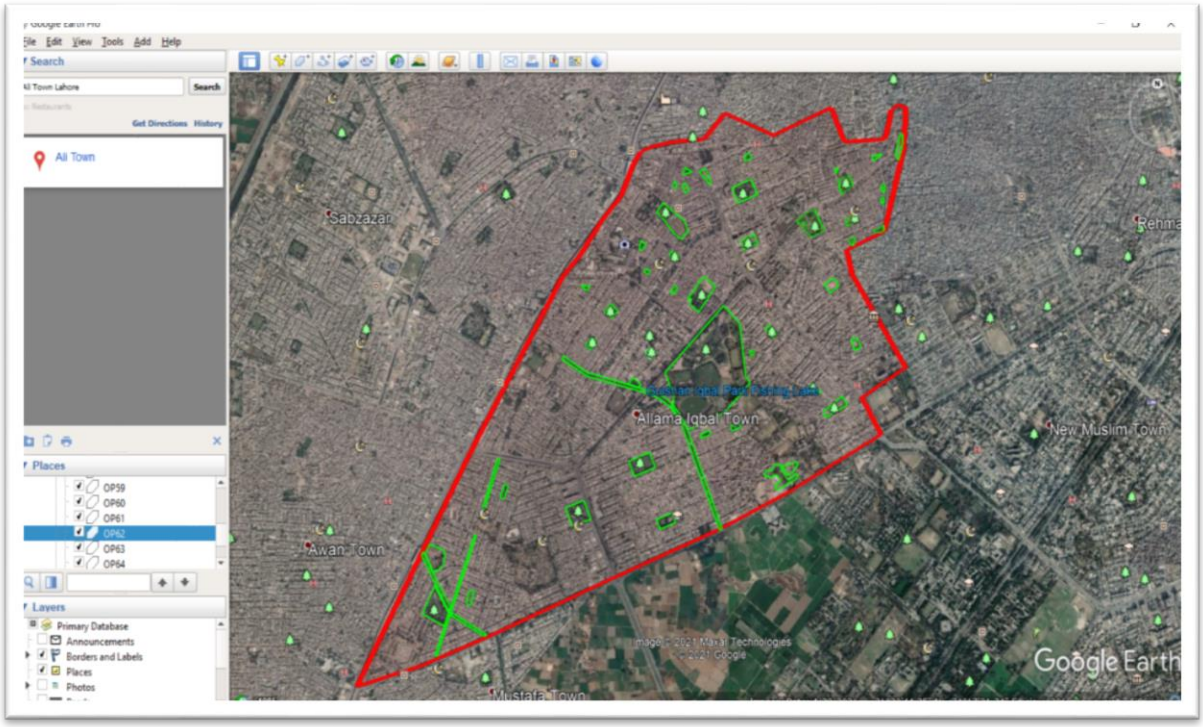


Figure 2 Marking boundary of a housing scheme and OGS using Google earth

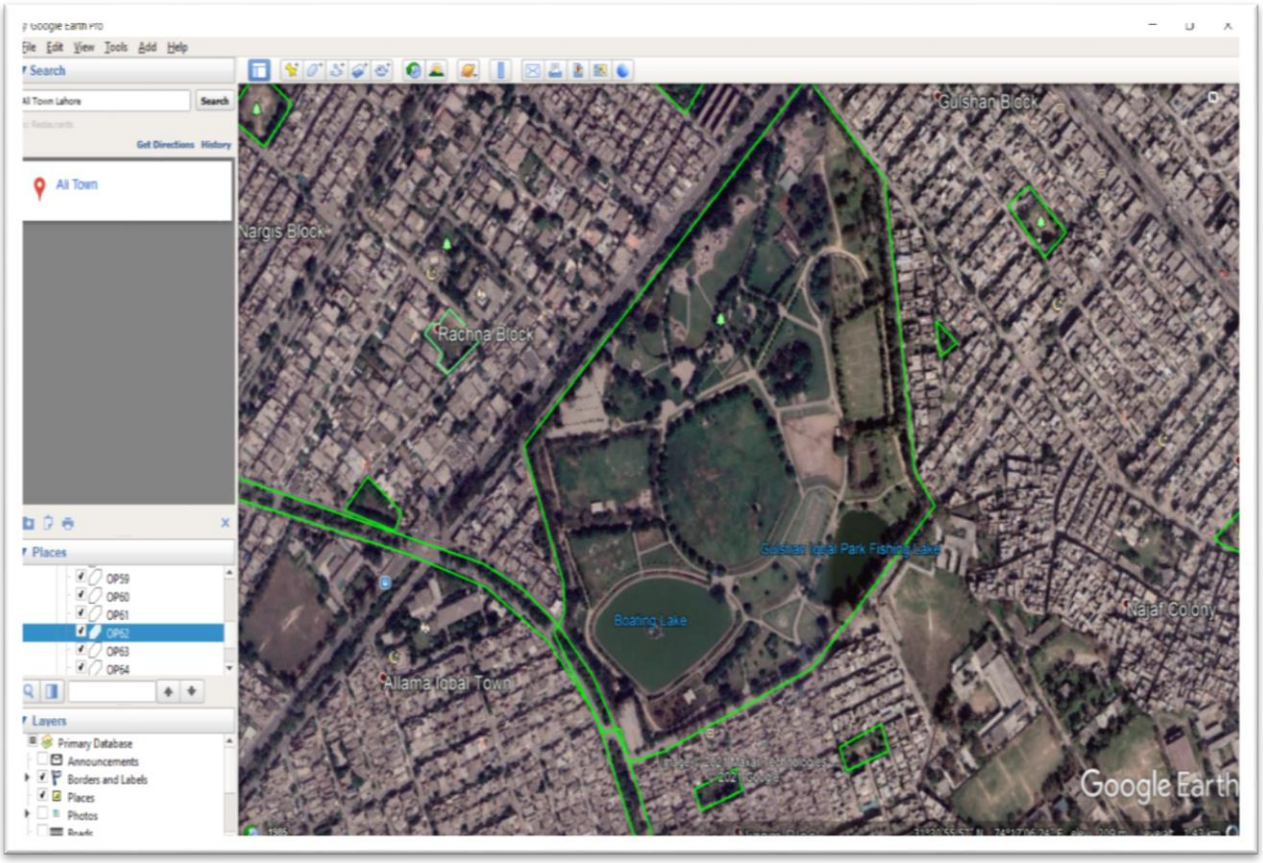


Figure 3 Marking of OGS in a housing scheme

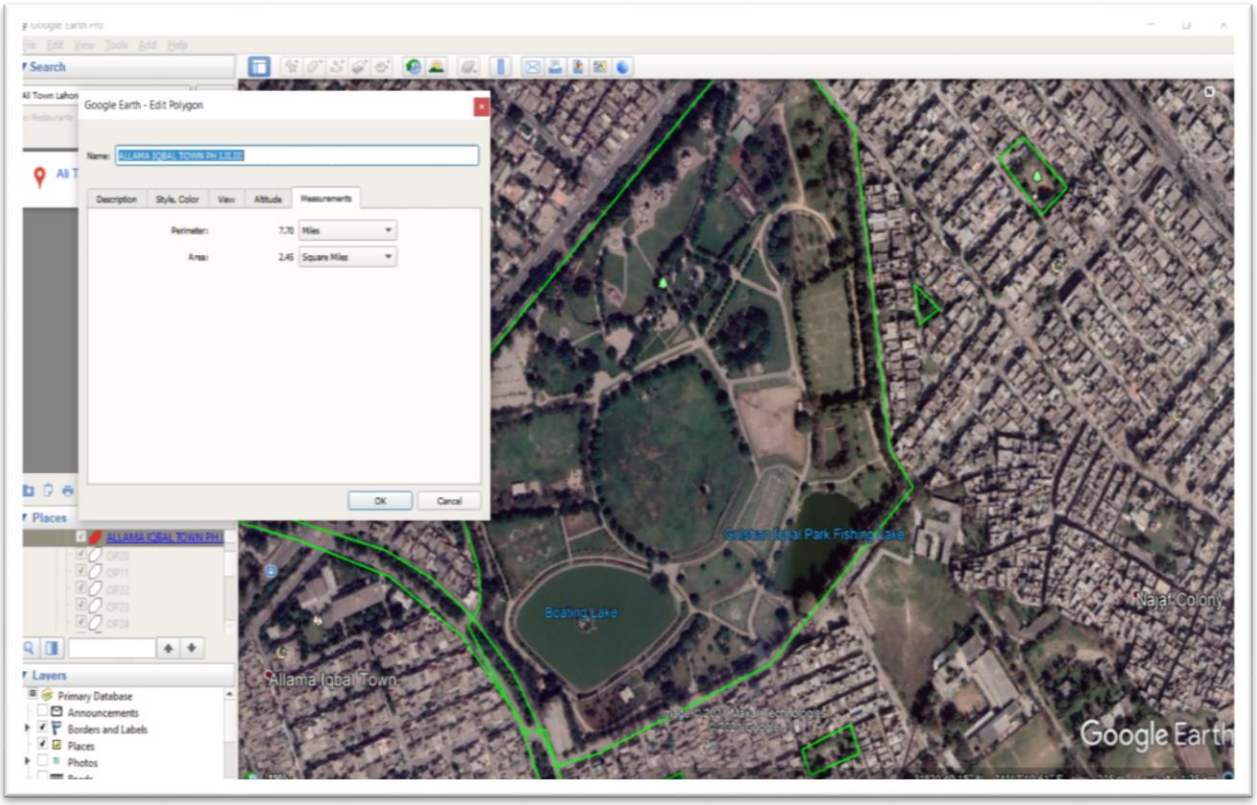


Figure 4 Measuring the OGS area using Google Earth

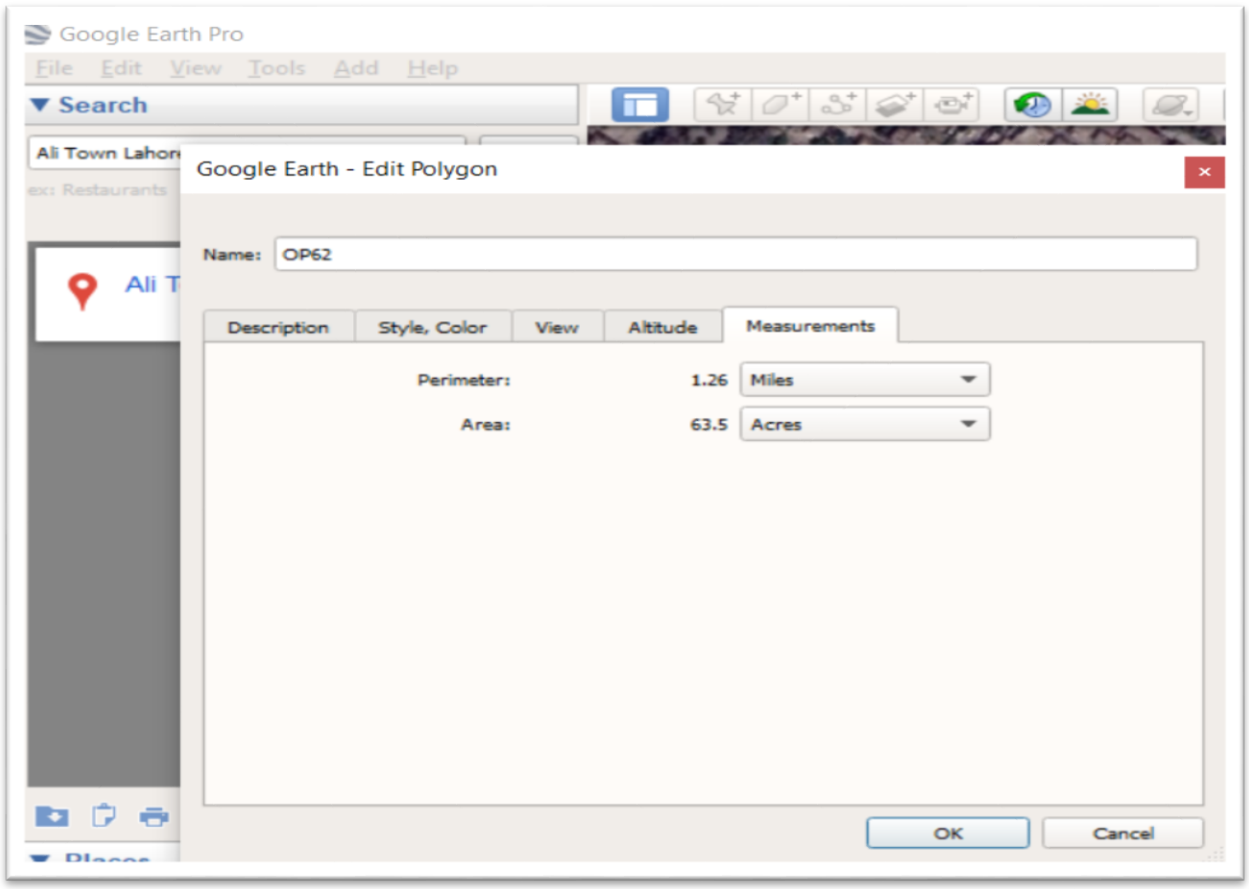


Figure 5 Measuring OGS area using Google Maps

Figure 6 Society Map downloaded from LDA official website

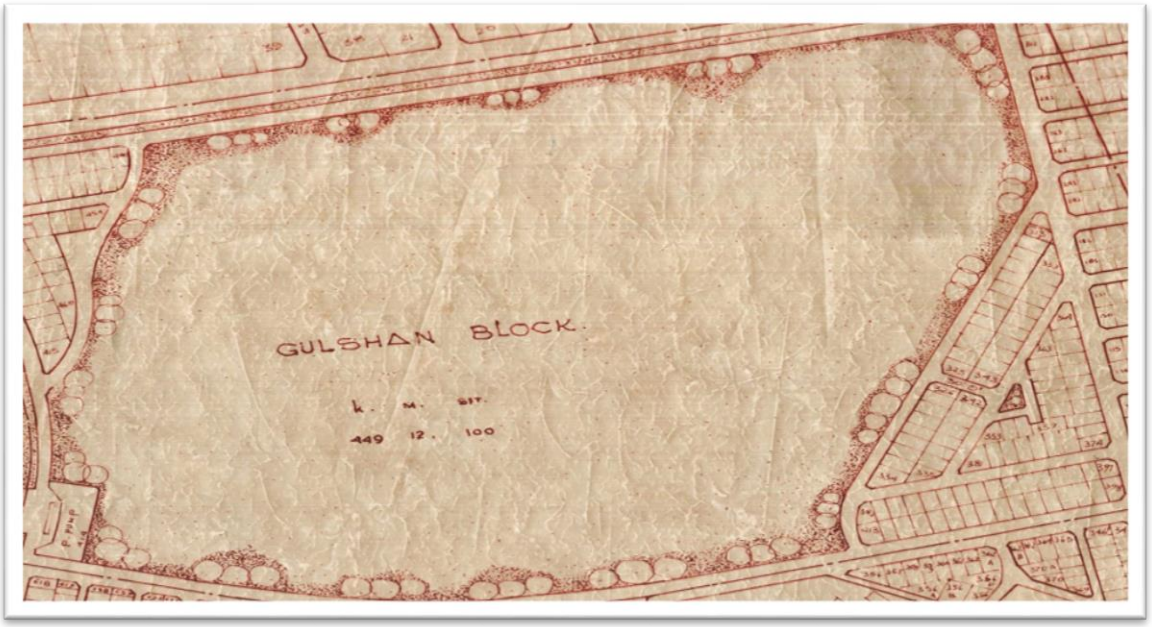


Figure 7 OGS focused on the Society Map downloaded from LDA official website

3.2.1 Conceptual Framework

Literature Review to identify the definition of OGS and current planning standards followed around the world and Pakistan

Chose 40 housing societies on the basis of availability of official and viable datasets.

Comparison of provision of OGS and on ground realities by using google earth.

The differences were then computed as percentages and the on ground situation was analyzed

The causes and factors for these conversion of OGS into other land uses was sought through quantitative questionnaires from all relevant stakeholders.

Social questionnaire was done on 330 respondents, where the Cluster data sampling was used and the sampling population was derived from Cochran's Formula.

Expert Questionnaire was done on maximum number of available officials via online interviews due to limited availability during Covid-19.

PCA was done on social questionnaire while qualitative analysis was done on the expert questionnaire.

The findings were used to draw out a conclusion on which policy recommendations were based and put forward.

Figure 8 Conceptual Framework

3.3 Determinants of OGS Conversion:

Sims & Schuetz (2007)) therefore showing a lack of implementation of the original approved housing scheme plan and on-ground realities. Due to the conversion of these Open/Green spaces to residential, commercial land uses, the land designated for Open/Green spaces is lost. Issues of concern emanating from open space conversion could be diverse and multi-faceted given the plethora of individual differences which could exist among residents in a neighbourhood.

To cater to the public opinion about the OGS and the factors leading to the usage of OGS a quantitative questionnaire was designed.

3.4 Questionnaire Design

There were two questionnaires designed for achieving the objective of determining the factors leading to affect public behaviour towards Open/Green Space usage, keeping in mind that it should be simple enough for people to understand and answer. It contains open-ended questions nd questions based on the Likert scale where 'Definitely yes' is the high acceptability factor and 'Definitely No' is the Low acceptability factor. The questionnaire would help us understand the barriers, limitations and public opinion about the management of OGS.

3.4.1 Cronbach's alpha

After the collection of data the reliability of the scale needs to be checked by the reliability test. Cronbach alpha (D.A. De Vaus, 2002) is a widely used test to measure internal reliability and is used by (Azeem, Naeem, & Waheed, 2017; Dagiliūtė et al., 2018; Nordhoff et al., 2018) in their studies. The threshold for Cronbach's alpha value is 0.7.

3.5 Mean Score Method

When asked from the users of OGS in selected housing societies about the factors affecting their choices about going to the OGS like the absence of walkways, parking facility, adequate lighting etc., the responses received from the target audience have been summarized in graphical form in fig 8. The facilities were marked from "1 = Definitely Yes" to "5 = Definitely Not". The responses have been orderly ranked separately by the mean score method (Mao, Shen, Pan, & Ye, 2015; Nordhoff et al., 2018).

3.6 Exploratory Factor Analysis / Principal Component Analysis

After standardization of data of survey questionnaire, factor analysis and principal component analysis (Berrigan et al., 2010; Biernat et al., 2018; Fu & Farber, 2017; Göçer & Göçer, 2019)

was performed to reduce the data size to a more manageable one and to determine the clusters of variables known as a latent variables that correlate highly with each other (Azar & Al Ansari, 2017).

The survey questionnaire was comprised of determinants affecting and Principal Component analysis is used. However, there are some initial checks to see whether Principal Component Analysis is viable to be used or not.

3.6.1 KMO measure and Bartlett's test

The first check for Principal Component Analysis includes the check for Kaiser-Meyer-Olkin (KMO) measure for sample adequacy. The KMO value is recommended to be above 0.5 (Azar & Al Ansari, 2017; Ozorhon & Karahan, 2017) with the following categorization as mentioned by (Field, 2013) in Table 2;

Table 2: KMO measure of sample adequacy

Sr. No	KMO Value	Acceptability
01	0.9 – 1.0	Marvelous
02	0.8 – 0.9	Meritorious
03	0.7 – 0.8	Middling
04	0.6 – 0.7	Mediocre
05	0.5 – 0.6	Miserable
06	Below 0.5	Unacceptable

The second check is Bartlett's test for sphericity (Azeem et al., 2017) to check whether the correlation matrix is the identity or not. If the correlation matrix is the identity matrix, then Bartlett's significance value will show value greater than 0.001, and PCA cannot proceed.

REFERENCES		Silnite&Isman	Fattah	Muis	Lestari	Aurelia (2010)	Dinarian a (2011)	Olaleye et al (2013)	Joga (2013,	Brodhead	Mc Donald et	Prihatiningsih et al (2013)	Ernawati & Silas (2013)
INDICATORS	Immigrants	-	-	-	-	√	-	-	-	-	-	-	-
	Population growth	-	-	-	-	-	√	-	-	-	√	-	-
	Population density	-	-	-	-	√	-	-	-	√	-	-	-
	Land limitation	-	-	-	√	-	√	√	-	-	-	-	-
	Private land ownership	-	-	-	√	-	-	-	-	-	-	-	-
	Health facilities	-	-	-	-	√	-	-	-	-	-	-	-
	Education facilities	-	-	-	-	√	-	-	-	-	-	-	-
	Surrounding environment	-	-	-	-	-	-	√	-	-	-	-	-
	Housing density	-	-	-	-	-	-	√	-	-	-	-	-
	Commercial areas	-	-	-	-	-	-	-	√	-	-	-	-
	Changes in land use function	-	-	-	√	-	-	-	-	-	-	-	-
	Finance program	-	√	-	-	-	-	-	-	-	-	-	-
	Land price	-	-	-	√	-	-	-	-	-	-	-	-
	Economy	-	-	√	√	-	-	-	-	-	-	-	-
	Limited funds	-	-	-	√	-	-	√	-	-	-	-	-
	Vague concept	√	-	-	-	-	-	-	-	-	-	-	-
	Allocation of green open space in spatial planning	-	-	-	√	√	-	-	-	-	-	-	-
	Weak policy	-	-	-	-	-	-	√	-	-	-	-	-
	Constantly changing of policy	-	-	-	-	-	-	√	-	-	-	-	-
	Green Basic Coefficient	-	-	-	-	-	-	-	√	-	-	-	-
	Incentives and disincentives	-	-	-	-	-	-	-	√	-	-	-	-
	Coordination among agencies	√	-	-	-	-	-	-	-	-	-	-	-
	Weak institutional and legal certainty of the open space area	√	-	-	-	-	-	-	-	-	-	-	-
	Program executors	-	√	-	-	-	-	-	-	-	-	-	-
	Supervision and control of land use	-	-	-	√	-	-	-	-	-	-	-	-
	Political influence of government	-	-	-	-	-	-	√	-	-	-	-	-
	Corruption	-	-	-	-	-	-	√	-	-	-	-	-
	Lack of planning tools	-	-	-	-	-	-	√	-	-	-	-	-
	The quality and quantity of government	-	-	-	-	-	-	√	-	-	-	-	-
	Coordination between government agencies and developers	-	-	-	-	-	-	√	-	-	-	-	-
	Concept offered by developers	-	-	-	-	-	-	-	√	-	-	-	-
	Community participation	√	-	-	-	-	-	-	√	-	-	-	-
	Public awareness	√	-	-	√	-	-	-	√	-	-	√	-
	The influence of community leaders	-	-	-	-	-	-	√	-	-	-	-	√

Table 3 Research indicators

3.7 Expert Survey

For an expert opinion, to identify these root causes an interview-based questionnaire was designed to cater to the opinion and highlight the conversion causes by the stakeholders at management and commercial levels. The target audience was selected on the basis of their respective roles. The governance arrangement comprises four aspects: Actors, including individuals, groups and organizations that are either part of a governance arrangement, or have the potential to have influence—in this case on urban green spaces in Lahore; It's about how these entities value urban green spaces; rules of the game, which explain the challenges and opportunities in the planning and management of urban green spaces; and resources, which are discussed in terms of the capacity of actors to achieve some outcome (Appendix B). The statements were kept in their original form, as they came from the source, except for occasionally supplying nouns for clarity.

Table 4 Expert survey

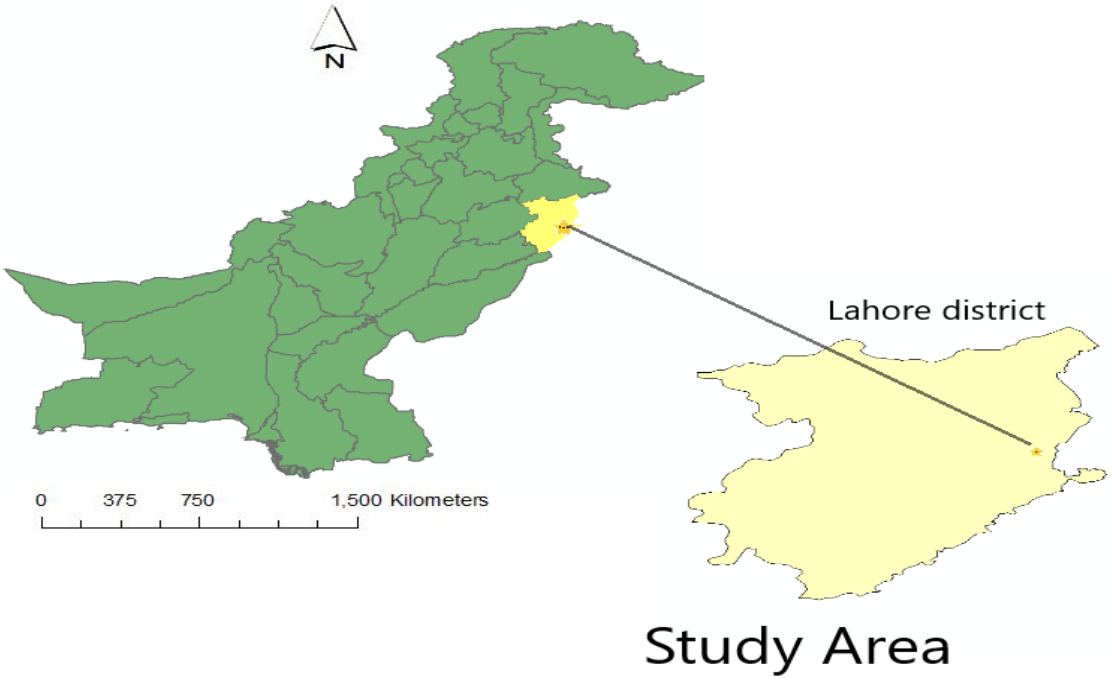
Stakeholder's Group	Organizations/Institutes /Public	Number of Interviews
Government Stakeholders	Lahore Development Authority	2
	Parks and Horticulture Authority (PHA) Lahore	2
	Walled City of Lahore Authority, Lahore	3
	Department of Planning and Development	3
	Cantonment board, Cant	1
	Metropolitan Corporation Lahore	2
	Total	13

Non-Government Stakeholders	Private	Expert	4
		Lahore Chamber of Commerce	2
		Private Developer	5
	Civil Society	International NGOs with local partners	2
		Local Environmental groups	1
		Academia	12
		Users	355
	Total		

3.8 Study Area

Lahore, the second-largest urban city in the country, enjoys the status of a fast-growing city with a population of 5,443,495 persons (GOP, 2000) in 1998. 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 the rapidly increasing population. The phenomenon of urban development is very obvious in Lahore which resulted in a more built environment than the 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

Table 5 Study Area Map: Lahore



3.9 Sampling and Data Collection:

As the target audience wasn't bound with age, gender, income group, ethnicity constraints but rather with the general public present in the OGS at the time of filling out the Social Questionnaire, the sampling technique used was "Probability Sampling".

3.9.1 What is probability sampling?

Probability sampling is defined as a sampling technique in which the researcher chooses samples from a larger population using a method based on the theory of probability. For a participant to be considered as a probability sample, he/she must be selected using a random selection.

The most critical requirement of probability sampling is that everyone in your population has a known and equal chance of getting selected. For example, if you have a population of 100 people, every person would have odds of 1 in 100 for getting selected. Probability sampling gives you the best chance to create a sample that is truly representative of the population.

Probability sampling uses statistical theory to randomly select a small group of people (sample) from an existing large population and then predict that all their responses will match the overall population.

3.9.2 Advantages of probability sampling

Here are the advantages of probability sampling:

1. It's Cost-effective: This process is both cost and time-effective, and a larger sample can also be chosen based on numbers assigned to the samples and then choosing random numbers from the more significant sample.

2. It's simple and straightforward: Probability sampling is an easy way of sampling as it does not involve a complicated process. It's quick and saves time. The time saved can thus be used to analyze the data and draw conclusions.

3. It is non-technical: This method of sampling doesn't require any technical knowledge because of its simplicity. It doesn't require intricate expertise and is not at all lengthy.

Table 6 Difference between Sampling Types

Probability sampling	Non-probability sampling
The samples are randomly selected.	Samples are selected on the basis of the researcher's subjective judgment.
Everyone in the population has an equal chance of getting selected.	Not everyone has an equal chance to participate.
Researchers use this technique when they want to keep a tab on sampling bias.	Sampling bias is not a concern for the researcher.
Useful in an environment having a diverse population.	Useful in an environment that shares similar traits.
Used when the researcher wants to create accurate samples.	This method does not help in representing the population accurately.
Finding the correct audience is not simple.	Finding an audience is very simple.

For population sampling Cochran's Formula was used, $\boldsymbol{n^{o}} = \frac{\boldsymbol{z^2(p)(q)}}{\boldsymbol{e^2}}$

Where " n^o " is the sample size, " z^2 " is the alpha value for the desired confidence level. "*p"* is the estimated proportion of the total population being surveyed and *"q=1-p"* and "e" is the required precision level.

Confidence Level	**Z Score**
80%	1.282
90%	1.645
95%	1.960
98%	2.326
99%	2.576

CHAPTER 4

RESULTS & DISCUSSIONS

4.1 Standards for provision of Open Spaces:

Over the world there have been five sorts of standard methodologies being utilized generally,

- Population proportion
- Catchment region
- Area rate
- Local guidelines
- Facility specification

Population ratio has been a major standard types employed by the urban-planners in many nations and proved to be an effective provision tool for recreation areas and open/green.

In population ratios, no matter how high the rate of densification occurs in the city, total open/green spaces/1000 populations or per person is generally set according to the state or national planning standard and it should be achieved and maintained. The total open/green spaces per person or per 1000 populations require the calculations centered around the set of rules or specific formulas applied equally to every situation.

Wilkinson clarified that the guidelines approach being clear and easy to help organizers or related organizations to apply them as a momentous proposal or as an answer to take care of issues with respect to the sufficiency of urban green space arrangement. Measures are regularly set by the national office and perceived by specialists. Therefore, this methodology is viewed as legitimate and relevant. The originality of this idea is then utilized as per point of reference in local specialists to assess the national or state advancement for providing urban green /open spaces requirements for its population.

Table 7 Types of Green Spaces Standards:

Types	Description
Populations proportion/fixed standards	A recommended level of arrangement of open space identified with the degree of populace – Normally per 1000 populace
Area percentage standards	Specific land Percentage to be designated for open space (for example 10% of total development land is dispensed for open space).
Catchment Area based standards	Distances which occupants ought to need to go to obtain entrance (for example ¼ mile walk from neighborhood)
Facility-standard	Specification (sizes, marking and stuff for game fields).
Local standards	Provisions standards explicit to a local zone built on information, local condition and locally decided or communicated.

Source: Sustainable development and planning VIII, C.A. Brebbia, 2016.

4.1.1 Hierarchy of Open Spaces

4.1.1.1 Regional Green/Open Spaces:

Characterized in territorial, sub-local construction plan as well as comprised in a district plan then put aside then acquired later;

- Regional open space serves at least one geological or social districts and will draw in visitor from outside a government territory at the local level;
- Size is adaptable and dependent on work (Playing spaces are distinguished, at that point best possible capacities is needed, playing fields allotments and sport facility ought to be more than 20 hectares in territory)
- Stays open for long hours

4.1.1.1 District-Level Open Space

- Services a few neighbourhoods;
- Principally intended to accommodate formalized sorted organized games;
- Site sizes vary between 5 Hectare - 15 hectare;
- In a walking circle of 2 km or 5min by car.

- Open for visit longer hours.

4.1.1.2 Neighbourhood Open Space

- Service encompassing communities
- Site size is 1 Hectare to 5 hectares.
- In a 0.8 km or Ten min walkable distance
- Less open hours except if sports are being played.

4.1.1.3 Local Open Space

- Service catering private populace;
- Site size varies between 0.4 - 1 Hectares;
- In a 0.4 km or Five minute of walkable distance
- Accessible for short hours.

4.1.1.4 Straight Open/Green Spaces

- Linear, slender open/green spaces destinations existing much elongated than being wide;
- Should exist as separate from adjoined private plots as minimum as half the percent of total stretch;
- Aids connectivity, supports person on foot, give ecological passages.
- Can't be seen as open/green spaces contributor if existing as a limited or confined open space
- Accessible for short hours.

4.1.1.5 Small Open Spaces:

- Located in near to industrial centres and activity hubs, or inside 200 meters of another open space site so as to set up network
- Site size under 0.4 Hectares.
- Can't be counted as open/green spaces contributor (might be allowed when open spaces are littler than 0.4 ha and deemed un-restricted appearing to have solid communities advantage
- Accessible for little hours.

4.1.2 Standards for Planning of Recreational Facility in various nations on the planet:

Planning standards for various nations differ as per their specific arranging setting and other dimensions. A nation can't imitate other nation's regulations without detail appraisal of interest

of its specific locality or population for whom it will be applied. Following piece of the article depicts some arranging measures followed in different nations and urban areas on the planet.

4.1.2.1 Open Space Standards in Bangladesh

Throughout the years, different planning gauges have been received for arrangement of master plan for various urban communities of Bangladesh. 1959 Master plans of Dhaka city had standards of 20 acre of land of open space for an area of 7500+ people setting the standards of open spaces of 2.670 acre of land per 1000 people. 1995 Dhaka Metropolitan Development Plan proposed for 4 acre of land of open spaces for 25000+ individuals, in this manner showing a standard of 0.161 acre of land of open space per 1000 people. 1961 Khulna Master Plan suggested 4 acre of land of open spaces for each 1000 populace, later on 2001 Khulna city Master Plan decreased those standards to 2 acre of land for each thousand people. Metropolitan Development Plan Rajshahi 2004 proposed for 1.5 acre of land/1000 populace though Master Plan Barishal suggested 1 acre of land of open spaces/thousand populace (Dhaka master plan, 1959)**.**

Table 8 Open Space Standards (for 1000/acre) in development plan of urban areas metropolitans in Bangladesh

2001- 2010 Master Plan Khulna City,	**1995- 2015 Development Plan Dhaka Metropolitan,**	**2004-24 Urban Area Plan/Functional Master Plan Rajshahi,**	**2010-30 Master Plan Barishal**
2 acres/ 1OOO people	0.16 acres/ 1OOO People	1.5 acre / 1OOO People	1 acres/1OOO People

Source: 1995 Project DMDP; 1999 Master Plan Khulna; 2004 Metropolitan Development Plan Rajshahi, 2010 Master Plan Barishal.

Table 9 Provision and Requirement of Community Facilities, 2000 in Kuala Lumpur

Types	Number of Unit/10,000 Populations	Land Area /10,000 Populations (Hectares)	Least Land Area/Unit (Hectares)	Normal Area (Hectares) /Populations	Standards Area/Person
District Park	0.05	2 ha	40 ha	40 hectares per 200k	2 m^2
Neighborhood -Park	0.20	2 ha	10 ha	10 hectares per 50k	2 m^2
Local-Park	0.50	1 ha	2 ha	2 hectare per 20k	1 m^2
Local-Play Areas	2.00	1 ha	1/2 ha	1/2 hectare per 5k	1 m^2
Sports-Complex	0.20	1/2 ha	5/2 ha	5/2 hectare per 50k	0.5 m^2

Source: Kuala Lumpur Structural Plan 2020.

Table 10 Open space Typology proposed in Dhaka (Bangladesh)

Structural Plan Dhaka (2016)	Type	RAJUK (2016)	Standard
Parks	Metropolitan Park	150+ acres	3200–4800 m (approx.)
Playgrounds and sport facilities	District Parks	50 – 75 acre	1200 m (approximately)
Urban Developments	Local Parks	5–10 acres	0.4 km (approximately)
Functional Open spaces	‘Mini’ Parks	Less than 2 acre	< 0.4 km (approximately)
Street scapes, trail, and buffer Urban forests/natural parks	District Parks	50–75 acre	1.2 Km (approximately)

***** *RAJUK; Rajdhani Unnayan Kartripakkha*

4.1.2.2 Open Space Standard in UK:

The standard commonly embraced today in rethinking of English urban communities is to allot land 2.83 ha open space/1,000 people and with utilization of this standard is viewed as fitting and applicable whereas no different premise has been built up (Veal, 2008).

It's commonly acknowledged that the arrangement of open spaces is ranged from 10 m^2-28 m^2 for each individual (Daley, 2000).

Table 11 Open spaces standard in London

Gardens and Parks	**Open Space (Linear)**	**Variable**	**Wherever Feasible**
Natural, semi natural green spaces	Pocket park	Less than 1 acres (approximately)	>400 m
Green corridors (Local)	Small open space Garden	1-5 acres (approximately)	>400 m
Open-air Sport Facility	District park	50-150 acres (approximately)	1200m
Facility Green space	Metropolitan park	150-1000 acres (approximately)	3200m
Provision for children and young people	Regional park	1000+ acres (approximately)	3.2-8 kilometre

Source: Open Spaces Audit: City of London 2013.

4.1.2.3 Open Space Standard in the USA:

USA, NRA (National Recreation Association) advises neighbourhood parks and amusement zones on the premise of 10 acre of land i.e. 4 ha/1,000 people (suggested) and 5 acre of land i.e. 2 ha/1000 people (atleast), or possibly ten percent in the local zone (Sherrard and Brown, 1951).

Without a current affirmed strategy, where open spaces are needed in a pocket of the area designated to be partitioned, the measure of unrestricted open spaces needed isn't under six percent of site region (Joint Venture for More Affordable Housing, 1989).

Table 12 Open spaces standard in London

	Neighbourhood parks and amusement zones		Large City Park	Playgrounds	Gardens and Town Squares	
NRPA (National Recreation & Parks Association)	10 acre of land i.e. 4 ha/1,000 people	5 acre of land i.e. 2 ha/1000 people (at least)				
New York State Department of Parks	25 acres/100,000 people		700 acres/100,000 people	400 acres/100,000 people	2 acres/10 0,000 people	50 acres/100 ,000 people

Source: NRPA, USA.

No valid arguments are presented for this is offered for this 'retreative' suggestion, other than being employed as a result of thorough and carefully carried out considerations. The commonly seen approach as seen in NSW Australia is to divide the 2.8 Ha area into 1.2 Ha for "Dynamic" open spaces (Sport fields) while the remaining 1.61 HA into "Inactive/Passive" open spaces (for entertainment). Likewise with the existing standards there are no present documents or justification for this approach whatsoever. (New South Wales Department of Planning, 1992)

British Columbia, Vancouver standards of 2.7 acre of land of neighbor hood parks spaces/1000 populace is proven to some extent on the perception that demands for extra park land come to a great extent from zones with a smaller measure of parks spaces. In early 19th century, "Play area Associations of America" advised for play area space equal to Thirty ft^2 for every kid. (Lancaster, 1983, Gold, 1973).

In time "general guideline" proportions rose with 10 acre of land of parklands per thousand populace turning into the most broadly acknowledged standard. Other regularizing guides additionally have been refered to as "customary measures," yet not as much of generally acknowledged.

4.1.2.4 Open Spaces Standards in Hong Kong:

The government of Hong Kong defined numerous rules for the arrangement, planning and structure of open spaces in "Hong Kong Planning Standard and Guidelines (HKPSG)". As indicated by the Hong Kong Planning Standard Guidelines, open spaces are commonly isolated

into "Entertainment Open Spaces" and "Green Spaces" meanwhile aforementioned is partitioned in to three chains of importance: District Open Spaces" and "Local Open Spaces and "Regional Open Spaces". In general practice Open spaces provision on a regional level is large: minimum 5 Ha open space is provided. “Open Spaces provision at the district level is seen as medium minimum 1 Ha in order to cater for a population of a district. “Open Spaces provision at Local level is smaller in size a minimum of 500m^2 for the population residing within an urban area to provide for neighbourhood’s residents

Hong Kong Planning Standard and Guidelines (HKPSG)	**Open Space Provision level**	**Open Space Minimum size**	**Open Space recommended size**
Regional Open Spaces	Large	5 Ha	20 Ha
District Open Spaces	Medium	1 Ha	10 Ha
Local Open Spaces	Small	500 m^2 (0.05 Ha)	1 Ha

In the urban regions (counting Metropolitan Areas, New Town), remote island and rustic township, (for example, Sai Kung and so forth.), the rule for open space provision is at least 20 Hectares for each 100k people (for example 2m^2 per individual), meanwhile 10 Hectare ought to be provided as "Open Spaces for District" and 1 hectare ought to be provided for " Open Spaces at local level". Relating to provincial towns and little private advancements in country zones, the scale for provision of open/green space is at least 1m^2 per individual for Local Open Space.

The prime reason for the provision of "Green/Open Spaces" is to preserve common habitat, visual and pleasantry improvements. Many "Green/Open Spaces" has been assigned as per "National Parks" and "Unique Areas" existing as preservation regions secured by by-law, or categorized as "Green Belts", "Preservation Area", "Beach front Protected Areas" in legal framework zone plan and improvement zone plans. Such zones would commonly be for passive entertainment, and preservation, being inappropriate for improvement.

As of today, In any event 1 park in every new towns in the fresh territories with over Eighty percent regional populace residing inside a span at 4oo meters different sorts open space. In case of "National Parks" and the "Exceptional Areas" are considered (such territories spread 40 % of the whole region of 1100 Km^2 in Hong Kong), at that point about 90/100% of the populace is residing inside span 0.4km of green/open spaces from more extensive perspective.

Besides, the parks situated in the urban zone for the most part are within 10 minutes walkable distance from the open transport terminal and effectively available for people in general.

4.1.2.5 Open Space Standards for India

Term open spaces, inside the setting of physical arranging, implies the land secured and utilized by nurseries, schools, play parcels, play areas and parks , and so on (Hamid, A. 2002). The Indian Town Planning Institute suggests keeping guidelines for Open spaces for Indian urban areas. A play area of 2000 to 5000 sq-ft will be required as kids' play area for around 100-200 families. A local play area – the zone is resolved either as 4-7 acre of land or 1 section of land for every 2,000 populaces. A playfield which ought to be given to 4 to 5 neighbourhoods. Territory will be 12-20 acre of land or 1 section of land for 2000 populace. A recreation centre space will be given at the pace of 2.5 acre of land for 1000 populace.

Indian Town Planning Institute

Type	Size	Standard
Regional Park	4 to 5 neighbourhoods	12-20 acre/2000 people
District area	2000 to 5000 sq-ft/150 families	4-7 acre/2000 people
Local Park	Neighborhood	2.5 acre/1000 people

4.1.2.6 Open space Planning Standards in Australia

Table 13 Australian standards

Type	Western Australia Rutherford (2012)	Parks and Leisure Australia (2013)	South Australia (City of Marion)	
Local Open Spaces	Recreation spaces	0.5 hectares	1.5km –0.3 km	Lawn/Turf
Neighbourhood open spaces	Sport space	0.75 hectares-2 hectares	0.4km	Water courses
Sub District open spaces		5 hectares to 6 hectares		Natural areas
District open spaces		Upto 10 hectares	Six neighborhoods per 15k–25k peoples	Undeveloped areas
Townships	Nature space	Upto 10 hectares		Wetlands
Municipality		Minimum 3 hectares	at 2000m from localities	Drainages/storm waters
Rationality		10 to 30 hectares	-	Buffers
States		-	-	Hard surfaces Coastals Unclassifieds

*Source: PLA (2013) *PLA: Parks and Leisure Australia*

Various NSW local committees and different offices keep on alluding to measures into development plan. For instance, the Hurstville City 2004 Community Recreation Facilities and Open Spaces Contribution Plans expresses that measure of open spaces needed to fulfill overall necessities of individual communities maybe thought as 28.3O meter of open spaces per individual [= 2.830 hectares /1OOO population], being generally acknowledged Australian & UK standard for provision of local open spaces inside Urban Metropolitan setting. Centennial

Parklands, one of the government's organization liable for significant parks complexes in focal Sydney, as of late expressed in its magazines: 'The present proportion of open spaces in Sydney is 2.36O hectare/1OOO individuals, much less than generally acknowledged industry's standards of 2.43O hectares/1OOO individuals'. In any event, when boards have not put together their own arranging with respect to the norm, its utilization is still frequently alluded to as acknowledged practices. For example, the Shire Council Sutherland Contributions Plans didn't depend on norms yet alludes at going to '28 Sq m/person i.e. 2.83 hectares per 1OOO population, standard gauges of open spaces provision (Shire Council Sutherland, 2006: 12).

However, in another arrangement identifying with prior discharge zones, a similar gathering states that 'Board recognizes ongoing patterns from the customarily acknowledged.

As expressed before, the standard for park and open space changes incredibly in different urban communities and nations because of fluctuating national, territorial or local settings and situations. Adhering to the table shows gauges for open space per thousand populaces in various urban communities of the world.

4.1.3 Green spaces standards in Pakistan:

	Cities	Sizes (hectares)	Population	m^2/person
1	**Greater London**	4	1000	40
2	**Edinburg**	2.9	1000	29
3	**Cambridge**	4.6	1000	46
4	**Washington**	3.8	1000	38
5	**Minneapolis**	2	1000	20
6	**Los Angeles**	4.85	1000	48.5
7	**Kansas City**	3.64	1000	36.4
8	**Bristol**	1.0	1000	10
9	**India**	0.8	1000	8
10	**Pakistan**	**0.52**	**1000**	**5.2**

Source: Sustainable development and planning VIII, C.A. Brebbia, 2016

4.1.3.1 The issues and challenges of a standards approach in providing urban green space in Pakistan:

Like other countries, Pakistan has its own infrastructure classification and standards, approved by the Government of Pakistan. According to the report of the Government of Pakistan; Ministry of Housing and Works, Environment and Urban Affairs Division, in Pakistani cities planned green spaces are generally associated with outdoor recreation which is further subcategorized into stadiums and play field, designed for active recreation. At the same time

parks, zoos etc, are meant for relaxation, sightseeing i.e. passive recreation. The demand for active recreational facilities is very much a function of social preference. But increasing size of population and population density implies that Bahawalpur city is in dire need of parks. In sub-tropical countries like Pakistan, hot weather prevails for a longer period of the year. Therefore, the propensity for parks can be assumed to be very common. Given the table below describe the classification, standards, and properties of urban parks for passive recreation followed by all the municipalities and cities of Pakistan (PEPAC, 1986). According to (PEPAC, 1986)" at gross urban area densities around 30 persons per acre (which are common in cities of the country), it implies 18% of land should be reserved for planned open spaces, at 20 persons per acre it is 12%". Recommended by Punjab Local Government and Community Development Department, any private housing scheme developer who needs approval from the Tehsil Municipal Administration or Development Authority must adhere to requirements of "open space or park seven percent (7%) or above" (Government of Punjab, 2010).

Table 14 Pakistan standards

Type	Size	Catchment Area	Characteristics
Metropolitan City Park	50-70 hectares	Up to 3,200- 8,000 meters	A specialized facility containing zoo & botanical garden
City Park	12-15 hectares	3,200 meters or more	Wide range of amusement facilities, fountains, lake, landscaping etc.
Community Park	4-5 hectares	1,200 meters	Selected amusement facilities, paved walks, tree plantation
Neighborhood Park	3.25-4 hectares	About 400 meters	Wide range of child play fixtures, walking and jogging paths
Mohalla Park	1.6-3.6 hectares	About 400 meters	Tot-lots with slides, swings, other spaces with some greenery

Source: (PEPAC, 1986)

According to the Government of Pakistan cited in National Reference Manual on Planning and Infrastructure Standards (PEPAC, 1986), it implies that 18% of the land should be reserved for planned open spaces. Particularly for the residential colonies, according to Punjab Local Government and Community Development Department, any private housing scheme developer who needs approval from the Tehsil Municipal Administration or Development Authority must adhere to requirements of "open space or park seven percent (7%) or above" (Government of Punjab, 2010).

The study reveals further that planned residential areas and government residential colonies have relatively better parks for the residents than other residential areas. (Asad Ali Khan, Adila Shafwat, 2014)

The high urbanization rate has become the main obstacle in preventing the local authorities from achieving the standards. The needs for infrastructure development and the demand for urban green space provision grow in parallel and compete with each other for the scarce urban land order to meet the demand of increasing population as witnessed in Kuala Lumpur and Penang. The expansion of residential, commercial and other spatial infrastructure due to rapid urbanization has caused the decline of urban green space provision. Urban green space will always give way to infrastructure development that seems to be the priority in most high-density cities. city. According to Abdul Mutalib the limited urban space and land scarcity has led to the changing need for urban land use status from public to other purposes, which has also worsened the situation. Thus, the provision of urban green space has become more critical and difficult. This reason was somehow responded to the declination of urban green space quantity and has caused inadequacy of urban green space provision in high-density city. The lack of consideration in the user preferences has caused the design of urban green space based on planning guidelines that occasionally not paralleled to the needs of the current and specific users. Thus, it produces monotonous, bland and plain green spaces that users find it unattractive. It happened when most of the developers provide the urban green spaces solely to fulfil the minimum requirements of planning permission approval, omitting the population's needs. As a result, it neglects the high quality of urban green space that should be delivered to the users. If further actions fail to take place by the related agencies much sooner, the target of the standards will never be attained and caused the local authority to face inadequacy and poor quality of urban green space provision for urban dwellers in the future.

4.2 To analyse the existing status of open/green space in approved plans versus on-ground realities.

Out of 238 private housing societies, 29 societies were selected while out of 58 public housing societies, 11 were selected on the basis of availability of high definition maps, land use legend, development stage and other constraints. The societies were chosen at random yet close proximity societies were preferred due to the limited research budget. The total area of the society was taken from the approved map legend along with the total OGS area. It was then compared with the OGS area calculated through Google Earth and the difference was then computed as percentages for better understanding. These percentages were then used to draw graphs and analyze which societies had not provided approved OGS area.

Table 15 Difference in approved Private Housing Schemes OGS and actual OGS provided in perccentages

	Name	Total Area (Kanal)	Map OGS Area (Kanal)	Google Earth OGS Area (Kanal)	Difference (Kanal)	Difference (Percentage)
1	Gujjar pura	5101.6	234	162.4	71.3	30.5
2	Izmir town	4104.1	308	281.4	26.6	8.6
3	Khaiban e amin	2760.5	195	149.3	45.9	23.5
4	Canal view Coop Housing society	2013.3	140	128.5	11.7	8.3
5	Wapda town Phase II	1817.1	134	100.5	33.1	24.8
6	Tariq Gardens	1461.3	117	90.6	26.2	22.5
7	Abdalian cooperative housing	1395.0	98	96.4	2.0	2.0
8	Nawab Town	1366.1	78	82.5	-5.0	-6.5
9	Engineering University ECHS	1047.3	107	72.8	34.5	32.1
10	Airline society	884.3	74	50.6	23.0	31.3

11	Employees Revenue Block B	844.0	69	61.4	7.6	11.0
12	Employees Revenue Block A	760.18	39	36.1	2.8	7.1
13	River edge	765.8	51	22.6	28.2	55.5
14	Azam Gardens	734.8	39	29.2	10.3	26.1
15	Rail town	679.0	36	31.0	5.3	14.6
16	Westwood Society	663.4	35	29.4	5.3	15.3
17	P&D employees coop	645.8	45	38.1	7.1	15.8
18	River Edge	543.4	55	43.4	12.1	21.8
19	Sheraz	539.8	32	22.8	9.1	28.6
20	Gulshan e mustafa	507.0	31	30.9	0.1	0.5
21	Khaiban e khairaud din	423.0	26	24.4	1.6	6.3
22	Gulshan e jinnah	316.4	22	20.1	2.0	9.2
23	Hassan town	259.0	14	10.5	3.4	24.3
24	Khayam mini city ph-I	205.9	14	14.5	-0.1	-0.3
25	Gulshan e shalimar	177.5	9	9.1	-0.5	-5.9
26	Kings town	175.3	12	10.9	1.4	11.5
27	Khayaban e quaid	152.0	16	15.1	0.8	4.8
28	Khayban e khairud din ext	71.0	5	4.7	0.3	6.2
29	Khayaban e Zahra	66.7	10	5.1	4.9	48.5

Table 16 Difference in approved Private Housing Schemes OGS and actual OGS provided in percentages

	Name	Total Area (Kanal)	Map OGS Area (Kanal)	Google Earth OGS Area (Kanal)	Difference (Kanal)	Difference (Percentage)
1	Gulberg 1	1217.2	115.52	80.088	35.432	30.67
2	Civic centre township	2389	167.23	146.36	20.87	12.48
3	Allama Iqbal	9281	239.4	214.72	24.68	10.31
4	Gulberg-4	678.8	36.85	34.06	2.79	7.57
5	Faridkot housing	764.83	53.5381	50.61	2.9281	5.47
6	Gulberg- 3	8754.52	475.64	455.18	20.46	4.30
7	Faisal Town	3605.4	191.02	183.68	7.34	3.84
8	Data Nagar	176	9.55	9.45	0.1	1.05
9	New Garden Town Scheme	6911.3	375.28	373.14	2.14	0.57
10	Arya Nagar	106	8.904	9.1	-0.196	-2.20
11	Begumpura	28.12	0.58	0.6	-0.02	-3.45

It was observed that out of a total of 40 public and private housing societies, 95% of housing societies had not followed the approved provision of OGS and violated the bye-laws. Although the threshold for minimum OGS land converted is set at +2 Kanal. Still 80% public and private societies still violated the OGS provision standard according to their approved housing maps.

4.3 Sample Size

For population sampling Cochran's Formula was used, $\boldsymbol{n^{o} = \frac{z^{2}(p)(q)}{e^{2}}}$

Using 90% confidence level *z score* was chosen to be "1.645" and *p value* was estimated to be 50% i.e. 0.5 as *q=1-p* therefore *q value* was 0.5, e is the *precision level* which was chosen to be 5% therefore the value was 0.05, using these values population sample size was found to be 355.

4.4 Highlighting determinants for using Open Green Spaces in Public/Private housing societies

Principal component analysis extracts and categorizes the variables that correlates with each other into sets of latent factors as discussed below.

4.4.1 Checking the reliability of scale

The Cronbach's alpha value for the determinants is measured to be 0.889 therefore scale is reliable enough to perform further analysis.

Table 17 Cronbach's alpha value

Cronbach's alpha value for determinants		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.889	.891	20

4.4.2 KMO measure and Bartlett's test

KMO and Bartlett's values are shown below. Both tables show that the KMO value is adequate for sampling adequacy i.e. above 0.801 for determinants. The Bartlett's test of sphericity values in 696.221 is acceptable (Azeem et al., 2017; Mao et al., 2015) and the significance value is 0.000 which is below 0.001. Hence, the correlation matrix is not an identity matrix and PCA can proceed

Table 18 KMO and Barlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.801
Bartlett's Test of Sphericity	Approx. Chi-Square	696.221
	df	190
	Sig.	.000

4.3.3 Factor Extraction for Determinants

The purpose of this investigation is to find out underlying determinants affecting the public usage of public and private housing societies. From the survey, the determinants were found. To properly analyse the survey Factor analysis using the Principal component method was done. The analysis can reduce a large number of indicators into fewer groups. Variables that are sufficiently correlated are conceptually tied to each other and therefore are grouped.

Based on factor loading using varimax rotations, factor analysis of determinants of OGS usage by the public within the housing society have categorized 20 determinants into 05 lateral factors with the Eigen values greater than "01" as shown in

Table 19 Total Variance Explained of the Determinants

	Initial Eigenvalues			Rotation Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	6.570	32.848	32.848	3.300	16.499	16.499
2	1.951	9.757	42.604	3.101	15.505	32.003
3	1.602	8.009	50.613	2.268	11.341	43.344
4	1.421	7.104	57.717	2.085	10.425	53.770
5	1.124	5.621	63.338	1.914	9.569	63.338
6	.955	4.773	68.112			
7	.886	4.430	72.542			
8	.834	4.172	76.714			
9	.710	3.550	80.264			
10	.603	3.016	83.280			
11	.561	2.805	86.085			
12	.499	2.494	88.578			
13	.412	2.061	90.639			
14	.367	1.836	92.476			
15	.331	1.657	94.133			
16	.311	1.553	95.686			
17	.271	1.354	97.040			
18	.236	1.182	98.222			
19	.184	.920	99.142			

20	.172	.858	100.000

Extraction Method: Principal Component Analysis.

These five components explains the total variance of 63.338 % which is acceptable (Azar & Al Ansari, 2017; Nordhoff et al., 2018).

Table 20 Rotated component matrix for factor extraction

		Rotated Component Matrix				
Code	**Component**	**1**	**2**	**3**	**4**	**5**
D1	Cleanliness	.802				
D2	Beautification	.723				
D3	Silence	.610				
D4	Security personnel	.564				
D5	Sitting places	.534				
D6	Parking space	.527				
D7	Walking distance from home		.727			
D8	Walkways		.722			
D9	Adequate lighting		.627			
D10	Integration of park, playground, jogging track		.624			
D11	Accompanied by Family		.624			
D12	Different accessible hours for different age groups; families, young adults etc for parks, playgrounds etc			.825		
D13	Separate sections for Male/Female for parks, playgrounds etc			.722		
D14	Personal space			.611		
D15	Provision of shade			.543		
D16	Longer open hours for parks, playgrounds etc				.696	
D17	Accessibility; Entrance/Exit gates for parks, playgrounds etc, Visually inaccessible spaces				.685	

D18	Swings/children play areas for parks, playgrounds etc	.617
D19	Organized entertainments	.784
D20	Refreshment café	.648

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 9 iterations.

The 05 groups of factors deducted by factor analysis of determinants is shown in

Table 20 Rotated component matrix for factor extraction. Those variables shall be eliminated from interpretations due to factor loading less than 0.4 and between 0.5 (Mao et al., 2015) and 0.3 (Azar & Al Ansari, 2017; Biernat et al., 2018).

Table 21 Group extraction after factor extraction

The five components were named accordingly to their contents. Furthermore, determinant index was found using the equation:

$$\text{Determinants Index} = \frac{D1+D2+D3+\cdots Dn}{n}$$ *Determinants index equation 1*

Where 'D' are the determinants from separate groups and 'n' is total number of determinants. After factor extraction, internal reliability of each factor was also checked to see whether all the variables in these eight factors show maximum reliability and that internal reliability will not increase if a certain variable is deleted. Consequently, no variable was found showing the possibility of an increase in internal reliability value if deleted.

4.3.4 Anderson Rubin Test for effectiveness of factor analysis:

		Aesthetics	Infrastructure	Privacy	Accessibility	Fun
N	Valid	83	83	83	83	83
	Missing	0	0	0	0	0
Mean		.0000000	.0000000	.0000000	.0000000	.0000000
Std. Deviation		1.00000000	1.00000000	1.00000000	1.00000000	1.00000000

Anderson-Rubin (A-R) test is a way to assess the effectiveness of the factor analysis. The groups that have been made are checked for consistency. Using the mean score and standard deviation of each group we can accept the analysis as consistent and good for interpretation.

Groups	Aesthetics	Infrastructure	Privacy	Accessibility	Fun
Factors	Cleanliness	Walking distance from home	Different accessible hours for different age groups; families, young adults etc for parks, playgrounds etc	Longer open hours for parks, playgrounds etc	Organized entertainments
	Beautification	Walkways	Separate sections for Male/Female for parks, playgrounds etc	Accessibility; Entrance/Exit gates for parks, playgrounds etc, Visually inaccessible spaces	Refreshment café
	Silence	Adequate lighting	Personal space	Swings/children play areas for parks, playgrounds etc	
	Security personnel	Integration of park, playground, jogging track	Provision of shade		
	Sitting places	Accompanied by Family			
	Parking space				
Determinant Index	3.9663	4.1064	3.7922	3.8072	3.7169

4.4 Explanation of Determinants:

Table 22 Highly effective determinant

Aesthetics				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Very Low	1	1.2	1.2	1.2
Low	6	7.2	7.2	8.4
Moderate	19	22.9	22.9	31.3
High	30	36.1	36.1	67.5
Very high	27	32.5	32.5	100.0
Total	83	100.0	100.0	

4.4.1 Aesthetics:

It was found that aesthetics played the most important role in the decision to go to OGS. The presence of hygiene factors such as cleanliness was most important for the respondents as it is undesirable to visit dirty OGS for relaxation purposes. Beautification and silence were also important factors for respondents as an eye-pleasing place would be more pleasing and be visited more often as well as the presence of silence and serenity was a significant factor for people visiting so they could get away from the noisy daily routine for some time. The presence of security personnel was also a very important factor for the respondents as people feel much safer with some form of security being around them, so they can enjoy their time in the park, playgrounds without threat to their wellbeing. Another important factor for the respondents was the availability of sitting places such as benches. Also presence of parking spaces was an important factor for visiting public as some OGS being far from their homes they have to drive their families in cars subsequently needing a car parking space.

Table 23 Highly to Very Highly effective determinant

Infrastructure				
	Frequency	Percent	Valid Percent	Cumulative Percent
very low	1	1.2	1.2	1.2
low	9	10.8	10.8	12.0
moderate	23	27.7	27.7	39.8
high	22	26.5	26.5	66.3
very high	28	33.7	33.7	100.0
Total	83	100.0	100.0	

4.4.2 Infrastructure

Infrastructure was also found to be highly affecting factor as respondents were very keen on the availability of proper infrastructure facilities which would affect their choice of visiting the OGS. The most important determinant among these factors was walking distance from home to their nearest OGS. The respondents with less distance to OGs were keener on visiting the green spaces than those with large distances. Another important factor of importance for the respondents was the presence of walkways, as many people come to the OGS for a good amount of fitness activities and a nice evening stroll with their family and the absence of a walkway may hinder that opportunity for them. Adequate lighting was also a very important determinant for respondents as most of them visited the OGS after their office hours or home chores in the day time thus the presence of adequate lighting was mandatory for them to have a nice evening walk or enjoy the leisure time. In this way one could jog while his family and children could enjoy the park/playground. During the visit to an OGS the prospect of being accompanied by a family member, a work colleague or a friend was also marked important by the respondents as for a lot of people this time of visiting OGS is also employed for catching up with friends and family so they prefer having someone along during the visit to OGS.

Table 24 Moderate to highly effective determinant

Privacy				
	Frequency	Percent	Valid Percent	Cumulative Percent
very low	2	2.4	2.4	2.4
low	12	14.5	14.5	16.9
moderate	27	32.5	32.5	49.4
high	24	28.9	28.9	78.3
very high	18	21.7	21.7	100.0
Total	83	100.0	100.0	

4.4.3 Privacy:

The factor of privacy was also deemed important by the respondents as a lot of their majority claimed to go to OGS with their families and also to follow our cultural norms we tend to be at places with the family environment thus the privacy factor. Different accessible hours for different age groups were deemed the most important for respondents. Those who brought their families to OGS preferred doing that when only families are around and age groups are time-barred. Also some respondents who wanted to only have their own age fellows around with much more free environment than families. Similarly, the presence of separate sections for Male/Female for parks was also very important for respondents. It meant they could visit the OGS any time possible in the day and won't have to wait for the specified time fixed for the families. The presence of personal space was an important determinant for respondents as people want their personal space to enjoy their time while visiting an OGs after a day at work or home chores. During visiting OGS, respondents felt it necessary to have an appropriate arrangement of shades, which seems appropriate as our country has different seasons among which humid, dry and quite hot temperatures are experienced.

Table 25 Highly effective determinant

Accessibility				
	Frequency	Percent	Valid Percent	Cumulative Percent
very low	1	1.2	1.2	1.2
low	15	18.1	18.1	19.3
moderate	21	25.3	25.3	44.6
high	22	26.5	26.5	71.1
very high	24	28.9	28.9	100.0
Total	83	100.0	100.0	

4.4.4 Accessibility:

Accessibility was a highly effective factor group for respondents as when visiting an OGS apart from the OGS being close to their homes it had to be highly accessible in their view. If an OGS wasn't properly accessible for the general public, then it won't be visited by them. Most of the respondents wanted longer open hours for parks, playgrounds etc as the respondents felt the need to visit OGS after they've had a working day, home chores completed and free from other commitments to enjoy their off time in an environmental friendly and an eye-appealing place. If the OGS was shut early in evening, then those with work/home commitments wouldn't be able to visit these parks ultimately shutting this door for them unless they find some other activity with same attributes. Also the presence of a suitable number of entry/exit gates was deemed important determinant by the respondents as they needed a suitable number of entry/exit gates to be able to enter and leave through any gate instead of circling back to the same gate they had entry through. Also if an OGS was visually inaccessible but in reality it wasn't then it'd also discourage residents from visitation, it may happen due to poor planning of entry/exit gates etc. The respondents also rated the importance of the presence of children swings/play areas in parks and playgrounds, as a lot of families have to bring their children put of need as they cannot leave them at home. At the same time they go outside or due them being the sole reason as children prefer outdoor activity once in a while. Thus having these accessories in an OGS may improve the chances of general public visitation.

Table 26 Highly effective determinant

Leisure				
	Frequency	Percent	Valid Percent	Cumulative Percent
very low	1	1.2	1.2	1.2
low	14	16.9	16.9	18.1
moderate	19	22.9	22.9	41.0
high	39	47.0	47.0	88.0
very high	10	12.0	12.0	100.0
Total	83	100.0	100.0	

4.4.5 Leisure:

Leisure as a factor group was also rated highly effective by the respondents in their choice to visit an OGS. As in their opinion it was the reason one pursues the very idea of taking out some time to visit an OGS. Among the daily routine that turns hectic for a lot of us, some time is only used for sitting in a green place with no commitments, no work life, no chores, just serene time to yourself enjoying by yourself or with your friends and family. The respondents felt that organized entertainments such as stalls where one could win something against a fun game, a puppet show for children etc, were very appealing for them as they'd help them feel some distance from the daily round the clock routine they deal with. Also the presence of refreshment cafes around the OGS was deemed quite important for the respondents as after having a jog, a nice walk, or running after your kids one may get thirsty or the children may want some snacks, so in case one forgets to bring home made sandwiches or doesn't want to carry extra burden while walking to the OGS, they may have an option in the OGS to do so.

After factor extraction, the internal reliability of each factor was also checked to see whether all the variables in these 04 factors shows maximum reliability and that internal reliability will not increase if a certain variable is deleted. Consequently, no variable was found showing the possibility of an increase in internal reliability value if deleted.

4.6 Expert Survey on the causes of OGS conversion into other land uses

4.6.1 Civil Society:

Academics/NGO's/Lahore Chamber of Commerce

Among the experts who were interviewed, 25% belonged to the cadre of academicians who agreed with the fact that OGS is being converted into other land uses especially on the periphery areas into societies and other constructed areas which is not only the cause of food insecurity but it's also affecting the livelihood of farmers being settled there, the institutions that are supposed to watch over the implementation of bye-laws safeguarding the rights of people specially poor people are not taking enough concern/effort to protect them because of the extra profit they might get from the society owners as a bribe. "One of the experts remaining anonymous said," The institutions that are supposed to protect the right of common people look away when construction tycoons occupy the land meant for green/agriculture space because of high amount of resources that they might get in return". The housing needs of the country is facing a constant increase that too being quite exponential and the land inside the city being already scarce , the constructers are keen in developing more and more houses while neglecting the psychological need for OGS, also due to land scarcity issue and a great housing need the general public also caters the need for OGS as a wastage of space thus leading to constructers building them housing societies stepping over the government's bye-laws of mandatory development of OGS in every housing society. One academician anonymously claimed "The administration looks the other way in many cases as they are being offered prime location plots in return for turning a blind eye towards the bye-laws". The academicians agreed that in the absence of proper interest from the OGS administration, the OGS might fail to attract the public from visitation hence ultimately be a barren piece of land just laying there amidst quality construction and prove to be a land waiting to be the victim of land greed and be converted into some other land use i.e. commercial/residential, as the incompetence of OGS administration would also not pay any heed in the event of such piece of land being converted into other land use. Upon the question of some recent cases in Punjab related to land conversion and the responsible authorities being alarmed by it or not, the academicians were quick to criticize the lack of appropriate response from the said authorities which would further reduce the happening of such incidents, rather cause an increase in the audacity of people carrying out this illegal activity. Among the chief factors causing these type of land conversions, the top tier causes were pointed out to be the lack of awareness by the general public about the importance of OGS and the weak implementation of bye-laws to provide, maintain and ensuring the land rights of an OGS by governmental bodies. As the aforementioned cause was related to the

uninformed public about the importance of OGS, as being a developing country our problems at this stage of our country's development are somewhat of other priorities, in which our society currently prefers having a commercial/residential land use in the place of a barren piece of land with just the name tag of OGS that also due to the poor maintenance standards. But even if the OGS were to be in good shape, this lack of awareness by the general public about the OGS's importance to society and the environment would cause the same effect of land conversion, which is very unfortunate. The other top cause identified by the academicians being the weak implementation of policy measures and bye-laws by the governmental bodies is due to absence of coordination between different departments along with the problem of duplication of roles, such as there are different departments with the responsibility of the same role. Still they are putting it on each other while the main task gets unresolved and unattended. This confusion is taken advantage of and the awaiting parties swiftly convert this OGS into required land use and eat away at the huge profits.

4.6.2 Private

Real Estate Owners/Land Developers/Property Dealers:

OGS is important but living in a house of their own with a cheap piece of land in a good society is more important for working class people. For that reason, OGS do experience land conversion and only those who already have houses oppose the conversion of OGS. OGS is provided as per the approved plans in most of societies being developed by the developers at least in the initial stages as government officials mostly visit the developing sites in this phase. As time passes these visits tend to decrease both in frequency as well and the intensity of legalities and bye-laws bounding. After that obviously the developers who know the land conversion of these OGS would profit them hugely, they do try to gradually turn them into residential and commercial plots and sell them accordingly. A real estate personality remaining anonymous stated "We are hesitant at first about this activity that's why we follow it at a gradual pace instead of immediate. But once we have completed most of conversion we tend to protect that investment by allocating resources into relevant intruding official pockets, it's illegal obviously but we have to safeguard our interest in a manageable way and institutional lapses pave the way for us". Another group of land developers group was hesitant to relay the details or even give their opinions but they were quite against the allocation of even minimal percentage of land to OGS regarding it as a waste of land which could have been made into huge profits. So property dealers remaining anonymous stated that they've had investors scouting for possible ill-maintained pieces, undeveloped pieces of OGS land in already developed societies which may be converted into profitable residential and commercial plots. Among the leading causes for conversion of OGS, the group of real estate owners and land

developers placed the lack of public usage of OGS and considerable profits in land conversion for their cadre at the top. Among the top factors leading to land conversion they put critical housing need and weak intensity of institutional supervision during the initial stages of OGS provision as the top factors leading to land conversion of OGS. From this we can assess that the failure in the provision of OGS adhering to public need and environmental importance is the fault of institutional weakness in implementing the bye-laws and land regulations. It can't be pinned on the accuracy and effectiveness of land rules and regulations although they are decades old and held responsible by some to be outdated or ineffective.

4.6.3 Government Officials:

Lahore Development Authority/ Parks and Horticulture Authority (PHA)/ Walled City of Lahore Authority/ Department of Planning and Development/ Cantonment board/ Metropolitan Corporation Lahore

More than 65% of the expert cluster consisted of government officials because currently Lahore has many land authorities overseeing the role of land custodians and the enforcer of land rules and regulations such as Lahore Development Authority (LDA), Parks and Horticulture Authority (PHA), Walled City of Lahore Authority, Department of Planning and Development, Cantonment board, Metropolitan Corporation Lahore. It was quite important to collect the expert opinion from most of these authorities among all of these authorities. Also due to the constraint of Covid-19, not all of these authorities could be covered. Still a good amount of expert interviews were conducted and a database was constituted. They did agree to the phenomenon of land conversion of OGS to other land use and stated that steps were being taken to mitigate these issues efficiently and swiftly. On the question that were the OGS being provided by the developers their response was in agreement that whether it's illegally converted later on into other land uses but they sure are provided when the land in being developed. It was observed that a lot of blame was put on other departments responsible for overseeing the peripheral boundaries of a city being developed, which in their view was paving way for the developers to turn those areas into housing societies, resulting in unprecedented growth of housing societies growing illegally and making it hard for already resource exhausted authorities to check them too. One official remaining anonymous stated that "We have put forward multiple requests to treasury department to increase our budget for buying appropriate machinery, hiring more staff and having more legislative powers but it has been stalled for years now", another anonymous official mentioned, "It has happened a lot of times that we plan to raid some illegal establishment/construction site where land use is being altered but the news gets leaked and before we can even reach the relevant place, people in thousands gather to make a ruckus which eventually results in a possible scuffle and ultimately a court stay,

which hinders our progress as well as results in relevant officials being transferred away from their stations". The lack of public awareness about the importance of OGS was also highlighted by the officials. As a preventive measure to deal with this situation awareness campaigns were launched to educate public about the importance of OGS. The officials straightforwardly denied any claims whatsoever about the possible bribes from the developers or real estate owners in order to turn a blind eye towards the illegalities as claimed by the academicians as well as the developer cadres, but remaining anonymous did accept the fact that in some cases external pressure from higher-ups and political elites, they have to back down or delay some proceedings against some real estate tycoons which would have faced huge fines due to violations of land rules and regulations, which is alarming. Rapid urbanization and critical housing need were picked as top tier factors leading to the weak implementation of land bye-laws while profiteering by the private sector and lack of public awareness about the importance of OGS was considered the most important contributors to the land conversion by most of government officials.

4.7 Policy Recommendations

Throughout the research it was observed that many institutional and policy issues need to be resolved to provide sufficient open spaces to the public. Following are the key policy recommendations that should be seen as guidance for a better approach towards OGS.

1. Departmental coordination on a level that ensures smooth flow of relevant information and resources has to be imminent and red-tapism must be ended.
2. Awareness campaigns have to be arranged by the relevant authorities so public pressure along with their renewed interest in the OGS protection discourages developers from converting OGS lands to other land uses for profiteering.
3. The accountability authorities charged with in land audits and departmental resource management, have to increase their efficiency to ensure the transparency in the authorities and their officials against the execution of their responsibilities in implementing the land rules and regulations.
4. Special courts or special court sessions have to be arranged for the hearing of legal cases related to land conversion and development projects. These cases face a swift k resolution thus resulting in more power to the land regulation authorities and their lawful action against land conversion parties.
5. Every official responsible for implementing bye-laws must be bound to report about their actual society visits with complete details of current on-ground situations, which

must be vetted as a background check by the relevant accountability authorities to minus any chances of corruption.

6. The land authorities have to arrange scheduled surveys with the residents of societies to get feedback about possible illegal activities taking place in the background and highlight their problems and issues.
7. GIS and Information technologies should be used at least weekly to check on actual on-ground situations with departmental coordination with SUPARCO to reduce the burden on administrative machinery

Appendix 1: Social Questionnaire

NOTE: This questionnaire is just for academic research purpose, information acquired will not be shared with any personnel

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Name: _____

Age: _____ **Gender: M / F** **Occupation:** _____

Income: _____ **Household Size:** _____

Distance to nearby Park/Playground: _____

5	4	3	2	1
Definitely Yes	**Probably Yes**	**Not sure**	**Probably No**	**Definitely not**

1	What would you term open/green space as, if options are;	Necessity	Amenity	Luxury	Waste of space	
2	When you go out for recreational purpose where do you usually go?					
3	How many times in a week are you likely to go to an open/green space?					
4	On a scale how likely are you to go to an open/green space on a holiday?	5	4	3	2	1
5	On a scale how likely are you to go to an open/green space on a working day in the early morning/evening?	5	4	3	2	1
6	Do you agree that the intensity of the traffic in this neighborhood is annoying enough that it may overcome your need to go to an open/green space?	5	4	3	2	1
7	How satisfied are you with public spaces in your neighborhood as a social gathering place?	5	4	3	2	1
8	On a scale, how would you rank the importance/effect of absence of following elements contributing towards open/green spaces not being used by the public;					
i.	Accessibility; Entrance/Exit gates for parks, playgrounds etc, Visually inaccessible spaces	5	4	3	2	1
ii.	Separate sections for Male/Female for parks, playgrounds etc	5	4	3	2	1
iii.	Longer open hours for parks, playgrounds etc	5	4	3	2	1
iv.	Refreshment café	5	4	3	2	1
v.	Swings/children play areas for parks, playgrounds etc	5	4	3	2	1
vi.	Integration of park, playground, jogging track	5	4	3	2	1
vii.	Adequate lighting	5	4	3	2	1
viii.	Walkways	5	4	3	2	1
ix.	Security personnel	5	4	3	2	1
x.	Sitting places	5	4	3	2	1
xi.	Silence	5	4	3	2	1
xii.	Different accessible hours for different age groups; families, young adults etc for parks, playgrounds etc	5	4	3	2	1
xiii.	Beautification	5	4	3	2	1
xiv.	Walking distance from home	5	4	3	2	1
xv.	Cleanliness	5	4	3	2	1
xvi.	Personal space	5	4	3	2	1
xvii.	Provision of shade	5	4	3	2	1
xviii.	Parking space	5	4	3	2	1
xix.	Organized entertainments	5	4	3	2	1
xx.	Accompanied by Family	5	4	3	2	1
9	In your opinion what are the most limiting factors for activity in the public open space such as local park in your neighborhood?					
10	Would you be ok if a marginalized community group/family visits the same park as your family?	5	4	3	2	1

11	Do you think the involvement of residents in the management of public spaces would improve the existing situation?	5	4	3	2	1
12	Do you think privately operated programs for the management and maintenance public spaces and places might be better than government operated ones?	5	4	3	2	1
13	If commercial area is far from your home, would you support a conversion of a nearby open/green space into a commercial area?	5	4	3	2	1
14	Would you agree that in an attempt to curb crime, regeneration strategies or policies driven approaches aimed at reducing vandalism or misuse, has instead decreased public users?	5	4	3	2	1
15	Do you agree that the Covid-19 pandemic has highlighted how the provision of public spaces in residential areas (parks, gardens, balconies) can serve the purpose of ensuring public health during a pandemic?	5	4	3	2	1

Suggestions & Recommendations:

Appendix: 2 Expert Questionnaire

NOTE: This questionnaire is just for academic research purpose; information acquired will not be shared with any personnel

Name: _____ **Department:** Pvt/Gov/Sem-Gov

Age: _____ **Gender:** M / F **Organization:** LDA/Real Est

Designation: _____ **Service Period:** _____

1	Are Open/Spaces being converted into other land uses? If yes what are the institutional lapses hindering the implementation?
2	Are Open spaces being provided by the developers as per the approved plans? If no then why.
3	Are the existing open space standards adequate as per todays housing needs and dynamics? If not then what is missing?
4	Would you agree that the continuous growth of urban areas without effective management and monitoring of their proper beneficial use has led to developers illegally developing the land allocated for open spaces as residential and commercial purposes?
5	Would you agree that the continuous growth of urban areas without effective management and monitoring of their proper beneficial use has led to conversion of existing open spaces into other land uses?
6	In the case of inadequate usage of an open space, to what extent the provision of amenities and open space policies to guide the maintenance of parks is responsible?
7	In the complete absence of public usage of an open space, should it be converted into any other land use for general public advantage?
8	Does the idea hold potential that, conversion of un-utilized and empty lands that constitute nuisance in the cities to be re-designed as public open spaces in addition to the few existing ones?
9	Are the existing standards for provision of open space in Pakistan aligned with that of modern approaches? If no then how long would it take for our institutional system to catch up?
10	Recently there have been cases in housing societies in Punjab, where even graveyards were converted and local Nullahs passing through the scheme were earth filled and developed into residential plots. Are our institutions alarmed or concerned about such activities at the level they should be?
11	To what or any extent, public pressure in lieu of land provision for housing has been a factor in the conversion of open spaces into other land use?
12	Is there is a lack of harmony in carrying out individual and corporate tasks in planning, development and protection between concerned/responsible institutions?
13	Whether its credited to the lack of awareness or vice versa but an ill-informed public would prefer a piece of land for commercial or residential use over that of green space any day, If that's the case then what should be our institution's role in rectifying such thinking?
15	Among other urban housing issues how much priority would our institutions would grant to major differences of green space provision thus deviations from original master plans for public/private housing societies?
16	Private housing schemes being developed by an independent person are more prone to deviation from the approved plans but why we can also see nearly the same practice being going on in public housing societies under the direct control and supervision of housing authorities?

17	Some **factors** contributing to the lack of implementation of as per approved plan **provision** of green spaces are as follows please rate them on a scale of 1-5, 1 being least effective and 5 being most effective,					
	Critical housing need	**1**	**2**	**3**	**4**	**5**
	Rapid Urbanization	**1**	**2**	**3**	**4**	**5**
	Lack of institutional supervision during development phase	**1**	**2**	**3**	**4**	**5**
	Profit making	**1**	**2**	**3**	**4**	**5**
	Influencing the concerned officials/departments to turn a blind eye	**1**	**2**	**3**	**4**	**5**
	Inadequate or weak laws that are outdated as per todays need, dodge able or easy to get around through litigation	**1**	**2**	**3**	**4**	**5**
18	Some **causes** contributing to the **conversion** of green spaces into other land uses are as follows please rate them on a scale of 1-5, 1 being least effective and 5 being most effective,					
	Lack of institutional monitoring after development phase	**1**	**2**	**3**	**4**	**5**
	Profiteering	**1**	**2**	**3**	**4**	**5**
	Huge return in conversion to commercial land	**1**	**2**	**3**	**4**	**5**
	Lack of awareness of open space importance to the environment and population	**1**	**2**	**3**	**4**	**5**
	Absence of public usage due to unawareness, lack of interest in physical activity leading by majority population or inadequate accessibility/facilities/beautification in an open space.	**1**	**2**	**3**	**4**	**5**
	Zero maintenance	**1**	**2**	**3**	**4**	**5**

19: Suggestions to solve these problems: _____

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References

1956 Recreation and Park Yearbook. George D. Butler, Editor. National Recreation Association, 1956.

A Guide for Planning Facilities for Athletics, Recreation, Physical and Health Education. A Workshop Report, Athletic Institute, 1947.

Barbosa, O., Tratalos, J. A., Armsworth, P. R., Davies, R. G., Fuller, R. A., Johnson, P., & Gaston, K. J. (2007). Who benefits from access to green space? A case study from Sheffield, UK.Landscape and Urban Planning, 83(2), 187-195.

Brown, G. (2008). A theory of urban park geography. Journal of leisure research, 40(4), 589-607. Building and Environment, 108, 284–294.

Butler, George D. Introduction to Community Recreation. Prepared for the National Recreation Association, 3rd edition, McGraw-Hill Book Co., 1959.

Butler, George D. Recreation Areas. National Recreation Association, 1958.

Butler, George D. Standards for Municipal Recreation Areas. National Recreation Association. Revised edition, 1962.

California Public Outdoor Recreation Plan, Parts I, II. State of California, California Public Outdoor Recreation Committee, 1960.

Chiesura, A. (2004). The role of urban parks for the sustainable city. Landscape and Urban Planning, 68(1), 129-138.

E.J. & de Jong, N. 2013. Planning for lively spaces: Adding value to old spaces. 49th Cilliers, E.J. 2010. Rethinking Sustainable development:

The Economic Value of Green Cilliers, E.J. 2015. The Importance of Planning for Green spaces.

Clawson, Marion. Land and Water for Recreation, Policy Background Series. Rand McNally and Co., 1963.

Clouston, B & Stansfield, K. 1981. Trees in Towns: Maintenance and management. London: Comber, A., Brunsdon, C., & Green, E. (2008). Using a GIS-based network analysis to determine urban greenspace accessibility for different ethnic and religious groups.Landscape and Urban Planning, 86(1), 103-114.

Crompton, J. L. (2001). The impact of parks on property values: A review of the empirical evidence. Journal of leisure research, 33(1), 1-31. Dunnett, N., Swanwick, C., & Woolley, H. (2002). Improving urban parks, play areas and green spaces: Department for transport, local government and the regions.

E Thekwini Municipality. 2013. Integrated Development Plan.

EPA (Environmental Protection Agency). 2013. What is Open Space/Green Space?

Golf Operators Handbook, edited by Ben Chlevin. National Golf Foundation, Inc., 1956.

Government of Punjab, L. G. a. C. D. D. (2010). Punjab Private Housing Schemes and Land Subdivision Rules 2010. Lahore: Government of Punjab, Local Government and Community Development Department

Guide for Planning Recreation Parks in California. California Committee on Planning for Recreation, Park Areas, and Facilities, 1956.

Handley, J., & Nature, E. (2003). Accessible natural green space standards in towns and cities: A review and toolkit for their implementation: English Nature Peterborough.

Harper, J. 2009. Planning for Recreation and Park Facilities: Predesign Process, Principles.

Harrison, C., & Nature, E. (1995). Accessible Natural Greenspace in Towns and Cities: A Review of Appropriate Size and Distance Criteria: Guidance for the Preparation of Strategies for Local Sustainability: English Nature.

Hayden Brooks, Garcia, R., Guerrero, L., Marler, S., McCabe, C., Osgood, L., . . . Way, H. K. (2011). City of Austin Urban Parks Workgroup Report. City of Austin.

Hedman, R. & Jaszewski, A. 1984. Fundamentals of Urban Design. United States of America.

Kaczynski, A. T., & Henderson, K. A. (2007). Environmental correlates of physical activity: a review of evidence about parks and recreation. Leisure Sciences, 29(4), 315-354.

Kamenicky, M. (2018). Enhanced sound source composition methods for qualitative mapping of urban sound environment. 11th European Congress and Exposition on Noise Control

Kang, J., Aletta, F., Gjestland, T. T., Brown, L. A., Botteldooren, D., Schulte-Fortkamp, B., Coelho, J. L. (2016). Ten questions on the soundscapes of the built environment.

Kaya, E. M., & Elhilali, M. (2017). Modelling auditory attention. Philosophical Transactions of the Royal Society B, 372(1714), 20160101.

Keeble, Lewis. Principles and Practice of Town and Country Planning. 2nd edition, The Estates Gazetto, Ltd., 1959.

Kent, Thomas J. Public Open Space Requirements as a Factor in Determining Maximum Population Density. Division of City Planning, Massachusetts Institute of Technology, Graduate School of City Planning, 1942.

Latinjak, A. T. (2012). The underlying structure of emotions: A tri-dimensional model of core affect and emotion concepts for sports. Revista Iberoamericana de Psicología del

LDA BUILDING AND ZONING REGULATIONS (2019)

LDA Landuse Rules 2019

Levent, T.B., Vreeker, R. & Nijkamp, P. 2004. Multidimensional Evaluation of Green Spaces:

Lewis, Nelson P. The Planning of the Modern City. New York: John Wiley and Sons, 1916.

Local Planning Association, "Recreation and Open Spaces." Published by International City Managers' Association, 1959.

Long Range Park and Recreation Plan, City of Streator, Illinois. Prepared for the Streator Civic Association by the University of Illinois Department of Recreation, June 1961.

Long Range Recreational Plan. City of Baltimore, Maryland, April 1943.

Loukaitou-Sideris, A., & Sideris, A. (2009). What brings children to the park? Analysis and measurement of the variables affecting children's use of parks. Journal of the American Planning Association, 76(1), 89-107.

Marcus, C.C. & Francis, C. 1998. People Places: Design Guidelines for Urban Open Space.

Mensah, C.A. 2014. Urban Green Spaces in Africa: Nature and Challenges. International Metropolitan Planning Council. 2008. Place making Chicago: A neighbourhood guide to place making in Chicago. Four key qualities of a successful place of Urban Transformation: The Origins, Objectives and Implementation of the City of Cape

Parker, E. 2014. Proposals for the development of child-friendly spaces in urban areas

Planning and Building the Golf Course. National Golf Foundation, Inc.

Planning the Neighborhood. American Public Health Association, Committee on the Hygiene of Housing Public Administration Service, 1960.

Play Space in New Neighborhoods. A Committee Report on Standards of Outdoor Recreation Areas in Housing Developments, National Recreation Association, Inc., 1939.

Prange, M. 2014. Urban Design tools to improve child-friendly green spaces

Preliminary Park and Recreational Plan for Vancouver and Vicinity. City Planning Department, Vancouver, British Columbia.

Prospective Demand for Outdoor Recreation. Outdoor Recreation Resources Review Commission, Report of the Outdoor Recreation Resources, Review Commission by Commission Staff, Report No. 26, 1962.

Recreation and the Town Plan. Connecticut Development Commission, Planning Division, April 1961.

Recreation Is Everybody's Business. Prepared by General Electric Company in Cooperation with the NRA, 2010.

Recreation Manual. Pennsylvania Department of Commerce State Planning Board, Vol. No.5. 1950.

Recreation Study and Facility Plan. Rockland County, New York: Rockland County Planning Board, September 1960.

Recreation, Vacation, Tourism in Northern Berkshire, Massachusetts. Technical Planning Associates, New Haven, Connecticut, April 1964.

Recreational Boating Facilities. ASPO Planning Advisory Service Information Report No. 147, June 1961.

Regional Recreation Area Study. The Inter-County Recreation Planning Committee, Southern California, 1963.

Second Edition. Canada: John Wiley & Sons, Inc.

Solomon, Julian Harris. Camp Site Development. Girl Scouts of America, 1959.

Southworth, B. 2007. City Squares in Cape Town's Townships – Public Space as an Instrument Space in the Urban Pattern. Baltimore: The Johns Hopkins Press.

Sports and Recreation Facilities, for School and Community. M. Alexander Gabrielsen and Caswell M. Miles, Prentice-Hall, September 1958.

Standards of Recreational Facilities. Bureau of Governmental Research. Association of Washington Cities, University of Washington, Seattle, Washington.

Tankel, S.B. 1963. Cities and Space The Future Use Of Urban Land: The Importance of Open Thai Utsa, B., Puangchit, L., Kjelgren, R. & Arunpraparut, W. 2008. Urban green space, street Town's Dignified Places Programme. http://www.treasury.gov.za Date of Access: 2 May. 2016.

Williams, Wayne R. Recreation Places. Reinhold Publishing Corporation, February 1958.

Wood, Samuel E. "Recreation Planning in Natural Resource Areas," Pacific Planning and Research. Presented at the 1959 Conference of the American Society of Planning Officials, Minneapolis, 1959.