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Residential Structure and Land Value Pattern in Karachi City

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Abstract

The residential structure of Karachi City comprises high rent, medium rent and low rent residential areas. High rent residential areas are located next to the city center while low rent residential areas are generally located in the peripheral part of the city. The medium rent residential areas are located between the two. Presence of a large number of squatter settlements makes the residential land use arrangement complex.The land values of the residential areas differ in accordance with their location, amenities and neighbourhood characteristics.

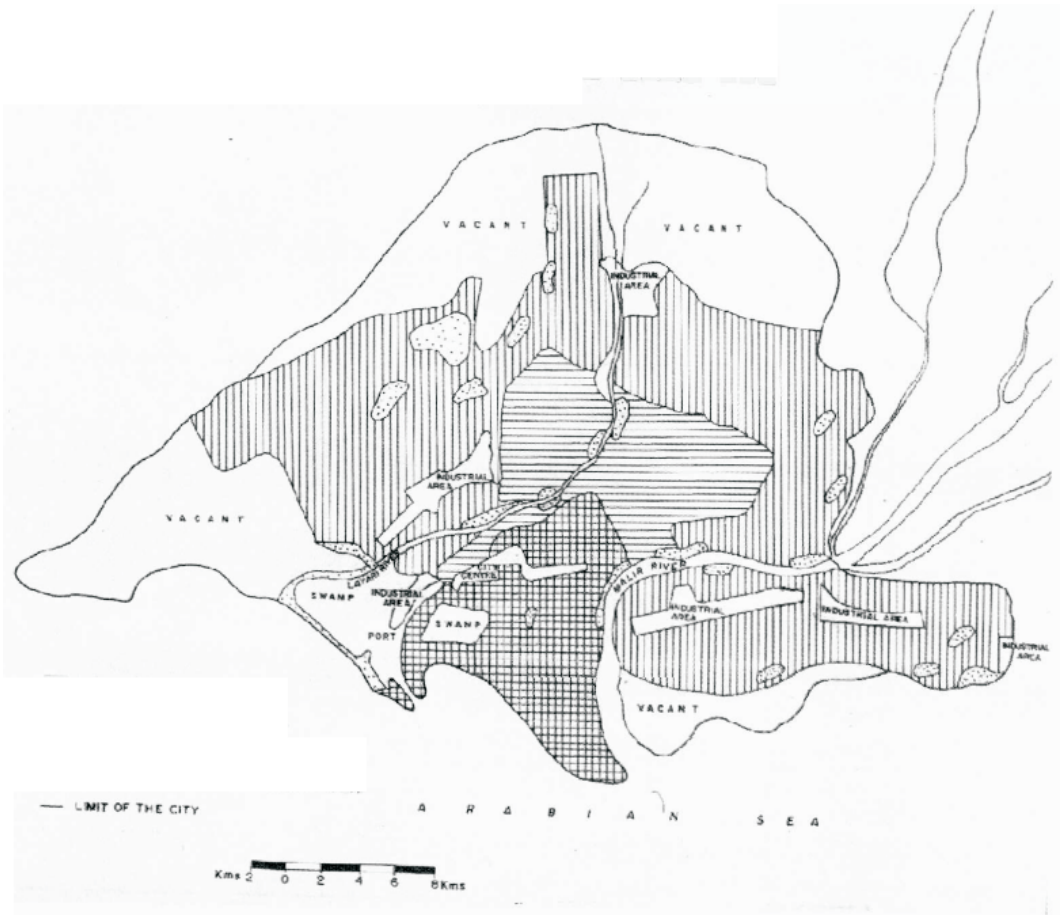
Like other cities of the world residential land use is the most dominant land use in Karachi City.However its arrangement is different from the Western Cities. High rent residential areas are located close to the city center while low rent residential areas are generally located in the peripheral areas of the city. The medium rent residential areas are located between the two. Presence of a large number of squatter settlements in Karachi makes the residential land use arrangement more complex. These squatter settlements are locally known as Katchi Abadis inhabited by low income people. The squatter settlements are generally located at the peripheries but a few settlements are located within the high class and middle class areas.

High-Rent Residential Areas

High-rent residential areas are located next to the city center.Defence Housing Society, Kahkashan (Clifton), K.D.A. Scheme 1, Pakistan Employees Cooperative Housing Society(P.E.C.H.S.), Al-Hilal Society
and Garden East are high class residential areas(K.D.A.,1974). These residential schemes were developed by the Government for high income class, officers of Defence and Federal Government. These areas have high proportion of large size plots i.e 1000 to 3000 sq. metres(Table 1). Only rich can afford such large size plots.
The physical condition of high-rent residential areas is good. Roads are wide and utilities are available. The
Peaceful environment and spacious structure are attractive features for rich people. Land value in such areas is very high. For example the mean land value in Clifton is Rupees 15000 per sq. Metre.

Medium-Rent Residential Areas

Medium-rent residential areas are located in Karachi City between the high-rent and low-rent residential areas.Gulshan-e-Iqbal,Gulistan-e-Jauhar,Nazimabad,North Nazimabad(Taimuria),Federal B.Area (Mansoora) are the residential areas of middle class people. These residential schemes were developed by Government.They have large proportion of medium size plots(240 to 600 sq.metres). They are located away from the city center but close to high-rent residential areas(Fig 1). Price of land in the medium-



rent residential areas are nearly half of those of high-rent residential areas. For example mean land value in Federal B.Area(Mansoora) is about Rupees 8200 per sq. metre.

Low-Rent Residential Areas

Low-rent residential areas in Karachi are located far away from the city center. Low-rent residential areas have high proportion of small size plots(less than 240 sq. metres). Because of the high proportion of small size of plots these areas are congested . The physical condition of such areas is not good. Roads are narrow. Basic amenities like water,sewerage etc. are not properly provided. The social environment is unsatisfactory and rate of crime in these areas is higher. As a result land values in these areas are low. The low-rent residential areas may be classified in two categories: i. planned and squatter settlements.

i.Planned Areas

To provide housing for low income people Government developed several housing schemes in Karachi.

Liaqatabad was developed soon after the creation of Pakistan in 1947. In 1958 the Government decided to

resettle the low income immigrants from India during 1947 to 1951 who were

squattering in the city (K.D.A,1972). To achieve this goal a Greater Karachi Resettlement Plan(GKRP) was developed. According to that plan two satellite towns, Landhi-Korangi to the east and New Karachi to the north of the city at a distance of 25 kms from the city center were developed. Industrial estates were developed as part of the satellite town plans and industries were offered incentives to invest in the industrial areas of Landhi, Korangi and New Karachi. It was assumed that population moving in these locations would find employment there. The Government planned to construct a large number of low-income houses but only a small number could be constructed. The plan met with failure and was abandoned in 1964.

In 1960s Government developed several residential schemes for low income people like Malir, Model Colony,Baldia Town, Qasba Town, Orangi Town etc.(K.D.A,1972). All new low income housing schemes were developed at the outskirts of the city. Under Metroville schemes 80 to 120 sq. metres plots were developed in Orangi and Gulzar-e-Hijri areas(KDA,1981).

ii. Squatter Settlements

Squatter settlements are locally known as Katchi Abadis developed illegally mostly on Government lands(KDA,1974). These settlements in Karachi are mainly located in the flood plain of the Layri and Malir River in ribbon form. Two large Katchi Abadis , Orabgi and Baldia are located at the outskirts of the city.

Small squatter settlements are located in every part of the city. They are also found in High-rent residential areas like Delhi Colony and Punjab Colony . In Karachi 539 registered Katchi Abadis. Other unregistered Katchi Abadis are called encroachments. The Katchi Abadis are treated as slums because of poor physical structure and social conditions. Plots are small and land values are low.

Residential Land Values Pattern

Residential land values in Karachi city differ from one area to other areas. Price of land between residential areas and within residential areas vary. Let us examine the residential land values pattern in Karachi City as well as the factors that govern land values variation in residential areas.

i. Residential land values decrease with increasing distance from the city centre

The city centre is the heart of business and financial offices. It is the main work place of the city.It comes out that residents prefer to reside near to their work places(Ohkawara,1985). As a result a competition in the residential land market develops, eventually land values decrease with increasing distance from the main work place(the city centre). Price of residential lands in Karachi City decrease with increasing distance from the city centre. For example the land price of high rent residential areas is Rupees 15000 per sq. metre within 5 kms of the city centre and Rupees 13500 per sq. metre from 5-10 kms of the city centre.

Table 1. Karachi City, price of residential land and distance from the city centre.

ii. Residential plots of same size in high, medium and low rent areas differ in land value.

To examine the land value variation of same plot size between high and medium rent residential areas three high rent residential areas and three medium rent areas were taken as case study. Land values of 100 plots of same size of each residential area were

Distance from the City Centre Kms	Residential Land Rupees per sq. m.
05	15000
10	13500
15	8000
20	6000
25	3000
30	1000

Source: Estate Agencies, 2003

randomly collected. Analysis of Variance was applied. The results of the variance clearly shows that land values of same size plots in high and medium rent residential areas differ. The same method was applied on medium and low rent residential areas as well as between low rent planned and squatter residential areas. The results are given in table 6.3.

ii. Land values within residential areas increase with increasing width of road.

Residential plots located on wide road have relatively higher land values. It provide space for parking and for making lawn. Such residential plots which are located on wide road look spacious. It comes out from the study that on the 12 meters wide road location generally about 10 percent extra price has to be paid as compared to 8 meters wide road. (Fig 6.2)

iii. Land values within residential areas increase with increasing road frontage of Plot.

Road frontage provide extra land which is available because of front road location. This extra land is generally used for making lawn. The location of large front road plots is more attractive because the large area of plot face road (Fig 6.2). The houses built on large road frontage plots look spacious and beautiful. The large road frontage house have advantage of two entrances. Therefore to obtain the advantages of large road frontage extra price is paid.

v. Residential land values are affected by amenities and socio-physical environment

Amenities are most important elements in the choice of residential location . The dwellers give priority to physical amenities of residential area like electricity gas, water and sewerage social amenities like school, parks, public transport and social and physical environment like law and order, security and pollution in the choice of residential location. The dwellers do not want to reside in such areas where residential infrastructure are not developed, amenities are not provided and have serious law and order and security

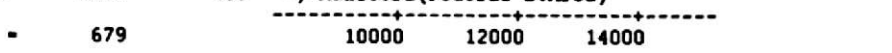
Table 6.3 : ANOVA TABLES

a) Analysis of Variance (High-rent and Medium-rent residential areas)

Source	DF	SS	MS	F	P
Factor	5	5.840E+09	1.168E+09	2529.84	0.000
Error	594	274239700	461683		
Total	599	6.114E+09			

Level	N	Mean	StDev
Clifton	100	15089	621
Al-Hilal	100	14678	822
KDAsc 1	100	14618	1019
Gulshan	100	8785	545
Taimuria	100	8670	456
Mansoora	100	8257	403
Pooled StDev =		679	

Individual 95% CIs For Mean Based on Pooled StDev



Dubin R and Sung H.C . 1987 , Spatial variation in the price of housing: rent gradients in non-monocentric citie,Urban Studies.

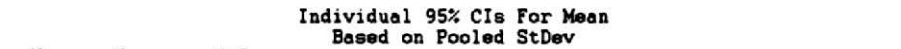
Duncan O.D and Duncan B . 1955, Residential distribution and occupational stratification. American Journal of Sociology

b) Analysis of Variance (Medium-rent and Low-rent residential areas)

Source	DF	SS	MS	F	P
Factor	5	6.310E+09	1.262E+09	1.2E+04	0.000
Error	594	61371500	103319		
Total	599	6.371E+09			

Level	N	Mean	StDev
Gulshan	100	9112.0	133.5
Taimuria	100	9062.0	107.1
Mansoora	100	8828.0	300.9
Baldia	100	2590.0	484.8
Qasba	100	2557.0	374.5
Orangi	100	2408.0	353.2
Pooled StDev =		321.4	

Individual 95% CIs For Mean Based on Pooled StDev



C) Analysis of Variance (Low-rent Planned and Squatter residential areas)

Source	DF	SS	MS	F	P
Factor	5	135697750	27139550	200.21	0.000
Error	594	80518500	135553		
Total	599	216216250			

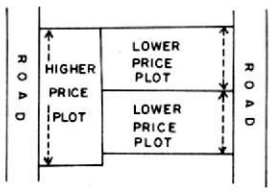
Individual 95% CIs For Mean Based on Pooled StDev

Level	N	Mean	StDev	1750	2100	2450	
Baldia	100	2590.0	484.8			(-*-)	Baldia
Qasba	100	2557.0	374.5			(-*-)	Qasba
Orangi	100	2408.0	353.2			(-*-)	Orangi
Islamia	100	1595.0	334.7	(-*-)	Islamia Colony		
Pirabad	100	1629.0	346.2	(--*-)	Pirabad		
Burmee	100	1506.0	285.3	(-*-)	Burmee Colony		

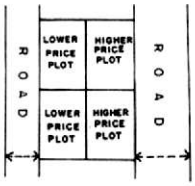
Pooled StDev = 368.2

KARACHI CITY
RELATIONSHIP BETWEEN LAND VALUES
AND
ROAD FRONTAGE, ROAD WIDTH AND CORNER PLOT

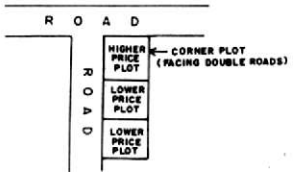
(A) ROAD FRONTAGE



(B) ROAD WIDTH



(C) CORNER PLOT



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A Geographical Study of Land-use in the Commercial Heart of Karachi (Saddar)

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Abstract:
The study of land-use in the commercial heart of Karachi, provides the useful information of commercial structure of the area. It is a challenging task to investigate the commercial structure of an evolving city in a developing country like Pakistan where no business census was ever conducted, that could provide information about retail, wholesale and service functions. The systematic information of land-use is critically important for future planning of an area.

Sadder is the central business area though it is not a geographical center of the city. The land-use information of Saddar has been taken by conducting the intensive field survey on parcel levels to accommodate a wide variety of commercial activities. Data analysis and cartographic work have been employed by using GIS software. This study can be highly useful for local, national and international organization like KDA, WHO etc. It may provide a base for future research.

Introduction:
Of the contemporary Pakistani city, one can easily generalize that in terms of functions, our cities are not spatially well-differentiated. In other words, mixed land uses continue to be a common feature, so far as the internal structure of our cities is concerned. Our metropolitan cities are beginning to have a central commercial area, though not yet quite as well-defined as the CBD of Western cities. Likewise, with increase in areal extent and population, one can see the emergence of outlying business centers including the regional business centers in our cities. The emergence of the outlying shopping centers points to gradual decline in the relative influence of central commercial area in the contemporary Pakistani city (Azad, 2004).

Karachi has passed through three well-defined periods of development: pre-British (1729-1838), British (1839-1947) and post-British (1947 onward). During the pre-British period, differences in land-use were not very prominent. Land-use took definite shape during the British period whereas many changes have taken place after partition. The city center (Saddar) is the heart of Karachi. It is not the geographical center of the city but it enjoys a pivotal position. It is the main center of the wholesale trade and for a long time it was also the heart of the retail trade (Khan, 2002).

The core area of Pakistani cities is generally centrally located, and is characterized by commercial activities of all types, in addition it acts as a center of social, cultural and entertainment functions. The core areas of Pakistani metropolitan centers are not the same as the central business districts of American cities. The latter is a highly specialized district characterized primarily by a hole-in-a doughnut phenomenon due to its zero night-time population and is invariably characterized by skyscrapers which mark the focus of the densest concentrations of office employment and commercial activity having high retail value. The core areas of Pakistani cities look like enlarged replica of traditional bazaar or market. Infect the high rental value section of Saddar (the core area of Karachi) is also performing space consumptive and low order functions such as Parsi High School and car service center at Abdullah Haroon Road, Saddar (Ahmad, 1987).

Study Area:

Saddar, a North Indian term for the cantonment area, was built by the British who captured Karachi in 1839. Soon after partition, it became the main shopping area of a city (Noorani, 1997). Saddar which had developed as the main cultural center of Karachi after partition is now an environmentally degraded area (Hassan, 1990). By 1947 Saddar was consisted of wide roads on a grid iron-plan, residential areas dominated by Goons, Parsies and Europeans. Churches, missionary schools, community halls and civic buildings were dominated in the bazaar. A short distance from the bazaar, a university was established in 1952, and the federal secretariat was constructed adjacent to the bazaar. The older educational institutions and the court of law were already in the vicinity. Thus within four years of the creation of Pakistan, Karachi became a high-density multi class city and Saddar became the center of the city with a unique cosmopolitan culture.

The commercial area of Saddar is located in the Saddar Union Council of Saddar town (Figure 1). Saddar town is divided into 11 Union Councils. Saddar town includes the old towns of Kharadar, commercial areas of Saddar, Clifton and Khehkeshan. The old areas such as UC no. 1, 2, 3, 5 and 6 are thickly populated with people based in flats meaning small areas contain larger population. Therefore, in comparison to the newer areas such as UC no. 9, 10 and 11 the population is relatively higher. On the whole this town is a compact yet diverse unit containing Governor House, Sindh Secretariat, GOR and Burns Road. The Layari Town, Kiamari Town, Jamshed Town, Karachi Cantonment and the Arabian Sea, surround it.

Saddar is the largest shopping center and also a huge retail and wholesale market of Karachi. About 95 % area is dominated by the retail functions such as. Jewellery, carpets, electronics, mobile phones, fur coats, leather garments, silk scarves, hosiery garments and handicrafts. Gold Jewellery shops of Saddar are very famous. Service activities are comparatively low comprising banks, money changers and travel agents. Empress marked, the most prominent structure of Saddar, was once the heart of the retail trade, now it has become a wholesale market for vegetables, meat etc.

The study area has been divided into eight portions to gain the high level of accuracy (Figure 2):

Empress market and Jahangir Park
Bohri Bazaar
Area bounded by Raja Ghazanffar Ali Road and Dr. Daud Pota Road
Area bounded by Zaib-un-Nisa Street and Raja Ghazanffar Ali Road
Area bounded by Abdullah Haroon Road and Zaib-un-Nisa Street
Mehboob Cloth Market, Karim Center, Paradise Hotel and Cooperative market

Objectives:

In any region, land-use survey is extremely important for formulating development schemes. The objective of land-use in any country is that misuse of land be eliminated and its use rendered as effective as possible. The aim of land-use survey is to build foundation, drawing conclusions towards more rational utilization resources. Land-use survey is an essential input for planning and development as well as to identify the existing use of land. In Pakistan first land-use survey was conducted during 1950. The work was actually carried by the Resource Survey Division of the Photographic Survey Corporation of Toronto, Canada.

Thus the main objectives of our study are to record the existing commercial land-use of Saddar, to find out the type and nature of function carried out in commercial heart and to observe the specialized functions.

Methodology:

An extensive field survey has been made to collect first hand knowledge about the study area and to fill inventories. The data recorded on the field was the land-use function. The study area performing a variety of functions it is therefore necessary to summarize. Tabulation was done in order to do the functional classification of land-use with in the area. The general use categories include: retail functions, retail-cum services, service functions (personal, professional, and business), residential areas, vacant land, open spaces, institutional buildings etc (Azad, 2004).

By using cartographic techniques, we assigned different colors to different categories of function and using that color we produce thematic maps of the study area. To analyze comparatively the functions present in study area we use graphical method. The graphs represent the comparison of different functions in study area. Cartographic work and data analysis have been employed by using GIS software, ArcView.

Results and discussions:

Information relating to the shopping centers has been obtained from both primary and secondary sources. Primary sources of data include field observations including personally conducted interviews and field notes which were developed to acquire information regarding different kinds of functions (retail, wholesale and service) performed by a center, total number of workers, floor covered area of the commercial establishments, problems faced by shopkeepers and residents, consumer behavior and related information about commercial structure.

Secondary data sources include published material such as Population Census Reports, Karachi Development Plans (1974, 2000), various KDA reports, Karachi Mass Transit Study, maps prepared by KDA and Population Census Department, estate agencies, and many other sources. The quality of data used, is crucial to any kind of analysis and this point has been adequately emphasized in this study. Each of the study areas was analyzed in much greater depth using extensive field survey.

The types of variables used in this study are the number of different kinds of functions such as retail, wholesale and service, performed by a center. Codes have been allocated to various functions, number of business establishments (stores as well as private educational institutions and hospitals) in a shopping center. There are a wide variety of approaches in the marketing geography to analyze data. A simple approach is to convert data into information with technical management. The steps involved in this respect are: indexing of categories (commercial); allocation of codes; categorization of functions: retail, wholesale and service. To make the work more convenient the study area Saddar is divided into six parts. The interpretation of field investigation for each block is provided as under.

There are various kinds of specialized functional areas in Sadar. The more significant are grocery, general stores and birds in Empress Market, kids' garments and crockery in Bohri Bazaar, jewelry polish, casting and dies making and jewelry boxes at Raja Ghazanffar Ali and Dr. Daud Pota Road, jewelry shops at Zaib-un-Nisa Street, hosiery and leather goods in Zainab Market, ladies and gents' garments especially wedding dresses in Mehboob Cloth Market, electronics in Karim Center, gents' cloth and tailor, handicrafts and marble decoration in Cooperative Market. Specialized functional areas develop because many kinds of uses agglomerate inside the largest cities to facilitate comparison buying, to serve a special market or to make joint use of specialized facilities (Berry, 1967) such as jewelry business in case of Saddar.

STUDY AREA 1: Empress Market and Jahangir Park

Empress market the huge, bustling market is located in Saddar. It is essential a food market

Table 1: Categories of functions: Study area 1

No. of shops	Categories of functions	% of total
1825	Retail function	96.25
15	Retail cum service	0.79
28	Personal service	1.4
5	Professional service	0.26
17	Business	0.89
6	Vacant	0.31
1896	**Total**	**99.9**

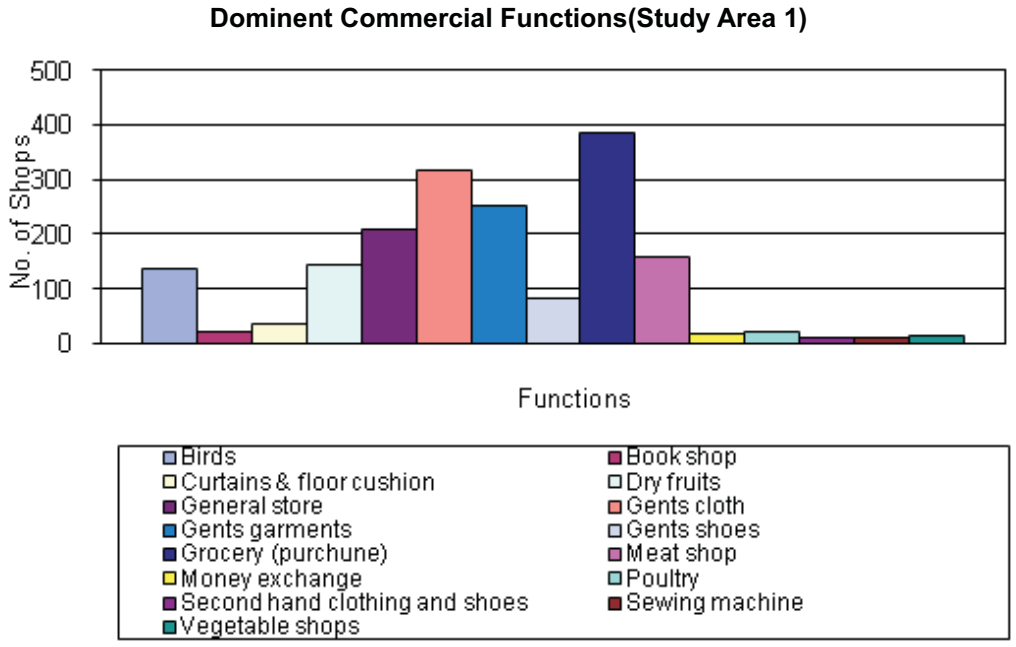

Fig: 3

and sells all manner of products from fruit and vegetable to fish, poultry and red meat to canned/tinned goods, house wares and spices. Dried fruits and nuts are always available in abundance and many of the small grocers' stalls occasionally get imported goods as well.

Field investigation of Empress Market and Jhanagir Park reveal that there are total 1896 commercial establishments (shops) having the size of 12/12 feet and 12/14 feet in Empress Market while 6/7 feet in Jahangir Park. Jahangir Park is commercial cum residential area having two to four story buildings.

Table 1 indicates the share of different functions in this block. It has been observed that there is a considerable share of retail functions (92.25%). This study brings to light the relative importance of different kinds of functions. Empress Market and Jahangir Park dominates in grocery (384 shops), gents' cloth (317 shops), gents' garments (250 shops), meat shops (160), birds (138), and dry fruits (145). (Table 2) (Figure 3)

Table 2: Commercial functions: Study area 1

Categories of functions	Code	Functions	No. of shops
Retail function	11	Birds	138
	12	Book shop	20
	18	Pan and betel	8
	30	Fish	1
	31	Curtains & floor cushion	37
	33	Fruits	1
	36	General store	207
	37	Gents cloth	317
	38	Gents garments	250
	39	Gents shoes	83
	43	Grocery (purchune)	384
	48	Ice store	1
	66	Meat shop	160
	71	Dry fruits	145
	80	Plastic goods	9
	82	Poultry	23
	87	Electronics	1
	98	Vegetable shops	13
	101	Second hand clothing and shoes	11
	122	Sewing machine	12
	131	Tea shop	4
Retail cum service	52	Jewelers	6
	100	Watch retail & repair	9
Personal service	2	Auto repair motor / bicycle	2
	32	Food places	9
	47	Hotel / restaurants	6
	79	Photostat	4
	109	Welding	2
	124	Public call office	5
Professional service	19	Clinic	5
Business	132	Money exchange	17
Vacant	29	Empty	6
Total			**1896**

Study Area 2: Bohri Bazaar

Close to Empress market, this bazaar comprises hundred of small shops in a maze of narrow streets which sell a whole variety of goods, such as house wares, pots and pans, crockery, cutlery, plastic items, silk flowers, cushions, sheet, buttons, threads and second hand cloths.

Table 3: Categories of functions: Study area 2

No. of shops	Categories of functions	% of total
824	Retail function	58.27
354	Retail cum service	25.03
118	Personal service	8.34
4	Professional service	0.28
17	Business	1.2
98	Vacant	7.85
1414	**Total**	**99.97**

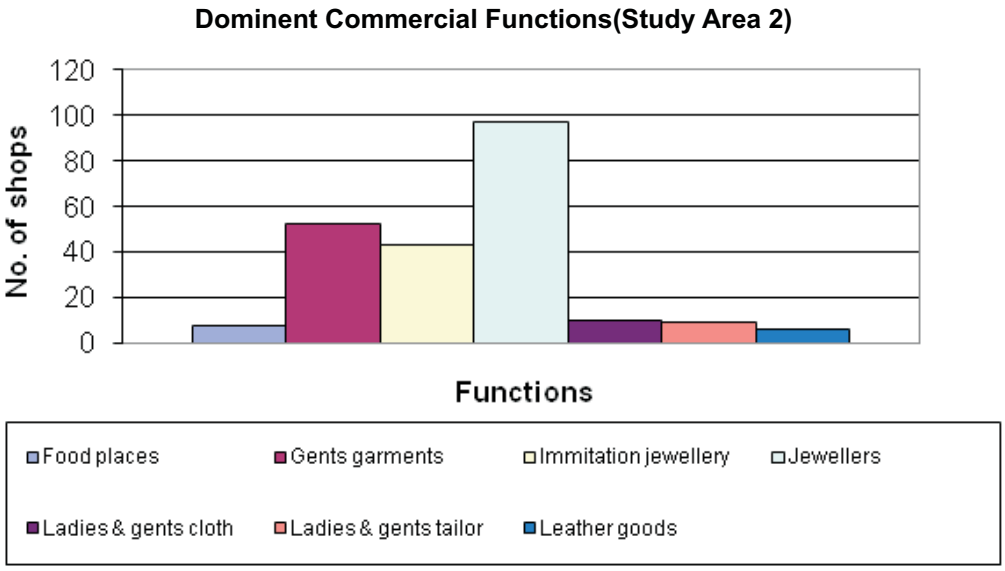

Fig: 4

Bohri Bazaar occupies 1414 commercial establishments. The various categories of commercial functions considered here are; retail, retail cum service, personal service, professional service, business, and vacant shops. Table 3 shows the dominance of retail functions (58.27%) followed by retail cum service (25.03%) and vacant stores (7.85 %). Most of the vacant stores are found in the inner portions of the market or in the congested sections of this bazaar.

Figure 4 indicates the relative dominance of different kinds of function. Bohri Bazaar dominates in watch retail / repair shops (142), jewellery (124), ladies cloth (98), vacant shops (97) and optical goods (58) (Table 4).

Study Area 3: *Area bounded by Raja Ghazanffar Ali Road and Dr. Daud Pota Road*
The field investigations of Raja Ghazanffar Ali Road reveal that there are 374 shops performing various kinds of functions. Table 5 shows the relative importance of different categories of functions. Among these retail cum service functions (27%) are dominated and followed by vacant shops (17.11%), retail (15.24%) and Retail cum light manufacturing (15.24%).

Table 4: Commercial functions: Study area 2

Categories of functions	Code	Functions	No. of shops
Retail function	12	Book shops	32
	15	Cassette dealer shops	28
	18	Cigarette & beetal	14
	20	Cold drink & ice cream	40
	23	Departmental store	8
	24	Drapery / carpets	2
	28	Electric supply store	2
	31	Curtains & floor cushion	11
	36	General store	34
	37	Gents cloth	26
	38	Gents garments	24
	41	Gifts & handicrafts	20
	43	Grocery (purchune)	18
	49	Imitation jewellery	12
	51	Ittar / scant	14
	53	Kids garments	33
	54	Kids shoes	18
	55	Lace & button	10
	56	Ladies & gents cloth	28
	57	Ladies & gents shoes	42
	59	Ladies cloth	32
	60	Ladies garments	98
	61	Ladies shoes	13
	63	Leather goods	44
	67	Medical & general store	14
	75	Cigarette / pan	42
	87	Electronics	37
	90	Refrigerator & washing machine	8
	93	Sports goods	8
	95	Stationary	8
	103	Sweet & nimco	14
	104	Glass house	34
	116	Flower shops	2
	119	Bangle	14
	121	Crockery	36
	122	Sewing machine	4
Retail cum service	27	Dupata center	10
	52	Jewelers	124
	73	Optical goods	58
	78	Photo Studio / camera	20
	100	Watch retail & repair	142
Personal service	7	Barber shops	3
	8	Battery & charging shop	4
	16	Catering service	2

Table 5: Categories of functions: Study area 3

No. of shops	Categories of functions	% of total
57	Retail function	15.24
101	Retail cum service	27
1	Retail cum light manufacturing	15.24
53	Personal service	14.17
1	Professional service	0.26
57	Service cum Light manufacturing	0.26
40	Light manufacturing	10.69
64	Vacant	17.11
374	**Total**	99.97

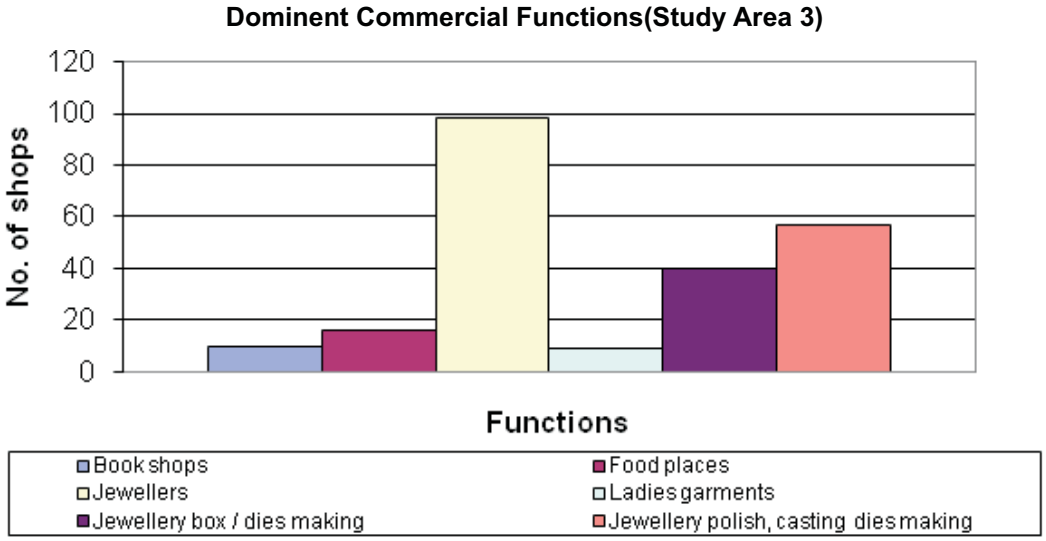

Fig: 5

Figure 5 indicates the dominant functions having relative position of jewelers (98 shops), empty (64 shops) and jewellery polish; casting dies making (57 shops) performing light manufacturing (Table 6).

Study Area 4: *Area bounded by Zaib-un-Nisa Street and Raja Ghazanffar Ali Road*
This study area is located almost in the center of Saddar commercial core. It is famous for jewellery not only in Karachi metropolitan but also through out Sindh. It is worth noting that most of the commercial establishments are located on the ground floor while first and second floors are occupied by residential cum light manufacturing of jewellery.
Proliferation of commercial functions can be observed in this area. The block occupies total 310 shops. Table 7 indicates the relative position of different categories of functions. Among these retail functions (48.7%) dominates and followed by retail cum service (33.22%), personal services (8.06%) and vacant shops (8.7%).

Table 6: Commercial functions: Study area 3

Categories of functions	Code	Functions	No. of shops
Retail function	3	Auto spare parts car	2
	12	Book shops	10
	20	Cold drink & ice cream	1
	24	Drapery / carpets	1
	28	Electrical supply store	2
	30	Fish shops	1
	31	Curtain & floor cushion	4
	36	General store	2
	45	Hosiery	1
	55	Lace & button	3
	60	Ladies garments	9
	63	Leather goods	5
	67	Medical & general store	2
	69	Mobil motor oil shop	1
	74	Paints	2
	75	Cigarette / pan	4
	93	Sports goods	2
	95	Stationary	1
	122	Sewing machines	1
	125	Hard board / chip board / farmica	1
	128	Boutique	2
Retail cum service	52	Jewelers	98
	73	Optical shop	2
	100	Watch retail & repair	1
Retail cum light manufacturing	5	Bakery	1
Light manufacturing	134	Jewellery box / dies making	40
Service cum Light manufacturing	135	Jewellery polish, casting dies making	57
Personal service	1	Auto repair car	1
	2	Auto repair motor / bicycle	2
	7	Barber shops	4
	9	Beauty parlor	1
	14	Car service stations	7
	32	Food places	16
	47	Hotel / restaurants	9
	58	Ladies & gents tailor	7
	79	Photostat	1
	124	Public call office	4
	130	Net cafe	1
Professional service	19	Clinic	1
Vacant	29	Empty	64
Total			**374**

Table 7: Categories of functions: Study area 4

No. of shops	Categories of functions	% of total
151	Retail function	48.7
103	Retail cum service	33.22
25	Personal service	8.06
4	Business	1.29
28	Vacant	9.7
310	**Total**	**99.97**

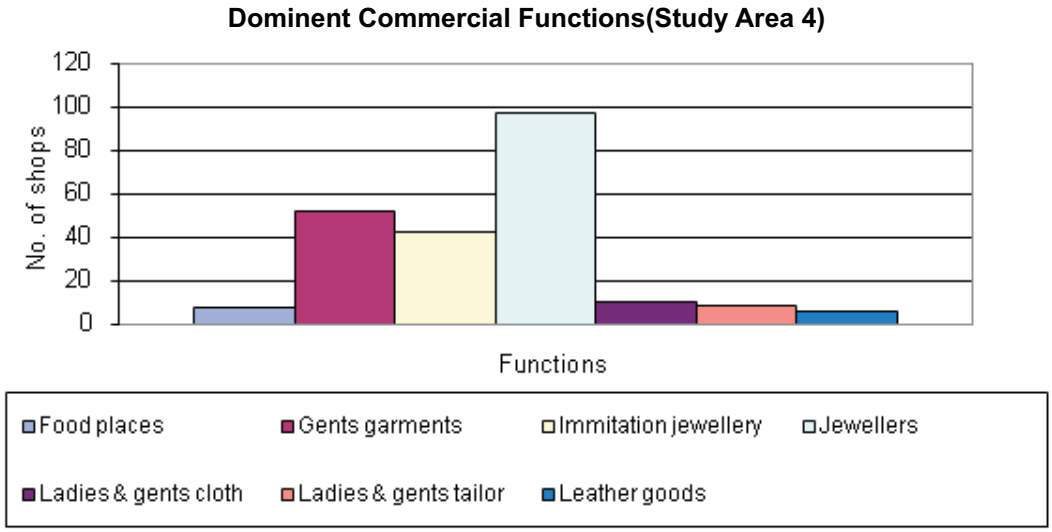

Fig: 6

Figure 6 denotes the dominant functions having relative position of jewellery (97 shops), gents' garments (52 shops) and imitation jewellery (43 shops), (Table 8). Zaib-un-Nisa Street has been a glorious shopping artery since the British period. The cream of the crop from all over Karachi as well as tourist are attracted by the famous fashion designers, jewelers and branded gents garments stores on this glorious street.

Study Area 5: *Area bounded by Abdullah Haroon Road and Zaib-un-Nisa Street*
It was found that most of the structures in this area have duel usage. Ground floor is occupied by the commercial establishments while the upper floors are either residences or offices.
It has been witnessed that most of the old structures having low height are in a very bad condition while all newly constructed structures have four and above floors. The observation suggests that there are very few buildings in good condition, which are generally privately owned. The stores in this area are moderately furnished and equipped with sufficient window display and well illuminated.
The field investigation reveals that there are 942 well-decorated commercial stores in this block. Retail trade (49.46%) dominates and followed by vacant shops (30.78%) and retail and service (12.42%) (Table 9). Figure 7 indicates the dominant kinds; gents garments (211 shops), kids garments (121 shops), jewellery (88 shops) and leather goods (Table 10).

Table 8: Commercial functions: Study area 4

Categories of functions	Code	Functions	No. of shops
Retail function	3	Auto spare parts car	1
	12	Book shops	2
	15	Cassette dealer	4
	24	Drapery / carpets	4
	28	Electrical supply store	3
	36	General store	3
	38	Gents garments	52
	39	Gents shoes	1
	41	Gifts & handicrafts	2
	45	Hosiery	1
	49	Imitation jewellery	43
	51	Ittar / scant	2
	53	Kids garments	1
	55	Lace & button	1
	57	Ladies & gents cloth	10
	59	Ladies cloth	1
	60	Ladies garments	2
	63	Leather goods	6
	67	Medical & general store	1
	72	Newspaper dealer	1
	87	Electronics	1
	93	Sports goods	2
	95	Stationary	2
	97	Toy shops	3
	103	Sweet & nimco	1
	125	Hard board / chip board / farmica	1
Retail cum service	52	Jewelers	97
	73	Optical shop	1
	100	Watch retail & repair	5
Personal service	7	Barbar shops	1
	9	Beauty parlor	1
	32	Food places	8
	47	Hotel / restaurants	3
	58	Ladies & gents tailor	9
	79	Photostat	3
Business	6	Banks	4
Vacant	29	Empty	27
Total			**310**

Table 9: Categories of functions: Study area 5

No. of shops	Categories of functions	% of total
466	Retail function	49.46
117	Retail cum service	12.42
39	Personal service	4.14
30	Business	3.18
291	Vacant	31.78
942	**Total**	**99.98**

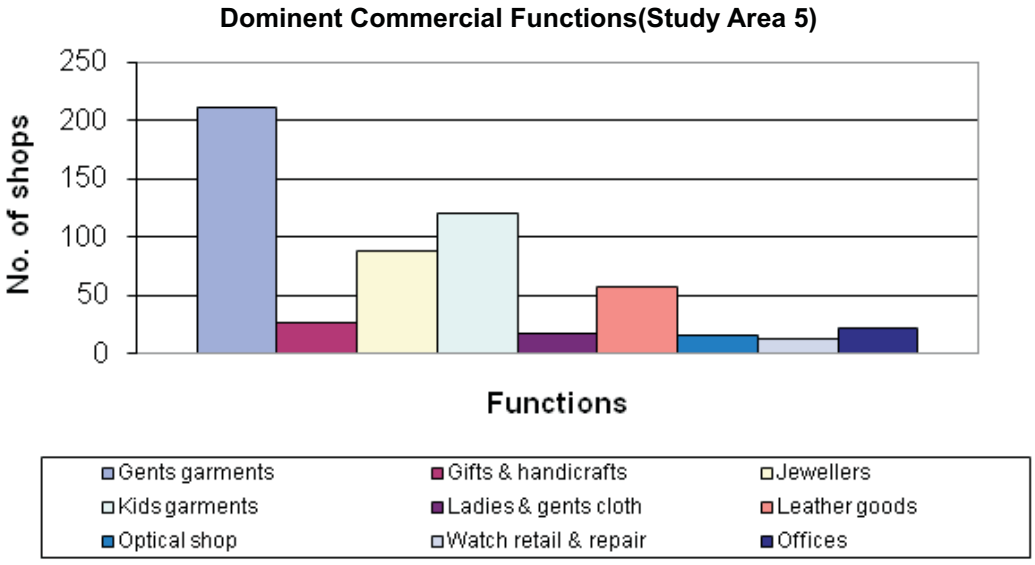

Fig: 7

Zainab market the most famous spot in this study area is a real Aladdin's cave. It deals with retail trade mainly traditional Pakistani handicrafts and has a huge range of silk paintings, onyx, hangings, bedspreads, Kashmiri shawls etc. This is the place where a lot of tourists' shop and the initial price quoted could be two or three times higher then the real price. One part of this market also sells cheap ready-made western clothes for ladies, gents and children shorts, T-shirts, legging, blouses, etc. The wholesale trade, leather goods and godowns can be observed at the first floor of this market. Figure 8 reveals the commercial activities of Zainab market and the adjoining areas.

Study Area 6: *Mehboob Cloth Market, Karim Center, Paradise Hotel and Cooperative market*

Mehboob Cloth Market is a planned market located on the original map of Saddar. It mainly deals with gents and ladies wedding cloth, gents' shalwar kameez, and gents' garments on the first floor. However the shops of gents' tailors and ladies wedding cloth are located on the second floor.
Cooperative market is slightly further down Abdullah Haroon Road from Zainab market.

Table 10: Commercial functions: Study area 5

Categories of functions	Code	Functions	No. of shops
Retail function	3	Auto spare parts car	1
	12	Book shops	1
	24	Drapery / carpets	5
	35	Furniture	1
	36	General store	6
	38	Gents garments	211
	41	Gifts & handicrafts	27
	51	Ittar / scant	1
	53	Kids garments	121
	56	Ladies & gents cloth	17
	59	Ladies cloth	3
	63	Leather goods	57
	87	Electronics	5
	110	Computer	1
	116	Flower shops	1
	125	Hard board / chip board / farmica	1
	129	Mobil phone	7
Retail cum service	52	Jewelers	88
	73	Optical shop	16
	100	Watch retail & repair	13
Personal service	9	Beauty parlor	2
	26	Dry cleaner	4
	32	Food places	2
	40	Gents tailor	4
	47	Hotel / restaurants	7
	58	Ladies & gents tailor	2
	62	Ladies tailor	6
	102	Embroidery & pico	5
	124	Public call office	2
	127	Courier service	1
Business	6	Banks	9
	107	Offices	21
	133	Travel agents / cargo	4
Vacant	29	Empty	290
Total			**942**

Stores are located on two levels and deals with a variety of Pakistani wares, from onyx to brass, wood carving, lower quality of other wooden items, men's clothing material shawls, etc. like Zainab. This market caters to the needs of tourists.

The field survey indicates that there are 1058 stores in these two blocks. Table 11 denotes that retail trade (60.86%) is dominated in this block and followed by personal services

Table 11: Categories of functions: Study area 6

No. of shops	Categories of functions	% of total
644	Retail function	60.46
133	Retail cum service	12.57
265	Personal service	25.04
5	Business	00.47
2	Light manufacturing	00.18
9	Vacant	00.85
1058	**Total**	**99.57**

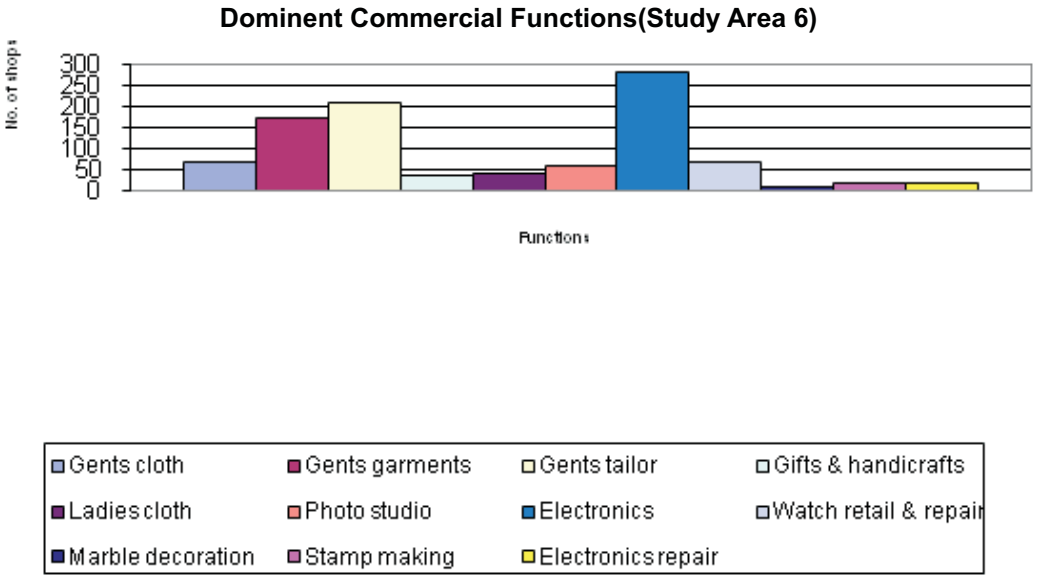

Fig: 9

(25.04%).

The dominant functions of this block (Figure 9) are electronic goods (284 shops), gents tailor (209 shops), gents' garments (174 shops), watch retail and repair (70 shops) and gents clothe (Table 12).

Conclusion:

Similar to the other non-western cities, the commercial core of Karachi, Sadder also has intermingled non-residential and residential activities. Shops and workshops often occupy the ground floor while the upper stories are used by residential purpose. The commercial activity and light manufacturing is diffused throughout the areas. Hence Saddar is not the Central Business District (CBD) but it is a central commercial place of Karachi where all low and high order commercial functions are existed. To make it as CBD all the residential areas should be relocated.

There is a direct relationship between land or rental values. Intensity of land use is reflected chiefly in the height of buildings and type of uses or functions located at the place. The core area of major metropolitan centers in Europe and America are characterized by skyscrapers,

Table 12: Commercial functions: Study area 6

Categories of functions	Code	Functions	No. of shops
Retail function	12	Book shops	5
	31	Curtains & floor cushion	1
	37	Gents cloth	69
	38	Gents garments	174
	41	Gifts & handicrafts	36
	51	Ittar / scant	2
	57	Ladies & gents shoes	6
	59	Ladies cloth	40
	63	Leather goods	5
	87	Electronics	284
	103	Sweet & nimco	1
	133	Tie shop	4
	136	Medical equipments	2
	137	Marble decoration	10
	138	Cosmetics	5
Retail cum service	52	Jewelers	5
	78	Photo studio	58
	100	Watch retail & repair	70
Light manufacturing	83	Printing press	2
Personal service	32	Food places	7
	40	Gents tailor	209
	79	Photostat	1
	124	Public call office	5
	127	Courier service	5
	139	Stamp making	18
	140	Electronics repair	20
Business	6	Banks	5
Vacant	29	Empty	9
Total			**1058**

which mark the concentrations of office employment and commercial activity. This is not the case with the core areas of Pakistani cities. The entire Saddar area has only few multistoried buildings.

The central commercial area of Saddar performs wholesale and wide range of retail functions to serves the surrounding hinterland. The extensive study area of Saddar has a number of specialized markets like Empress market (grocery, meat and birds), Mehboob cloth market and Cooperative market (gents garment and wedding dresses) Zaib-un-Nisa street (shoes and jewellery) and Zainab market (hosiery and leather garments) etc. Saddar comprises many beautiful old structures and there is a great need of maintenance. Yet another feature noted during the course of this study is the large number of stores, which are lying vacant, particularly on first and second floors of a commercial building.

The field investigation indicates that a lot of low order, middle order and service functions are being flourishing in the core area of Saddar. There should not be a large number of space consumptive uses in the central core areas due to high rental values such as high school and automobile showrooms.

The roads and streets of Saddar are straight and crowdy. Traffic congestion is observed almost all parts of the area especially on Abdullah Haroon Road, Sharah-e-Liaquat and around the Empress Market. Parking lots are conspicuous by their absence throughout the areas. The only space available for parking of cars and motorcycles is in the form of off-street parking. In matters of parking space Saddar is the worst sufferer. Even the off-street parking in Saddar is simply not possible most of the time during the day because roads and streets are mostly encroached by hawkers.

After the detailed investigations we suggest that the area of Saddar should be used properly. Bus terminal, schools and small shops and residential buildings might be relocated to another. Considering the high land value multistoried commercial buildings should be built. To avoid traffic congestion, pedestrian flow and parking problems, it is suggested that functions carried on side walks and push carts should be highly discouraged, multistoried parking and under passes should be constructed as well as limited bus routs should be allowed.

Saddar town today needs a similar strict enforcement of zoning, regulation and building byelaws. There is need to conserve the original urban fabric of the city, but at the same time it is important to encourage misused development to achieve the 24 hours cycle. Which existed in the old town and is a distinctive feature of the historic cities of Pakistan Encroachments, traffic congestion, noise and air pollution and illegal stalls are the major problems of Saddar.

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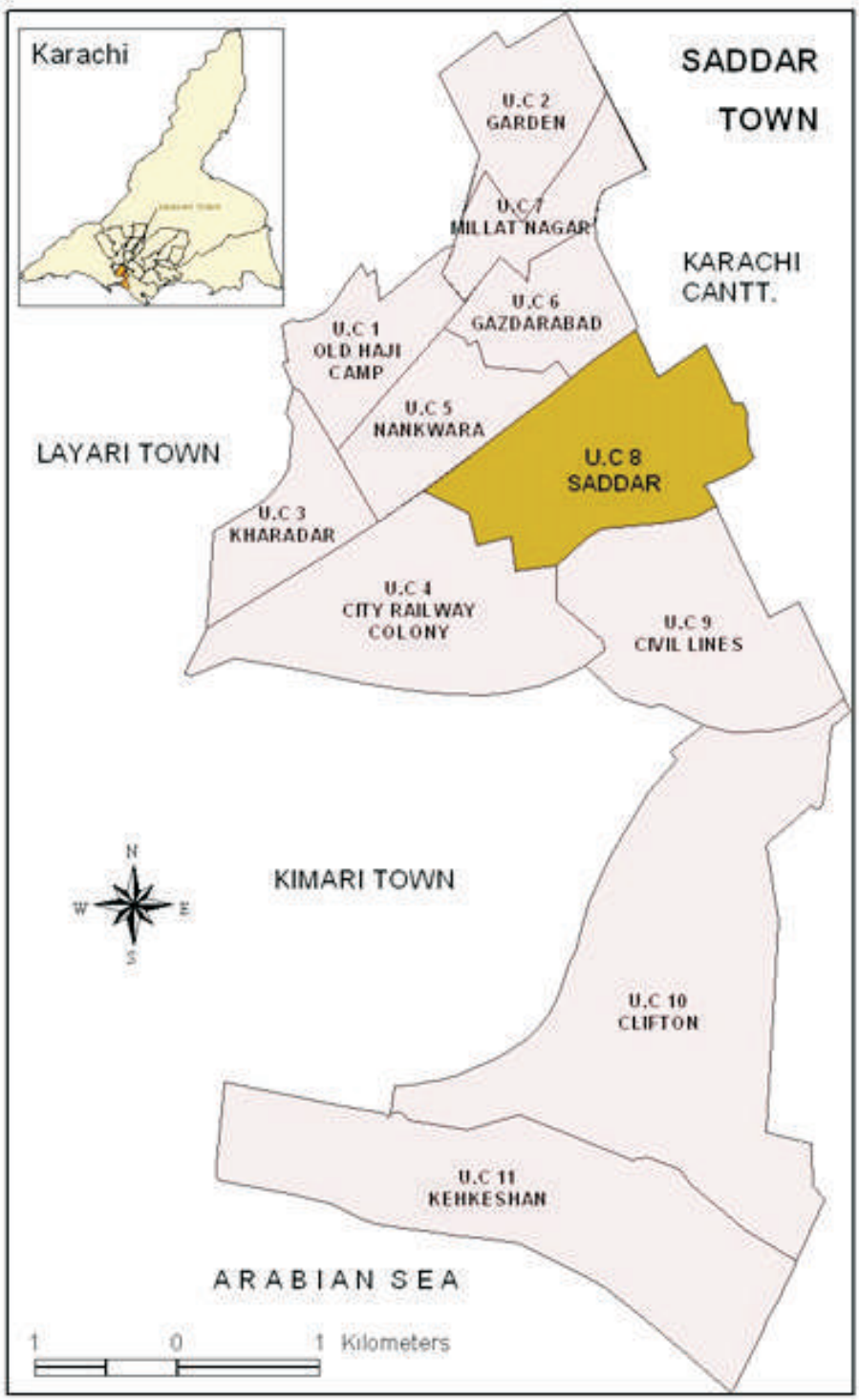
Karachi
SADDAR
TOWN
U.C 2
GARDEN
U.C 7
MILLAT NAGAR
KARACHI
CANTT.
U.C 6
GAZDARABAD
U.C 1
OLD HAJI
CAMP
U.C 5
NANKWARA
LAYARI TOWN
U.C 8
SADDAR
U.C 3
KHARADAR
U.C 4
CITY RAILWAY
COLONY
U.C 9
CIVIL LINES
N
W
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S
KIMARI TOWN
U.C 10
CLIFTON
U.C 11
KEHKESHAN
ARABIAN SEA
1
0
1 Kilometers

Figure 1


STUDY AREA
Karachi Cantt
N
W
E
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1
2
3
4
5
6
KARACHI
CANTT
U. C. 9
CIVIL LINES
0.1
0
0.1
0.2 Kilometers

Figure 2


Commercial Functions Zainab Market and Adjoining Area
D I N M O H A M M A D W A F A I R O A D
A B D U L L A H H A R O O N R O A D
Zainab Market
S A R W A R S H A H E E D R O A D
Based on field study conducted in 2004-2005
Not to scale

Figure 8

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Urban Poverty

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Abstract
Today more than 50 percent of the world's population is living in urban areas and according to estimates it would be about 60 percent by 2030. The important feature is that urban areas of developing countries are growing fast and there is unprecedented increase in urban poor in many developing countries. Urban poverty is one of the most important development challenge the world is facing urban poor mostly live in slums or in deprived neighborhoods in unhygienic conditions present study is an attempt to discuss some issues of urban poverty.

Introduction
Poverty is a worldwide phenomenon. A large number of countries in the world are afflicted with this problem since a large segments of their populations live below poverty line. Poverty is a major issue in the world economy. Despite social and economic development, poverty continues to persist and even increase in many areas of the world. Its persistence and growing dimension has caused concern among both the developed and developing countries.

The World Bank's report on World Development Indicators 2005, provides briefly the dimensions of poverty across the world. The report indicates that 21.1 percent of the world population consisted of the poor who earn less than one $ a day. The poverty was wide spread in regions of Latin America and the Caribbean, South Asia and the Sub-Saharan Africa when it showed an enormous increase over time (Table 1).

The report also indicates that in 2001 about 53 percent people earn less than $ 2 per day per person and this percentage was about 77 percent in South Asia and also in Sub-Saharan Africa (Table 2).

Urban Poverty
The cities of the world are growing at unprecedented rates. The world's urban population doubled during the period 1970 to 2000. The world's urban population was about three billion in 2003 and according to UN estimates, it will grow to 5 billion by 2030 (Table 3).

Urban population has grown very rapidly during last 50 years. In 1950 about 29.8 percent of the world's population was living in urban areas, by 1975 this figure had reached around 37.3%. In 2006-07 this figure was about 50 percent and according to estimates by 2030 more than 60 percent of the world's population will live in cities. (Table 4). Ninety four percent of this urban population growth will be in less developed regions. One of the most important dimensions of urbanization is the rapid increase in the number of urban poor. According to estimates about 30 percent of all poor people live in urban areas, and the percentage in 2020 will be 40 and 50 by 2035 (UN 2003). Africa had the highest annual rate of urban growth over the period 1975-2000 at 4.21%, compared to Asia at 3.47%, Latin America and the Caribbean at 2.76%, Europe at 0.68% and North America at 1.32%. The projected rate of urban population growth (2000-2030) in the less developed regions is 2.3% per annum, in contrast to that of developed countries at 0.5% (UN, 2004) .Present urbanization pattern is different from the past due to three interrelated characteristics ,1) the rapid rate of urban growth ; 2) the upsurge in poverty and its effect on the urban economy; and, 3) the proliferation of slums and their impact on the urban environment and the environment's

Table 1 World Regional Distribution of People in Poverty (less than $ 1 a day) For the years 1987, 1990, 1998 and 2001

	Number of Persons $ 1 a day (millions)				Headcount index (percent)			
Region	**1987**	**1990**	**1998**	**2001**	**1987**	**1990**	**1998**	**2001**
East Asia and the Pacific (excluding China)	417.5 114.1	452.4 92.0	267.1 53.7	271 212	26.6 23.9	27.6 18.5	14.7 9.4	14.9 16.6
Eastern Europe and Central Asia	1.1	7.1	17.6	17	0.2	1.6	3.7	3.6
Latin America and the Caribbean	63.7	73.8	60.7	50	15.3	16.8	12.1	9.5
Middle East and North Africa	9.3	5.7	6.0	7	4.3	2.4	2.1	2.4
South Asia	474.4	495.1	521.8	431	44.9	44.0	40.0	31.3
Sub-Saharan Africa	217.2	242.3	301.6	313	46.6	47.7	48.1	46.4
Total	1,183.2	1276.4	1174.9	1089	28.3	29.0	23.4	21.1

Source: *The World Bank, World Development Indicator 2005*

Table 2 World Regional Distribution of People in Poverty (less than $ 2 a day) For the years 1987, 1990, 1998 and 2001

	Number of Person $ 2 a day (millions)				Headcount index (percent)			
Region	**1987**	**1990**	**1998**	**2001**	**1987**	**1990**	**1998**	**2001**
East Asia and the Pacific (excluding China)	1052.3 299.9	1084.4 284.9	884.9 252.1	864 594	67.0 62.9	66.1 57.3	48.7 44.3	47.4 46.7
Eastern Europe and Central Asia	16.3	43.8	98.2	93	3.6	9.6	20.7	14.7
Latin America and the Caribbean	147.6	167.2	159.0	128	35.3	38.1	31.7	24.5
Middle East and North Africa	65.1	58.7	85.4	70	30.0	24.8	29.9	23.2
South Asia	911.0	976.0	1094.6	1064	86.3	86.8	83.9	77.2
Sub-Saharan Africa	356.6	388.2	489.3	516	76.5	76.4	78.0	76.6
Total	2549.0	2718.4	2811.5	2735	61.0	61.7	56.1	52.9

Source: *The World Bank, World Development Indicator 2005*

impact on slums. These conditions give rise to “new urban settings” characterized by a radical process of change with positive and negative effects, increased inequities, greater environmental impacts, expanding metropolitan areas and fast growing slums (WHO 2005). The causes of urban growth in each of these regions vary. The most important reasons of rapid urbanization in developing countries are the natural growth as well as migration from rural areas. People migrated from rural areas generally due to economic reasons, for employment and batter income. Rural to urban migration is theoretically viewed as an equilibrating mechanism that reduces urban earnings and may cause increase in urban poverty. Poor people will make up a large part of future urban growth. It is argued that most urban growth now stems from natural increase (more births than deaths) rather than migration. In fact urban poverty is one of the most serious development challenges for developing countries and now many organizations working for development have great

Table 3 World population 1950 2030

Year/Period	**Population** (billion)				**Growth Rate** (%)	
	1950	1975	2000	2030	1950-2000	2000-2030
Total Population						
World	2.52	4.07	6.06	8.27	1.75	1.04
Developed Countries	0.81	1.05	1.19	1.22	0.76	0.07
Urban Population						
World	0.75	1.54	2.86	4.98	2.68	1.85
Developed Countries	0.45	0.73	0.90	1.00	1.40	0.38
Developing Countries	0.30	0.81	1.96	3.98	3.73	2.35
Rural Population						
World	1.77	2.52	3.19	3.29	1.18	0.10
Developed Countries	0.37	0.31	0.29	0.21	-0.45	-1.09
Developing Countries	1.44	2.21	2.29	3.08	1.46	0.20
Percentage Urban						
World	29.8	37.9	47.2	60.2		
Developed Countries	54.9	70.0	75.4	82.6		
Developing Countries	17.8	26.8	40.4	58.4		
Urban Population in developing countries as percentage world urban population	40.0	52.6	68.5	79.9		

Source: *UN World Urbanization Prospects. The 2001 Revision, 2003*

Table 4 Urbanization Prospects

	Percent of Urban Population			Percent Share of Urban Population		
Regions	1975	2000	2030	1975	2000	2030
Africa	25	37	54	7	10	16
Asia	25	38	55	39	49	54
Latin America	61	76	85	13	14	2
North America	74	79	87	11	8	6
Europe	67	73	80	30	19	12
World	37	50	61	100.00	100.00	100.00

Source: *UN World Urbanization Prospects. The 2001 Revision, 2003*

concern about the issue of urban poverty. Urban poverty is now on the world's development agenda. United Nations Millennium Declaration drew attention to the growing significance of urban poverty, specifying, in Target 11, the modest ambition of achieving by 2020 “a significant improvement in the lives of at least 100 million slum dwellers”.

UN-Habitat mentioned that the proportion of urban poor is increasing faster than the overall growth rate of urban population in a large number of developing countries. According to estimates the current 30 percent level of world urban poverty will grow to 40-50 percent by 2020. Urban area of the least developed regions will absorb nearly all of the global population increase over the next three decades (UN-Habitat, 2004). In 2003 more than 900 million people (about 32 percent) lived in slums under life and health threatening circumstances (UN-Habitat 2003). Almost one of three urban dwellers, world wide lives in a slum.

In 2001 about 924 million people lived in slums, it constituted 31.6 percent of the total urban population. Table 3 presents urban population and estimated slum population in various regions of the world. In sub-Saharan Africa about 72 percent of the population was living in slums, in South Central Asia about 59 percent population was living in slums and in Eastern Asia more than 36 percent of the urban population lived in slums (Table 5).

Table 5 Population, Urban Population and Slum Population 2001

Major area, region	Total population	Urban population		Estimated slum population	
	(million)	(million)	Percentage of total population	(thousand)	Percentage of urban population
World	6134	2923	47.7	923986	31.6
Developed regions	1194	902	75.5	54068	6.0
Europe	726	534	73.6	33062	6.2
Other	467	367	78.6	21006	5.7
Developing regions	4940	2022	40.9	869918	43.0
Northern Africa	146	76	52.0	21355	28.2
Sub-Saharan Africa	667	231	34.6	166208	71.9
Latin America and the Caribbean (LAC)	527	399	75.8	127567	31.9
Eastern Asia	1364	533	39.1	193824	36.4
South-cultural Asia	1507	452	30.0	262354	58.8
South-eastern Asia	530	203	36.3	56781	28.0
Western Asia	192	125	64.9	41331	33.1
Oceania	8	2	56.7	499	24.1
Least developed countries (LDCs)	685	179	26.2	140114	78.2
Landlocked developing countries (LLDCs)	275	84	30.4	47303	56.5
Small island developing states (SIDS)	52	30	57.9	7321	24.4

Source: A *total and urban population: World Urbanization Prospects: The 2001 Revision, table A,1,b Slum population and percentages calculated by UN-Habitat using data from DHS (1987-2001); MICS (1995-2000); WHO/UNICEF JMP (1998-1999)*

Slum dwellers increased substantially during the 1990s. Urban population in less developed countries increased by 36 percent during 1990s , from 1439 million in 1990 to 1964 million in the year 2000. It is likely that the number of slum households increased by a higher proportion (UN-Habitat 2003).

Poverty in urban areas has been increasing during some decades and there are higher numbers of the 'poorest of the poor' in urban centers dwellers is found in Asia, with the largest clusters found in two countries in the China and India.

'Slum households' were defined the Millennium Declaration as target 11 of Goal 7, as a group of individuals living under the same roof lacking one or more of the following necessities: access to improved water, access to improved sanitation facilities, sufficient living area, structural quality and durability of dwellings, and security of tenure (UN-Habitat 2003). The general definition used by UN-Habitat in its reports about slums denotes 'a wide range of low-income settlements and/or poor human living conditions.' Slums are further characterized by the following attributes13: a) lack of basic services; b) substandard housing or illegal and inadequate building structures; c) overcrowding and high density; d) unhealthy living conditions and hazardous locations; e) insecure tenure, irregular or informal settlements1; f) poverty and social exclusion; and, g) minimum settlement size. The slum dweller population is dynamic all over the world. Slums are the major centers of urban poverty where concentration of poor is high. They suffer from a stigma, of living in a slum. Over 90 per cent of slum dwellers today are in the developing world. South Asia has the largest share, followed by Eastern Asia, sub-Saharan Africa and Latin America. China and India together have 37 per cent of the world's slums. In sub-Saharan Africa, urbanization has become virtually synonymous with slum growth; 72 per cent of the region's urban population lives under slum conditions, compared to 56 per cent in South Asia. The slum population of

sub-Saharan Africa almost doubled in 15 years, reaching nearly 200 million in 2005(UNFPA 2007).

The growth of large cities in the developing world is accompanied by an upsurge in urban poverty. According to estimates one-third to one-forth of all urban households in the world live in absolute poverty, which are vulnerable to a number of hazards. They are living in slums, in illegal residence where population density is high, generally without basic services, have precarious employment in the formal and informal sector. They are exposed to high incidence of arbitrary arrest and forced eviction. Neglected by formal institution they are often left unprotected against violence, drugs, dealers, corrupt officials, slumlords and organized crimes. Urban poverty is generally defined in terms of households income, that the households having income below poverty line are poor, but urban poverty is multidimensional and only monetary measures of poverty do not define multidimensional nature of poverty. People are poor not only because they lack income, but they lack assets, their houses are overcrowded, of low quality, insecure, they do not have access to safe drinking water, adequate sanitation, health care or schools. According to Mitlin (2003) the term 'urban poor' in the literature is used very generally, often with a spatial meaning means those living in a low-income settlement, rather than based on other characteristics such as low-income, unmet basic needs and lack of political voice, because some residents of low-income settlements are not poor some of them have large houses. Mitlin (2003) argues that, (1) nature of urban settlement differs greatly therefore, the forms of chronic poverty differs, as some chronically poor urban residents may live in the center of larger cities, while others may live in small towns, with similar characteristics to that of the rural poor, (2) the process is one of transition means some of the settlements now classified as urban may have been rural previously, (3) data from different countries cannot easily compared. It is also recognized that these trends are not simple nor unidirectional.

Measuring Urban Poverty

It is argued by Hulme et al. (2002) that monetary measures are not fully presented the multiple dimensions of poverty, because there are differences in expenditure patterns of different groups of the poor. Satterthwaite (2004) argues that the aggregated international and national figures underestimate the degree of urban poverty.

Mitlin (2003) suggest that measures of urban poverty need to be sensitive to:

- Differences between cost of living in different urban (and rural areas);
- Differences in basket of goods required to remain healthy in a state of well-being;
- Access to basic infrastructure and services;
- Levels of civil and political rights.

The Scale of Urban Poverty

Urban poverty is relatively ignored by planner, policy makers, researchers , donor agencies such as World Bank and also by those working in this field. Maxwell et al. (1995) pointed out that poverty analysis has suffered from the non-acceptance of the concept of “urban poor” and a feeling that there was no need to consider urban poverty. Generally researchers and experts have feeling that rural poverty is much more intense, deeply rooted and long term than urban poverty. Thus they generally ignored the urban poverty and as Rakodi (2002) mentioned that many poverty specialists emphasis the significance of rural rather urban poverty, and because such conclusions appear to be based on income measurement of poverty and hence be misleading. The roots of urban poverty are more complex than rural poverty. Structural adjustment is one of the most pronounced reason of urban poverty, emerged from review literature. Rakodi (2002) argued that structural adjustment, “hit urban

areas particularly hard". Haddad et al (1999) said that "Many analysts believe that the locus of poverty and under nutrition is gradually shifting form rural to urban areas". They analyzed data of eight countries and pointed out that "in 5 out of 8 countries, the absolute number of poor urban and the share of poor people living in urban areas is increasing over time (Bangladesh, China, Ghana, India and Nigeria) and 7 of the 8 countries "the share of poor people in urban areas is increasing".

The basic demographic characteristics of urban poverty are that its incidence is high in households in which dependency ratio is high. The poorest households tend to be those with the largest numbers of consumers relative to income earns. Urban poor are more likely to earn money and purchase the goods and services they consume. The poorest urban residents live in self-built, usually illegal housing. Living costs may be 10-25 percent higher in urban than in rural areas. Food and housing are comparatively more expensive. More urban poor engage in informal sector of economy and some of the urban poor receive government or private transfers. Urban poor are often discriminated against in the provision of government services. (Mitlan 2003).

Written (1995) said that conceptualizing urban poverty problematic because the definition of the categories is arbitrary means defining poverty is difficult as well as defining urban. Definition of urban vary greatly country to country.

The dimension and nature of the urban poverty is different from that of the rural poverty. Poverty in urban and rural areas differ in incidence, economics and demographically. Understanding urban poverty presents a set of issues distinguish for the poor in urban areas and many require specific analysis (Baharaoglu and Kessides, 2002).

Satterthwaite (2004) pointed out following aspects of urban poverty.

1. Inadequate income (and thus inadequate consumption of necessities).
2. Inadequate, unstable or risky assets base for individual households.
3. Inadequate shelter: Poor quality, overcrowded, and community's inadequate provision of public infrastructure (piped water, and sanitation, roads, footpaths etc.) which increases health burdens and often work burden.
4. Inadequate provision for basic services (schools, or vocational training centers, health care centers, emergency services, public transport, communication, law enforcement etc.).
5. Limited or no safety nets to ensure basic consumption can be maintained.
6. Inadequate protection of poorer groups' rights through the operation of the law including laws and regulations regarding civil and political rights occupational health and safety pollution central, and health, protection from violence and other crime, protection from discrimination, exploitation.
7. Poorer group's voiceless ness and powerlessness with political system.

Aims (1995) emphasized the importance of the labor market and wider societal forces in determining urban poverty. According to him lack of employment is one of the main and important determinants of urban poverty. He discussed the interaction between wage levels and food prices, means discussed the labor market approach by focusing on questions of how individuals survive, and differences between urban and rural poverty.

Written (1995) said that urban poverty treated differently in the South and the North because of differences in conceptualization of urban poverty. In the North, urban poverty is not generally treated as a separate category and policy emphasis and regional interventions, with selective assistance at intra-city level to targeted deprived areas or groups. In the South, policies have focused on raising incomes and improving access to services in the rural sector. Urban-rural divide must be treated as a continuum rather than as a rigid dichotomy because (1) the cutoff point for any division is bound to be chosen arbitrarily, and also there are linkages between the functions of cities, small towns and rural areas, which imply that the

problems of one sector cannot be treated in isolation from the other, (2) concentrating on whether urban poverty is worse or more extensive than rural poverty diverts attention from structural determinants which affect the life chance of the poor in both sector, (3) the acknowledgement of diversity in life-chances with in urban settlements to disaggregate within the city as order to analyze and explain poverty.

According to Baharogh and Kessides (2000) there are five dimensions of poverty, income/consumption, health, education, security and empowerment. They presented key features of poverty across their dimensions in the urban context. They also state that urban poverty is often characterized by cumulative deprivations that is, one dimension of poverty is often or contributor to another dimension.

Conclusion

For the first time in history, more than half its human population ,is currently living in urban areas. By 2030, this is expected to grow to almost 5 billion. The world's urban population grew very rapidly (from 220 million to 2.8 billion) over the 20th century, the next few decades will see an unprecedented scale of urban growth in the developing world. This will be particularly notable in Africa and Asia where the urban population will double between 2000 and 2030 .It is also estimated that most of these new urbanites will be poor living in urban areas of developing countries .Poverty, currently, is increasing more rapidly in urban areas than in rural areas but has received far less attention. Many planners and policy makers underestimate the scale and depth of urban poverty Urban poverty is severe, pervasive and largely unacknowledged. According to the Global Report on Human Settlements (2004), 43% of the urban population in developing regions lives in slums. In the least developed countries, 78% of urban residents are slum dwellers. Many countries do not welcome urbanization and urban poverty remains largely unaddressed (WHO 2005). “The growth of cities will be the single largest influence on

development in the 21st century.” (UNFPA 1996): By 2030, the towns and cities of the developing world will make up 80 per cent of urban population (UNFPA,2007).There is need to consider the issue of urban poverty in developing countries seriously.

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Plants as soil indicator in Cholistan desert, Pakistan

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Abstract
Soils of different vegetation types of Cholistan desert, Pakistan, dominated by a particular desert plant community have been analyzed for salinity, pH, organic matter and ionic concentration (P and K). The results showed some important relationships between different soils and plants. The association of plant species to certain soil types and places was common which indicated that the chemical composition of soils has enabled these plant species to become "indicator" for certain plant types. The most ecological parameters responsible for plant distribution seem to be the salinity, pH and organic content.

Introduction
Cholistan desert, an extension of Great Indian Desert, is located in southern Punjab province between latitudes 27° 42' and 29° 45' north and longitudes 69° 52' and 75° 24' east (Akbar et al. 1996, Akhter and Arshad 2006). This desert comprises an area of 2.6 million hectors having a length of about 480 km and width varying from 32 to 192 km (FAO 1993; Akbar et al., 1996). The mean annual rainfall varies from less than 100 mm in the west to 200 mm in the east. Aridity is the most striking feature of this desert with wet and dry years occurring in clusters. Mean minimum and maximum temperatures are 20 °C and 40 °C, respectively. The mean summer temperature (May-June) is 34 °C with maximum reaching 50 °C or more (Akhter and Arshad 2006). No perennial or seasonal stream is available in this desert. Factors like strong summer winds, low rainfall, high rate of infiltration and excessive evaporation prevent the accumulation of surface water. Ground water is mostly brackish having salts concentration 9000-24000 mg/l and water table is at a depth of 40 to 50 meters (FAO 1993; Akbar & Arshad 2000).

This desert is divided into two geomorphic regions depending upon its topography, parent material, soil and vegetation. The northern region or Lesser Cholistan bordering the canal-irrigated areas covers about 7770 km^2 while the southern region or Greater Cholistan comprises of 18130 km^2. The Lesser Cholistan consists of saline hard pans (locally called 'Dahars') alternating with low sandy ridges. These soils are generally homogenized to a depth ranging from 30 to 90 cm. Sand dunes are stabilized, semi-stabilized or shifting while the valleys are mostly covered with sand. The soils are classified as either saline or saline sodic, with pH ranging from 8.2 to 8.4 and 8.8 to 9.6, respectively. The Greater Cholistan is a wind sorted sandy desert and comprises of river terraces, large sand ridges and less depressions (Baig et al., 1980; Akbar et al., 1996; Akbar & Arshad 2000, Arshad et al., 2006).

The vegetation of Cholistan desert is typical of arid regions and comprises of xerophytic species, which are adapted to extreme seasonal temperature, moisture fluctuation and wide variety of edaphic conditions. Vegetation cover is comparatively better in eastern region (200 mm rainfall zone) than the hyper arid southern region. The soil topography and chemical composition has enabled a number of plant species to become "indicator" for certain soil types. The association of certain plant species to certain soils at different places is very common. The compact saline 'dahars' without any soil cover are dominated by *Haloxylon recurvum*, *Suaeda fruticosa, Cymbopogon jwarancusa, Sporobolus iocladus, Aeluropus lagopoides* and *Capparis decidua*. *Ochthochloa compressa, Salsola baryosma, Haloxylon salicornicum and Prosopis cineraria* are specific to the 'dahars' having some sandy cover.

Similarly, the sand dunes are dominated by *Calligonum polygonoides, Aerva javanica, Panicum turgidum, Stipagrostis plumosa* and *Lasiurus scindicus.* (Rao et al., 1989; Arshad et al 2006). Within the Cholistan desert a number of different dominant plant species and soil types are found (Arshad and Akbar 2002). Boer (1996) evaluated the coastal soils of Saudi Gulf and found some very important relationships between the soils and plants. In order to evaluate the soil ecological range and to understand the plants as soil indicator, soil analyses of the soil samples collected from different plant communities have been carried out including salinity (E.C), pH, organic matter and ionic concentration (P and K).

Baig et al., (1975) soil-wise classified the vegetation of Cholistan desert into six communities i.e. *Haloxylon recurvum, Prosopis specigera, Eleusine compressa, Tribulus terrestris, Dipterygium glaucum* and *Calligonum polygonoides*. Rao et al., (1989) while exploring the interior of Cholistan desert, recorded that certain plants are the indicator of soils such as *Cymbopogon jwarancusa* is specific to the sandy loam soil, *Capparis decidua* is specific to medium high sand dunes, *Calligonum polygonoides* is specific to sand dunes, *Prosopis cineraria* is specific to sandy loam calcarious soils, *Haloxylon recurvum*, *Suaeda fruticosa* and *Hoxylon salicornicum* are specific to the saline soils. Arshad and Rao (1995) identified four soil divisions in Cholistan desert i.e. Sand dunes dominated by *Calligonum polygonoides*, Sandy plains dominated by *Calligonum-Prosopis-Capparis* community, Compact soils with gravels dominated by *Capparis-Prosopis* and saline areas dominated by *Haloxylon-Suaeda-Tamarix* community.

Knowledge of soil quality is essential for protection of the vegetation of the Cholistan desert therefore the present study was performed to ascertain the plants as soil indicator in this desert.

Materials and Methods

Soil samples from different vegetation communities of Cholistan desert were collected and analysed. All the soil samples were collected during the first week of November, 2005 that soil had been subject to similar climatic conditions. Five soil samples for each vegetation type were taken, always from directly underneath a dominant plant at a depth of 35-40 cm which is major rooting layer in Cholistan desert. The area dominated by *Haloxylon recurvum, Suaeda fruticosa, Cymbopogon jwarancusa, Prosopis cineraria, Lasiurus scindicus, Salsola baryosma, Haloxylon salicornicum, Calligonum polygonoides, Tamarix aphylla, Capparis decidua, Calotropis procera, Ochthochloa compressa* and *Aerva persica* were included in this study. Electrical conductivity was measured with an LF 92 (WTW Germany) and pH was measured with a WTW pH 91 set. Potassium and phosphorus was determined by Flame Photometric method described by Khan et al., 1970. Organic matter was calculated by following the methods described by Olsen et al., (1954) and Khan et al., (1970).

Results and discussion

Salinity

Figure I. shows the average and range of electric conductivity (E.C.) of the soil samples collected from different habitats of Cholistan desert dominated by a particular plant community. High electric conductivity was recorded in the soils dominated by *Suaeda fruticosa, Haloxylon salicornicum* and *Tamarix aphylla* communities. These soils are considered as highly saline having extremely high conductivities. The range of electric conductivity in the soils dominated by *Suaeda fruticosa* was 9.1 to 10.3 dS/m and average 6.78 dS/m, it ranged from 0.9 to 7.10 dS/m in the soils dominated by *Haloxylon recurvum* and 3.5 to 5.9 dS/m in the *Tamarix aphylla* dominated soils. Average electric conductivity recorded in these soils was 2.88 ds/m and 4.70 dS/m. Range of electric conductivity in the soils dominated by *Ochthochloa compressa, Salsola baryosma, Calligonum polygonoides,*

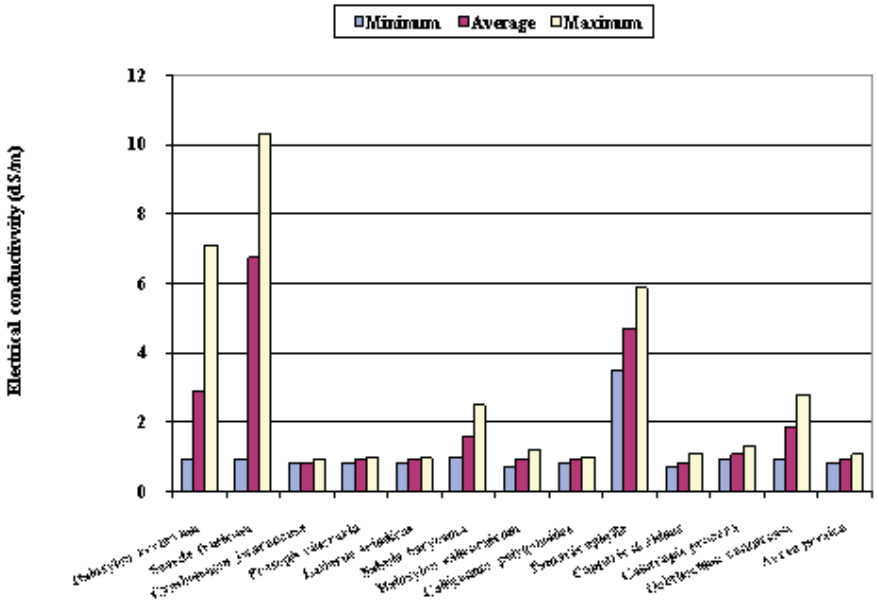

Fig. 1. Electrical conductivity of soil samples collected from different plant communities

Cymbopogon jwarancusa, Prosopis cineraria, Capparis deciduas, Calotropis procera and *Aerva persica* was 0.7 to 2.8 dS/m, showing non- significant difference.
Soil salinity and texture exert their influences both directly and indirectly. Extreme salinity values, for example, may simply exceed the physiological tolerance level of a given species. In other cases physical effects may be mediated by interspecific interactions, as when a species finds a certain environmental (e.g., edaphic) regime tolerable but is a poor competitor under that regime (e.g., Connell, 1961; Wilson, 1967; Mobray and Oosting, 1968; Bovbjerg, 1970). Salinity was found relatively important factor regarding plant soil relationship.

Ionic concentration

Phosphorus

The concentration of available phosphorus in the soil types dominated by different plant communities in Cholistan desert are given in Fig 2. Maximum concentration of phosphorus was recorded in the soils dominated by *Salsola baryosma* ranging from 0.15 to 0.16 g/100g, very closely followed by the soils dominated by *Tamarix aphylla* (0.14 to 0.16 g/100g). Minimum concentration of phosphorus (0.04 to 0.14 g/100g) was recorded in soils dominated by *Suaeda fruticosa*. Phosphorus concentration was ranged from 0.10 to 0.14 g/100g in *Cymbopogon jwarancusa* and *Aerva persica* dominated soils, 0.04 to 0.16 g/100g in *Capparis decidua* dominated soils*, 0.11* to 0.14 g/100g in the soils dominated by *Calligonum polygonoides, 0.04* to 0.13 g/100g in the soils dominated by *Haloxylon salicornicum* and 0.09 to 0.10 g/100g in the *Lasiurus scindicus* dominated soils*.* No significant difference in phosphorus concentration in the soils dominated by *Prosopis cineraria, Ochthochloa compressa* and *Calotropis procera* ranging phosphorus 0.15 to 0.15 g/100g.
The presence of organic P in desert soils is well established (Jenny 1941). The availability of P in soil organic matter depends primarily on seasonal patterns of precipitation and

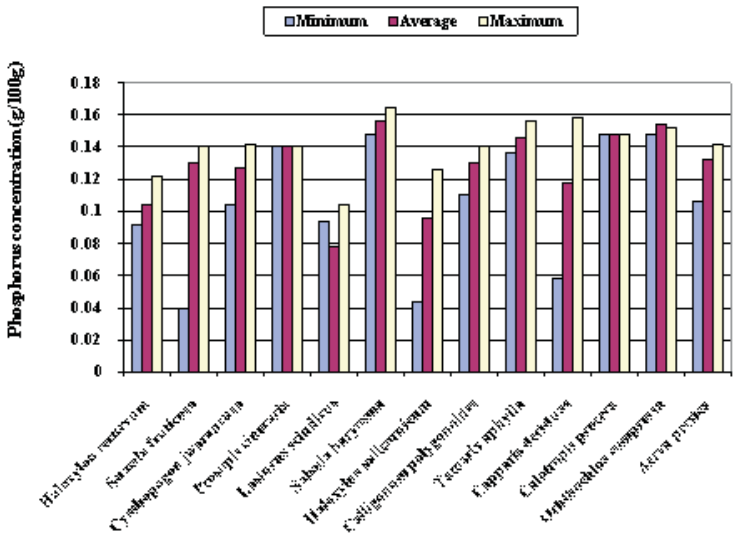

Fig. 2. Available phosphorus of soil samples from different plant communities

temperature, which affect microbial activity and mineralization (Eid et al., 1951; Dormaar 1972; Westin 1978; Magid & Neilsen 1992). In desert soils, phosphorus availability to plants and microbial biomass is determined by the labile, surface-adsorbed phosphate, rather than the $CaCO_3$-bound, crystalline forms (Murrman & Peach 1969). The availability of crystalline forms is minimal owing to the low surface area of calcium phosphates, which are mainly present as sand and silt-sized particles (Chu & Chang 1966; Stewart & Tiessen 1987). In most soils, soil texture is central to soil phosphorus availability (Roberts et al. 1985; Anderson 1988). Often, clay content correlates with soil organic carbon and phosphorus, because a high sand content allows a higher rate of phosphate leaching as water percolates through the soil (Jenny 1980; Nichols 1984; Anderson 1988). In the light of above mentioned facts the dominance of silt and sand size particles in the wind blown deposits of cholistan desert minimizes the chances of phosphorus availability to the plant species. Hence the phosphorus did not seem a controlling factor for vegetation distribution in the cholistan desert.

Potassium

Fig. 3 shows the concentrations of potassium in the soil samples of Cholistan desert dominated by different plant communities. The concentration of potassium was found sufficiently high in all the soil samples. Maximum concentration of potassium (6.96 g/100g) was recorded in the soils dominated by *Haloxylon recurvum*, very closely followed by the soils dominated by *Salsola baryosma* and *Tamarix aphylla* where it ranged from 5.5 to 6.7 g/100g. The soils dominated by *Lasiurus scindicus* and *Aerva persica* potassium concentration ranged from 4.9 to 5.0 and 5.1 to 5.2 g/100g, respectively. The soils dominated by *Salsola baryosma, Cymbopogon jwarancusa, Prosopis cineraria, Calligonum polygonoides, Capparis deciduas, Calotropis procera, Haloxylon salicornicum* and *Ochthochloa compressa* the potassium concentration ranged from 4.2 to 6.3 g/100g.

Limited amounts of potassium are required by the plants. High concentrations in the soil solution are rare but toxic effects of potassium on plants have been reported by the U. S. Salinity Laboratory (1954). Potassium was apparently not a critical factor in determining distribution of these species. Similar observations have been reported by Gates et al., (1956)

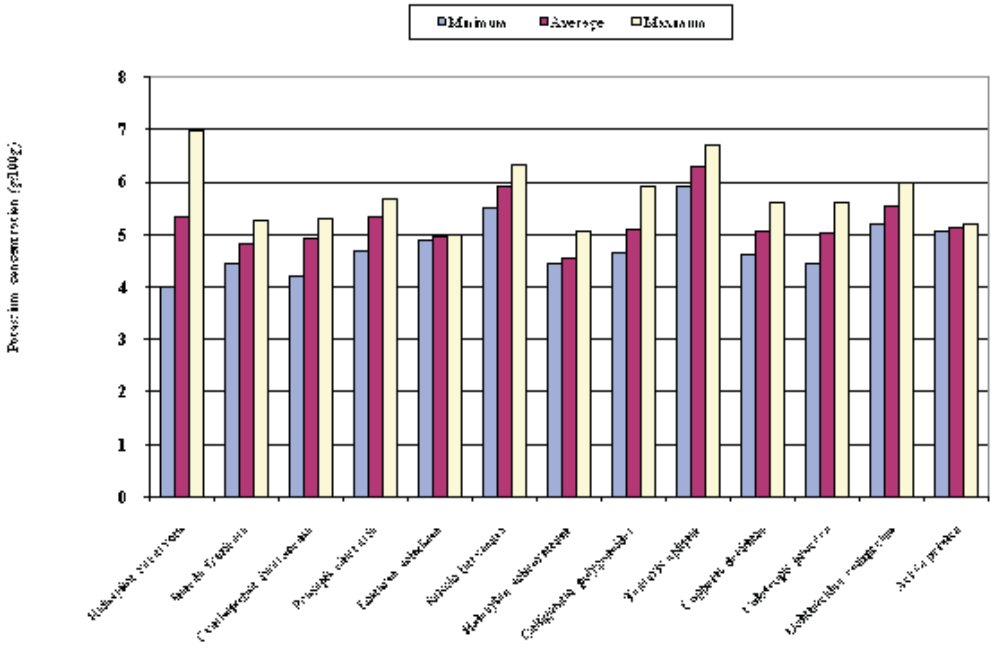

Fig. 3. Available potassium of soil samples from different plant communities

in their study of plants and soils of Salt-Deserts of Utah and presented his observation as "Soil analyses showed some significant edaphic difference between soils occupied by the various species. However no species was restricted in distribution by a narrow tolerance range for any specific soil factor".

Organic matter

Table 1 shows the percentage of organic matter in the soils dominated by different plant communities in Cholisatn desert. Minimum organic matter 0.5% was found in the habitats dominated by *Calligonum polygonoides* and *Ochthochloa copressa*. The plant communities where *Cymbopogan jwarancusa, Capparis decidua* and *Aerva persica* appeared as leading dominant plant species showed maximum concentration of organic matter i.e. 0.68%.The variation in the percentage of organic matter was non-significant in all the habitats dominated by *Haloxylon recurvum, Suaeda fruticosa, Prosopis cineraria, Lasiurus scindicus, Salsola baryosma, Haloxylon salicornicum Tamarix aphylla* and *Calotropis procera*.

The low amount of organic content in these soil samples may be attributed to the over-grazing as very little plant residue becomes available for its decomposition as humus. The observation given by Oades (1988) that "much of the organic matter in soil is particulate and not evenly spread through the soil" creates another problem for the growth of plants. However the uneven distribution of organic matter may provide an opportunity to the selective accommodation of the plants.

pH

Dominant Plant Species	pH		Organic matter (%)	
	Minimum	Maximum	Minimum	Maximum
Haloxylon recurvum	7.7	8.7	0.57	0.62
Salsola baryosma	8.0	8.5	0.60	0.61
Cymbopogon jwarancusa	8.2	8.6	0.55	0.68
Prosopis cineraria	7.2	8.4	0.57	0.63
Lasiurus scindicus	8.2	8.4	0.52	0.56
Salsola baryosma	8.2	8.5	0.62	0.63
Haloxylon salicornicum	8.5	8.7	0.55	0.60
Calligonum polygonoides	8.4	8.6	0.50	0.57
Tamarix aphylla	8.1	8.4	0.62	0.65
Capparis decidua	7.8	9.2	0.55	0.68
Calotropis procera	8.3	9.0	0.55	0.60
Ochthochloa compressa	8.2	8.3	0.60	0.62
Aerva persoca	8.4	8.5	0.62	0.68

Table 1. Concentration of pH and organic matter in soils of different plant communities

The pH values of the soil samples in different plant communities of Cholistan desert are incorporated in Table 1. The minimum value of pH 7.2 was recorded in the soils dominated by *Prosopis cinerariawhere* where it ranged from 7.2 to 8.4. Maximum pH value 9.2 was noted in the soils dominated by *Capparis deciduas,* ranging from 7.8 to 9.2. The soils where *Haloxylon recurvum, Suaeda fruticosa, Cymbopogon jwarancusa, Lasiurus scindicus, Salsola baryosma, Haloxylon salicornicum, Calligonum polygonoides, Tamarix aphylla, Ochthochloa compressa,* and *Aerva persica* appeared as prominent plant species the pH of the soil ranged from 8.2 to 8.6 showing non-significant differences. In case of the soils dominated by *Calotropis procera* the pH ranged from 8.3 to 9.0.

West (1982) stated that the salinity and aridity tolerance levels of various species cause a sorting effect along a moisture and salinity gradient. Branson et al. (1967) observed soil-moisture relationship and soil salts as the primary cause of different plant communities. In western Utah, Gates et al. (1956) established differences between soils and salt-desert plants, but concluded that no specific soil factor limited each species range as there was an overlap of the soil factors measured. Boer (1996) also presented similar observation for pH role regarding the vegetation.

Conclusion

The results described above showed that the major plant species of Cholistan desert grow on certain soils indicating a relationship of soil-type and vegetation. Different plant communities corrospond clearly different soil types. Different plant communities correspond clearly to different soil types. The soils of the communities where *Tamarix aphylla, Suaeda fruticosa* and *Haloxylon* recurvum are dominant plant species are indicating the soils with high salt concentration. The concentration of phosphorus was hardly above the minimum level and varied maximum in the soils dominated by *Suaeda fruticosa, Capparis decidua,* and *Haloxylon salicornicum.* The concentration of potassium in all the soil types was above the maximum level. In the study area the pH values of the soils were generally very high between 7.2 to 9.2. Thus the soils can be classified as moderate to strongly alkaline. The pH influences the plant growth both directly and by affecting the availability of essential elements Boer (1996). Maximum organic matter level recorded in all the soil types of the study area was less than the minimum level i.e. 0.86% conforming that the soils of Cholistan

desert are very poor in organic matter (Rao et al., 1989). Jafari et al., (2004) during the evaluation of soil factors responsible in distribution of vegetation types in rangelands of Yazd, Iran reported that the vegetation distribution pattern was mainly related to soil characteristics such as salinity, texture, soluble potassium, gypsum, and lime. Each plant species has a significant relation with soil properties.

Generally, the different vegetation types found in Cholistan desert are very specific to various soil types. The most important ecological parameters responsible for plant distribution in Cholistan desert seem to be the salinity and pH.

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Assessing urban sprawl in Lahore by using RS/ GIS techniques

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Abstract

Urban population growth is one the major geographical phenomenon in present times. A large number of factors such as employment opportunities, education & health facilities as well as industrialization and commercial activities in the cities have been contributing rural-urban migration. Due this immense migration urban centres are expanding day by day which is known as urban sprawl. Study of patterns of urban sprawl has been focus of urban geographers and planners. Recently, introduction of remote sensing and GIS techniques have been very useful to assess the nature and patterns of urban sprawl. This paper is a little contribution towards the use of RS and GIS techniques for assessment of urban sprawl in Lahore.

Introduction

Urban centres have been the focus of civilization as well as sources of reflections of socio-economic and cultural activities of historical places. The field of archaeology is based on the study of historical urban centres. The excavations and exploration of historical urban centres describe socio-economic and cultural patterns in those historical urban centres.

In present times, urban centres have not only maintained their historical entity but have also grown by adding a large number of new socio-economic and cultural functions which have developed due to the industrialization in 20th century. The age of industrialization has played a very important role in expanding the physical landscape of the urban centres. London. Paris, Moscow, New York, Tokyo and Beijing etc clearly reflect the nature of mega polis cities which have grown very rapidly due to the industrialization. Rural to urban migration in search employment, expansion of commercial activities, availability of better academic and health facilities have been the major factors of expansion of physical landscape of urban centres not only in industrialized countries but also in developing countries.

Study of urban centres has been one of the main focuses in geography which lead to the development of urban geography. Although, major focus of these studies such as Matherson (1958), Koshal (1976), Berry (1978) has been to evaluate the various functions which are performed by the urban centers. However, work such as Gibbs,(1961), Lee (1979), Chang (1981) and Leichenko (2001) has also been carried out to see the nature of growth of urban centres in the physical landscape. The physical expansion of cities always involve the loss of peri-urban areas which historically known as the hinterlands of the great urban centres. This loss of peri-urban area results in the loss of agricultural and forest areas. The study of physical expansion of urban landscape and the loss of agricultural and forest areas have been carried out by applying statistical and cartographic methods. The introduction of use of remotely sensed data in late 60s has been very useful for assessing changes in urban landscape. Later, in 80s the development of GIS has entirely change the nature of studies of urban landscape. The integration of RS and GIS techniques has added the accuracy and precision in monitoring urban landscape in the shortest period of time. This study aims to present a little effort to assess the changes in urban landscape of Lahore which is the oldest historical urban centre of Pakistan since 1951.

Methodology

Assessing the sprawl of urban landscape has been the key issue in urban geography. Historically, the urban landscape has been mapped by using cartographic methods in order to study the factors behind the nature of physical expansion of urban landscape. The studies such as Wolman et al. (2005), Lawrence (1988) have used the cartographic and statistical methods for assessing the changing nature of urban landscape. In late 19th and early 20th centuries, the introduction of aerial photography aided to measure the accurate changes in urban landscape. In 1980s the availability of satellite remote sensing data brought new dimensions in studying urban centres. The use of remote sensing techniques in urban geography can play very important role. The urban landscape can be classified in as many categories depending upon the bands and resolution of RS data. The studies such as Dietzel and Clarke (2004) have explained the use of RS data in monitoring the urban landscape. Various techniques are available in RS and image processing softwares. A number of researchers such as developed a number of algorithms for specific purpose projects.

Advancement of GIS has proved the most important spatial analysis tool in geography. A number of studies such as Wise (1999), McClure & Griffiths (2002), Vert (2002), Oetter (2004), Mennis and Liu (2005) have demonstrated the use of GIS in monitoring urban patterns.

However, the Integration of GIS and RS methods have produced more useful results in evaluating the spatial nature of urban land. Mrozinski and Cromley (1999), Hall (2001), Wise (2002), Mas (2005) and Ghaffar (2005) have explained various methods of GIS and RS integration to monitor urban and agricultural land use changes.

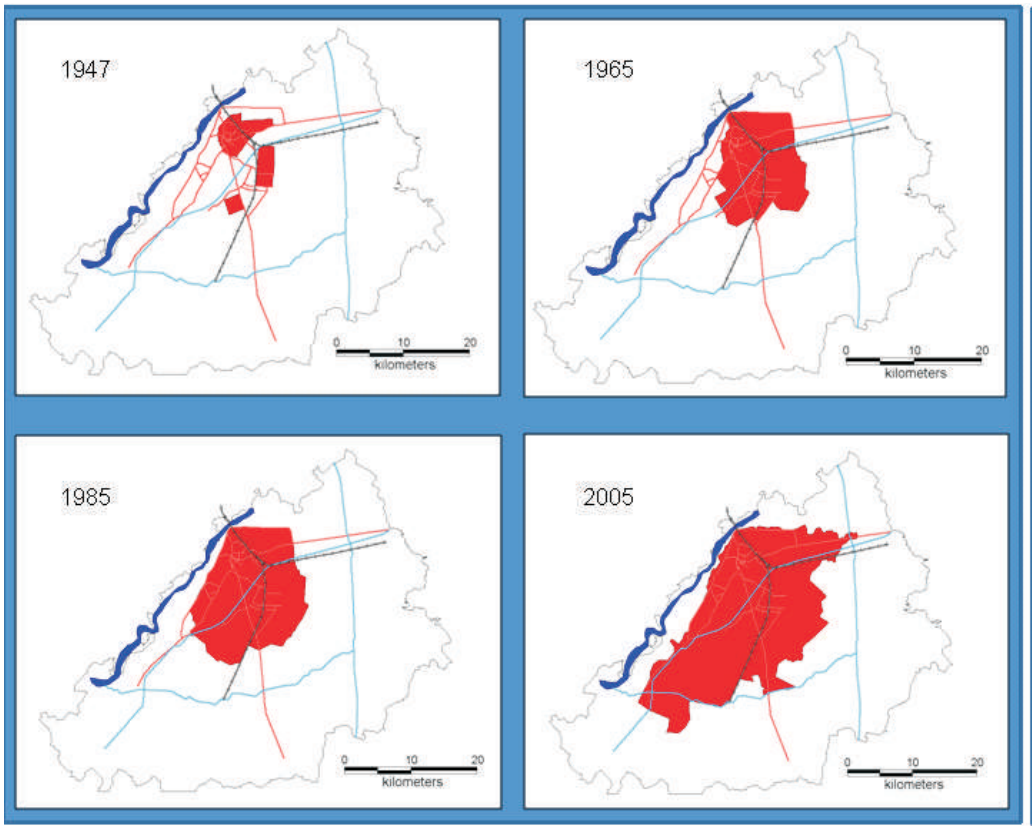
In this study spatial data regarding the historical nature of urban land has been acquired from the historical images from maps and aerial photographs. Satellite image of Lahore has been acquired from Landsat 7. All the images are digitised by on-screen digitization method. Digital data layers generated from various temporal images have analysed in GIS to create spatial database of these layers. Moreover, statistical data from the DCRs have also been collected to strengthen the results obtained in spatial analysis.

Urban sprawl in Lahore

Lahore is one of the oldest historic cities of Pakistan. dating back some 1000 B.C. It lies on 74^{o} 40^{l} east longitudes and 31^{o} 34^{l} north latitudes comprising 1772 km^{2}. Fig. 1. Represents the geographical location of Lahore. Traditionally, it was built on a mound surrounded by a boundary wall. However, with the passage of time the city has been destroyed and rebuilt by the invaders and settlers. The present walled city represents the reign of Mughal Empire. In late 19th century (1849) it was occupied by the British. As part of their military policy, the British built a cantonment away from the walled city. In 1947, at the time of independence, the urban area of Lahore was consisting of Walled city, Baghbanpura, Mughalpura, Misri Shah, Chah Miran, Naulakha, Gari Shahu, Qila Gujjar Sing, Mozaang, Ichhra, Nawan Kot, Qila Lachman Sing, Kirshan Nagar, Sant Nagar, Ram Nagar, Raj Garh, Cantt. Area and Model Town. Fig. 2. describe the urban expansion since 1947 to 2005. Total urban area as computed by GIS at that time was only 66 km^{2}

Due the migration from India at the time of independance, the population of Lahore city begin increase rapidly as it was the gateway to Pakistan from the Indian Punjab. Moreover, it was the only commercial city at that time. Lahore also provided the opportunities of employment to the immigrants. New settlements such as Gulberg, Samanabad, Shadbagh, Bahawalpur House, Wahdat Colony, Poonch House, Colony, Shadman, Shah Jamal, New Garden Town and Muslim Town appeared in 1960s. Total urban area as calculated by GIS was 170 km^{2} in 1965 During the period of 1965 and 1985 there has been steady growth of population. The city expanded with the passage of time. A number of new settlements such as Faisal town,

Fig. 1 Urban expansion of Lahore, 1974-2005



Joher town, Allama Iqbal Town and New Garden town were added to the urban area of Lahore during the period 1965-1985 in order to cope the population growth of the city.
Since 1985, the population of Lahore began to rise at a highest rate. New opportunities of employment in the various sectors of economy such as commercial, business, Industrial and transport gave rise to the urban population of the city. The population explosion played an important role in the urban expansion of the city. The city grew very rapidly on the east and south-east sides. Large number of housing settlements was added in the urban area. This tremendous growth in the urban area captured the hinterland of the Lahore city. A large number of villages (Table 1) were merged into the urban area of Lahore. Total area of these merged villages was 340km^2. The total urban area computed by GIS in 1998 was 690 km^2. Since 1998 due to the inflation of land prices and the involvement of private sector, a large number of new housing colonies have been added to the urban area by converting agricultural land of the adjoining villages of the city though most of these new housing settlements are not in-habilitated yet. Total area of the city has risen up to more than 730 km^2 in 2005.

Conclusion

Use of satellite image is an excellent source of geographical data. By making the satellite image in the back drop, vector layers can be generated by onscreen digitizing. The new vector layers of pertaining to history can be generated by putting either scanned images of

topographical maps or by creating new layers in the bases of statistical information regarding the new urban settlements added to the city. In this study, integration of satellite image with various sources regarding new housing settlements has very well generated a number of vector layers about the historical boundaries of Lahore city. Further, hidden patterns of urban growth as well as merging of villages to city and loss of agricultural land can be assessed to probe the future changes

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