



Urban Sprawl in Karachi

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Abstract: In the period of 1981 to 1998 massive flight of population was recorded in Karachi City from the central city to the outskirts. As a result central population density sharply fell and population density gradient adopted a gentle slope. Similarly during the period 2002 to 2012, massive rural lands in Karachi had been converted into urbanized lands. As a result first time overall population density of Karachi fell. These results indicate urban sprawl phenomenon in Karachi which was first identified in America in the 1950s. This paper is an attempt:

- a) to investigate urban sprawl phenomenon in Karachi
- b) to evaluate how urban sprawl in Karachi is dissimilar to American cities
- c) to probe causes and impacts of sprawl in Karachi, and
- d) to analyse opinions of the city dwellers about the policies of dispersal and counter dispersal.

Keywords: Karachi, Urban sprawl, counter dispersal, density gradient.

1. INTRODUCTION

Urban sprawl is a term associated with the rapid growth of urban area resulted loss of agricultural land, forest and rangeland. It was first identified in 1950s when it was noted that the gross urban population density across America fell quickly (Miron, 2003). There are three parameters used to identify urban sprawl:

- a) It occurs when urban expansion consumes land at a faster rate than population grows.
- b) Population density of urban area declines significantly as a result of areal growth.
- c) Central population density falls significantly and population density gradient becomes gentle. Urban sprawl is emphasized by following characteristics:
 - i. Loss of open spaces as a result of urban areal growth
 - ii. Low density characteristic in the peripheral city in contrast to compact central city
 - iii. Residential degradation of inner city areas and increase dependence of automobile.

Urban sprawl in developed countries like United States, Canada, United Kingdom etc. has been linked with rapid suburban expansion. In the United States and the United

Kingdom suburbanization started in the late 19th and early 20th century as a result of the policies of population deconcentration and industrial decentralization (Hall, 1996). In the 19th century, because of congestion, bad housing condition, violence and crime in large cities of Europe and America like London, Paris, Berlin, New York, Chicago etc. were considered slum cities (Hall, 1996). To provide clean environment and independent houses, ideas of garden cities, satellite towns and mass transit suburbs were introduced. Due to rapid suburbanization central population density fell and population density gradient became gentle. In the 1950s it was observed that population density of cities declined and urban areas expanded with faster rate than population growth rate. Urban researchers coined a term "urban sprawl" for this phenomenon. The rapid increase of personal cars, development of freeways and shopping Malls encourage population dispersal and sprawl.

There are different views in favour and against of sprawling. Environmentalists are concerned about increase in urbanized land is the loss of rural land, forest, wildlife and rangeland. It is estimated that in just a 15 years from 1990 to 2005, approximately 25 million acres (53,000 square kilometers) of rural land (cropland, rangeland and forest) in United States had been converted into urbanized land

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(houses, freeways, factories, malls, airports etc.) (Miron: 2003). Urban planners who support population dispersal are in favour of suburban development. They are in support of detached housing, neat and clean environment, avoid congestion and local government. The urban planners who are against dispersal consider urban sprawl cause loss of cropland, forest and rangeland, increase commuting cost, number of personal cars, traffic Jam and increase community segregation. The anti – sprawl urban planners support apartment housing, vertical growth and raised population density. They are in support of rehabilitation and renewal of housing quality of inner or old city to attract middle class population of suburbs to reside there. In United State this policy is known as gentrification. About dispersal or counter dispersal residents' opinions are also important. In United States majority of citizens like independent housing with open space rather than apartments. However suburban residents show concern of increasing commuting cost (Hall, 1998).

In the Less Developed Countries, where percentage of urban population is low and suburbanization has not achieved desired results, urban sprawl is an important problem in the mega cities like Mumbai (Bombay), Kolkata (Calcutta), Lagos, Dhaka, Jakarta etc., particularly in the absence of proper urban infrastructure like water supply, sewerage system, mass transit etc. The same is also true to Karachi where rapid conversion of rural land into urban land uses had been taking place during the last decade (2002 to 2012). Such rural lands around Karachi City have been converted for planned and unplanned housing, squatter settlements and factories. Land grabbing in which political elites, investors, land revenue department of government, police and city administration are involved has become a most profitable business in Karachi. The city administration has failed to check this urban mismanagement due to lack of urban land management policies, corruption, and involvement of political mafias.

2. MATERIALS AND METHODS

Urban sprawl in Karachi is different from the American and European cities in this manner that massive suburbanization had not taken place in Karachi as happened in the American and European cities. To examine urban sprawl phenomenon in Karachi following methods were applied.

- i. Population density gradient is an important method to study dispersal of population. This method was applied on Karachi in the study of sprawl. For this purpose Population data of all Censuses conducted after creation of Pakistan; 1951, 1961, 1972, 1981 and 1998 (last Census) were taken into account for study.
- ii. Decline in overall population density of urban area as a result of growth of urbanized lands is an important measurement of urban sprawl. Similarly, relative higher rate of urbanized area than rate of population growth is an important parameters of urban sprawl. Both these parameters were computed for Karachi City with the help of data of population and urbanized area in different periods.
- iii. Urban sprawl is linked with loss of rural land, increase in surface runoff and urban flooding, escalating commuting cost and fuel consumption, dependence on personal vehicles, increased urban infrastructure development cost, community segregation etc. To examine these facts, relevant data were analysed.
- iv. There are two different phenomena in the growth of urban areas. United States, Canada, United Kingdom represent urban dispersal model while in contrast Hong Kong, Singapore and Japan follow urban compactness model. It is important to examine the views of the residents of Karachi city in favour of the policy of dispersal or counter dispersal for the future growth of Karachi. For this purpose survey research technique was used. About 1000 questionnaires comprises open and closed ended questions were filled through stratified random method and results were analysed.

3. RESULTS AND DISCUSSION

Analysis of population density, rates of urban areal and population growth are important measures used to explain urban sprawl in Karachi.

Population Density Distribution

To investigate the pattern of population density gradient, the Model of Clark (1951) was found fit to explain population density distribution in Karachi City. The model states that population density exponentially declines with increasing distance from the city centre.

Mathematically it is expressed by following expressions.

$$D_x = D_o e^{-bx}$$

Where D_x is population density at distance from the city centre

D_o is central density, b is population density gradient

x is distance from the city centre and e is natural log.

To examine the changes in the pattern of population density in Karachi City during the period of 1951–1998, population data of 1951, 1961, 1972, 1981 and 1998 censuses were used. The graph (Fig 1) and values of density gradient (b) and values of central density (D_o) (Table 1) of the model indicate that population density gradient and central density continuously declined.

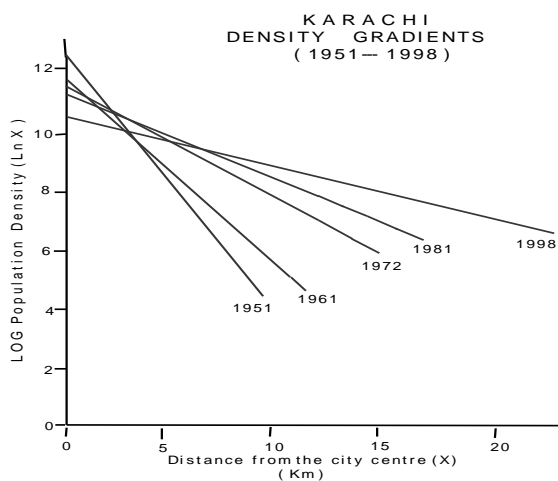


Fig 1: Population density gradients in Karachi City (1951–1998)

Table1: Result of Clark’s Population Density Model, 1951, 1961, 1972, 1981 & 1998

Census Year	Central Density D_o (Persons per sq.km)	Central Density Ln D_o	Density Gradient (b)	(r)
1998	29,747	10.3005	-0.19558	0.9695
1981	102,867	11.5412	-0.37101	0.9717
1972	114,955	11.6523	-0.45542	0.9846
1961	160,075	11.9834	-0.69845	0.9881
1951	300,228	12.6123	-1.16211	0.9878

Source: Computed by Authors

The reason was that because before 1947 Karachi was a small city. In 1947 Pakistan came into existence and Karachi was chosen as a first capital of the country. Due to influx of about 1 million populations in Karachi from India, rapid growth of population and areal expansion of the city took place. Therefore the density gradient decreased from 1.37 in 1931 to 1.16 in 1951. However, central density continued to rise from 11.63 in 1931 to 12.61 (Shakila: 1983), mainly due to lack of rapid transportation and poor economic condition of the people who could not afford commuting cost. Diesel tram was introduced, but the whole network confined in between Saddar to Tower (the present city centre of the city), resulted further concentration of population at the centre. In the period 1961–1981, due to development of automobile transport system like buses, rickshaw, taxi and intra city railway population dispersal started. As a result of the movement of population from the old and central city population density gradient and population density decreased. In 1961 the density gradient was 0.699 which decreased to 0.3654 in 1981 (Table 2,3).

Table 2: Distance-wise population density distribution in Karachi City, 1981

Distance from the city centre (Km)	Population Density (persons per sq. km)	Distance from the city centre (Km)	Population Density (persons per sq. km)
1.0	87012	9.0	4298
2.0	44934	10.0	3032
3.0	19866	11.0	2176
4.0	17632	12.0	1220
5.0	16733	13.0	920
6.0	12749	14.0	530
7.0	9772	15.0	230
8.0	9300	16.0	98

Source: Computed by Authors on the basis of 1981 Census

Table 3: Distance-wise population density distribution in Karachi City, 1998

Distance from the city centre (Km)	Population Density (persons per sq. km)	Distance from the city centre (Km)	Population Density (persons per sq. km)
1.0	33970	12.0	3021
2.0	22273	13.0	2560
3.0	18229	14.0	2216
4.0	8910	15.0	2134
5.0	8210	16.0	1415
6.0	7389	17.0	1093
7.0	7029	18.0	1032
8.0	6456	19.0	732
9.0	5551	20.0	523
10.0	4165	21.0	307
11.0	3592	22.0	183

Source: computed by Authors on the basis of 1998 Census

During the period of 1981 to 1998 the pattern of population density distribution changed significantly. The population of Karachi City expanded from 5.15 million in 1981 to 9.28 million in 1998 which means the city had grown about double of its population during 17 years. The city expanded from 800 km^2 in 1981 to 1,200 km^2 in 1998. Many new housing schemes like Taiser Town, Khuda Ki Basti, Halkani and Shah Latif Town were developed during this period as well as many new squatter settlements came into existence in the outskirts of the city. Population of peripheral residential areas which were developed in 1980s like Gulistan-e-Jauhar, North Karachi, Gulzare-Hijri, Surjani, Baldia and Orangi had increased significantly. It was observed that a considerable number of residential populations moved from old city area and central part of the city to these areas. The development of roads and flyovers had played an important role in sprawl of the city. It was also observed that due to improvement in economic condition of people of the city on one hand number of private cars and motorcycles had increased significantly while on the other hand a large number of rapid commuter mini-buses were introduced. These development encouraged shifting of population from central city to peripheral residential areas. As a result of these developments in Karachi City population density gradient declined sharply from 1981 to 1998.

It is evident from (Tables 2 and 3) that up to 8 kilometers from the city centre the population density declined in 1998 as compared to 1981. Similarly from 9 kilometers from the city centre, population density increased significantly in 1998 as compared to that of 1981 (Tables 2 and 3). This clearly shows that population deconcentration continued in the period of 1981-1998 with rapid pace. In 1981 population density at 1km distance was 87,012 persons per km^2 which was reduced to 33,970 persons per km^2 which means during this 17 year period, population density reduced to nearly one third from 1981. This is clear indication that the process of urban sprawl continued during this period with rapid pace. Its affect can be seen on the graph of population density gradient which has more gentle slope in 1998 as compared to 1981.

In the period of 1981-1998 remarkable changes took place in central population densities and density gradients. The central population density declined from 102,867 persons per km^2 to 29,747 persons per km^2 . It means during the 17 years, a huge number of population had moved out from the 8 kilometers radius of the city centre towards peripheral residential areas. As a result, central population density dropped one third in 1998 as compared to 1981. Similarly, as a result of significant population dispersal and areal expansion, the density gradient had become gentle. The value of density gradient (b) declined from 0.371 to 0.195 in 1998. These results clearly support this view that Karachi has been experiencing urban sprawl phenomenon.

Declining Urban Population Density & High urbanized areal growth rate

Decline in population density due to higher urbanized areal growth as compared to population growth is an important parameter to identify urban sprawl phenomenon.

It was computed that first time population density fell from 7733 persons per sq.km in 1998 to 7258 persons per sq.km in 2012 (Table 4).

Table 4: Urban Population, urban area, population density and growth rate of urbanized area of Karachi

Year	Population	Area sq.km	Population Density (Persons per sq.km)	Growth rate of urbanized area (Percentage)	Population Growth Rate (Percentage)
1859	56,879	59.6	954	----	----
1941	386,655	114.0	3392	----	----
1951	1,600,000	386.0	4145	12.197	14.200
1961	1,912,598	450.0	4250	1.534	1.785
1972	3,498,614	640.0	5466	3.201	5.490
1981	5,153,000	840.0	6134	3.022	4.302
1998	9,280,000	1,200.0	7733	2.098	3.460
2012(est)	15,500,000	2,000.0	7258	3.648	3.412

Source: Population Census Organization

Similarly urban sprawl occurs when urbanized area grows with higher rate than the population growth. In 1951, just after the creation of Pakistan, Karachi experienced explosive population and areal growth rate mainly due to mass migration from India and rest of the Pakistan. However, during that period urban areal growth rate was also lower than population growth rate. It comes out from the computed results that first time in 2012 urbanized areal growth rate was higher than the population growth rate (Table 4). The results of both declining density and higher rate of growth of urbanized area in 2012 confirm that the city has been sprawling.

Causes of Urban Sprawl

Population dispersal and sprawl in Karachi city are linked with three main factors:

- relationship of rapid population growth and eventual areal growth
- Government policies of population dispersal and horizontal growth
- Massive conversion of rural lands of Karachi into urbanized lands.

Let's see how these factors are responsible for urban sprawl in Karachi.

Population and Areal growth

Karachi started its growth as a walled city in 1729 A.D with a population of 1000 and an area of 0.12 sq. km. In 1798 A.D, the population of Karachi increased to 10,000. The first official census was held in 1813 A.D by Talpur Mir and according to this the population of Karachi was 13000 living in 3250 houses inside the wall. Thus Karachi in the Pre-British

period was a walled city with the attribute of a port. The city was compact and congested.

The British occupied Karachi in 1839 A.D and it was annexed as a part of Sindh in British India in 1843. New residential and administrative buildings were constructed at a new site which was far away from the walled city. The British named it the Civil Lines. The population of Karachi in 1839 A.D at the time of British occupation was about 14000 (Shakila, 1983). In 1853, Karachi Municipality was established and a marked expansion and development of the town took place. The city was no more a fortified settlement. As more people came and settled in Karachi, the areas between the city and the Civil Lines were filled up. The population of Karachi in 1856 was 56,879. The city covered an area of 59.6 sq. kms before the establishment of the Municipality. Its area expanded to 114.2 sq.kms a few years after the establishment of the Municipality. In 1923, Karachi Municipality approved Miram's Development Plan for the planning and development of Karachi. Under that plan the city expanded rapidly. In 1941 the population of Karachi increased to 386,655 and its area expanded to 115 sq. kms (Census, 1941).

Pakistan came into existence in 1947 and Karachi was made its capital. It retained its status as the capital till 1960 when the capital of Pakistan was shifted to Islamabad. Soon after the creation of Pakistan large scale migration from India took place. Between 1947 and 1950 about one million migrants came from different parts of India (Census, 1951). A large number of people also migrated to Karachi from different parts of Pakistan. As a result, the population of Karachi increased rapidly. In 1951 Karachi, with a population of 1.6 million became the largest city of Pakistan (Census, 1951). Many new urban housing schemes were developed after the creation of Pakistan. As a result, area of Karachi city expanded to 386 Sq.km in 1961(KDA, 1974) and population increased to 1,912,598 (Census, 1961). In 1971, the East Pakistan now Bangladesh separated from Pakistan. About 0.175 million people came from Bangladesh to Karachi (Census, 1972). The population of Karachi increased to 3,498,614 in 1972(Census, 1972) while the area expanded to 640 sq.kms (KDA, 1974).

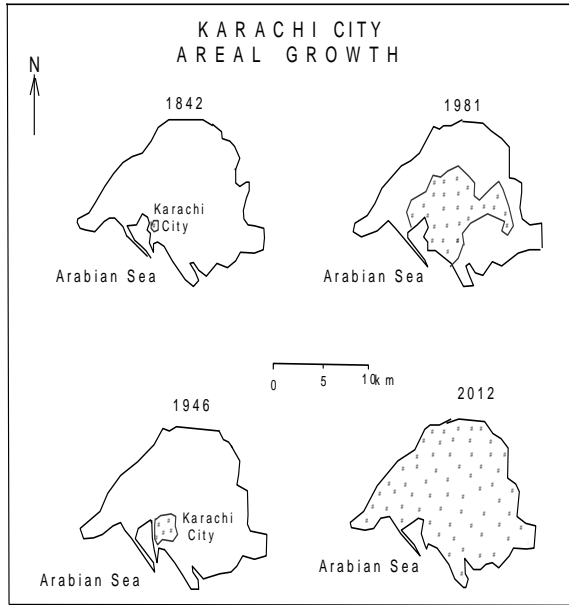


Fig 6: Areal growth of Karachi City.

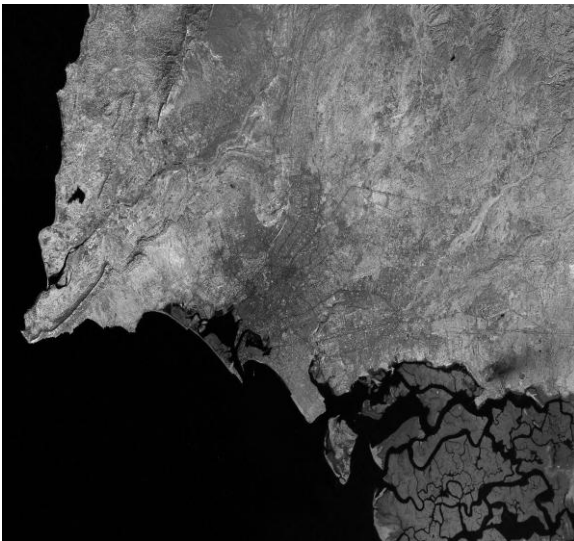


Photo 1: A satellite image of Karachi City and its surrounding.

The population and areal growth of Karachi city continued. Its population increased from 5,153,000 in 1981 to 9,280,000 in 1998 (Censuses, 1981 and 1998). Its area extended from 840 sq.kms in 1981 to about 1400 sq.kms in 1998. It is estimated that population of Karachi has increased to 15 million in 2012 while its urbanized area extended to about 2000 sq. km (Photo 1). Thus it can be concluded that population growth is one of the main factor of the expansion of urbanized lands in Karachi. The results of correlation and regression analysis confirm that

population and areal growth have strong significant relationship (Fig 2).

Regression Analysis

Correlation Coefficient $r = 0.9784$

The regression equation is

$$y = 150 + 0.120 x$$

Predictor Coef StDev T P

Constant 149.84 38.32 3.91 0.008

x 0.120116 0.005624 21.36 0.000

S=78.89 R-Sq=98.7% R-Sq (adj) =98.5%

Analysis of Variance

Source DF SS MS F P

Regression 1 2839457 2839457 456.22 0.000

Error 6 37344 6224

Total 2876801

7

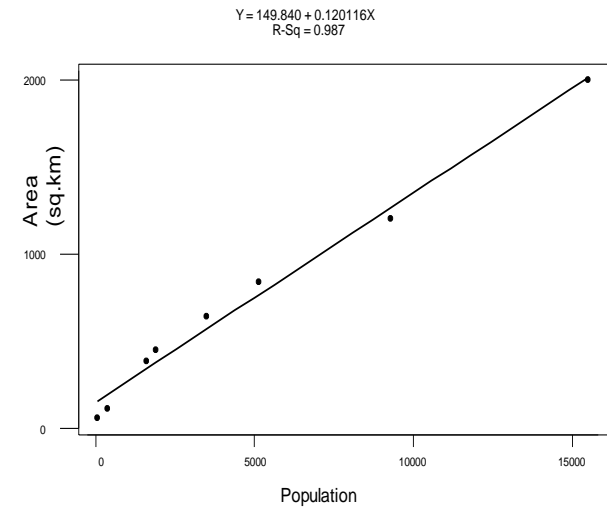


Fig. 7: Regression line showing relation between population and areal growth in Karachi

Government policies of population dispersal and horizontal growth

The policies of population dispersal and horizontal growth in Karachi were laid down by the British and the Greek planners. British occupied Karachi in 1839 and adopted policy of suburban growth. A planned and spacious administrative cum residential suburb called Civil Lines for British families and a cantonment for British Soldiers were developed about 7 kms away from the congested and unplanned city. However, as the city expanded the suburbs of Civil Lines and Cantonments absorbed in the city. In 1923, British Planners developed Miram’s Development Plan for the planning and development of Karachi. Under

that plan the city horizontally expanded and residential suburbs were developed in Clifton and near Soldier Bazaar for elite Parsi and Hindu families. After creation of Pakistan in 1950s, Greek Planners developed a plan of residential and industrial suburbs to resettle immigrants came from India. However due to lack of financial resources, development of these suburbs could not achieve desired results and in the later period with the areal expansion of the city the suburbs of Landhi, Korangi, Malir and New Karachi absorbed in the city. In the 1970s, under Greater Karachi Plan, satellite industrial areas and satellite towns were developed. Dhabeji Industrial Area and a town were developed about 55 kms away from the city. Similarly Pakistan Steel Mill, Bin Qasim sea port and Satellite Town were developed about 45 kms away from the city. In 1980 a residential suburb of Gulshan-e-Hadeed was also developed near to satellite town and Steel Mill Complex. The results of the policy of dispersal could not achieve significant flight of population from the city. In 2002, to resettle affected people of Lyari Express Way Project three urban housing schemes were developed at the fringe of the city in Deh Lal Bhakar, Deh Mokhi and Deh Halkani. In 2006, Defence Housing Authority planned a big residential suburb called DHA City along the Super Highway about 55 kms from the city. Plots were offered for sale on soft mode of payment. Similarly in 2011 Government announced development of Benazir Town, a satellite town located 45 kms from the city for poor flood affected homeless people. Despite past failure of Government suburbanization policy urban developers continue to follow policy of urban sprawl.

The study also reveals that in all housing schemes developed by Government in Karachi City policy of single house dwelling has remained prominent. High rise structure is generally not allowed in the mega city. Only two commercial buildings comprise 25 storied exist in the city. About 23 residential apartments located in cantonments are 10 to 12 storied. It is estimated that the city has only 5000 apartments comprise not more than five storied where only about 10 percent of the total population of the city reside. In cities where policy of counter dispersal and compaction have been executed like Hong Kong, Singapore etc. about 98 percent of population live in high rise apartments. In Hong Kong 60th floor is the average floor for residing (Jenks, 2005).

Massive conversion of rural lands into urbanized lands

The rural lands in Pakistan are controlled and sold by the Government Provincial Land Revenue Department while the urban lands are controlled and sold by three Government authorities; City Development Authority, like Karachi Development Authority (KDA), Lyari Development Authority (LDA), Malir Development Authority (MDA), City administration like Karachi Metropolitan Corporation and Cantonments Board. The urban authorities purchase lands from Land Revenue Departments. In Karachi due to lack of legal cover of Provincial Assembly, Master Plans prepared for city future growth and development could not be truly implemented. It is a general norm that rural lands around the city have been converted into urban residential and industrial purposes legally or illegally without considering the City Master Plans. Corruption and malpractices of Government officials, political pressure of elected political parties, involvement of powerful land grabbing mafias and builders are main factors behind such practices. In 1980s and 1990s the Sindh Land Revenue Department granted about 5000 hectares agricultural lands at very low price in Deh Halkani, Manghopir and Deh Bund Murad Khan to industrialists and influential persons for urban uses. Similarly in the period 1990-2000 about 20,000 hectares rural lands were granted for urban uses to private developers and Malir Development Authority in Deh Mehran and Deh Joreji.

The period of 2002—2012 was important because of massive conversion of rural lands for urban uses occurred which has triggered sprawl phenomenon in Karachi. In 2005, Karachi Cantonment Board developed a mega suburban housing project DHA City along Super Highway: For this purpose Sindh Revenue Department granted rural lands in Deh Khadeji, Deh Chohar and Deh Abdar. In 2011 a housing project Benazir Town was developed for land less flood affected people of Sindh in Deh Mandiari. Hawks Bay Housing Scheme 42 was expanded as a mega housing project by converting rural lands of Deh Lal Bakhar.

During the political Government of 2008-2012, massive rural lands of Karachi were grabbed under the legal cover of *Goth Abadkar* Schemes by elected political mafia accomplice by officials of Land Revenue

Department. *Goth Abadkar* scheme policy was announced in 1970s for poor tenants of Sindh who live in villages (Goths) built illegally on the lands of Revenue Departments. The scheme was announced for such villages which are 100 years old. Land grabbers of political groups used *Goth Abadkar* Schemes for their political and financial motives. Several hundred fake Goths were developed in rural areas of Deh Jam Chakro, Deh Mokhi, Deh Allah Pihai, Deh Mai Garhi, Deh Gondpas, Deh Metan, Deh Narathar, Deh Bijar Buthi, Deh Kharkharo, Deh Sanharo, Deh Bakran etc. Plots were sold to public and distributed free of cost to their political workers. Some of these Goths are well planned and residents have been granted legal document of ownership. This malpractice of land grabbing was supported by urban builders. Many housing apartment projects were announced on these rural lands and plots were sold to public. This malpractice and land grabbing is one of the cause of political and deadly conflict among political parties and mafia groups.

In the period 2010-2012 a significant number of populations moved from FATA and Swat to Karachi as a result of fighting between military and Taliban. It is estimated that about 100,000 poor people have settled in self developed illegal colonies located on rural lands, adjacent to the city like Buner Town, Kuwanri Colony, Sultanabad, Ittehad town etc.

Impacts of Urban Sprawl

Urban sprawl has got attention among urban researchers for their impacts. Loss of agricultural land, increase in commuting cost and personal vehicles, increase in surface runoff and flooding, degradation of old city and social detachment are important impacts observed in Karachi as a result of urban dispersal.

1. Loss of agricultural Lands

Karachi basin is made up of two main ephemeral streams; the Lyari River and the Malir River. During the British period Hindu farmers of Gujrat and local Siddhis were granted lands in the flood plains of Lyari River and Malir River to promote crops cultivation particularly fruits and vegetables required for the city dwellers. Rain fed farming and flood farming were practiced by native Baloch and Sindhi tribes in areas of Orangi, Manghopir, Halkani, Bund Murad, Gadap, Kathore, Mochko, Budnai, Landhi, Joreji etc. along

small streams called *nala*, *nadi*, *nai*, *dhoro* etc. After rain the loess covered basins and piedmonts covered with grass and shrubs provided fodder to animals of nomadic groups who came from far flung areas of Thatta, Thar, Rajasthan and Balochistan and stayed from July to October. After the creation of Pakistan, as city expanded rapidly, agriculture lands had been converted into urban built up areas. At present crops cultivation has confined to the upper course of the Malir River, Gadap-Konkar basin and Kathore. Development of urban land use is continuing in these areas and it is difficult to say that in future crops farming will be practiced in these areas.

2. Increasing in Commuting Cost and Number of personal vehicles

Due to Government policy of urban sprawl, commuting is a big problem for city dwellers. It is estimated that about 60 percent of employees commute daily to the central business area and Karachi harbour for work, while 15 percent goes to SITE industrial area located near to it. These areas are located in the old city far from the newly developed residential areas. It is a general practice of the Government planners to develop low income housing schemes in the peripheral parts of the city like New Karachi, Khuda Ki Basti, Landhi, Baldia, Orangi, Surjani, Lyari Resettlement Schemes etc. Due to low price of land and lack of effective control of Land Revenue Department of their rural land low income housing and squatter settlements have been developed at the fringe of the city. Therefore commuting is difficult in the mega city because of the policy of sprawl which has increased the commuting cost which is difficult to bear by low income workers. It is unfortunate that the mega city of about 15 million people have no mass transit system. In addition due to serious law and order problem, bloody political conflicts and increase of petrol price and gas shortage, public transport - mainly buses and mini buses - have reduced significantly. As a result, the city dwellers have no options to purchase their own vehicles. During 2000 – 2006, due to low interest rate Banks provided huge loans for purchasing personal cars. Similarly low income workers purchase motorcycles on installments. The table reveals that in 2006 about 88 percent of total vehicles in the city were personal cars and as a result number of personal cars and motorcycles had increased tremendously in the city (Table 5).

Table5: Register Vehicles in Karachi in 2006

Mode	Number	Percentage
Cars/Jeep	710,602	47.1
Motor Cycle	588,002	39.0
Auto Rickshaw	41,650	02.8
Taxis	44,794	02.9
Buses and Mini Buses	20,810	01.4
Trucks	19,439	01.3
Tractors	2,844	00.2
Others(Van &Pick-ups)	80,074	05.3
Total	1,508,215	100.0

Source: Traffic Engineering Bureau Karachi

In 2006 about 88 percent of total vehicles in the city were personal cars and motorcycle while only 7 percent vehicles (rickshaw, taxi, buses and mini buses) were used for public transport. The share of buses and mini-buses was only 1.4 percent. Motor cycle is generally used by low income commuters. Despite construction of flyovers in the city traffic jam and volume of traffic have increased which one hand has created traffic hazards and on the other hand increasing fuel consumption which is big problem for the country because of the serious shortage of gas fuel and increasing cost of imported oil fuel.

Increase in surface runoff and flooding

The study reveals that over the years urban flooding phenomenon has been increasing in Karachi. Expansion of urban built up lands caused increased runoff by two ways. First, due to construction of houses in the dry beds of the Lyari River, Malir River, Orangi Nala, Songal Nala, Gujro Nala etc. the size of actual channels of streams have reduced. This caused overflow of flood water. Due to expansion of urban built up, rainwater percolation capacity of soil has reduced which increased surface runoff. As a result, surface runoff in the catchment areas of the Lyari River and the Malir River has increased, which caused river flooding, and roads and streets of the city are inundated by rainwater, which created problems of traffic jam.

Degradation of old City and Social Detachment

The study reveals that old areas of Karachi city have deteriorated physically and socially. Berry (1963) identified such areas in Chicago as blighted areas of the city caused by suburbanization. Up to late 1970s old city areas of Karachi were main residential areas of middle and lower middle working and business class people of the city, like Bihar Colony, Lea Market, Pakistan Chowk, Aram Bagh, Ranchore Line, Burnes Road, Pir Illahi Bux

Colony, Jacob lines, Pakistan Quarters, Martin Quarters etc. As new planned spacious residential areas were developed far away from the old city areas like Nazimabad, North Nazimabad, Gulberg, Model Colony, Gulistan-e-Jauhar, North Karachi, Gulshan-e-Maymar etc. middle class and lower middle working class communities had been shifted from the old areas. As a result old areas have been gradually occupied by low income labour class, criminal groups and drug mafias. As a result, some areas of the old city have become ghettos and centre of crime and gang war groups.

It is observed in the study that social segregation in Karachi city has increased during the last two decades. It was the general attitudes of the people of the city that they preferred to live in same community areas which were developed on the basis of same social and religious characteristics like Bihar Colony, Bangalore Society, Dehli Society, Dhoraji, Karimabad, Hyderi, Gari Khata, Memon Society, Rizvia Society, Jaffar Tayar Society, Shamsi Society etc. With the development of new residential areas many families have shifted to newly developed areas. As a result community residential pattern has been diminishing and social detachment of communities has increased.

Dispersal or Counter Dispersal

Urban dispersal in Karachi is linked with the urban planning policies of the government. Apart from this factor the role of the city dwellers is also important because they are actual losers or gainers of government policies. To analyse the opinions of the city dwellers about dispersal or counter dispersal policies, a stratified random sample survey was conducted. About 1000 questionnaires were filled from 18 administrative towns and 7 cantonment areas of Karachi. About 90 percent of the city dwellers like to reside in spacious, uncongested, clean and unpolluted western style housing environment. They have a dream to reside in single houses having lawns, connected by freeways and have low price mass transit facilities for commuting to work. They did not like to reside in old city areas and prefer to reside away from these areas because of congestion, unclean environment, high rate of crimes etc.

In response to the question: "Do you want to reside in single home or apartment?", about

73 percent dwellers liked single house residency, 20 percent like both single house and apartment, while only 7 percent prefer to reside in apartments. The residents gave main reasons for not living in apartment are (i): apartments are not properly managed, (ii): apartments have no personal roof and majority of apartments have no elevators, therefore it is difficult to access through stairs particularly for old people; (iii): Apartments are generally in the city are not properly constructed, therefore their physical structure rapidly deteriorate; and (iv): They are generally located along the main thoroughfares which are congested and noisy. Those who liked apartments gave reasons that:

- a) Apartments are located on the main thoroughfares near markets and public transports
- b) They are more secure as compared to single houses
- c) They are relatively near to workplaces
- d) Apartments are available in good localities relatively at low price and installments.

4. CONCLUSION

Urban sprawl in Karachi has occurred mainly as a result of government urban dispersal policies. About 90 percent of the dwellers reside in single houses while only 10 percent live in apartments. On one hand government and builders have failed to provide good apartments housing and on the other hand majority of dwellers prefer single unit housing rather than apartments. Lack of effective control and implementation of laws of conversion of rural lands into urban land uses, corruption and malpractices of government officials who have nexuses with land grabbers, private builders and political mafias are other factors that accelerate sprawling in Karachi. As a result of sprawling massive agriculture and range lands of Karachi have been urbanized. Absence of effective public transport system dependency on personal vehicles for commuting has increased. This has created serious problems of traffic jams, high commuting cost and pollution.

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