

Open Green Spaces - Shah Faisal Town, Karachi, Pakistan: A Temporal Perspective

Muhammad Azam¹, Farkhunda Burke^{2,*}, Syed Nawaz-ul-Huda¹ and Muhammad Miandad²

¹Department of Geography, Federal Urdu University of Arts, Sciences and Technology, Karachi, Pakistan and

²Department of Geography, University of Karachi, Pakistan

Abstract: Temporal studies of open green spaces are essential in order to realize the conditions of improvement and deterioration, since the latter condition is unacceptable to the law abiding, tax paying urbanites. In the present study area the existing open space provision is unsatisfactory both in quality and quantity. The objective of this study is to evaluate the increasing pressure on open green spaces of Shah Faisal Town, Karachi. With this end in view Quick bird images 2004 and 2009 have been classified for comparative temporal study. Projection of population for 2004 and 2009 based on the 1998 census data has also been made. The paper elucidates how the current ungenerous provision of public open space can be attributed to a number of historical, political and institutional factors including, inefficient division of government responsibilities, and lack of public representation, pro-growth planning ideology, revenue-maximizing land sale policy and privatization and encroachment of urban space. This study concludes that the development of public open green spaces have been prejudiced under the statutory planning system and land allocation process. Planners think that open green spaces are more of a luxury than a need, hence encroachment is rampant. The paper suggests that the shrinking of open green space may cause excessive anomalous development which will aggravate the deteriorating urban, social and political climate in Shah Faisal Town, Karachi. This serious urban problem must be tackled to avoid unforeseen consequences.

1. INTRODUCTION

Open Green Spaces can be defined as outdoor places with significant amount of vegetation, existing mainly as semi-natural area [1], and provide sites of active and passive recreation for people in their neighborhoods [2-4]. Open green spaces are viewed as the last remnant of nature in urban areas [5] and typically perform important functions, including maintaining biodiversity [6], preventing soil erosion [7] absorbing rainwater and pollutants [8, 9] and mitigating urban heat island effects [10, 11]. Urban open green spaces can also provide considerable socioeconomic benefits, such as providing amenity-recreation venues, reducing work-related stress [12, 13] increasing property values [14-16] and becoming an important measure in judging the ecological sustainability of urban areas [17]. In third world countries, e.g. Pakistan, the population pressure on the shabbily maintained open green spaces, especially in Shah Faisal Town, Karachi, reflects the abject negligence of authorities to this source of good physical and mental health for the local people.

Nature is assumed to attract involuntary attention because of its fascinating qualities, therefore provide the opportunity for recovering from mental fatigue. Moreover, walking in a natural environment has been found to have significantly better restorative effects than walking in urban surroundings [18, 19]. Bodin [20] found a non-significant tendency for regular runners to have stronger positive emotional effects

when running in a park than when running in an urban environment and also observed that runners significantly preferred a park environment to an urban environment.

‘Park’ is usually defined as an open area with trees, grasses, playing fields, and playgrounds owned by a city or town for public recreation. National parks are usually forests or meadows owned by a national or federal government and are usually preserved for scientific study and public recreation. The term "park" may also be used to refer to an enclosed playing field with tiers of seats around it for people to sit and watch ball games, especially baseball. A ballpark is a playing field designed especially for baseball games with tiers of seats or bleachers for people to sit and watch [21]. However, in Pakistan, Karachi, parks and playgrounds are separate entities. The maintenance standard is comparatively poor, with insignificant facilities. There is little consideration of street frontage which may increase visibility for surveillance; swimming pools or natatorium are totally lacking in these parks. Presence of “ballpark” in parks, provision of visually screened and portable toilets has not been introduced in our part of the world. Landscaping is generally poor. Fishing access sites (e.g. decks and piers) are lacking. Horticultural centers are miserably lacking as also public works of art, save for a fountain or two. While provision of unique recreational activities is totally absent, only a variety of swings is available in these parks.

2. STUDY AREA

Shah Faisal Town is a small, densely populated town in eastern Karachi and is named after the late King Faisal of

*Address correspondence to this author at the Department of Geography, University of Karachi, Pakistan, E-mail: burkegeography@yahoo.com

Saudi Arabia. It was part of the Mohajir Colonies then known as Drigh Colony which was formed in 1954 [22]. The town is bordered by Malir Town to the northeast, Bin Qasim Town to the east, Korangi and Landhi Towns to the south and Faisal and Malir Cantonments to the west and northwest. The Malir River forms the southern boundary of the town and the Shahrah-e-Faisal Highway forms much of the northern boundary with the Jinnah International Airport at the northern end of the town (Fig. 1). The population of Shah Faisal Town was estimated to be about 335 823 at the 1998 census, of which 99 percent are Muslims. There are several ethnic groups including Urdu speakers, Punjabis, Sindhis, Kashmiris, Seraikis, Pakhtuns, Balochis, Memons, Bohras and Ismailis.

Subsequent to the local government reforms introduced by the federal government. in 2000, Karachi Division has been divided into 18 autonomous towns, one of which is Shah Faisal Town with 7 Union Councils (Fig. 1). Field Survey has revealed that there are 73 open green spaces (42 parks, 9 playgrounds and 22 green belts) in the town; 10 of these parks have been developed during the 5 years from 2004 to 2009 (Fig. 3). Overall, only 10 of these parks are well maintained while the rest are poorly maintained and 5 have been encroached upon. A detailed study of the open green spaces in this town has revealed the dismal conditions of open green spaces which is reflective of the poor quality of life in the area and properly one of the reasons for high crime rates and comparatively low land values in the town [23].

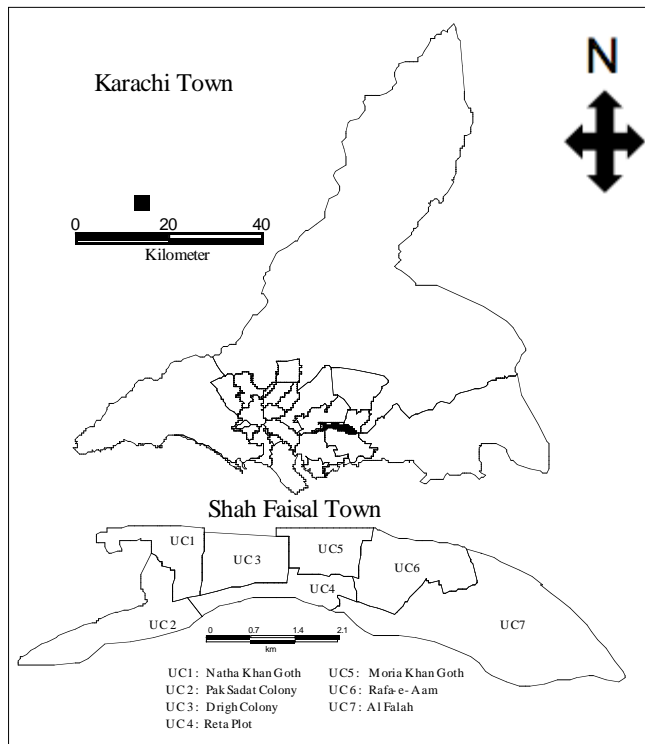


Fig. (1). Study Area - Union Councils (UCs).

3. MATERIAL AND METHODS

3.1. Sources of Data

Based on the data collected from Union Councils (UCs) and Town Office and 1998 Census data, comparative studies have been made. Data have been extracted from Satellite Imagery (Google Earth, 2004, 2009).

3.2. Development of GIS

Data management and map product creation in regional and urban planning is one of the most difficult challenges. Providing needed geospatial data (i.e., map products) to decision makers, planners, engineers, and analysts is a difficult task that is further complicated by the use of large geospatial image data sets that are needed for the products. The convergence of GIS, remote sensing and database management systems has supported in quantifying, monitoring and subsequently predicting this phenomenon. At the landscape level, GIS aids in calculating the breakup, patchiness, porosity, patch density, relative richness, diversity, and dominance in order to characterize landscape properties in terms of structure, function, and change [24, 25]. With the help of GIS techniques, Town and UC boundaries have been demarcated and location of open green spaces in the different UCs has been made. The area of the different UCs as well as area of different categories of open green spaces have been computed. Various types of comparative studies and GIS techniques have been used for plotting and mapping the retrieved information.

3.3. Projected Population

The projection of population for 2004 and 2009 has been based on the 1998 census with the present rates of fertility, mortality, and migration i.e. growth rate. The simplest projections are based on extrapolations of current and past trends, but a set of very differing projections can be calculated, based on a series of differing assumptions e.g. that current rate of increase will be maintained, will increase, or will decrease. According to [26], the projected population is given by:

$$P_n = P_f * \left(1 + \frac{r}{100} \right)^n$$

Where,

P_n : Population after 'n' years

P_f : Population at the start

r : Annual growth rate (in percentage)

n : Number of years

Projected population for the years 2004 and 2009 have been calculated, as the last census was conducted in 1998 and comparison of open green spaces has also been made for

the provision of facilities at the national standard 4 acres per 1000 population or 19 360 yd² per 1000 population [27] for both time periods.

4. RESULTS AND DISCUSSION

A detailed survey of open green spaces of Shah Faisal Town and an in-depth study of Satellite Imagery- Google Imagery, 2004 and 2009 has been the basis of study of outdoor recreational facilities available in this area. Table 1 showing the allocation of open green spaces along with its breakdown per thousand population and density of open green spaces (in %) UC wise reveals very interesting results, which are as follows:

- According to the Layout Status (Table 1), the total area of open green spaces was
- 325 471.8 yd², while Remote Sensing evaluation for 2004 and 2009 status under this land use were 337 365.8 yd² and 347 192.6 yd², respectively.
- There is an increase in area of open green spaces by 11 894 yd², and 21 720.8 yd², in status 2004 and status 2009, respectively, as compared to Layout Status.
- Over all there has been an increase of 9 826.8 yd² in area of open green spaces between 2004 and 2009.

- Table 5, which shows a decrease of area under open green spaces, in UC 1 is because of encroachment of 4 751 yd² by a hydrant there (Fig. 3), although an area of 2 115 yd² was increased in the form of Shohda-e-Haq Park.
- Afza Altaf Park covering an area of 4 631 yd² was developed in UC 2 during the study period.
- In UCs 3 and 4 Khursheed Begum Family Park and Linear Park [28] with area 1 631 yd² and 2 144 yd², respectively were made.
- Six more linear parks (Bagh-e-Ibrahim Park, Bagh-e-Malir Park, Family Park, Ibrahim Villas Park, and two Tikona Parks with total area of 5 802 yd², were developed but there was an encroachment of 1 925 yd², on open green spaces in UC 7.
- No changes of open green spaces were observed in UCs 4 and 5 during the study periods 2004 and 2009 (Fig. 3).

Considering that there should be a provision of 19 360.00 yd² of open green spaces per 1000 population, the highest level of this facility is found in UC 3 i.e. Drigh Colony, followed by Reta Plot (UC 4) and Rafah-e-Aam (UC 6) as can be seen from Table 2.

With reference to the service of open green spaces to

Table 1. Layout Status of Open Green Spaces (OGS)

UC Nos.	Names of UCs	Total Area OGS Layout (yd ²)	Area of UCs (yd ²)	Population 1998	Area of OGS /1000 pop . Layout (yd ²)	Density of OGS (in percentage)
UC 1	Natha Khan Goth	32723.00	1019000	56681	577.32	3.21
UC 2	Pak Sadat Colony	1785.20	1718000	47314	37.73	0.10
UC 3	Drigh Colony	100098.00	1184000	44575	2245.61	8.45
UC 4	Reta Plot	76274.10	925200	42968	1775.14	8.24
UC 5	Morio Khan	944.50	969300	47150	20.03	0.09
UC 6	Rifah-e-Aam	78428.00	1755000	44663	1755.99	4.46
UC 7	Al-Falah Society	35219.00	5156000	52472	671.20	0.68

Table 2. Status of Open Green Spaces 2009

UC Nos.	Total Area OGS 2009 (yd ²)	Projected Population 2009	Area of OGS/1000 pop. (yd ²)	Density of OGS (in percentage)
UC 1	30267.00	84081	1359.97	2.97
UC 2	28262.00	70186	402.67	1.64
UC 3	97065.00	66123	1467.94	8.19
UC 4	75093.10	63739	1747.65	8.11
UC 5	944.50	69943	13.50	0.09
UC 6	80572.00	66254	1216.10	4.59
UC 7	39096.00	77838	502.27	0.75

total area of UCs, Tables 2 and 3, showing the status of open green spaces for 2009 and 2004, reveal:

- The status in 2009 shows increased density in UC 2 i.e. Pak Sadat Colony, followed by UC 3 i.e. Drigh Colony and UCs 6 and 7 i.e. Rafa-e-Aam and Al-Falah Society.
- Only UC 1 i.e. Natha Khan Goth has recorded a decrease in density of open green spaces compared to 2004 status.
- There is no change in density of open green spaces in UCs 4 and 5 i.e. Reta Plot and Morio Khan.

In terms of ranking of density of open green spaces (in percentage) in 2004 and 2009 status:

- UC 4 has fallen from first to second rank.
- UC 3 has improved its rank from second to first.
- Rank of all other UCs has remained the same.

Table 4 shows the shortfall in area of open green spaces in layout, status 2004 and 2009. Considering that the optimum facility of open green spaces which should be provided to the population should be 4 acres or 19 360 yd² /1000 population, Table 4 gives the City Standard Area of open green spaces which should be present in each UC, but this is not the case in actuality . There is a great shortfall in all the UCs for both 2004 and 2009 status as the population has shot up tremendously and all UCs have very low from the ideal or optimum facility level of open green spaces to meet the requirements of the population of each UC of Shah Faisal Town.

Table 5 shows the difference in area of open green spaces of UCs in the town. Comparison of both 2004 and 2009 status, unfortunately reveals that all UCs lag behind the optimum facility of open green spaces (19 360 yd², per thousand population) but there is tremendous increase in area of open green spaces in UC 2 i.e. Pak Sadat Colony followed by UC 7 i.e. Al-Falah Society and UC 6 and 3 i.e. Rifah-e-Aam and Drigh Colony, respectively. The maximum

Table 3. Status of Open Green Spaces 2004

UC Nos.	Total Area OGS 2004 (yd ²)	Projected Population 2004	Area of OGS/1000 pop (yd ²)	Density of OGS (in percentage)
UC 1	32723.00	70283	465.58	3.21
UC 2	19524.20	58669	332.78	1.13
UC 3	95434.00	55272	1726.62	8.06
UC 4	75093.10	53280	1409.40	8.11
UC 5	944.50	58465	16.15	0.09
UC 6	78428.00	55381	1416.15	4.46
UC 7	35219.00	65064	541.29	0.68

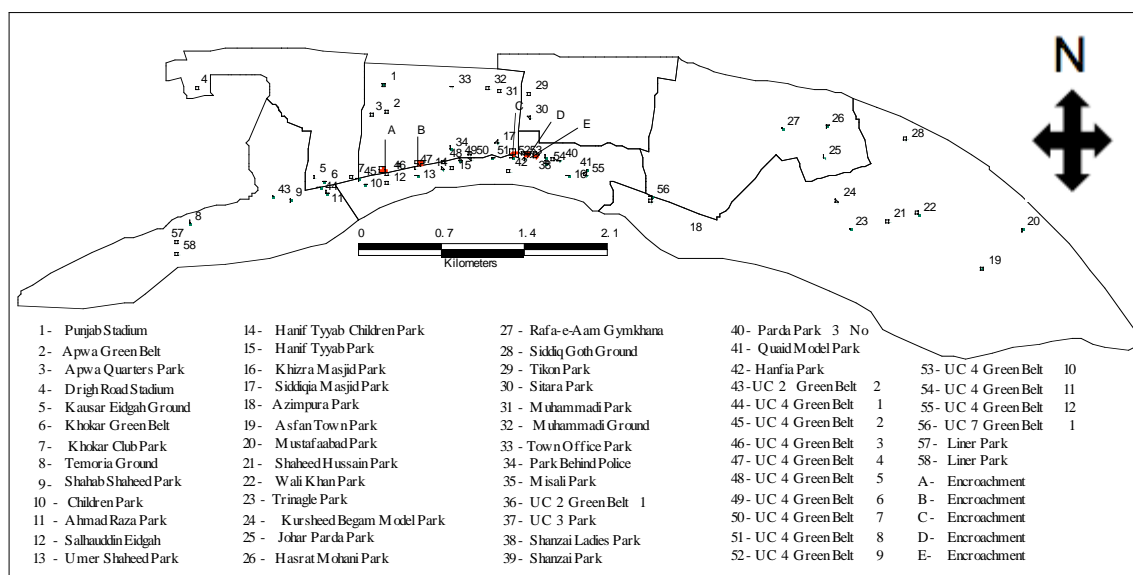


Fig. (2). Shah Faisal Town- Open green spaces and encroachment upto 2004.

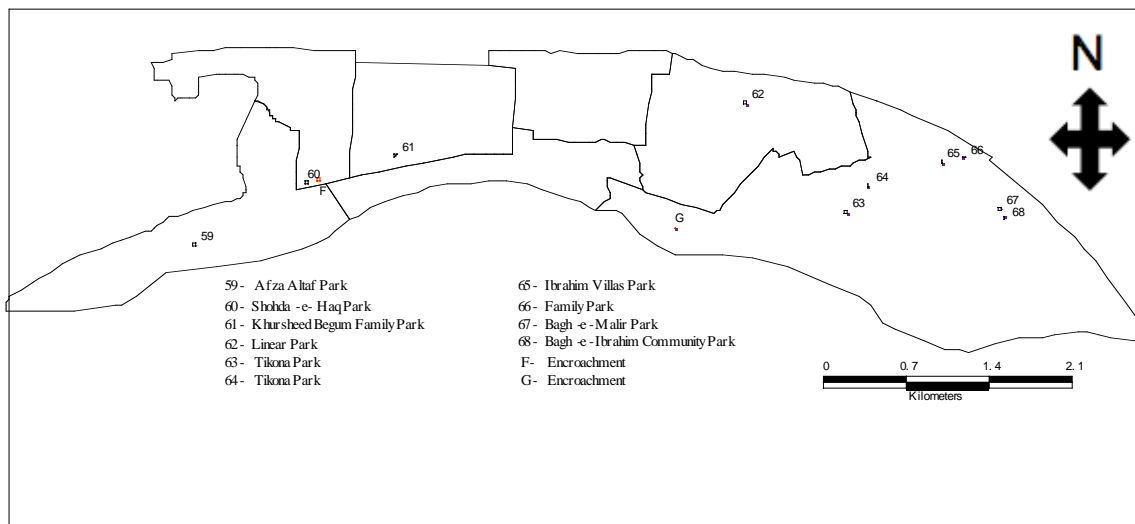


Fig. (3). Shah Faisal Town- Newly developed open green spaces and encroachment from 2004 to 2009.

Table 4. Shortfall of Area of Open Green Spaces Layout, Status 2004 and 2009

UC Nos.	Total Area OGS Layout (yd ²)	Total Area OGS 2004 (yd ²)	Total Area OGS 2009 (yd ²)	City Standard (yd ²)	Shortfall Layout (yd ²)	Shortfall 2004 (yd ²)	Shortfall 2009 (yd ²)
UC 1	32723.00	32723.00	30267.00	1097344.16	-1064621.16	-1064621.16	-1067077.1
UC 2	1785.20	19524.20	28262.00	915999.04	-914213.84	-896474.84	-887737.04
UC 3	100098.00	95434.00	97065.00	862972.00	-762874.00	-767538.00	-765907.00
UC 4	76274.10	75093.10	75093.10	831860.48	-755586.38	-756767.38	-756767.38
UC 5	944.50	944.50	944.50	912824.00	-911879.50	-911879.50	-911879.50
UC 6	78428.00	78428.00	80572.00	864675.68	-786247.68	-786247.68	-784103.68
UC 7	35219.00	35219.00	39096.00	1015857.92	-980638.92	-980638.92	-976761.92

Table 5. Change in Area of Open Green Spaces of Status 2004 and 2009

UC Nos.	Total Area OGS 2009 (yd ²)	Total Area OGS 2004 (yd ²)	Change in area of OGS (yd ²)
UC 1	30267.00	32723.00	-2456.00
UC 2	28262.00	19524.20	8737.80
UC 3	97065.00	95434.00	1631.00
UC 4	75093.10	75093.10	0.00
UC 5	944.50	944.50	0.00
UC 6	80572.00	78428.00	2144
UC 7	39096.00	35219.00	3877

shortfall was observed in UC 1 i.e. Natha Khan Goth while there is no change in area of open green spaces in two UCs i.e. Reta Plot (UC 4) and Morio Khan (UC 5).

Table 6 shows that according to projected population for the years 2004 and 2009 there is an incredible short fall in area of open green spaces in each UC except in UC 4 i.e. Reta Plot and UC 2 i.e. Pak Sadat Colony where very

negligible increase in area of open green spaces i.e. 338.25 yd² and 69.89 yd², respectively have been recorded. However, this increase is far short of the city standard which is 4 acres or 19 360 yd² per 1000 population. According to this standard, there should have been a total increase of 1 586 787 yd² in 2009, in order to cater to the demand of the population within the town.

Table 6. Comparison of Area of OGS per 1000 population for Projected Population Status 2009 and 2004

UC Nos.	Projected Population 2009	Area of OGS/1000 pop. 2009 (yd ²)	Projected Population 2004	Area of OGS /1000 pop. 2004 (yd ²)	Increase Required for 2009 (yd ²)	Difference (yd ²)
UC 1	84081	359.97	70283	465.58	267129.28	-105.61
UC 2	70186	402.67	58669	332.78	222969.12	69.89
UC 3	66123	1467.94	55272	1726.62	210075.36	-258.68
UC 4	63739	1747.65	53280	1409.4	202486.24	338.25
UC 5	69943	13.5	58465	16.15	222214.08	-2.65
UC 6	66254	1216.1	55381	1416.15	210501.28	-200.05
UC 7	77838	502.27	65064	541.29	247304.64	-39.02

Table 7. Status of Well Maintained Open Green Spaces to National Standard (N.Std)

UC Nos.	Area of Well Maintained OGS Layout (yd ²)	Area of well Maintained OGS per 1000 pop. Layout (yd ²)	Area of Well Maintained OGS 2009 (yd ²)	Area of well Maintained OGS per 1000 pop. 2009 (yd ²)	Shortfall from N.Std. Well Maintained OGS per 1000 pop. Layout (yd ²)	Shortfall from N.Std. Well Maintained OGS per 1000 pop. 2009 (yd ²)
UC 1	0	0.00	2155	25.63	-19360.00	-19334.37
UC 2	0	0.00	4631	65.98	-19360.00	-19294.02
UC 3	7430	166.69	9061	137.03	-19193.31	-19222.97
UC 4	15978	371.86	15978	250.67	-18988.14	-19109.32
UC 5	0	0.00	0	0	-19360.00	-19360.00
UC 6	7503	167.99	7503	113.24	-19192.01	-19246.75
UC 7	2406	45.85	4830	62.05	-19314.15	-19297.95

Table 7 showing the status of well maintained parks and playgrounds to National Standard shows that there were no well maintained open green spaces in UCs 1, 2 and 5 as revealed from the layout map and 2009 imagery. Thus, they have maximum shortfall. Other UCs in order of ranking of shortfall are 7, 3, 6 and 4. Regrettably, it has been observed in 2009 status that all UCs lag far behind the National Standard as the population has shot up by more than 48 percent as compared to the population of 1998 census. There is only a minor increase in area of well maintained parks and playgrounds in UCs. 2, 7, 1 and 3.

5. CONCLUSION

A considerable number of studies have shown that visiting open green spaces and being exposed to natural elements can reduce psychological strain, increase psychological well-being, and support recovery from illness etc. [29-36]. Temporal changes of open green spaces, thus are essential, as they reveal the changing trends towards improvement or deterioration. Since the latter condition is not acceptable to the law abiding, tax paying urbanites, its surveillance is of overriding significance.

The social and environmental values of well designed open green spaces necessitates the creation of well maintained and accessible open green spaces suitable for a

range of uses by a wide range of gentry. These spaces should be sensitive to local contexts and ensured with safety and security. Run down areas should be handed over for more beneficial public environmental use, thus helping boost the civic pride and revitalizing urban heritage and improving urban livability.

Environmental degradation, congestion of open green spaces must be prevented or the population pressure must be reduced in order to make the urban environment livable. Enormous effort is needed to enhance and develop the area of open green spaces, to meet the optimum facilities of the population of the study area with reference to the national standard. However, if areas of open green spaces cannot be increased in proportion to the population explosion, the existing open green spaces must be well maintained. Negligence in maintenance of open green spaces in Shah Faisal Town has crossed the tolerance threshold with reference to civic, environmental and recreational needs and there is urgency of extensive and intensive overhauling and improvement.

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