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Development Utilization of Green Open Space in Panakkukang District, Makassar City

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Abstract:- The impact of urban development is the rapid growth of the urban population, causing a decrease in the density of green open space. This study aims to describe the current condition of green open space in Panakkukang District as a target of its development to maintain the ecological balance and disaster mitigation function. The analytical method used is superimposed and quantitative descriptive based on population needs to be based on area, population density analysis, oxygen fulfillment analysis, and analysis of evacuation space utilization. This study shows that the current size of green open space in each village in the district has become much smaller; the highest need for green open space based on oxygen fulfillment is in Tammamaung village with an area of 56.31 ha; based on its area is the Panakkukang village of 109.85 ha, and based on the total population in the village of Tammamaung around 56.14 ha. Factors influencing changes in the size of green open space in Panakkukang Regency are the allocation of green open space in the Spatial Plan, economic facilities, number of visitors, population density, and educational facilities, and the development of green open spaces from parks, urban forests, and cemeteries. Green open space from the road lane is made on the primary and secondary road lane while the development of green open space on the river border is set to be 5 to 20 meters from the riverside. Roads, parking areas, parks, and urban forests are used as evacuation spaces for disaster mitigation.

Keywords:- *Green Open Spaces, Urban development, Spatial Plan, Disaster Mitigation, Makassar.*

I. INTRODUCTION

City in its development have a limited area to meet the demand for land use both settlements, as well as the construction of various urban facilities, including advances in technology, industry and transport, in addition to frequently change the natural configuration of land / urban landscape can also seize these lands in various other forms of open space, so it is generally detrimental to the existence of rmoneygreen is often regarded as reserve lands and uneconomical. On the other hand, the progress of the tool and increase transportation and utility systems, as part of improving the welfare of citizens, also have extended the amount of pollution and have caused various inconveniences in urban environments. To cope with environmental conditions such as the city is very much needed rmoneygreen as a bioengineering techniques and formations biofilter are relatively cheap, safe, healthy, and comfortable (Sibarani, 2003). In fact, the essence of urban green open space has not been fully realized in the construction and development of cities in Indonesia. In many cases the changes in the function of green open space (RTH) city land to other uses, with some of the examples is the conservation area that serves as a catchment area turned partly into settlements.

Green open space is the area that extends or path that the user group is open as a place to grow plants, both of which grow naturally or are deliberately planted. RTH is aimed at improving the environment comfortable, fresh, beautiful and clean as a means of urban ecological park and also creates harmony of the natural environment and the built environment is useful to the public interest (Irwan 2007). In urban areas, green space tends to change as a result of the various problems that exist. These problems, among others, associated with high rates of population growth is mainly due to urbanization, causing increasingly severe urban space management. In the year 2020 is estimated at around + 60% of the population is in urban areas, and will have implications for the demand for land for housing needs. Thus the spatial planning of urban areas needs to improve attention, especially as related to the provision of public open spaces.

Law No. 26 Year 2007 on Spatial Planning has mandated the provision of green open space in urban areas. One of the important provisions of the legislation that governed the Spatial Planning is about the existence of green open space. The proportion of green space in urban areas is set at least 30% of the area of the city, which consists of 20% public and 10% privat, Public green open space is a green space owned and managed by the city government used for the benefit of society in general. It includes parks, public cemeteries, and green lanes along roads, river banks and beaches. Entering private green open space is a garden or yard or privately owned building society or cultivated plants.

Panakkukang sub-district with an area of 17.05 km2. Is administratively divided into eleven urban regions namely; Village of Karampuang, Karuwisi, Karuwisi Utara, Masale, Pampang, Panaikang, Pandang, Paropo, Sinrijala, Tamamaung and Tello Baru. Soul population of 142 308 in 2014, with a population growth rate of 5.94% / year (Subdistrict Panakkukang in Figures, 2015). Growth and development are directly or indirectly in the District Panakkukang is a major node development center section settlements, trade and services in Makassar growing rapidly compared to other sub-district in the vicinity. Such a development would provide a

variety of spatial impact on the system in the District of Panakkukang, including system development rmoneyopen green. Therefore it is necessary to anticipate the development of the District as a unit Panakkukang Makassar city development region with other regions in terms of development of the system rmoney green to anticipate the rapidly growing city in the future.

II. RESEARCH METHODS

Based on the research objectives, the type of research is descriptive and correlation. Descriptive research will discuss the condition of open green space at this time and how the level of need that became the basis of the direction of development of green open space utilization to meet the level of comfort and aesthetic environment. Moderate correlation studies will discuss the relationship between the factors and the factors that influence the vast changes in open green spaces in the district Panakkukang Makassar.

A. Analysis of Green Open Space Conditions Current.

1. Analysis of Land cover with Superimpouse Method.

Used to limit the study site, where the administration of the District Panakkukang map overlaid with maps of land use, the results of this analysis will be obtained information on land cover. Information obtained in the form of extensive and distribution in each region vegetated.

2. Analysis of Carbon Dioxide Uptake

Analysis of carbon dioxide absorption is useful to get information about the ability of green open space to absorb carbon dioxide in the research area. Calculation of carbon dioxide absorption is based on land area that vegetated areas. Distribution and wide open green spaces obtained calculated value based on the ability of vegetation to absorb carbon dioxide, which produces carbon dioxide uptake value.

Carbon dioxide uptake value obtained based on the following assumptions:

- Carbon dioxide uptake value obtained through approach, not by calculation acquire field data. The approach used is:

N = (H x 58.2576) + (T x 3.2976) + (K x 52.3952) + (S x 3.2976)

Information :

N = Carbon Dioxide Uptake Values (CO_2/ Ha / yr)
H = Forest (ha)
T = Agriculture rice field (ha)
K = Plantations (ha)
S = Shrublands (ha)
58.2576 = CO2 uptake value of forests (CO2 / ha / yr)
3.2976 = C uptake valueO2 for rice cultivation (CO2 / ha / yr)
52.3952 = CO2 uptake value for plantations (CO2 / ha / yr)
3.2976 = value to scrub CO2 uptake (CO2 / ha / yr)

- Carbon dioxide uptake value obtained just above the soil surface.
- The result of the calculation of carbon dioxide uptake will be described in simulated form of mapping the needs of green open space at the sites.

B. Analysis of Green Open Space Needs

1. Compliance Analysis of Oxygen (O2)

Analysis of fulfillment of oxygen (Dahlan in Sibarani, 2003) was done to meet the needs of the population will be in urban areas where the oxygen has been very limited as a result of the development of the city. Meeting the needs of oxygen will be done using the formula:

$$L = \frac{+ \Sigma \Sigma \, Vi \, Ai \, Bi. \, Wi}{20}$$

Information:

L = RTH Size (ha)
Ai = Needs Oxygen (O2) per person (kg / h)
Bi = Needs Oxygen (O2) per unit of motor vehicles (kg / h)
Vi = total population
Wi = the number of vehicles of various types
20 = constants (rerataan oxygen / O2) is generated (20kg / h / ha)

2. Green Open Space Needs Analysis Based on Population

Needs analysis based on the number of residents is done by multiplying the number of people served by the broad standards of green space per capita according to regulations. The standard provision of green space based on population can be seen in Table 1.

Table 1. Provision of green open space based on population

No.	Environmental unit	Type RTH	Minimum Size / unit (m2)	Minimum Size /capita (m2)
1	250 people	RT Parks	250	1.0
2	2500 people	RW Parks	1,250	0.5
3	30,000	Village Parks	9,000	0.3
4	120,000	Parks Subdistrict	24,000	0.2
		Funeral	be adapted	1.2
5	480,000 inhabitants	City Park	144,000	0.3
		City Forest	be adapted	4.0
		For functions certain	be adapted	12.5

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3. Regional Needs Analysis Based on Size

Comprehensive needs analysis based on the area used to meet the needs of green space in urban areas using the standard as follows:

- RTH urban green open space consists of public (government-owned and open to the public) and open green spaces Privat (owned by individuals or institutions).
- The proportion of green space in urban areas is at least 30% was comprised of 20% of public green open space and 10% consists of private green open space.

C. Factor Analysis

In this study used a number of 6 origin variables that will be identified by using factor analysis. The table below explains the origin variable (X) used in factor analysis.

Tabel.2 Estimating Variables Used in Factor Analysis

No.	VOriginally ariabel	Notasi / Symbol Matematis
1.	Green open space allocation	X_1
2.	Population Growth Rate	X_2
3.	Population Density Growth Rate	X_3
4.	Growth Rate of Number of Migrants	X_4
5.	Growth Rate of Educational Facilities	X_5
6.	Growth Rate of Economic Facilities	X_6

III. RESULTS AND DISCUSSION

A. Areal Land Cover Analysis Method Research Superimpouse

Land cover analysis in this study is also used to determine how widespread availability of green open space, location and spread, is used as a reference for the analysis of further development of green open space. This activity is supported by the identification on aerial photographs or digital images to obtain information about the state of land cover types in the study area as a reference in land cover classification process.

Based on the results obtained secondary data on land cover types are vegetated land (forest, mixed farms, fields, ponds and swamps / inundation), vacant land, residential, and industrial facilities. Size and distribution of land cover in the study site, are shown in Table 3.

Table 3. Type in the Land Cover Research Area

No.	Urban Village	Land Use Types (ha)							amount (ha)
		Settlement/ Amenities	Garden	ponds / field	Forest	Industry	Swamp/ pool	Empty land	
1	Paropo	117.38	-	-	-	-	4.62	-	122.00
2	Karampuang	54.18	-	-	-	-	12.22	-	66.40
3	Pandang	186.29	-	-	-	-	3.96	-	190.25
4	Masale	151.79	0.02	-	-	-	-	0,001	151.80
5	Tammamaung	113.14	0.31	0.28	3.64	-	-	9.77	117.36
6	Karuwisi	24.31	0.81	-	-	-	-	-	25.12
7	Sinrijala	42.47	0.54	-	-	-	-	0.97	43.00
8	Karuwisi Utara	41.82	2.98	1.69	-	11,39	1.08	4.54	58.97
9	Pampang	59.06	1.73	56.18	4.24	-	-	3.26	121.21
10	Panaikang	136.13	32.85	93.97	79.43	-	0.93	3.58	343.33
11	Tello Baru	98.49	12.21	66.20	71.11	-	3.23	7.39	251.24
	Total	1025.05	51.44	218.33	158.43	11,39	26.05	29,50	1520.19

Source: GIS Spatial Data Of Makassar, 2015

The total area amounts to 1520.19 hectares of land cover. Land cover is divided into seven types:

1. Settlement / facilities, have a character who spreads, where the spread of settlements and facilities have to follow the pattern of the existing road network in the District Panakkukang center with an area of 1025.05 ha.
2. Forest, clustered pattern using the form located on the northern outskirts of the District Panakkukang has an area of approximately 158.043 ha.
3. Mixed gardens, has character shapes and patterns clustered to spread lies between forest and open land, sometimes mixed with residential areas, has an area of approximately 51.44 hectares.
4. Ponds / Rice, has a pattern that spread to the suburbs north and east region of the District with an area of approximately 218.33 hectares.
5. Industry, has an area of approximately 11.39 hectares, which is only located in the Village of Karuwisi Utara.
6. Swamp / Puddle, there is a mix between the gardens and ponds with spot shape which has an area of about 26.05 hectares.

7. Vacant land or land that has not been earned, has the shape and pattern of the spread between settlements, plantations and roads, an area of about 29.50 hectares.

In the above explanation shows the settlement areas and facilities already reached 68% of the total area of the study site, while the other uses the remaining 32%, so that areas with lots of vegetation found only in areas that have little settlements or on the outskirts of the District of Panakkukang. The vegetation is possible because of the development of the District of still centered on an area within the business center. Residential areas are at the center of activities of districts with clustered form. Distribution developed regions according to data obtained from secondary survey in the research area is approximately 1036.34 or 68.18% of the area of the District Panakkukang in 2015.

B. Analysis of Carbon Dioxide Uptake

Plants on land ecosystem has an absorption of carbon dioxide, carbon dioxide uptake approximate calculation done through the process of data classification existing land use, to get wide distribution and vegetated areas in each village at the sites. Vegetation needs to absorb carbon dioxide emissions from energy needs to be obtained based on the distribution of carbon dioxide emissions for each district.

Uptake of carbon dioxide present in the form of vegetation will be calculated on the analysis of the carbon dioxide uptake. The values of broad-vegetation has been distinguishing its kind that has been presented in Table 14, using secondary data is the ability uptake by vegetation it is known the ability of the current state of vegetation to absorb carbon dioxide.

The ability of vegetation to absorb carbon dioxide by Iverson (in Tinambunan 2006) that is to the forest vegetation 58.2576 tons of carbon / ha / year, rice cultivation 3.2976 tons of carbon dioxide / ha / year, shrubs 3.2976 tons of carbon dioxide / ha / year, and plantations 52.3952 tons of carbon / ha / year. Approach to estimate carbon dioxide uptake using literature that would be obtained vegetation uptake value for each of the districts in the study site. Calculation of carbon dioxide uptake by vegetation types are presented in Table 4.

Table 4. Absorption of Carbon Dioxide by Vegetation Types

No.	Urban Village	With CO2 uptake Vegetation Types (Ton / Year)				amount (Tons / Year)
		Garden	field	Forest	Bush	
1	Paropo	-	-	-	152.51	152.51
2	Karampuang	-	-	-	20.32	20.32
3	Pandang	-	-	-	71.61	71.61
4	Masale	8.59	-	-	-	8.59
5	Tammamaung	161.72	-	2118.63	-	2280.35
6	Karuwisi	426.39	-	-	-	426.39
7	Sinrijala	280.73	-	-	-	280.73
8	Karuwisi Utara	1563.90	-	-	-	1563.90
9	Pampang	904.15	-	2472.91	-	3377.06
10	Panaikang	17213.55	-	46276.25	-	63489.81
11	Tello Baru	6395.25	83.63	41428.44	-	47907.32
	Total	26954.28	83.63	92296.23	244.44	119,578.57

Source: Analysis, 2016

Based on the data in the table above, estimates of carbon dioxide uptake by vegetation is still mostly found in Panaikang village which is around 63489.81 tons of carbon dioxide. The uptake in the district due to the amount of vegetated areas in the region are still many and varied with a total area of 112.29 hectares, comprising 158.43 hectares of forest, 51.44 hectares for mixed farms, 2,54 and 7,41 hectares of rice fields hectares of bush. Administratively, Village Panaikang is a village that has the most extensive area in the district of Panakkukang is 366.17 hectares or about 23.21% of the total area of the District Panakkukang. Activities of community activities are still focused on trade and services center in the District of Panakkukang, thus diminishing green areas though for the development of Makassar city.

Estimates of the total carbon dioxide can be absorbed amounted to 119,578.57 tons. Uptake of carbon dioxide that can be done by the vegetation in each village in order are the Village Panaikang with an estimated total of 63489.81 tonnes of vegetation uptake of carbon dioxide. Tello Baru village with an estimated total of 47907.32 tonnes of vegetation uptake of carbon dioxide and Village Pampang with estimated uptake of 3377.06 tons of carbon dioxide.

The total estimated amount of carbon dioxide that can be absorbed by vegetation types based on the current condition is approximately 119,578.57 tons. Most of the existing vegetation is naturally grown vegetation. The form that the trees in the forest ecosystem, the opening of the plantation forests and shrubs and some have experienced a major restructuring in the main street. Estimated uptake of carbon dioxide emissions is presented in Figure 1.

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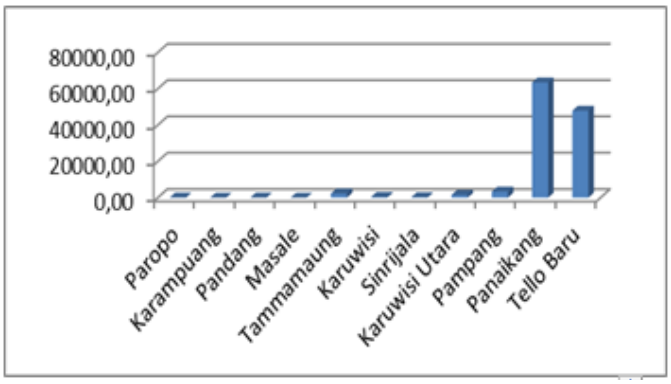

Figure 1. Uptake of Carbon Dioxide Emissions By Vegetation

C. Compliance Analysis of Oxygen (O2)

Calculation of ideal wide open green space on the fulfillment of the oxygen in the research area based on the formula fulfillment of oxygen is the level of oxygen requirement using the standard requirement per person is 0.04 kg / hour, and needs per unit of the motor vehicle is 0.33 kg / hour.

RTH needs in fulfillment of oxygen that with a population of 72 090 people need oxygen 2883.60 kg / hour, the number of motor vehicles need oxygen as much as 31 495 units 10393.35 kg / h, so that the total oxygen demand of the research location around 13276.95 kg / h. RTH needs based on the fulfillment of oxygen are presented in Table 5.

Table 5. The need for green open space is based on oxygen fulfillment

No.	Urban Village	Number of Motor Vehicles	Oxygen requirement (kg / h)	Constants (kg / hr / ha)	RTH needs (ha)
1	Paropo	9568	3157	20:00	32.92
2	Karampuang	8766	2.89	20:00	21:47
3	Pandang	8419	2.78	20:00	21.85
4	Masale	8715	2.88	20:00	24.24
5	Tammamaung	10 542	3:48	20:00	56.31
6	Karuwisi	7478	2:47	20:00	21:21
7	Sinrijala	6335	2:09	20:00	9:42
8	Karuwisi Utara	8,030	2.65	20:00	15.82
9	Pampang	8559	2.82	20:00	35.88
10	Panaikang	9134	3:01	20:00	32.17
11	Tello Baru	9112	3:01	20:00	22:53
Total		94.66	31.24	20:00	293.80

Source: Analysis, 2016

From the table above the oxygen requirement in the research area after dividing 20 which is the value constants rerataan, in getting the total requirement of open green space area of approximately 293.80 hectares so for the current conditions are considered inadequate in the fulfillment of oxygen. It can be seen from the difference between green space and vegetation land cover based on the fulfillment of the oxygen which the green space and land cover has an area of approximately 275.21 hectares while the level of 293.80 hectares of green space needs, so there is a difference or deficiency of approximately 18.60 hectares of green space, the difference RTH needs based on the fulfillment of the oxygen with the condition of the existing green space are shown in Table 6.

Table 6. Difference in the need for green open space based on oxygen fulfillment

No.	Urban Village	Total population	Existing RTH broad (ha)	RTH needs (ha)	Difference (ha)
1	Paropo	16,380	2,68	32.92	-30.24
2	Karampuang	10 665	4.94	21.47	-16.53
3	Pandang	10 854	9.65	21.85	-12.20
4	Masale	12 048	5.44	24.24	-18.80
5	Tammamaung	28 069	7.38	56.31	-48.94
6	Karuwisi	10,541	0.59	21.21	-20.62
7	Sinrijala	4656	2.76	9.42	-6.66
8	Karuwisi Utara	7842	0.4	15.82	-15.44
9	Pampang	17,869	22.09	35.88	-13.79
10	Panaikang	16 008	130.23	32.17	98.06
11	Tello Baru	11 189	89.08	22.53	66.55
Total		146.121	275.21	293.80	18.60

Source: Analysis, 2016

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D. Analysis of Green Open Space Needs by Area

Based on the Minister of Public Works Regulation No. 05 / PRT / M / 2008 dated May 26, 2008 on the guidelines for the provision and utilization of green open space. In the urban areas stipulate that at least 30 percent of the area must be open and the greens which comprises 20% public and 10% private. Based on the standards set in the area of research should be a minimum of green open space with an area of 473.38 hectares. Open space requirement for each district in the research area are presented in Table 7.

Table 7. Green Open Space Needs by Area

No.	Urban Village	An area	Public green space needs (ha)	RTH needs Privat (ha)	Total Requirement (ha)
1	Paropo	124.92	24.98	12.49	37.48
2	Karampuang	68.07	13.61	6.81	20.42
3	Pandang	192.94	38.59	19,29	57.88
4	Masale	151.80	30.36	15.18	45.54
5	Tammamaung	132.61	26.52	13.26	39.78
6	Karuwisi	25.12	5.02	2.51	7.54
7	Sinrijala	44.07	8.81	4.41	13,22
8	Karuwisi Utara	63.50	12.70	6.35	19.05
9	Pampang	128.58	25.72	12.86	38.57
10	Panaikang	366.17	73.23	36.62	109.85
11	Tello Baru	280.16	56.03	28.02	84.05
Total		1.577.9	315.59	157.79	473.38

Source: Analysis, 2016

Green open space needs study site with a distribution in each village amounts to a minimum of 473.38 hectares. Suitability requirements of green open space known based on the existing condition of green open space obtained from analysis of land cover. Vast green open spaces of existing conditions and the difference between green open space requirements by area are shown in Table 22. The difference is to be calculated only on the public green space development while the private RTH performed at each use with a minimum of 10% of green space.

In accordance with the objective that the standard is widely used for the purpose of improving the quality of urban living environment comfortable, fresh, clean, and as a means of safeguarding the environment and create harmony of the natural environment and the built environment is useful to the public interest. Difference in the green space needs based on an area in the show in Table 8.

Table 8. Difference in Green Open Space Requirement by Area

No.	Urban Village	Existing RTH (ha)	RTH needs (ha)	Difference (ha)
1	Paropo	2,68	37.48	-34.80
2	Karampuang	4.94	20.42	-15.48
3	Pandang	9.65	57.88	-48.23
4	Masale	5.44	45.54	-40.10
5	Tammamaung	7.38	39.78	-32.41
6	Karuwisi	0.59	7.54	-6.95
7	Sinrijala	2.76	13,22	-10.46
8	Karuwisi Utara	0.4	19.05	-18.68
9	Pampang	22.09	38.57	-16.49
10	Panaikang	130.23	109.85	20.38
11	Tello Baru	89.08	84.05	5.04
Total		275.21	473.38	-198.17

Source: Analysis, 2016

Green open space requirements based on the location of the area of study is not qualified by the number of green open space shortage is highest in Sub Pandang has lacked -48.23 hectares, Village Masale -40.10 -34.80 hectares and hectares of village Paropo from spacious standard specified, but based on the above calculation are urban regions that meet the needs of green open space that is in the Village and Village panaikan Tello Baru, so overall in District Panakkukang is still a shortage of green open space based on an area that is equal to 198.17 ha ,

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Seeing the results of the above analysis, there is a tendency that the lack of green open space that occurred in the study site because it is the center of the District Panakkukang while the development of urban activities still continue to be directed at the villages which are at the center of trade activities and services in the village of view, village Masale and villages Paropo which has lacked highest green open spaces. The total area is relatively small and community activities and a dense residential area is located on the Village sinrijala karuwisi and villages, making it difficult to get the area that will be open and green spaces.

E. Analysis of Green Open Space Needs Based on Population

The broad needs of green open space based on population where every type of green space has a minimum area per capita vary. Calculations based unit of society views as to the type of RT garden with a population of 250 people in need of at least 1.0 square meters per capita, RW garden with a population of 2500 people in need of at least 0.5 square meters per capita, garden village with a population of 30,000 people need a minimum 0.3 square meters per capita, park districts with a population of 120,000 people in need of at least 0.2 square meters per capita, funeral with a population of 120,000 people in need of at least 1.2 square meters per capita, garden city with a population of 480,000 inhabitants requires a minimum of 0.3 square meters per capita, forest city with a population of 480,000 inhabitants requires at least 4.

Green open space needs based on population most likely in Tammamaung village with a population of 28 069 inhabitants, requires a minimum of 56.14 hectares of green open space, then Pampang village with a population of 17,869 inhabitants have a green open space requirements as much as 35.74 hectares and the Village Paropo which has a population of 16,380 inhabitants require 32.76 hectares of green open spaces. Difference of green open space based on the number of residents with green open spaces existing conditions are presented in Table 9.

Table 9. Conformity of the Conditions of Existing Green Open Space Against Standards The area of green open space based on the population

No.	Urban Village	Existing RTH broad (ha)	RTH needs (ha)	Difference (ha)
1	Paropo	2,68	32.76	-30.08
2	Karampuang	4.94	21.33	-16.39
3	Pandang	9.65	21.71	-12.06
4	Masale	5.44	24,10	-18.65
5	Tammamaung	7.38	56.14	-48.76
6	Karuwisi	0.59	21.08	-20.50
7	Sinrijala	2.76	9.31	-6.55
8	Karuwisi Utara	0.4	15.68	-15.31
9	Pampang	22.09	35.74	-13.65
10	Panaikang	130.23	32.02	98.21
11	Tello Baru	89.08	22.38	66.70
Total		275.21	292.24	-17.03

Source: Analysis, 2016

Based on the existing conditions of green open space, which is presented in the table above. Kelurahan that have the highest green open space requirement difference are in Tammamaung Kelurahan which is -48.76 ha, Paropo Kelurahan -30.80 ha and Karuwisi Kelurahan -20.50 ha, but there are still villages that have green open spaces which are still fulfilled based on the population, namely in Panaikang Village with an area of 98.21 ha and Tello Baru Village 66.70 ha so that the difference in the need for overall green open space in Panakkukang District is -17.03 ha.

F. Factors That Affect Changes Area of green open space

Changes in green open space that occurred in Panakkukang Subdistrict in 2010 and 2014 were influenced by several influencing factors by taking into account the results of the analysis of the relationship between factors, so the population was not input because it was considered to represent population density data and the number of migrants in Panakkukang Subdistrict. Analysis of the determination of the factors that influence changes in the area of green space in Panakkukang District is carried out using a stepwise regression technique. The variables used in tiered regression are 6 variables, namely one objective variable and five estimating variables (X) that affect the objective variable. Each variable used is the value of the annual growth rate of each variable. The results of the regression analysis are shown in Table 10.

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Table 10. Regression Analysis

	beta	Std.Err.	B	Std.Err.	t (4)	p-level
Green open space allocation	-0.809	0.17	-0.24	0.05	-4.73	0.009
amenities Economy	.326	0.14	241.92	105.47	2.29	0.083
Total Arrivals	0.306	0.15	266.93	137.20	1.94	.124
Population density	0,217	0.17	1,362,92	1,074,82	1.26	0.274
Education facilities	-0.153	0.14	-327.29	308.25	-1.06	0,348
R-square (R2)	0.94					

Source: Analysis, 2016

In the above tableexplained that the regression equation has the R-square value (R2) of 0.94. R-square value (R2) close to 1 indicates that the selection of variables that affect the probe as variable variables relatively precise destination. Based on Table 29, the variables were highly significant predictor (p-level <0.05) that the allocation of green space in the spatial plan. The variables that significantly is a facility of the economy, the number of entrants, population density, and educational facilities.

Based on Table 10. the factors that influence changes in the area of Green Open Space in Panakkukang District are as follows:

- Green Open Space Allocation in spatial planning

Regression results show that the allocation of Green Open Space in the spatial plan is negative. This shows that if the allocation of Green Open Space in the plan is reduced, the changes in the area of Green Open Space that occur are large or the area of Green Open Space decreases.

- Economic Facilities

The more growth in economic facilities that are built, the greater changes in Green Open Space will also be greater. This can be seen from the results of the regression on the economic facilities variable which has a positive value. The construction of high economic facilities reflects the need for large welfare so that the development requires no small amount of land. Examples of economic facilities that require a sizeable amount of land are malls and shopping areas.

- Total Arrivals

Regression results show that the growth in the number of arrivals is positive. This shows that the higher the growth in the number of migrants, the greater the change in Green Open Space. The growing number of newcomers will increase the need for space, but the area of land in Panakkukang Sub-district does not increase, so there is a change of function of the Green Open Space to meet the needs of the space, so the Green Open Space will be smaller.

- Population density

The results of the analysis show that population density growth variables have a positive effect on changes in the area of Green Open Space. The interpretation of this is that increasing population density tends to have an impact on increasing changes in the area of Green Open Space. A high rate of population growth will certainly increase the population's need for built space such as settlements and various facilities. The human population will continue to grow, while the land area /space availability will never increase, so the demand for space availability will increase. Land use conversion is the most widely adopted method of meeting these needs, so that a lot of Green Open Space has been reduced due to being converted into built space.

- Educational Facilities

The growth of educational facilities has a negative role. This shows that the higher the growth of the number of educational facilities built, the change in the area of Green Open Space is low. This can happen because of the possibility of the growth of educational facilities such as course institutions built in areas that are not in the Green Open Space or in other words the facilities are built in the area of built land, for example in shopping areas.

Figure 2. Visualization of Developments in Economic Facilities that affect changes in green open space in Panakkukang District

IV. CONCLUSION

1) The current area of green open space in each village has been greatly reduced where land use for residential areas and facilities has reached 68%. existing green open spaces no longer provide good benefits to the population and the aesthetics of the city.
2) The need for green open space based on oxygen fulfillment is greatest in Tammamaung village with 56.31 ha, for the need for green open space based on the largest area in the

Panaikang village is 109.85 ha and the need for green open space based on the most population Large is found in Tammamaung Village at 56.14 ha.

3) Factors influencing changes in the area of green open space in Panakkukang District are the allocation of green open space in spatial planning, economic facilities, number of migrants, population density and educational facilities.
4) The development of green open space in the form of an area is developed in each neighborhood unit in the form of green open spaces of parks, urban forests and cemeteries, for green open money the lane is developed on the primary and secondary type of road network, while the development of green border green open money is developed with a distance of 5-20 meters from the river bank, especially for large rivers in Panakkukang District, Makassar City.

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