

The Research Regarding the Visual Continuity of the Green in the Re-development Area by Using the Aerial Photograph

Lee, Hyuk-Hae* · Hajime, Koshimiz*

*Dept. of Agriculture, Meiji University

Abstract

In the city of Asia like Seoul and Tokyo, aggregate power is poured into the city making which is suitable in new age. Large-scale re-development is active in various places as the present condition. As for the various East Asian cities, high-level utilization conversion of the land and high conversion of the building are advanced. As for these realities, the re-development is advanced in the situation that has not been clarified enough though it is true that green of the city has decreased.

This research was aimed at the clarifying the allocation of greenery when proceeding with town planning projects by quantifying the possibility of allocating greenery in the form of rooftop landscaping in redeveloped areas. Moreover, the distribution of the green in the re-development region was calculated and the coexistence level of green space was calculated. The realities of a desirable green were clarified in the spectacle by understanding a sight and spatial continuousness in the green.

In order to clarify the potentiality of roof greenery reevaluating, the research was conducted by analyzing from aerial photographs, in Tokyo and Seoul. And the flow of the research was conducted by selection of research object area, taking pictures, acquisition of the aerial photography, rearrangement the data and the analysis¹⁾.

As a result, I was able to prepare a land vegetation coverage classification chart and obtain data pertaining to the level of urban and green tract of land for the researched cities of Tokyo and Seoul. By analyzing this data, we were able to indicate patterns of greenery unable to be obtained through data from ratio of vegetation coverage and ascertain the effectiveness of rooftop landscaping.

Key Words : Rooftop Landscaping, Scenic Meaning, Re-Development, Green Tract, Continuous Arrangement

1. INTRODUCTION

The 21st century is called the age of the city, and the city requests an attractive place with competitive edge or more the change as much as possible. The city in the world is changing in each scenario now

when competition between cities increases that it should correspond to a new age. The redevelopment rushes which aimed at less than several years of completion are large-scale, and are performed in Tokyo and Seoul. Although the existence value has been thought as important about a green tract of land

also from the necessity for city planning of the value having begun to be accepted and having considered environment, it is very difficult to recover the green tract of land which has disappeared at once, and to newly create a green tract of land in a city, in development and the city where it was all fixed, the present condition is that reservation of a green tract of land has been a big subject also in a big city.

In a high dense city like Tokyo and Seoul, since just tree planting of a ground part is not enough, concern is increasing in the roof of the building which occupies half a part of the area of a city area²⁻⁴⁾.

This research was aimed at the clarifying the allocation of greenery when proceeding with town planning projects by quantifying the possibility of allocating greenery in the form of rooftop landscaping in redeveloped areas.

II. RESEARCH METHOD

1. Selection of the City and Object Region

In this research, Tokyo (Japan) and two cities of a soul (South Korea) were taken up among many cities enumerated as a big city in Asia. These two cities have various differences, such as a city development stage, land use and city environment, the policy and plan that receive it, and left-behind green tract of land environment, as well as geographical natural conditions. However, it both develops rapidly and also

has the common feature of passing through process in which rapid development has been performed.

As these two cities are representative cities of Japan and Korea, it is assumed that the planning of these cities will largely influence the planning of other cities in those countries.

Moreover, it is comparing among two or more cities as a reason for having chosen two or more cities where conditions' differ, and is because various characteristics of the city, such as a distribution, a kind, etc. of green tract of land, can be clarified. Selected regions for this research were those that recently experienced drastic re-development. Shinagawa and Samsungdong were chose for Japan and Korea respectively as they are representative business districts of their country, and Roppongi and Banpo were chosen for Japan and Korea respectively as they were built with the national culture as their theme.

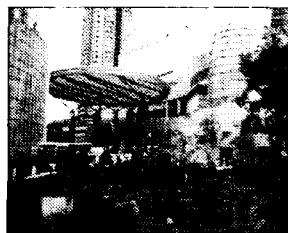
2. Analysis Method

Aerial photographs were taken of the two cities, Tokyo and Seoul to obtain a quantitative understanding of the level of the green tract of land and other land coverings. Furthermore, through field research, the validity and effectiveness of those aerial photographs were confirmed, and further detailed land vegetation coverage research and land use surveys were conducted.

The coexistence level of the urban area and the green tract of land was calculated to understand how



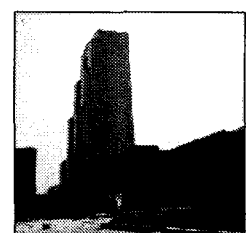
Shinagawa



Roppongi



Banpo



Samsungdong

Picture 1. Picture of the re-development area

the green tract of land in the city existed by the aerial photograph and the field investigation quantitatively, and sight continuousness in the green tract of land that existed in the research object region was understood.

1) Land coating investigation

When making the comparative analysis between cities, data with the accuracy of this level is used. And it becomes an indispensable condition to take the same analysis method. It is the purpose that this research grasps the distribution of a green tract of land. Therefore, a land use figure, a topographical map, etc. of each city are required^{5,6)}. However, acquisition of data is difficult by the difference in the conditions of a country. It was not suited to compare, because there is loose attachment in the accuracy and preparation time even if maps obtained etc. Therefore, the aerial photograph was used and it decided to perform analysis by the data which created by

performing image processing.

The aerial photograph used by this research is as being shown in the following tables. Data came to hand from Japan Map Center and National geographic information institute.

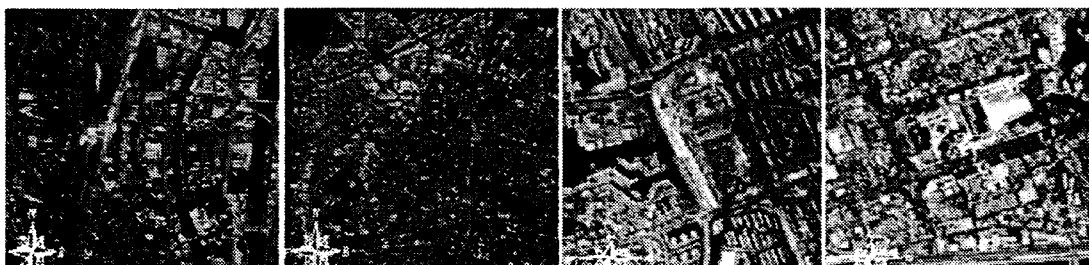
It is difficult to determine accurately the level of land vegetation coverage through aerial photos, as shadows appear depending on the angle and time of shooting. Therefore, prior to the analysis of those photos, there is a need to correct those distortions. For this purpose, Adobe Photoshop was used to adjust the shadows. Adjustments were done accordingly with data obtained from field research. Differences of scale were also adjusted using Adobe Photoshop.

2) The measure which evaluates a city area and a green tract of land

From the aerial photograph and the land covering classification figure created by the field survey, its attention was paid about the two categories, a "city

Table 1. The general information of aerial photograph

	Tokyo		Seoul	
	Shinagawa	Roppongi	Banpo	Samsungdong
Area				
Scale	1/10000	1/10000	1/5000	1/5000
Photographing Year	2003. 10	2003. 10	2001. 6	2001. 6
Photographing	Tokyo digital map corporation		Ministry of Construction and Transportation	
Type	Color	Color	Monochrome	Monochrome



Shinagawa

Roppongi

Banpo

Samsungdong

Picture 2. Aerial Photograph of the object regions

area" and a "green tract of land", and the measure which evaluates these quantitatively was considered. The urban districts include all man-made structures such as roads and buildings. The vegetated areas include all green areas including all rooftop landscaping and landscaping conducted on other man-made structures. When aimed at a green tract of land, "not only quantity" but a "form" should be taken into consideration. Although well told about various functions of a green tract of land, in order to fill this, the form which has continuity visually is searched for. Therefore, it is necessary to grasp the distribution pattern of the green tract of land in the object regions for investigation. In this research, "the degree of mixture" was taken up as a measure for knowing this distribution pattern, the JOIN analysis which is spatial self-correlation analysis as a method of asking for the degree of mixture of a city area and a green tract of land quantitatively was used, and the form of a green tract of land was quantified. The JOIN analysis is the technique of the space analysis which using the raster data, and the JOIN analysis is the method of being suitable for catching the degree of mixture of two kinds especially. The size of buildings within a 500m radius of the research area

center were taken into account and summarized in a 25m mesh. The size of a mesh was decided in consideration of the size of a circumference building.

3. Official Approval by the Monte Carlo Simulation

The Monte Carlo simulation performed statistical inspection. The Monte Carlo method will presume a value true by the average of the measured value which repeats an experiment repeatedly using a random number and is obtained as a result based on the law of large numbers⁷⁾.

III. RESULT AND DISCUSSION

The land covering classification figure was created through the aerial photograph and the field survey. The land covering classification figure was mesh-ized paying attention to two categories called a city area and a green tract of land. In Figure 1, areas displayed in green represent green tract of land, and in white represent city area.

The JOIN analysis was performed based on this

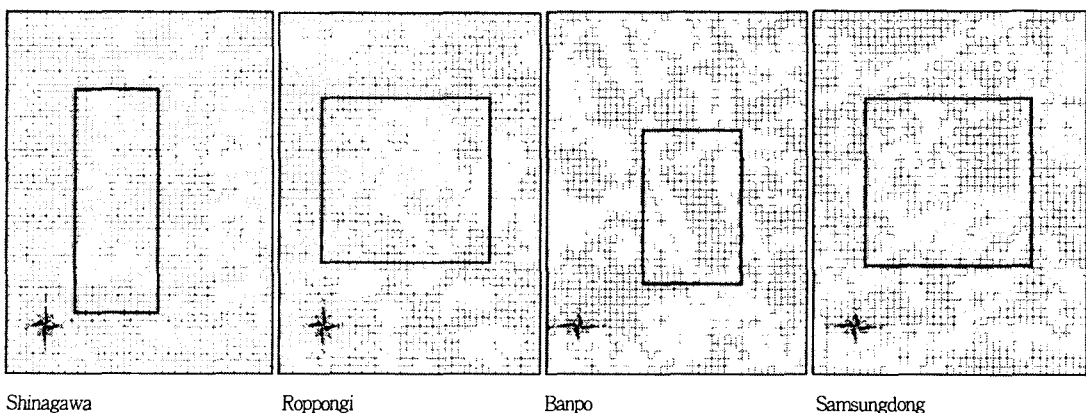


Figure 1. Land coating investigation(25m mesh)

Green	White	Red line
Green tract of land	City area	Re-development area

result.

The amount of JOIN statistics is calculated by the raster data of two values of 1 and 0. If it is in the state of gathering by same 1 or 0, it is said that there is positive spatial self-correlation. The state where 1 and 0 are mixed is said that there is negative spatial self-correlation^{7,8)}.

Although there was also the method of considering four vertical and horizontal meshes as a contiguity mesh about a contiguity mesh, in this research, the direction of slant was also further taken into consideration, and it analyzed by making eight meshes into a contiguity mesh (Queen's Case). The result of analysis was able to be summarized by the following Table 2⁷⁾.

Furthermore, JOIN analysis of only the re-development area which is the research region was performed, and the value was compared.

The result of the JOIN analysis authorized by the Monte Carlo Simulation. The p-value of B-B, B-W,

W-W become 0.009 in all the areas as a result, and it is statistically significant because p-value was 0.05 or less. So this analysis and data are effective.

The result of the JOIN value of the whole area and the JOIN value of only a re-development area, a little difference came out although a big difference was not found.

Data summarized in the Table 2 shows that in the case of BW, the expected JOIN value is higher than its actual value. On the other hand, BB and BW had the opposite result. This means that these two are independent of each other. Furthermore, changes were seen in the expected and actual JOIN values after analyzing the two that were adjusted to scale. Examinations were carried out making comparisons of this data and the land covering classification figure.

The green tract of land in Roppongi in Japan has grasped that it is in the tendency distributed to the whole region, taking the concentrated form. In Roppongi, it is judged that the concentrated form by

Table 2. Summary of Join Counts

Adjacency = Queen's Case Summary of Join Counts												B: Urban area W: Green space	
	Roppongi			Shinagawa			Banpo			Samsungdong			
	BW	BB	WW	BW	BB	WW	BW	BB	WW	BW	BB	WW	
# of Joins	1616	4623	885	1498	6407	829	2482	3458	1506	2245	3798	920	
z-Rand. Statistic	-30.1	23.42	31.47	-36.86	28.32	39.07	-24.20	20.05	24.18	-18.09	14.70	18.21	
Variance Rand.	991.0	380.68	243.8	853.22	348.82	196.5	1622.5	536.72	445.1	1237.2	443.54	321.5	
Expected of Joins	2564.56	4165.9	393.4	2574.9	5877.8	281.1	3456.8	2993.4	995.7	2881.3	3488.2	593.4	
	Roppongi Hills			ShinagawaGrandComons			Central City			KOEX			
	BW	BB	WW	BW	BB	WW	BW	BB	WW	BW	BB	WW	
# of Joins	380	366	245	606	2030	323	563	779	331	630	786	297	
z-Rand. Statistic	-6.62	1.990	9.272	-19.4	13.81	20.73	-11.2	8.866	10.21	-8.02	5.518	8.268	
Variance Rand.	230.2	97.72	76.01	372.8	174.7	87.03	366.9	150.5	109.5	365.1	151.5	106.6	
Expected of Joins	480.5	346.3	164.1	982.0	1847.	129.5	778.7	670.1	224.0	783.3	718.0	211.6	

roof greenery of a building and the small-scale green tract of land was seen. In the case of Shinagawa, the JOIN value of city areas was the largest. Because of Shinagawa station existed in an investigation area. Moreover, lakes and rivers exist but since JOIN analysis can detect only two categories, they were added as part of the urban district. The form of the green tract of land in Shinagawa also had the problem that the green tract of land concentrated and existed in one area, although the tendency which has continuity visually was seen.

In South Korean Banpo and Samsungdong, the largest difference came from two results to the JOIN value of green tracts of land. As the cause, a large-scale green tract of land exists around the object ground, and it is thought that the value low in comparison came out. It became clear that the form of the green tract of land of a redevelopment area does not fully have visual continuity again. However, this research was investigated about the re-development area: the green growth is not enough. It is judged that it had the influence by it.

Although the green tract of land existed in the re-development area, when seen from the air, it became clear, being arranged without having visual continuity. But, at the area which re-development ends, it is difficult to be able to give visual continuity, making use of the green tract of land. Then, if rooftop landscaping is used for the place where creation of green is difficult' it is not impossible to make visual continuity realize.

IV. CONCLUSION

The purpose of this research was to clarify the improvement effect in a scene by grasping the green distribution of the redevelopment area in a big city. In order to have visual continuity, also the view from the building is important from not only the land.

Because the city building has done complicated form, with just the photograph from the land cannot grasp that form sufficiently°. In addition, also it is difficult to grasp rooftop landscaping. In order to grasp overall green arrangement, it judged that it was effective to use the photograph from the air, and research was advanced.

As a result, we were able to prepare a land vegetation coverage classification chart and obtain data pertaining to the level of urban and vegetated areas for the researched cities of Tokyo and Seoul. By analyzing this data, we were able to indicate patterns of greenery unable to be obtained through data from ratio of vegetation coverage and ascertain the effectiveness of rooftop landscaping.

This understood that the application of the JOIN value is effective, when perceive to the point called the grasp of green quality and grasp more detailed area environment. However, there was a problem to analyze the complicated present city because the attribute was limited to 2 pieces^{9,10)}.

In the meaning, it becomes clear that rooftop landscaping of a building is required in order to realize the green which has continuity in a re-development area. But these result are from the air, so it was necessary to examine again with the three dimensional images for clarifying the solid continuity between rooftop greenery and ground level. Based on this result, it becomes possible the evaluation about existence of the green tract of land and roof, in an every place, it will be hoped to develop with the proper arrangement plan of a green tract of land in the future re-development urban area.

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