How to Reserve the Green Space in Megacity Region Based on the Greenery Area System

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Abstract :

Greenery area plays more important role to improve the environment in megacity region nowadays. In order to preserve the green area in megacity region in Japan, the "Greenery Area System" has been issued, with the revising of the Urban Green Area Conservation Law in 2004. This paper aims to clarify the effectiveness of the "Greenery Area System". So we took four municipalities-Nagoya City, Yokohama City, Setagaya Ward and Toyota City- where this system has been adopted as research objects.

Before or almost at the same time when the "Greenery Area System" is adopted, these municipalities already enact original ordinances to preserve the green space. As ordinances and the "Greenery Area System" are been simultaneously used, it becomes necessary to answer that what kind of affection will be bring when it comes to the issue of green space guarantee? According to the "Greenery Area System", how to guarantee the appropriate control of green space in megacity region?

Though case study of four municipalities, this research answers these questions. And we find the achievement of the "Greenery Area System" is that it helps to increase the inspection for completion of greening in megacity region. However, as the simultaneous use of ordinance and systems, the greening systems become complicated to understand. And through our research, the cases show that greening activities in megacity region are difficult to obligate by systems.

Keywords:

Greenery Area System, Green Space, Guarantee Method, Simultaneous use of Ordinance and System, Measures of Anti-violation

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1. Purpose and Background of the Research

There is no doubting that nowadays greenery area plays more important role to improve the environment in megacity region. In order to preserve the green area in megacity region in Japan, the "Greenery Area System"(abbreviate as the GAS in the following)has been issued, with the revising of the Urban Green Area Conservation Law enacted in 2004. According to the Article 34 in the Law, in every site where the size is over 1,000m^2[(1)] in use districts, when it comes to renovation or extension towards the site, the minimum value between 25% of the site or (1 minus building coverage ratio) minus 10% has been decided to be green space.

Figure-1

In Japan, Nagoya City, Yokohama City, Setagaya Ward and Toyota City are the only four municipalities where the GAS to be put into use to ensure the greening in the building site. Figure-1 shows the location of these municipalities. Although, when the GAS is adopted, these municipalities already enact original ordinances to preserve the green space.

In this manner, as ordinances and the GAS are been simultaneously used, what kind of affection will be bring when it comes to the issue of green space guarantee? According to the GAS, how to guarantee the appropriate control of green space? To the municipalities where the GAS has been adopted, it is thought to be necessary for them to cope with these issues.

Previous studies[1)2)3)] are mainly about the popularization of the GAS, and the subsidy system on relation to the GAS. Nevertheless, there is rare research on how to reserve the green space in megacity region based on the GAS.

The purposes of this research are to illustrate (i) the adoption process of the GAS, (ii) the application state of the GAS, (iii) how to reserve the green space in megacity region based on the GAS, (iv) that when following the solution of anti-violation what achievements have been achieved and what issues are still remain to face up to. And to illustrate those points, 4 municipalities where the GAS has been adopted are chosen as the research objects.

2. Outline of the GAS

Table-1 shows the details of the background, obligation and achievement of the GAS in case study areas.

2-1. Background of the GAS

In 1970s, Nagoya City, Yokohama City, and Setagaya Ward began to formulate ordinances to conserve green space in urbanization promotion area. Besides the ordinances, Master Plan for Parks and Open Spaces has been drawn up by those municipalities after 2000. One the other hand, Toyota City drew up Master Plan for Parks and Open Spaces in 2008 and formulated ordinance in 2010. In the Master Plan for Parks and Open Spaces of both municipalities, the

purpose to adopt and the active promotion of the GAS have been written. With the purpose of restrain the decrease of the green space in Nagoya City and the purpose of increase the green space in private land in Yokohama City, Setagaya Ward and Toyota City, the GAS has been adopted.

2-2. Obligation of the GAS

The GAS is applied to use districts merely. The Figures-2,3,4,5 shows that in Yokohama City, all residential-use district, in Setagaya Ward, the whole area except the bank of Tama River, in Nagoya City, all urbanization promotion area, in Toyota City, just the downtown area have been designated as Greenery Area. According to the GAS, in every site where the size is over 1,000m^2in use districts, the minimum greening rate has to be guaranteed compulsively. Nevertheless, it becomes more strict because in each municipality, the minimum greening rate has to be guaranteed compulsively in every site where the size is over300 m^2～500 m^2. The image of greening activities based on the GAS are showing in Photo-1 and- 2 (both in Setagaya Ward).

Photo-1 Greening of Apartment

Photo-2 Greening of Nursing Home

2-3.Achievement of the GAS

After the GAS to be adopted, there were 1300 cases of confirmation towards greening to be down and green space of 40ha was created through it in Nagoya City. The dates in Yokohama City are 270 cases and 8ha, in Setagaya Ward are 200 cases and 12ha, in Toyota City are 9 cases and 0.2ha.

Table-1The Implementation of the GAS in Each Municipalities

		Nagoya City		**Yokohama City**		**Setagaya Ward**		**Toyota City**	
Background of the GAS	**Plans or rules on relation to green**	Year	Plans or rules	Year	Plans or rules	Year	Plans or rules	Year	Plans or rules
		1978	*Ordinance of Greening Promotion in Nagoya City*	1973	*Ordinance of Creating and Cultivating the Green Environment*	1977	*Ordinance Related to Protecting and Rehabilitating Natural Environment*	2008	*Master Plan for Parks and Open Spaces of Toyota*

		2001	*Master Plan for Parks and Open Spaces of Nagoya: Flower, Water and Green Nagoya Plan*	2006	*Master Plan for Water, Parks and Open Spaces of Yokohama*	2005	*Basic Ordinance of Greening*	2010	*Ordinance of Greening Promotion in Toyota City*
		2005	*Ordinance of Greening Community Plan*	2008	*Ordinance Related to Greenery Area in Yokohama City*	2008	*Master Plan for Water, Parks and Open Spaces of Setagaya*		
		2008	Adoption of the GAS	2009	Adoption of the GAS	2010	Adoption of the GAS	2012	Adoption of the GAS
The ordinance of greening obligations based on the GAS	**Zone**	Whole area of Urbanization Promotion Area		Whole area of Residential Used District		Whole area of Urbanization Promotion Area(Except for Tama River bank)		Downtown area	
	Area	302.58km^2 (the ratio of green space:92.69%)		244.86 km^2 (the ratio of green space:55.96%)		56.80 km^2 (the ratio of green space:97.80%)		1.96 km^2 (the ratio of green space:0.21%)	
	Applying region	Showing in Figure2		Showing in Figure3		Showing in Figure4		Showing in Figure5	
	Plottage	≧300 ㎡(Building Coverage Ratio＜50%) ≧300 ㎡(50%<Building Coverage Ratio＜60%) ≧500 ㎡(60%≦Building Coverage Ratio＜80%)		≧500 ㎡		≧300 ㎡		≧500 ㎡	
	Minimum greening rate	≧10%(60%≦Building Coverage Ratio＜80%) ≧15%(50%≦Building Coverage Ratio＜60%) ≧20%(Building Coverage Ratio＜50%)		≧10%		・25% of plottage ・(1 minus Building Coverage Ratio) minus 10% The minor one between these two value		≧20%(Building Coverage Ratio＞60%) ≧10%(Building Coverage Ratio＞80%)	

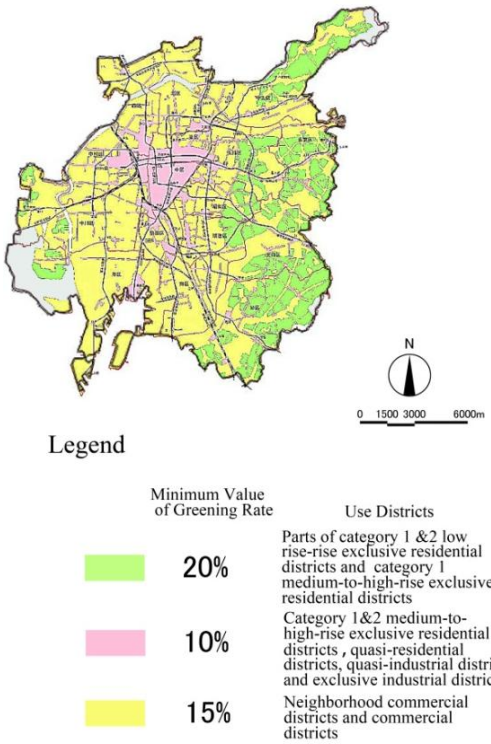

Figure-2Nagoya City

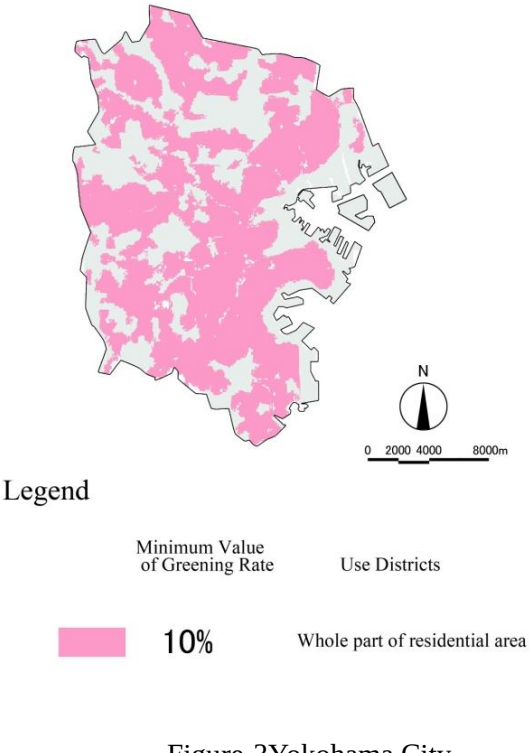

Figure-3Yokohama City

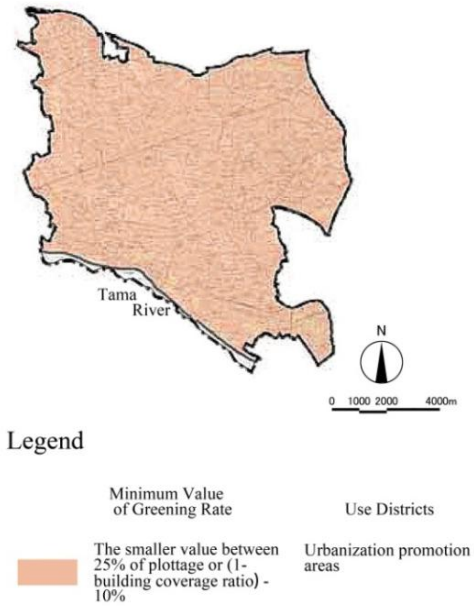

Figure-4Setagaya Ward

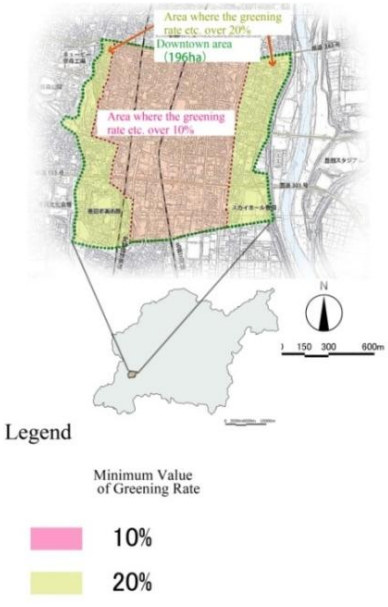

Figure-5Toyota City

2-4. Complicated Greening Systems

Based on the GAS, the greening area rate has been determined beforehand. However, besides the GAS, the municipalities determined the greening rate in their own ordinances. According to the usage of the GAS and the ordinances, it can be divided in two types. The one is *double standards of the GAS and the ordinance* in Yokohama City and Setagaya Ward. The other one is *mutual complementation of the GAS and the ordinance* in Nagoya City and Toyota City.

ⅰ. Double Standards of the GAS and the Ordinance (Yokohama City and Setagaya Ward)

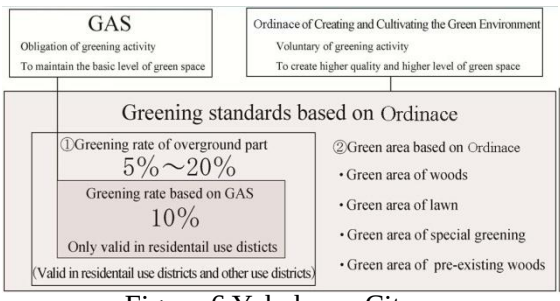

Figure-6 Yokohama City

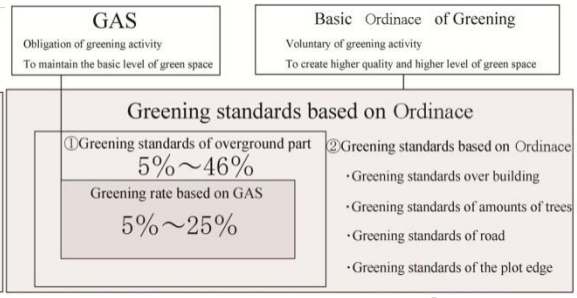

Figure-7 Setagaya Ward

Before the adoption of the GAS, the municipalities of Yokohama City and Setagaya Ward decided the greening rate in their own ordinances. The value of greening rate based on the GAS is contained in the value based on the ordinance (Figure-6,7). And for the site, the real greening standard to be observed is according to the ordinance. Therefore, the area of green space created in real will surpass the level decided by the GAS.

However, it is easy to be confused since there are 2 kinds of value towards greening rate and 2 versions of greening written notice, according to the GAS and the ordinance. To solve the problem, Yokohama City accepts the omission of the documents of the Ordinance in some cases [(1)]. In Setagaya Ward, only *Master Plan of Greening &Application of Proper Greening Rate Certification* needs to be provided to ensure the unification of the documents.

ⅱ. Mutual Complementation of the GAS and the Ordinance (Nagoya City and Toyota City)

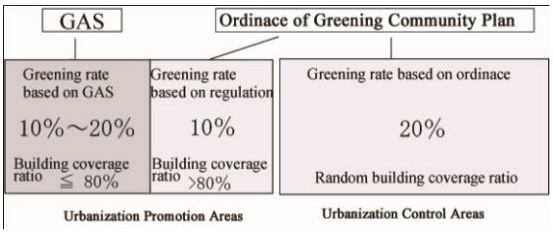

Figure-8Nagoya City

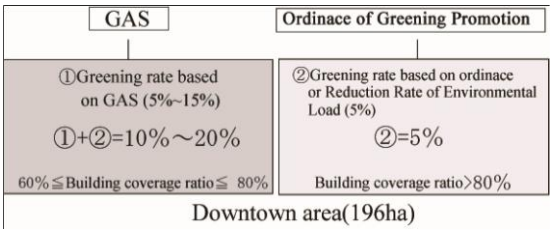

Figure-9 Toyota City

In Nagoya City and Toyota City where the ordinance is formulated and the GAS is adopted at the same time, the purpose to formulate the ordinance is to make it works with the GAS as a complement (Figure-8,9). In Nagoya City, in the area where it is non-greenery area and meanwhile the building coverage ratio is over 80%, or in the urbanization control area where greenery area is unavailable, the greening standard in the ordinance is working as a complement. In Toyota City, a new standard of Reduction Rate of Environmental Load [(2)] is created according to the Ordinance. According to the standard, it can be considered as greening action by providing facilities such as photovoltaic facility etc. Therefore, it can be realized to deregulation the greening rate based on the GAS.

3. The Guarantee Method of Green Area through the Application of the Greenery Area System

3-1. Advice from Administration before Greening Activity

Although neither of the municipalities set up inquiry information to cope with greening affairs, when submit the greening written notice at the specific section towards the issue, construction company can get information about the formality and advices on how to maintain green spaces.

Besides, each of the municipality has its own official homepage to offer guidebooks of the GAS, how to maintain the green space and greening support institution. It is considered that following these advices and guidebooks, not only the quantity but also the quality of the green space can be guaranteed.

3-2. Linkage of Inspection for Completion of Greening and Construction

Another way for the GAS to guarantee the green space is conducting inspection for completion of greening and inspection for completion of construction simultaneously. According to the GAS, inspection for construction cannot be carried out without providing greening written notice and pictures of greening situation on site. As a result, the submitting rate of greening written notice can be insured and confirming greening situation when completed becomes possible. Compares to the time when only ordinance is been used, submitting rate of greening written notice in each municipality rises from 30%~50% to 100% after the adoption of the GAS.

Nevertheless, in that case, merely greening situation right after completion can be confirmed. It is not easy to maintain the green space in high quality for a long term. After completion, with the time passing, it is not unusually to see trees withered or died, grass be changed into pavement for parking. All these may lead to decrease the greening rate beneath the minimum value of it. However, for now, there is not a system which can confirm long terms of greening situation.

3-3. Comprehensive Implement of Affirmation, Estimation and Subsidy Towards Green Space

In Yokohama City, one can apply for a green confirmation label after inspection for completion of greening if the greening rate meets the value stipulated in ordinance. The similar award system is carried out in Setagaya Ward. What different is that the label will be awarded automatically after the submission of greening written notice. Besides, when it comes to the project in which greening rate over the value of the GAS, towards the over part, in Yokohama City, roof greening subsidy will be offered and real estate tax will be reduced. And in Setagaya Ward, subsidy for trees transplantation, parking lot greening, road greening and roof greening will be offered. In Nagoya City, there is exclusive evaluation system for green space. The evaluation object is the surpass part of the greening rate compares to the value of the GAS also. The evaluation system is divided into several items, and each item contains 10~30 points to be accumulate according to evaluation of greening situation. The items including green area (10~20 points), trees planting (10~20 points), road greening (10 points), existing trees conservation (10 points), roof &wall surface greening(10 points), effort for maintenance (30 points). According to the result of the accumulated points, there are 3 levels of label will be offered. What is more, according to the rank of the label, there are other privileges such as greening subsidy and financing for environmental conservation facility (when the accumulated points over 80 points) or housing loan will be provided. In Toyota City, there is no evaluation system towards green space exists. Nevertheless, accompanied with the adoption of the GAS, subsidy will also be provided based on the green area when roof, wall surface, vacant lot or parking lot greening is conducted.

3-4. Measures of Anti-violation

3 of the municipalities except for Toyota City where the GAS is just started to use carry out

measures to prevent violation. Details can be seen in Table-2.

Table-2 Measures of Anti-violation

	Nagoya City	Yokohama City	Setagaya Ward
Measures of Anti-violation	Patrol	Patrol	Itinerate guidance towards maintenance state of greening facility
Responsible Department	Greening Master Plan Department	Green-up Promotion Department	Greening Policy Department
Number of People	10	2	6
Frequentness of Implement	Twice per year	Three times per year	Twice per year
Appointment Before Inspection	Without	Without	With
Selection Criteria of Inspected Item	・No deflection on location or usage ・The cases(except for personal residence) in which greening rate attained to 10~15%	・No personal residence ・No prefectural public facilities(like school or hospital etc.)	・No deflection on location or usage
Cumulative Number of Inspected Item	727 cases (2012.12)	67cases (2012.12)	101 cases(2013.10)
Cumulative Number of Violation	24 cases(4 cases were amended)	12 cases (4 cases were amended)	5 cases(3 cases were amended)
Violation Rate	3.30%	2.57%	4.90%
Judgment of Violation	It will be considered as violation if greening rate is lower than the minimum value of the GAS, because of loss of the lawn or withering of the trees and so on		
Matters of Violation	Loss of the lawn, green space be changed into pavement in parking lot, removal of wall surface greening	Loss of the lawn, loss of green space because of setting of parking lot, loss of green on pathway	Loss of the lawn, withering of the trees, removal of planting space
Violation of Different Type of Building	Storage, office, store	Apartment, store, school, garage、shrine	Kindergarten, store, paid nursing house
Amend Period	1~3 Years	1 Month~2 Years	1 Week~1 Month

Towards the project which greening written notice has submitted in Nagoya City and Yokohama City, staff from greening department will conduct patrol. Details are showing in Table-2. Based on selection criteria of inspected item, 200 projects will be chosen per year to be inspected on site without notification in advance. Inspection will be conducted twice by 10 staff in Nagoya City, and three times by 3 staff in Yokohama City. In Setagaya Ward, 6 staff from

greening department will choose 60 projects and conduct Itinerate Guidance Towards Maintenance State of Greening Facility(abbreviate as Itinerate Guidance in the following)twice per year. Different from patrol, staff will make appointment through telephone before inspection been conducted on site. Besides, request for rectification will be conducted towards the violation. Photo-3 and -4 shows the image of itinerate guidance towards maintenance state of greening facility in Setagaya Ward.

Photo-3 &4 Itinerate guidance towards maintenance state of greening facility

According to Urban Green Space Conservation Act, punishment like penalty has been formulated which makes the greening ordinance rigorous. Nevertheless, although request for rectification has been conducted towards violated projects, it is very common that the rectification will not be carried out even 2 or 3 years have passed. It is clear that the punishment does not work very well.

In addition, there is difference in measures of anti-violation in different municipality. In Nagoya City and Yokohama City, patrol without notification will lead to rejection of entering the site. In that case, it is not unusual that the greening situation can only be confirmed from outside door. In contrast, in Setagaya Ward, although notification in advance will make it more effective for inspecting on site, it makes it possible for those who does not conduct greening to make temporary attempt right before inspection.

4. Conclusion

As the conclusion, the achievement of the GAS is that it helps to increase the inspection for completion of greening from 30%~50% to 100%.

With the combination of an ordinance and GAS, every municipality tried to assure greening activities. However, the simultaneous use of ordinance and System, the greening systems become complicated to understand. In addition, the merit of penalty does not function. Furthermore, although greening activity based on the GAS has legal force, an average 3.6% violation was seen. In megacities, there are too many cases of land development and it is hard to follow the greening situation at each developed site. It is an obligation to guarantee the minimum greening rate decided by the GAS. However, through our research, the cases show that greening activities are difficult to obligate by systems.

Note:

(1). It can be brought down to300m^2according to the ordinance.

(2).The ratio of the area of facilities (photovoltaic facility etc.)divide by plottage

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