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A Study on a Counterproposal to Encourage Land Supply for URBAN Housing Through Revising the Green Belt System*

- A Case Study on the Green Belt Zones of Kwangju City and Cheonnam Prefecture -

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요약 : 본 논문은 도시용 택지공급의 유효성 증대를 위한 개발제한구역제도의 개선방향을 제시하는데 목적이 있다. 본 논문에서 얻은 결론은 다음처럼 정리할 수 있다. 첫째, 우리 나라의 토지이용계획 제도는 전통적인 계획법에 기초하고 있지 않으며 제도 자체의 한계로 인해 도시용 택지공급이 저해되어 택지수급의 부조화 문제는 필연적이었으며, 제도의 경직성까지 겹쳐 택지공급을 저해하였다. 둘째, 문헌조사나 전문가 인터뷰, 의식조사를 통해, 개발제한구역 제도는 도시환경 및 도시개발 측면에서 긍정적 효과가 있으나, 구역지정, 관리 및 토지이용 면에서 부정적 효과도 많아서 장래의 도시용 택지공급을 저해할 수 있음을 알았다. 셋째, 도시용 택지공급의 유효성 증대를 위해서는 개발제한구역제도의 개선이 필요하며, 개선방향의 핵심은 본 제도의 틀을 유지하면서 장기적 계획에 기초한 구역의 재조정을 통해 토지의 유효이용을 실현하는 것이다.

주요어 : 개발제한구역, 토지이용계획제도, 토지의 유효이용, 도시용 택지공급

I. Introduction

1. Background and purpose of this study

Korean society is now standing at a turning point. Due to the advent of high technology, the society is forced to transform itself into a knowledge-oriented one. The turning point can be pervasively found from a microscopic level to a macro economic one. The major turning point should be associated with social innovation. Among other forms of innovation, institutional innovation related to land policy is central for Korea's transition from an industrial society to a knowledge-oriented one, in order to improve quality of life. However, the land supply which could have remedied distribution problems in stock base was not accomplished. Furthermore, the current land policy mix has serious drawbacks in land use mechanisms, if we consider that the problems are caused by disharmony between land demand and supply. Now Korea recognizes the trade-off between equity and efficiency related to lands, and must revise the drawbacks of the policy mix in order to maximize the social benefits (Reference 1, 2, 3).

This study can be regarded as a series of research projects which aim to present an appropriate policy mix for urban land supply. Particularly, the study suggests a counterproposal to encourage land supply

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for urban housing through revising the green belt system in Kwangju City and Cheonnam Prefecture around Kwangju City. The paper deals with three main parts. First, it points out obstacles which hinder land supply for urban housing by tracing the Korean land use system including the green belt system. Second, it investigates the negative effects and the positive effects on land supply for urban housing caused by the green belt system within the land use system. Third, it presents a counterproposal of the green belt system to encourage land supply for urban housing.

2. Method of this study

In this study, we have selected Kwangju city and Yosu city of Chonnnam prefecture where lies to the southwest of Korea, and have undertaken 3 works to present a direction which encourages land supply for urban housing, as follows.

First, we have identified obstacles to land supply for urban housing in the Korean land use system.

Second, we have investigated the effects of the land use system including the green belt system through reference reviews and interviews of experts. Some questionnaires to inhabitants and landowners in the green belt zones have been administered. According to the findings of these questionnaires, the inhabitants want to abolish the system. Despite this objection, the abolishment of the system is not the best solution. Therefore our study on the impacts of the green belt system is based upon a questionnaire distributed to well-informed people who can suggest relevant opinions relating to the situation in Kwangju city and Yosu city (Note 1). We have collected 68% of our distribution (distribution 200, collection 130) from the survey. Among the respondents, professors and postgraduate students form 37%, research fellows form 13%, administrational staffs form 40%, and real estate agents form 5%. 73% of the whole respondents are owner-occupation households, 87% have no extra real estate in green belt areas. Dominant items of the survey were to investigate consensus on the publicity of lands, necessity of the green belt system, negative and positive effects of the system, drawbacks of the green belt zones, and precedent elements in improvement of the system and the counterproposal.

Third, we suggest an improvement plan of the green belt system to encourage land supply for urban housing based upon the above mentioned works.

II. Scheme of this Study

1. Obstacles which hinder land supply in the Korean land use system

The Korean land use planning act is composed of national, urban and individual areas applied on the scale of the planned area (Reference 6). In the regime, the national land use control act is applied in national areas, the city planning act is applied in urban areas, and the building act is applied in individual areas. Particularly, the land use plan is composed of a non-restraint plan which plays a role as a guideline of land use, development plan and conservation plan. The land use plan is composed of 2 main frames. The national construction comprehensive plan is located on the top of the frame. The national land use plan which is applied in non-urban areas and the city plan which is applied in urban area are located in the lower position of the frame. The national land use planning act controls almost all zonings except urban and tourist-resort areas.

Zoning Ordinance is below the regime as a policy method which aims to use the lands efficiently, to establish the minimum standards for sanitation and safety, to activate land supply for public use, to keep property rights and to adjust benefits and so on. The zoning ordinance was introduced in the Choseon City Planning Act of 1934, in which the zonings in land use were assigned, specifically, in 4 districts (housing, commercial, industrial, green) and in 4 zones (scenic, view, firebreak, public moral). Now, 4 districts and 13 zones are classified in the urban area, the city planning

act works merely to adjust and assign the zonings, and the building act controls the zonings more specifically. Exceptionally, however, the green belt zones are controlled by the city planning act.

Districts in the zoning are related to urban function, density and distribution for land use in the overall land use plan. Meanwhile, zones in the zoning are related to partial land use of the urban area. Now, the current zones include 7 sorts of zones in the city planning act and 5 sorts of zones in the ordinance of the city planning act. A view zone is subdivided into 5 sorts of zones in the ordinance of the city planning act, and the facilities protection zone is subdivided into school, public use and port facilities protection zone by their function. The districts and zones in assignment often tend to overlap, because the zone is assigned in order to refill the non-detail of districts in the zoning system. With the exception of the districts and the zones, there are 6 belts of specified facilities including the control belt, detail planning belt, metropolitan planning belt, and built-up designed belt. The green belt zone aims to prevent urban sprawl as a buffer zone between different urban areas and between urban areas and rural areas, In addition, this zone offers rural landscape to urban inhabitants and keeps a natural environment in urban outskirts. This means a permanent conservation green zone, which is different from a general green zone because the latter is strictly constrained in the setting up of a building, alteration of land use, and fragmentation of lands.

The zoning ordinance is the fundamental land use system of Korea. Assignment of the zoning as the national land use plan under the national land use control act or assignment of the zoning as the city plan under the city planning act represents the name of planning. This is no more than a land use control with uniformity andsturdiness. Thus it never functions as a planning act of 'no plan, no development' and reacts to change of land market situations accordingly (References 4, 5). In addition, the local governments never establish a pertinent plan which reflects regional situations because specialty in land development for urban housing is lacking and citizen participation in policy making is excluded thoroughly. Disharmony between flow base and stock base is inevitable because of drawbacks in the land use system and the tax system related to lands, as well as non-diversity in planning subject and method for land supply. Ultimately, these points become obstacles to efficient land supply for urban housing.

2. Bringing up a problem

Urbanization has enlarged into outskirts since rapid economic growth, inevitably, results in encroachment to rural and forest lands. Urban land use constantly increases while rural and forest lands use decrease in the change of land use rates (Reference 8). In this situation, the green belt zones prevent urban sprawl. However, soaring land prices due to shortages of residential lands supply, high-density of land use, decrease of lands stock in the future, destruction of urban amenity and environmental crisis result inside urban area and create avoidance of the green belt areas.

Alterations into urban land use occur constantly in the green belt in Kwangju city (Reference 7). As shown in Table 1, the development control lands caused by locating undevelopable land, airport area and military areas occupy 602.21km^2(81%) in Kwangju city, while areas for urban land use occupy just 142.01km^2 (19%). In this case, the undevelopable areas are areas which never alter land use, including the green belt area, parks, rivers, areas over 90m (except green zone), and inclined areas over 15 degrees. On the other hand, development control areas include safety zones for flights, military facilities, conservation zones and rivers which hold over the land use for the built-up area. 1.65 million㎡, however, are useful for residential lands in the development control areas and undevelopable areas judging from land category, inclination (less than 15%), sea level (less than 100m). The areas are 1.76 times as large as the Chomdan Residential Estate which was made recently in Kwangju city (Note 2). Notwithstanding, its development for residential lands is strictly

constrained.

It is meaningful to investigate how a change of political regime influences the reformed land use system and connects the land supply policy for urban housing hereafter. The most outstanding change in land supply policy after establishing Kim's government has been deregulation. Namely, policy allows landowners of the green belt areas to build new and enlarged structures, if not inducing environmental crisis in the process. Deregulation in the green belt brings about secondary effects in land use, and deregulation is never the best choice to encourage land supply for urban housing. Despite this fact, the most important thing is how to harmonize the deregulation of land policy with effective land use, spatially balanced regional developments, recapturing of capital gains tax, environmental conservation and so on.

Our discussion raises several questions: what are the problems of the green belt, and what has happened and will happen in land markets and land use mechanisms? We may encourage land supply for urban housing if we maximize the positive effects and minimize the negative effects caused by the system.

III. Outline and Changes of the Korean Green Belt System

1. Background and status quo of the Korean green belt system

The green belt zone was assigned by the City Planning Act of 1971, Article 21, in order to prevent urban sprawl, and to preserve a natural environment and military security. At first, the zone was assigned to the outskirts of Seoul in Jul. 1971, Pusan in Dec. of 1971, Taegu in 1972, Kwangju in 1973 and Yosu in 1977. 35 cities and 35 counties were assigned zones in 1977, their areas occupying 5.5% (5,397.1km^2) of the national areas, 36% of urban areas, and 48% of green areas. The green belt areas occupy 29% of the Capital region, 11% of the Pusan region, 10% of the Daegu region, 10% of the Kwangju region, and 1.6% of the Yosu region. The green zones occupy three-fourths of whole cities in the case of metropolitan area. In the case of Hanam city, Keong-gi prefecture, 98.4% of the city's areas are included in green belt. According to the purpose of the green belt, the green belt zone must consist of green lands absolutely. However, it is composed of non-green lands such as the residential lands, the mixed lands, the farm lands, and the forest lands which are beyond 60% of the whole green lands. Though almost of them are left to unassigned lands or reserved lands, alteration into the residential lands is strictly not allowed, so, they hinder land supply for urban housing.

City planning areas of Kwangju city are 744.22km^2 including 478.37km^2 of Kwangju city, 74.67km^2 of Changseong county, 117.68km^2 of Damyang county, 30.60km^2 of Hwasun county, and 42.90km^2 of Naju city, which they extend to administrative areas. 527.73km^2 (70.9% of the city planning areas) leading to 5 counties and 8 towns are assigned in the green belt areas when the town of Songjeong, Kwangsan county is included with Kwangju city. According to land

Table 1. The development control lands in city planning areas of Kwangju city

(unit: km^2, %)

Classification		Total	developable lands			undevelopable lands	development control lands	the rates of development (B/A)
			sub total(A)	developed lands(B)	undeveloped lands			
Total	Areas	744.22	142.01	82.51	59.51	595.94	6.27	58.1
	Share	100.0	19.0	11.0	8.0	80.0	1.0	
Kwangju		478.37	138.63	80.76	57.87	333.47	6.27	58.3
City, County		265.85	265.85	1.74	1.64	262.47	-	51.5

Source: Kwangju city planning restructure, 1998

Table 2. The areas of green belt by land category in Kwangju and Yosu

Land category	Kwangju areas	Yosu areas
Total	293,392,654m^2	86,637,593m^2
Forest	158,107,653m^2	64,002,486m^2
Fields	25,998,346m^2	6,953,862m^2
Rice fields	72,686,560m^2	10,291,728m^2
Residential lands	5,550,419m^2	527,993m^2
Mixed lands	330,286m^2	203,405m^2
Orchard	477,689m^2	19,196m^2
The others	30,241,701m^2	4,638,923m^2

Source: Cheonnam prefecture

category, the forest lands are overwhelming, occupying 153,017,653m^2 among 293,392,654m^2. As shown in Table 2, 5,550,419m^2 of the residential lands for urban housing are included in the green belt. Besides, in Yeocheon city, a planned industrial city, the green belt is assigned to prevent urban sprawl into the industrial complex. The green belt plays a role in preventing congestion between industrial zones and residential zones. The green belt areas of Yosu are 86,637,593㎡, the forest lands occupy 64,002,486m^2 (74%), and the residential lands occupy 527,993m^2 among them. Particularly, a gentle slope less than 100m occupies 75%. Most areas are less than 100m, and inclined areas of below 5% occupy 46% of the land outside the green belt areas. On the other hand, inclined areas (less than 20%) occupy 72% of the green belt areas, where a pressure for urban development is insignificant compared with other cities.

2. Revision of the green belt system at a local government

Twenty-nine years have passed since the introduction of the green belt system. The ordinance of the system was revised 47 times, and the allowed items reach 300 types now, though there were 27 types in the zone at the beginning of the introduction. The committee on the improvement of the green belt system reported on the 25th of Nov., 1998 (References 8, 9, 10). Improved contents so far can be summarized as follows.

First, the government revokes the regulation in areas which need not conserve though it continues to regulate in areas which need to conserve. The standards of revocation are judged from the 7 criteria of population size, rates of population increase, amounts of commutation, change of building permit areas, rates of occupied housing, density of urban development, usable lands for development. Additionally, 5 criteria of the share of green areas are considered, including the degree of air pollution, the degree of water pollution, farm lands and amenity. According to these criteria, 32% of the whole green belt (1,747km^2) will be revoked.

Second, the standards of conservation are judged from 6 physical criteria and 12 political criteria. In addition to these, new buildings of housing are allowed in the residential lands before execution of the system, as in the green zone. Settlement zone is assigned in the case of collective settlement. The green belt areas can be revoked on the assumption that plans systematically on public facilities, residential lands, a new building, rebuilding, extension building and so on, even in a high degree of conservation.

Third, an alteration in land use is strictly prohibited to manage the revoked areas and to prevent the areas from becoming slipshod. In addition, developments are induced in the revoked areas of low-density, and the city planning act and the building act are applied when the collective settlements are built in the areas.

Fourth, capital gain by revocation in the zones are planning to gather by the capital gain tax and public facilities charges.

Fifth, the green belt zone which has to conserve is classified and regulated into a conserving green zone, a productive green zone, and a natural green zone. In the case of application by the act of conservation zone for water supply, the green belt system is not applied.

Sixth, the charges for the waste zone have to be paid, if the public facilities are located inevitably in the green belt zone. The right to request purchase is allowed to

the lands which were owned before the system was introduced to conserve the green belt areas.

3. Problems according to the revision of the green belt system

The government has decided to deregulate partially according to the current situation of the zones in order to mitigate the inconvenience of the inhabitants' lives and disadvantages in exercising of the property rights. Many problems in the policy are included as follows.

First, the government never determined specifically how to raise the funds for purchasing the requested properties, though 14 trillion won is needed to purchase the conservation green lands. Furthermore, it is difficult to form a consensus on a purchase price, because the government tends to apply the notificated land price and the inhabitants are required to apply the real land price in trading the lands.

Second, the land prices soared on account of speculation because non-residential landowners who have lived in an external territory or who have purchased after assignment of the belt possess 79% of private lands in the green belt zones. There are a lot of defects in the tax system related to lands, though the government decides to gather the capital gain tax to this. Now, the stabilization of the real estate market has persisted to some extent (Note 3). Specifically, soaring land prices do not occur in the short term, owing to the asset deflation and the data base related to lands. The situation in the land market, however, can change if the current situation converts to a boom, because the transaction areas in the green belt zone tend to increase constantly since the government has vowed to reassign or revoke the green belt zones. For instance, the whole transaction areas in the green belt areas since May, 1999, increased 41.1% more than the transaction areas of a 4 month period, from Jan. to Apr., while the whole transaction areas of May, 1999 decreased 4.3% (965.6㎢) compared with the previous year (1,009.3㎢). This means that 114.7% have increased in transaction areas comparing with May, 1998. Also, 35.8% have increased this year in conservation areas anticipated to revoke.

Third, the destruction of urban amenity, misalignment in land use, and environmental crisis are also causing apprehension.

Fourth, it is anticipated that the inhabitants will dispute the ranks classified by the environmental standards of the government.

Judged from the government's reactions so far, it can be said that she intends to revoke the green belt zones. The local government regards the revocation of the green belt zones as being useful in encouraging land supply for urban housing, mainly stemming from augmentation of financial budgets for urban development. In the case of Kwangju city, the revocation is partially anticipated in the green belt. The zones have good accessibility to built-up areas and some plans for entertainment facilities, such as a country club and a race course. However, the stocks for residential lands in the long term decrease if the revoked green belt zones are not used as residential lands for urban housing. These issues work as obstacles to land supply for urban housing.

IV. Impact on Land Supply Caused by the Green Belt System in Kwangju City and Cheonnam Prefecture

1. Impacts of the green belt system by the reference reviews and interviews

According to the reference reviews and interviews of experts, the green belt system shares positive and negative effects in aspects of urban environment, development and economy.

The positive effects of the green belt zones can be summarized as follows. First, in the aspect of urban environment, it can be said that the zone offers unused green lands and clean air in the outskirts of urban areas. Second, it prevents urban sprawl and makes urban lands used intensively. Third, in the aspects of effects on land use, it offers inexpensive and unused lands in the outskirts of the urban areas to

supply lands for urban housing.

It can also hinder land supply for urban housing because the system involves a lot of drawbacks. The negative effects of the system can be summarized as follows.

First, it includes misalignment in assignment of the zones. The borderlines of the green belt are not readjusted at all. The bisected areas by the belt are 187,843m^2, occupying 35.9% of the green belt. The green belt zones bisected by the forest lands are dominant, occupying 80.1% in total, 43.5% by farm lands, 6.3% by residential lands. As shown in Table 3, the residential lands bisected by the green belt occupy 1.9% of all in Kwangju city and 4.2% in Yosu city.

Second, the system is not designed to realize effective land use but to restrain land use. Thus, public officials who manage the zones generate a lot of trouble with the inhabitants.

Third, in the condition of the shortage of urban residential lands, the hindrance of land supply constrained by the green belt brings about soaring land price due to the imbalance of demand and supply, and the increase of social costs due to high density development.

Fourth, a long run plan on the efficient land use in the zone is not established yet, and the development control in the zone is applied uniformly. Currently, the land use in the zone is strictly constrained for the inhabitants and generously applied for public. The inhabitants in the zone cannot help but suffer personally due to a shortage of convenience facilities and medical centers. Thus it becomes an obstacle in spatially balanced regional developments and efficient land supply for urban housing.

Fifth, there is no act which deals with the property loss independently though the inhabitants in the zone suffer from a serious loss of property. Most of the

Table 3. Bisected areas by green belt in Kwangju city and Yosu city

Land category	Kwangju (1.9% of the whole)	Yosu (4.2% of the whole)
	areas	areas
Total	5,686,320m^2	3,642,971m^2
Forest	4,766,833m^2	2,651,490m^2
Farms	138,252m^2	602,211m^2
Rice fields	189,733m^2	184,063m^2
Residential lands	6,834m^2	6,373m^2
Mixed lands	2,612m^2	9,348m^2
Orchard	2,870m^2	
The others	579,186m^2	189,486m^2

Table 4. The gap of notificated land prices between in green belt and non-green belt zone

(unit: 1,000Won/pyong)

Region		Land category							
		Average		Residential lands		Farms, rice fields		Forest lands	
		G.B.	N.G.B.	G.B.	N.G.B.	G.B.	N.G.B.	G.B.	N.G.B.
Total		28	80 (2.8 times)	55	144	25	90	3	6
Kwangju region	Damyang (Daejeonmyon Daechiri)	37	100 (2.7 times)	86	230	22	66	2	5
	Changseong (Jinwonmyon seonjeokri)	21	100 (4.7 times)	46	220	15	70	3	12
	Hwasun (Hwasuneup pungrimri)	23	51 (2.2 times)	47	84	20	66	1	2
	Naju (Nampyongeup, pungrimri)	16	74 (4.6 times)	26	69	20	148	3	5
Yosu region (Soramyon daepori)		41	75 (1.8 times)	69	119	50	99	3	6

Source: Cheonnam prefecture

green belt are private lands (85% of the whole in Kwangju city, 91% of the whole in Yosu city), and the gap of land prices between green belt areas and non-green belt areas is remarkable. Table 4 reveals the gap of the notificated land price between the green belt and non-green belt. The gap becomes more remarkable if the real transaction price is applied.

In addition, deregulation of the system gives advantages to non-residential landowners rather than inhabitants. Subsequently, the government never transfers the benefits of people enjoying the advantages to people suffering the disadvantages through the execution of the system. As shown in Table 5, the landowners are constantly purchasing the private properties in the green belt zones after the execution of the system. They occupy 44.6% of the private properties in Kwangju region and 53.9% in Yosu region. In addition, the inhabitants who have dwelled more than 10 years occupy 74% of the private properties in Kwangju region and 77% in Yosu region, as shown in Table 6. Twenty-five percent of all inhabitants have also dwelled less than 3 years in the zone.

Table 5. Green belt areas possessed by external landowners

	Kwangju(44.6%)	Yosu(53.9%)
Land category	areas	areas
Total	130,793,000m^2	46,713,000m^2
Forest lands	83,941,000m^2	36,392,000m^2
Farms	10,856,000m^2	3,825,000m^2
Rice fields	29,077,000m^2	5,940,000m^2
Residential lands	1,482,000m^2	164,000m^2
Mixed lands	72,000m^2	72,000m^2
The others	5,365,000m^2	320,000m^2

Source: Cheonnam prefecture

Table 6. Dwelling time of the inhabitants in green belt zone

Dwelling time	Kwangju (4,578 households, 13,618 persons)		Yosu (538 households, 1,853 persons)	
less than 1 year	433	1,026	54	153
more than 1 year	759	1,865	84	241
more than 3 years	1,616	4,237	159	494
more than 5 years	2,715	7,480	277	897
more than 10 years	3,545	10,179	418	1,434
more than 15 years	4,106	12,041	515	1,755
more than 20 years	472	1,577	23	78

Source: Cheonnam prefecture

Sixth, lands which have to be conserved outside the green belt are encroached upon while usable lands are not available inside the green belt. It induces social cost due to the increase of commuting distance and destruction of urban landscape. The farms and forest lands which changed to urban use every year reach 350km^2 which occupy 6.5% of the whole green belt. In the case of Yosu city, the change of land covering was remarkable in inclining areas of below 5%, from 1981 to 1998. Particularly in the farms, the change of land covering was remarkable in the 10% to 15% section. It means that the steep forest lands are changing into farms and the urbanization occurs in the gentle farms. Table 7 reveals the change of land covering by satellite film by years. According to the table, in urban areas from 1981 to 1998, the increase of 9% can be observed, while the decrease can be observed in the forest lands, the rice fields and the water zones (Reference 9). The forest lands and rice fields which are decreased in the green belt changed into farms and the urbanized areas were not great. Otherwise, the forest lands and rice fields altered into urban areas in non-green belt zones. This means that urban sprawl toward non-green belt zones, increase of environmental crisis and social costs occur.

Seventh, the green belt system never prevents

Table 7. The change of land covering in Yosu

(unit: km^2)

classification	1981	1989	1998	'81-'98
Forest	88.5	85.8	77.9	-10.7(-5.0%)
Rice fields	25.2	17.0	10.8	-14.5(-6.7%)
Farms	15.0	18.0	20.9	5.9(2.7%)
Water zones	76.1	75.7	73.9	-2.2(-1.0%)
Vacant lands	4.8	5.8	6.1	1.3(0.6%)
Urban	4.5	12.0	24.7	20.2(9.4%)
Total	214.2	214.2	214.2	0.0(0.0%)

Source: The ministry of construction and transportation

population concentration itself though it may protect the cities from urban sprawl.

2. Effects and improvement direction of the green belt system proved by a questionnaire in Kwangju city and Cheonnam prefecture

We have confirmed the effects of the green belt system based on a questionnaire to well-informed people. The sample results we have obtained are statistically significant at the 1% significance level.

First, according to the concept of public use of land in people's minds, as shown in Table 8, 81% of the respondents responded that the government should restrain the rights of the private property for public use. Also, 91% of the respondents agree with the pertinent use of lands and use by a plan, because lands are used efficiently and developed harmoniously, and the contexts should be realized inevitably by legal control and the tax system. Thus, a consensus on public use of lands is formed.

Many people recognize the necessity of the system. Particularly, it is worth noting that they assert not abolition but improvement of the system. Second, according to the positive effects of the system as shown in Table 9, 49% of the respondents estimate the effects affirmatively which offer lands in urban areas to use intensively and acquire the green zones in the outskirts of the urban area. 46% of the respondents recognize the effects of anti-urban sprawl and encroachment of the farms. As for the negative effects of the system, however, 45% of the respondents point out that the inhabitants in the zones suffer inconvenience in their lives and disadvantages in their property rights. The land use control in the zones is very strict for people, on the other hand, it is generous for public facilities. They assert that the system is not fair to everyone. Besides, it brings about soaring land price and high-density land use in urban areas, so, it distorts urban landscape and forms imbalanced regional development due to the depression of local cities.

Third, what are the problems in the assignment, management, and use of the green belt zones? As shown in Table 10, on the assignment of the zones, 45% of the respondents point out that there is no long

Table 8. Consensus on public use of land and pertinent land use

concept for public use of land	share	pertinent land use	share
The constraint of private property for public is justified	81%	It needs to realize efficient and balanced land use through legal constraint and tax system.	91%
The right of private property is free in the range of public welfare.	14%	It doesn't need legal constraint and tax system, but appropriate land use and development are necessary.	5%
The right of private property is more important than the public welfare.	4%	Individual freedom and creativity to land use must be kept.	3%
The others.	1%	The others	1%
χ^2 = 222.863, significance probability = 0.00		χ^2 = 307.354, significance probability = 0.00	

Table 9. Perception on the positive effects and the negative effects of the green belt

positive effects	share	negative effects	share
offering the green zones in outskirts of urban areas	49%	inconvenience of inhabitants' lives and loss of property rights	45%
anti-urban sprawl	46%	unfair for the strength of control	39%
offering the inexpensive lands in outskirts of urban areas	3%	increase of land price and development density in urban areas	9%
trust on land policy	2%	skewed spatial structure	7%
χ^2 = 104.756, significance probability = 0.00		χ^2 = 61.58, significance probability = 0.00	

Table 10. Perception of defects in the assignment, management, and use of the green belt

the problems in the assignment, management, and use of the green belt zones					
assignment	share	management	share	use	share
no-long run plan	45%	uniformed control	41%	inefficient land use	36%
disadvantage to inhabitants	40%	not efficiency but control	32%	no long run plan on land use	31%
misalignment in assignment	11%	management ability	22%	alteration is difficult	23%
exclusion of dwellers' opinion	5%	inconvenience in life	5%	depression of local cities	10%
χ^2 = 61.256, significance probability = 0.00		χ^2 = 38.431, significance probability = 0.00		χ^2 = 19.372, significance probability = 0.00	

run plan for the green belt system. 40% of the respondents point out that the government doesn't take measures like compensation to address the disadvantages caused by the assignment. Actually, a lot of inhabitants make complaints due to the loss of property rights. Besides, they point out that the government never collected inhabitants' opinions when the zones were assigned.

On the management aspect, 41% of the respondents point out that the zones are not managed efficiently because the control is practised uniformly irrespective of urban scales or characters. 32% of respondents point out that the government controls in order not to promote effective land use. 22% of respondents complain that the zones are managed powerfully for the inhabitants, and the administrational reactions for inhabitants and the public differs. Besides, the inhabitants cannot but infringe the ordinance because they suffer inconvenience in their lives.

On the use of the zones, 36% of the respondents dispute the current situation. The green belt zones are not used substantially as recreation spots which connect with urban areas and rural areas. Besides, land use based upon the long run plan is not practised and it is opposite to substance which offers green lands in the outskirts of the urban area. Now, a lot of usable lands except the forest lands are constrained in the zones.

Fourth, we will investigate pre-condition and improvement directions of the system. As shown in Table 11, as the pre-condition for improvement of the system, 48% of the respondents assert to establish a long run plan in order to develop and use a plan. 25% of respondents assert to deal with the current problems positively, by following up and reassigning the zones, and by establishing an act independently from the City Planning Act. According to the direction of improvement of the system, many respondents assert that the usable lands out of the zones are efficiently transferred into the residential lands for the garden housing estates and developed to have an affinity for the environment. However, they do not want to abolish the system and to use the lands for public use.

3. Reviews on the impact study of the green belt system

The land use pattern and the hierarchical scheme spread into suburbs by encroachment recently in Kwangju region. In addition, a lot of regional

Table 11. Perception on pre-condition and improvement directions of the system

the pre-condition	share	the direction of improvement	share
establishment of long run plan	48%	efficient land use	44%
reassignment of the zones	25%	sustaining a frame of the system	39%
enacting of the ordinance on compensation	17%	land use for public	12%
the others	10%	the others	5%
χ^2 = 41.877, significance probability = 0.00		χ^2 = 58.985, significance probability = 0.00	

developments are quite within the realms of possibility to plan in the green belt instead of the non-green belt area by change of urban function in the future. In Yosu region, also, the development pressure can be anticipated to some extent, because the built-up areas are located between the green belt and the seaside. According to this situation, the pressures for alteration in the green belt are strengthened.

It can be said that the green belt system has to be improved and used efficiently to cope with the disharmony between land demand and land supply for urban housing. Particularly, the efforts to maximize the positive effects and to minimize the negative effects of the system are required. Judging from these findings, the concept of public use of lands is implanted in people's minds and the positive effects are recognized. However, the government reacts to some problems of the green belt system at short term. The inhabitants suffer inconvenience and loss of property rights because the zones are not assigned according to a long run plan. In other words, the current positive effects of the green belt system do not work to encourage land supply for urban housing, since there is no route to transfer the benefits from the landowners enjoying the advantages to the inhabitants suffering disadvantages through the execution of the system.

In order to encourage land supply for urban housing, the obstacles for urban land supply in the land use planning system have to be removed. That the frame of the system is sustained and the zones are reassigned in the long-run plan. Also the usable lands are positively developed into garden town.

V. Concluding Remarks and Recommendations

Faced with regional disparity and inefficiency in land use caused by the growth-oriented economic policy, the Korean government has to find a new land policy that can bring about more efficient and spatially-balanced regional developments. In that sense, Korea can be viewed as being at the turning point towards a knowledge based society. It is, however, easy to forecast that movement in this direction may accelerate regional development in the knowledge based society. It is therefore time to devise a new economic policy, especially, a land policy mix that enables Korea to encourage the quality of life in her society and to foster advanced economic growth. The deregulation of the green belt system which the government has recently published is considered as a political issue. Thus, we have presented a pertinent counterproposal to the green belt system that will encourage land supply for urban housing. The results obtained in this study can be summarized as follows.

First, the obstacles which hinder land supply for urban housing by tracing the land use system including the green belt system are found. Second, the negative effects and the positive effects on land supply for urban housing of the green belt system among the land use system are investigated through reviews, interviews and a questionnaire. Third, a counterproposal to the green belt system to maximize positive effects and to minimize negative effects is suggested. Particularly, in order to encourage land supply for urban housing, the frame of the system basing on the long-run plan should be sustained and efficient land use through reassignments should be realized. The government has to make an individual act to thoroughly deal with the problems caused by the green belt system.

The drawback of this paper is that the findings obtained by the questionnaire are lacking in objectivity. The future study may include a modeling of the proposed counterproposal. Particularly, the simulation of the model with the empirical data to verify to the model may be beneficial. We are willing to investigate the impacts of the green belt zones on land use and land price time-serially and spatially. This future study may present a much more objective direction of land supply policy for urban housing than the current paper.

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Notes

1) The authors have also administered a questionnaire on the 27th of Jan.-the 9th of Feb. 1997. The findings are presented at QOL Conference, 1998. Boo-Kui Lee, Yoshinobu Kumata, "An Empirical Study on Counterproposal of Green Belt System to Encourage Land Supply for Urban Housing in Korea", The 1st International Conference on Quality of Life in Cities, 1998, Singapore.
2) According to calculation based on the data of Kwangju city, the areas of residential lands in land category occupy 5,422,341m^2 of the whole 283,533,725m^2. Among the areas, the areas of 50m below are 77% of the whole areas, the areas from 90m to 100m are 92% of the whole areas.
3) Land price at the national level hardly changed: 0.35%(Mar. 1999) to 0.7%(Jun. 2000).

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