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Study on Seoul Metropolitan Town Plan

Chapter 1 Basic Town Plan of Seoul Metropolitan

The Basic Town Plan of Seoul Metropolitan should be referred to prior to implementing this study. The Town Plan of Seoul Metropolitan which includes fundamental schemes was established in May, 1990. Its content is described below.

1.1 History of the Formulation of the Plan

1966 1st Town Plan was formulated.

1980 The middle-term implementation plan of the long-term conceptual town plan was formulated.

1981 The Town Plan Act was issued following the revision of the town plan.

1984 2nd Town Plan was formulated.

1988.7 The Town Plan was prepared by the Seoul University, Environmental Graduate School and Environmental Plan Institute, discussed with a consultative committee, given a public hearing and presented to a regional and a central town plan committee.

1990.5 The Town Plan of Seoul Metropolitan was formulated.

1.2 Target of the Plan

1) Role of the plan

- a. To form a projection of Seoul in the 21st century and to direct a implementation program to attain it.
- b. To function as a fundamental guideline for the administrative and financial plan.
- c. To coordinate different departments and sections.
- d. To motivate citizen, enterprises, national government and district-government to cooperate with the policy of Seoul

Metropolitan.

- c. To function as a guideline for sub-plans.

2) Objective of the plan

- a. To provide all citizens with standard benefits and a safe human environment.
- b. To provide guidelines for the construction of reliable infrastructure to ensure the safety of the citizens.
- c. To maintain the existing valuable town environment and to form an rational energy town.
- d. To cope with internationalization.
- e. To become information-oriented.

3) Basic policies of the plan

- a. To represent a policy of socio-economic interests.
- b. To function as the fundamental scheme for the material field.
- c. To be the implementation program that shall achieve the target town projection of the 21st century.

1.3 Basic Indices of the Plan

The principal basic indices which are adopted by the plan are shown below.

(1) Population

The population will reach 11,525,000 in 1991 and 14,492,000 in 2001, if the past movement tendency is used as the basis of the estimates. The formation of the plan however considers the limitation of the land use, the possibility of the facility improvement and the solution to the problem of congestion and concentration.

Table 1-1 Proposed Index of Daytime Population unit: 1,000 persons
(Source: Basic Town Plan of Seoul Metropolitan)

Category	1981	1986	1991	1996	2001
Seoul (A)	8,676	9,798	10,580	11,267	12,000
Korea (B)	38,723	41,569	44,094	46,939	48,389
A/B (%)	22.4	23.6	24.0	24.3	24.8

(2) Employment Component

The employment component in Seoul was constant in the last 20 years, and it is estimated that a rapid change, such as from the 2nd to the 3rd industry, will not happen.

Table 1-2 Proposed Index of the Employment Component
unit: 1,000 persons

Category	1981	1986	1991	1996	2001
Agriculture & Fishery	19 0.8	20 0.7	17 0.5	12 0.3	5 0.1
Heavy Industry	676 28.6	825 28.5	931 27.4	1,029 26.2	1,131 25.0
Service Industry	1,669 70.6	2,054 70.8	2,449 72.1	2,886 73.5	3,389 74.9
Total	2,361 100	2,896 100	3,397 100	3,927 100	4,525 100

(3) Industry and Economy

1) Economy

GRP (gross regional product) of Seoul Metropolitan occupies 27% of GNP (gross national product) of Korea and. With regards to GNP per capita, Seoul's GNP per capita is 1.145 times that of the overall average of the whole Korea according to data in the year 1986.

It is estimated that production will concentrate in Seoul, up to 32%, and product per capita will increase around 1.1 times in future.

Table 1-3 Predicted Economy Scale
unit: top-100 million won, middle-1000 won, bottom-US\$

Category	1981	1986	1991	1996	2001
Seoul GRP	116,583	255,820	449,780	645,717	927,010
A per capita	1,344	2,291	4,415	6,338	9,098
US dollar	(1,973)	(2,962)	(6,445)	(9,253)	(13,283)
GNP	451,262	828,157	1,398,936	1,942,028	2,695,961
B per capita	1,171	2,000	3,767	5,409	7,768
US dollar	(1,719)	(2,268)	(5,500)	(7,896)	(11,340)
A/B Production	25.8	27.1	28.3	29.7	31.8
per capita	114.8	114.5	112.9	110.8	110.0

2) Industry Structure

Table 1-4 Industrial Structure

unit:100 million won

Category	1981	1986	1991	1996	2001
Agriculture & Fishery	1,399	2,469	3,171	2,883	1,176
Heavy Industry	26,581	50,916	86,006	118,764	169,044
Service Industry	88,603	171,016	307,152	454,876	687,329
total	116,583	224,431	369,339	576,523	858,089

1.4 Strategy to Implement the Plan

The following principal policies have been set up in order to attain the target of the plan.

1) Characteristics of the Town

In spite of the fact that the superior plan restrains a lead population increase, manufacturing industry to the country region, however, population is still continuing to increase due to the growth of the tertiary industry. In the fields of socioeconomics and culture, the central functions still are continuously accumulating in Seoul.

The following policies were instituted in order to spread the town function to local regions.

- a. To develop residential towns for Seoul in its environs.
- b. To equip with central town functions a satellite town in order to form an independent life range.
- c. Seoul Metropolitan is to grow as a metropolitan region, while

maintaining its central function as the capital.

- d. To reform the town from the existing tertiary industry to the intellectual industry.
- e. To equip the town to enable it to cope with internationalization.

2) Infrastructure Level

- a. All infrastructures, are to be improved on the basis of their use, location and population, concentrating on creating a good life.
- b. This plan is not able to fully improve the housing problem, however it shall provide a variety of choices of residences and estates to comply with the necessary number of homes and life cycle.
- c. The recreation facilities will continuously be improved and expanded to conform with the increase of time.

3) Restriction of Land Use

- a. The infrastructure in the existing town area has been provided without any comprehensive plan. In addition, the new area is being developed without any infrastructure properly provided in order to receive a population increase.
- b. It is very difficult to obtain open space in the town area even if living environment improvement is tried out. In the case of improving a function at a spot in the new development, only point estates remain.
- c. The existing land utilized ratio is high but the building volume to land ratio is still low. Therefore, it is desirable to create available land by proceeding with a vertical expansion of the city.

4) Development Strategy

- a. To organize town structure components effectively.
- b. To closely connect with the goals of a town development.
- c. To properly distribute population and activities to conformity

with the town structure.

d. To promote a rational energy strategy.

1.5 Basic Conceptual Plan of Open Space

The town center distribution and the network are established as showing below.

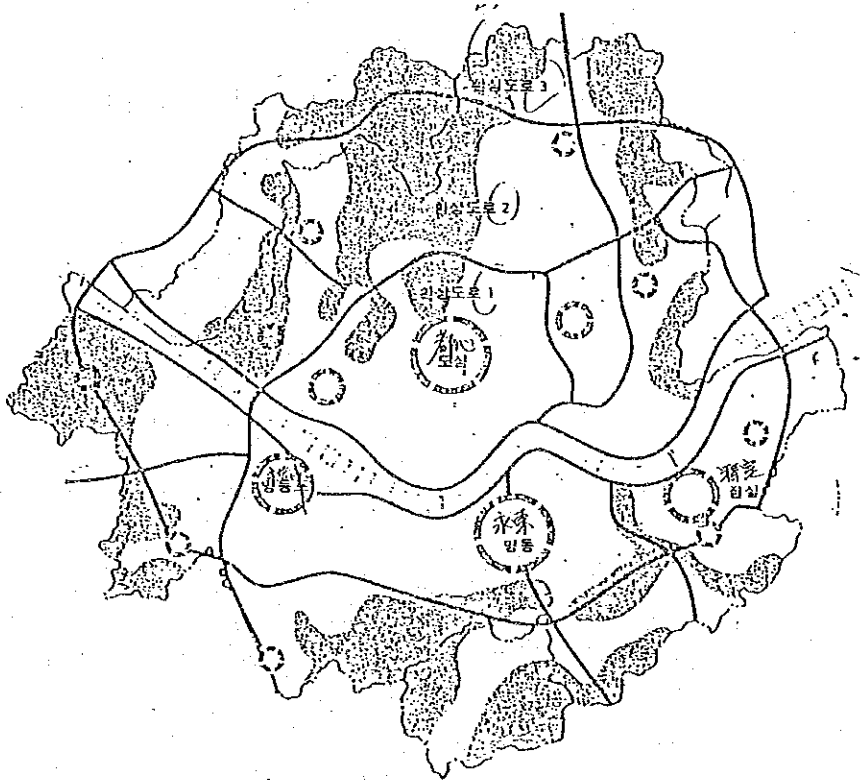


Fig.1-1 Basic Open Space Plan

1.6 Living District Category

Facility use areas are a units where a citizen can get facility use benefits considered under the living district category area. It is different from the living zone which is the equal living area of its region.

- a. The use area limitation of basic life infrastructure is deemed as a unit considering closeness.
- b. Each gu district is divided into a few living districts by road, topography and boundaries.
- c. As for special characteristic districts, such as an industrial district, a slope district and so on, living areas are determined by its speciality.

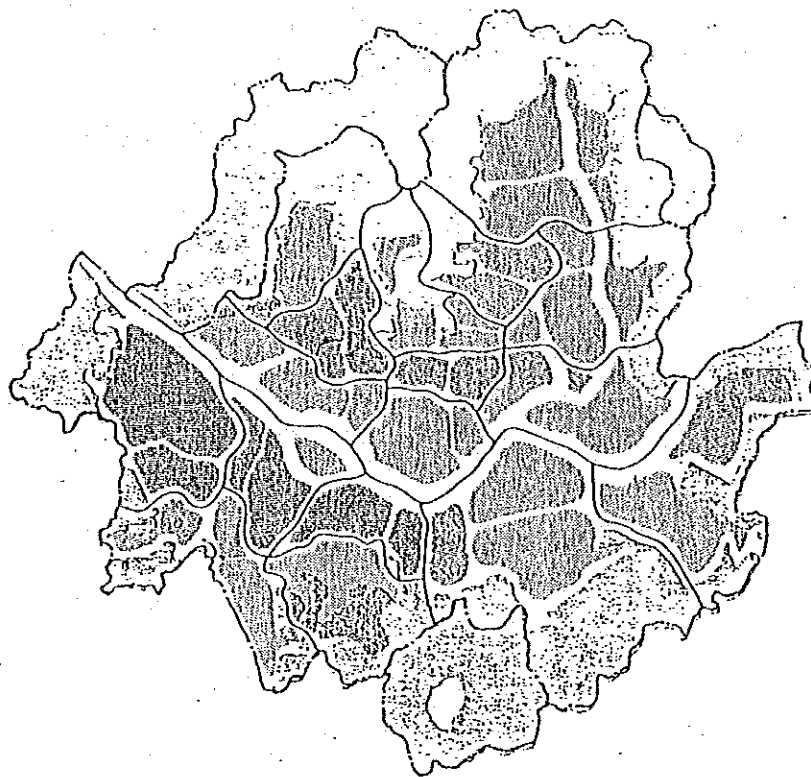


Fig.1-2 Living District Category

1.7 Plan of Population and Land Use

1) Problem of Population Distribution

At the center of the old town the population is decreasing because of the following reasons.

- a. The environmental improvement is too difficult to carry out due to the high concentration of urban functions.
- b. Infrastructure has not been fully provided.

The population density of Tondaemun-gu and Songbuk-gu is more than 400 persons per hectare and they reside on the congested towns instead of on the slope ground. By contrast, in Kangnam-gu there are about 200 persons per hectare, and the planned large scale housing development projects are under progress there.

An improvement of the infrastructure and an urban re-development to activate the town are necessary in order to prevent the population from decreasing. In addition, new development shall be introduced to normalize the congested towns.

2) Matter of Issue on Land Use

The town plan area is approximately 708.387 km², and the possible development area, which is deducted from the development restricted zone, the park zone and impossible development area due to topographical reasons, is 371.88 km². Among it, approximately 85% of land, 317.93 km², has been urbanized already. It is too difficult to execute the planned development at the possible development area, because they are very narrow except in a few places.

It is therefore necessary to switch from the unplanned land use to the rational land use.

3) Basic Principle of the Plan

- a. To design a sophisticated town development based on railway networks and stations, which shall form the skeleton of the town.
- b. To design the residential zone within the primary stations to be the high density population, 600 persons per hectare in average, and to design the residential zone within the sub-stations to be the middle density population, 320 persons per hectare in average.
- c. To design the vertical expansion of the land in order to utilize the limited land more effectively.

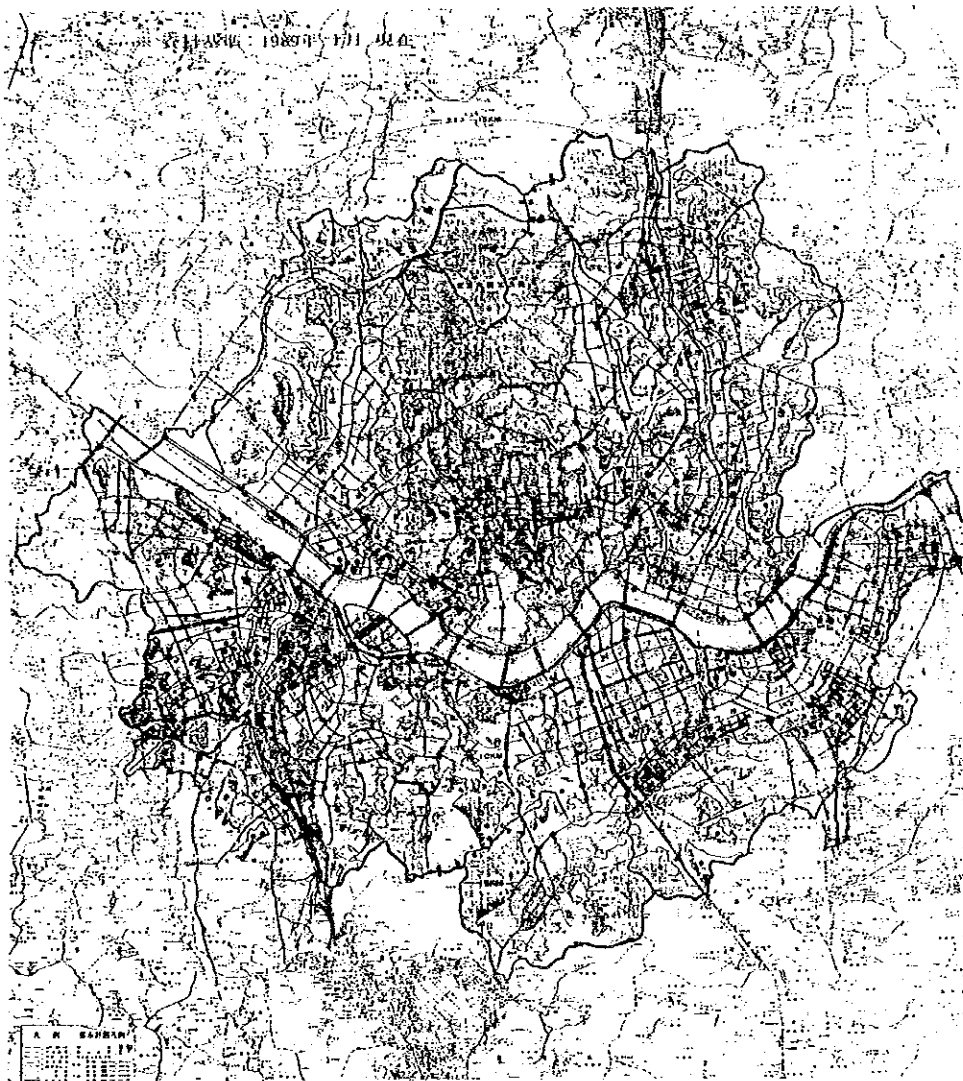


Fig.1-3 Present Land Use Map

Chapter 2 Regional Characteristics of Seoul

The regions of Seoul have the different characteristics due to their varying backgrounds. In order to grasp the general characteristics of the regions, they are described below.

This analysis was carried out using statistical data, but is not precise because the number of gu in administrative areas varied, from 17 to 22 in 1988.

2.1 Population Density in 1988 (Gross Population Density)

(1) Seoul Metropolitan Area

- a. There are three ku-districts, Tongdaemun-gu, Yongdungpo-gu and Yangchon-gu, which have over 250 p/ha of population density. Tongdaemun-gu is especially considered an over congested condition.
- b. The population density of Chongno-gu, which is located in a center of Seoul, is 105.7 p/ha and this is due to a population cavity phenomenon. Its environs such as Nowon-gu, Kangnam-gu, Kangso-gu and Socho-gu show similar tendencies.

(2) Trend of the River Studied

Anyang Chong

The downstream basin area has the highest population density area in Seoul. However, the population density of the upstream basin is likewise high, at over 200 p/ha.

Yangjae Chong

The population densities of Kangnam-gu and Socho-gu are still low because they are under development at present.

Ui Chong

The population density is high in the downstream basin but rather low

in the upstream basin.

Chungroung Chong

The downstream basin has one of the highest population density area in Seoul, and the upstream basin is filled with the high population density towns.

2.2 Population Increase Trend

The following trends can be seen according to the population fluctuation of 5 years, from 1980 to 1985.

The ku-districts where the population increased by more than 20% are all located in the southern region of the Han River, such as Kangdong-gu, Kangnam-gu, Kangso-gu and Kuro-gu. In particular, Kangdong-gu and Kangnam-gu which were nicely improved for the Olympic Games of the year 1988 indicated population increase of 73% and 62% respectively. In addition, population increased more than 20% in Kangso-gu and Kuro-gu. The ku-districts where the population decreased by 12% and 19% are Chung-ku and Chongno-gu. Its environs too, such as Songbuk-gu, Sodaemun-gu and Yongsan-gu indicated population decreases.

In the old town areas in the northern Han River, the town central cavity phenomenon of population can be significantly seen, and rapid population increase can be seen in the newly developed area in the southern region of the Han River.

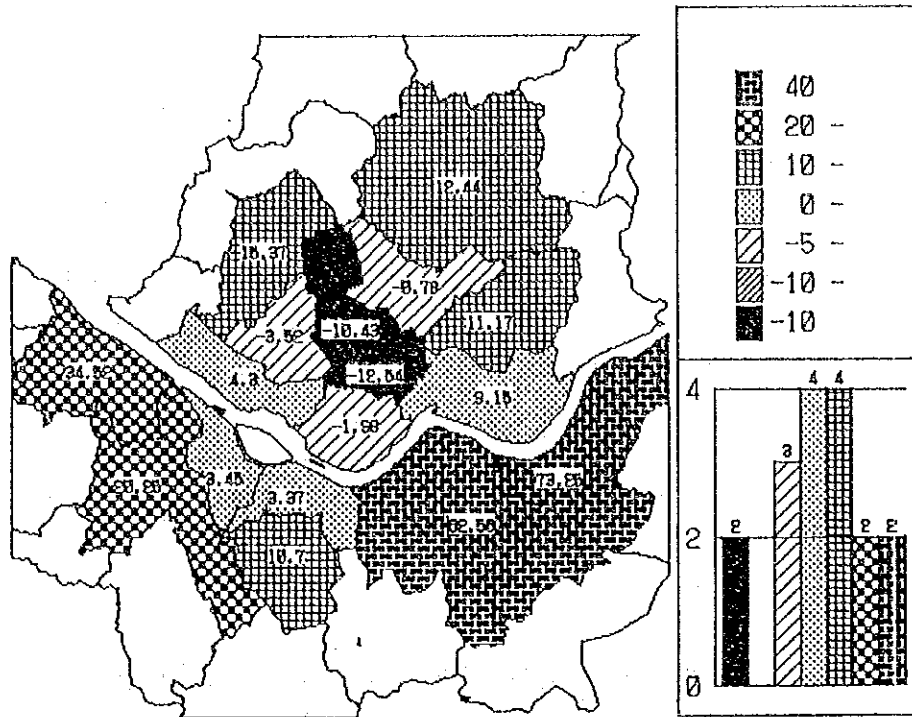


Fig.2-1 Population Increase Rate 1980 - 1985

2.3 Recent Population Movement Trend

(1) Seoul Metropolitan Area

The following trends can be seen according to the population fluctuation of the recent 3 years, from 1985 to 1988.

The population decrease trend, which was seen in Chung-gu and the central part of Seoul, expanded to the adjacent ku-districts, and was accelerated in Tongdaemun-gu, Songbuk-gu, Yongsan-gu and its vicinities.

The population decrease was abated in Chongno-gu, and it is deemed that the population flow out is nearly over.

The population increase was seen to have been abated in the ku-districts in the southern part of Han River, however it is still greatly increasing in Kangso-gu because of a new development project.

(2) Trend of the River Studied

Anyang Chong

Between 1980 and 1985, there was a rapid population increase in all the basin areas. Between 1985 and 1988, however, population was stagnant in the middle and upstream basins. Present population in the left bank area shows a trend of increase because of ongoing development projects.

Yangjae Chong

The population increase was recently abated though it had been proceeding very rapidly.

Ui Chong

Population decrease trend is expanding in the downstream basin, while population is increasing rapidly in the middle and upstream basins.

Chungroung Chong

The population decrease is being accelerated in the whole basin, and it is obvious in the upstream basin in particular.

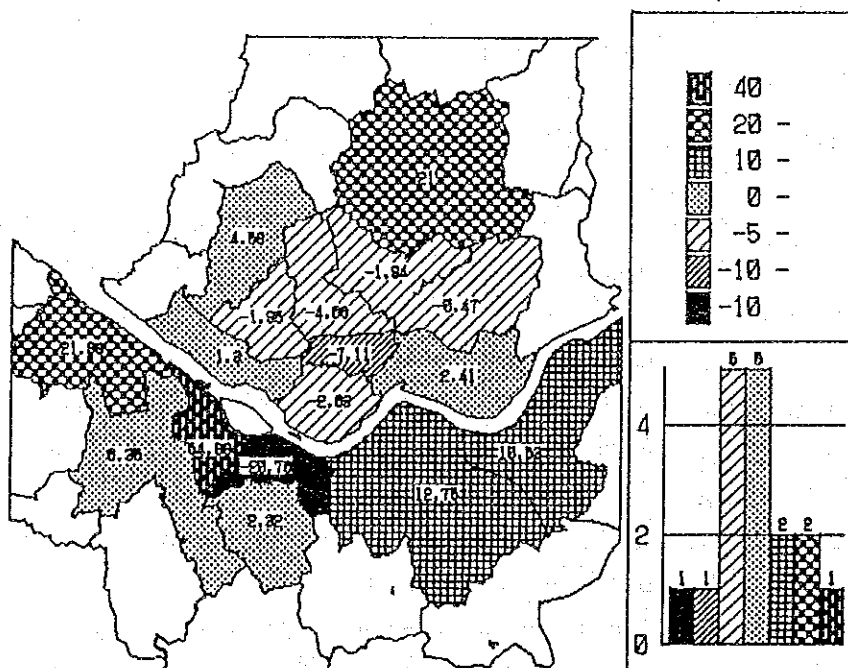


Fig.2-2 Population Increase Rate 1985 - 1988

2.4 Population Density per Residential Land (net population density)

Population density per residential land (pd/l) is considered the area of its district is subscribed by road, park, farm and forest areas. There are six ku-districts which have more than 600 p/ha of population density per residential land, and this is deemed to be a very high and dense residential condition, comparing to a middle-rise apartment which generally has 850 to 1,000 p/ha.

The areas which have low densities are the planned development areas such as the central part of Seoul and Kangnam-gu.

The areas which have high densities are the old towns, such as Songbuk-gu, Tongdaemun-gu and Songdong-gu, and also the new towns such as Dobong-gu, Nowon-gu, Kangdong-gu, Kwanak-gu, Yangchon-gu and Kuro-gu.

Trend of the River Studied

In the basins of Anyang, Ui and Chungroung Chong, net densities are very high, it is thereby expected that citizens' demand for public open space is high.

The density is rather low in the Yangjae Chong basin.

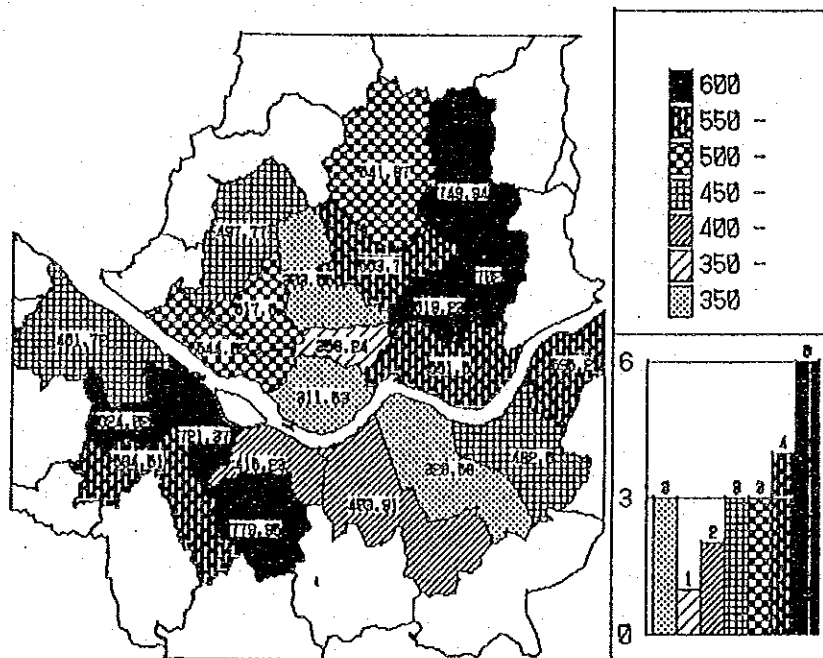


Fig.2-3 Net Population Density In 1988 (22 ku-districts)

2.6 Distribution of Manufacturing Industry

Focusing on the industry concentration in terms of the number of permanent residents to manufacturing industry employee, Kuro-gu is recognized to be the center of industrial concentration in Seoul. Industry is concentrated next in the ku-districts, facing the Han River, such as Songdong-gu, Yongdungpo-gu and Kangso-gu.

Many enterprises are likewise distributed in Chongno-gu, Songbuk-gu, Tongdaemun-gu and so on.

The ku-districts along Anyang Chong, such as Kuro-gu, Yongdungpo-gu and Kangso-gu, are also considered high industry concentration areas.

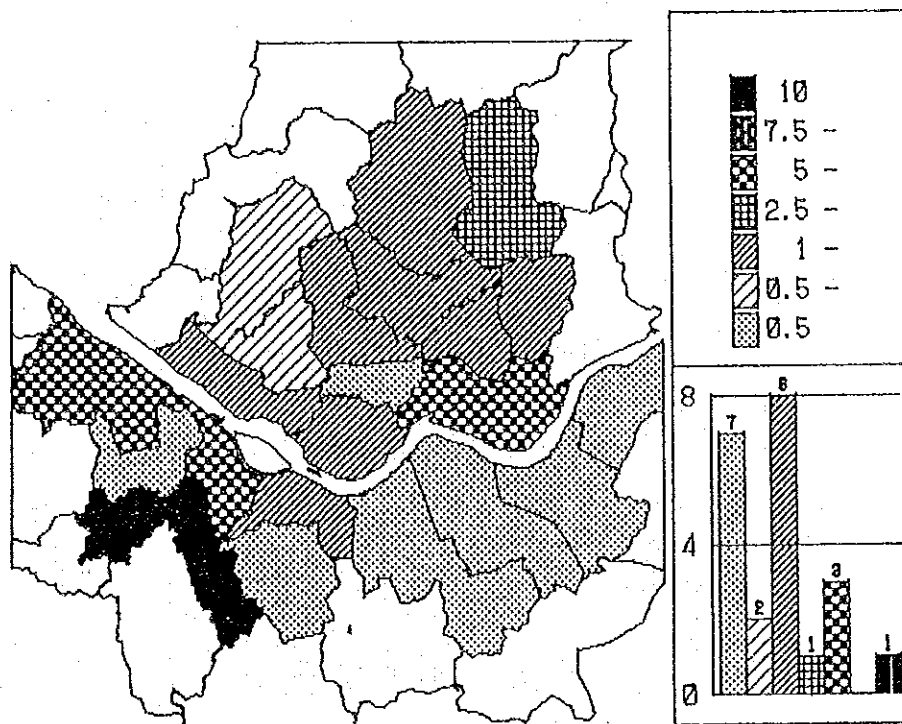


Fig.2-5 Manufacturing Industry Employee by Permanent Population in 1988

2.7 Present State of Construction Business

Focusing on the functional characteristics of the towns in terms of the construction business, building projects are much seen in Kangnam-gu and Songpa-gu, second in Kangdong-gu and Socho-gu, and 3rd in Dobong-gu.

Generally, most of the construction is being carried out in the southern area of Han River.

Focusing on the ratio of new building floor area to business floor area, the area for commercial and business purposes occupies more than 60% in Chung-gu, Kangnam-gu, Chongno-gu and Socho-gu. New commercial and business districts are being formed in Kangnam-gu and Socho-gu in particular.

In Dobong-gu, concentration is on residential areas.

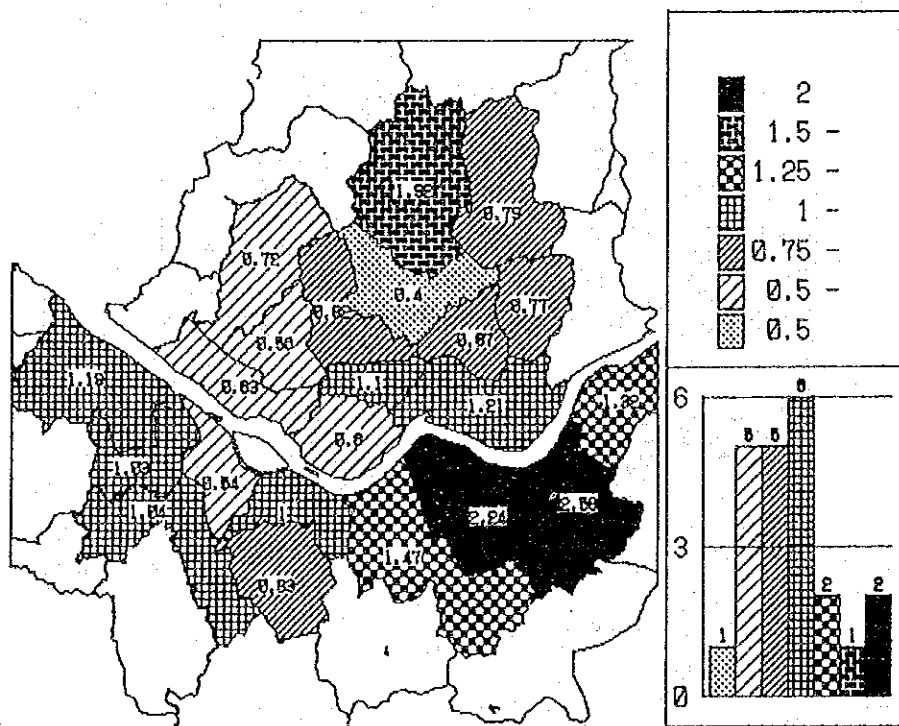


Fig.2-6 New Building Trend in 1988 (Floor / Population)

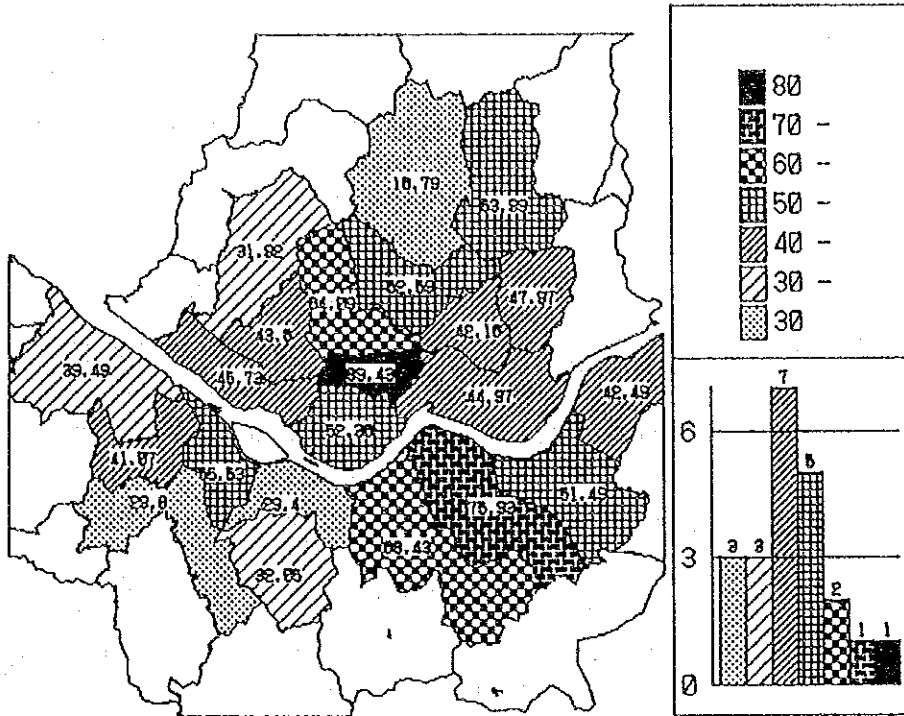


Fig.2-7 Business Floor / New Building Floor in 1988

Chapter 3 Present State

3.1 Anyang Chong

3.1.1 Socio-economic State in the Basin

(1) State of Town

The populations began to increase at Kuro-gu located in the middlestream from around the year 1980, and at Kangso-gu located in the left bank downstream from around the year 1983. Yongdungpo-gu in the right bank has been urbanized since the early times.

The populations increased by 20% at Kuro-gu and by 35% at Kangso-gu for 5 years from the year 1980 to 1985. The increase of the population stopped after the year 1985 at Kuro-gu, but still maintains in the high rate of 21% at Kangso-gu.

The population density is 254 p/ha at Yangchon-gu and 283 p/ha at Yongdungpo-gu, these are considered to be two of the highest population density districts in Seoul. In Kuro-gu it is also high at, 221 p/ha.

At Yangchon-gu located in the downstream basin, there are still agricultural farms remaining, inspite of the ongoing planned development projects. In Kuro-gu, the most areas have been urbanized except a few areas of farmland. Yongdungpo-gu has been completely urbanized. The possible development areas in Kwanak-gu and Tongjak-gu have been completely urbanized as well.

The net population density is 624 p/ha at Yangchon-gu, 721 p/ha in Yongdungpo-gu and 504 p/ha in Kuro-gu. They are as high as the population density of the north-eastern areas of Seoul such as Tongdaemun-gu, Chungyang-gu and Songbuk-gu.

(2) Function Formation of Town

Kuro-gu is the most concentrated town for the factories in Seoul. The employees of the manufacturing industry occupy a large percentage of the total population. Kangso-gu and Yongdungpo-gu form the part of the industry zone spreading along the Han River like Kangso-gu and Yongdungpo-gu.

Commercial functions are not concentrated in one certain place, and they are scattered.

3.1.2 Socio-economic State along the River

(1) Land Use

The left bank area is composed of mainly a residential zone and a quasi-industrial zone, a commercial zone, a park zone and a natural green zone.

The right bank area is composed of a quasi-industrial zone, a park zone and a natural green zone.

It is noted that land use is quite different between the left bank and the right bank.

(2) Population Density

The population density by don-district is 400 to 600 person/ha. The difference between the downstream area and the upstream area is minimal.

In the area facing the river, the population density, 150p/ha, is lower than other areas due to the drain pump stations and factories existing.

In the right bank area, the population density is very high along the Torim Chong, the tributary.

In the left bank area, the population density is constantly high, because of the continuing planned developed zone.

(3) Fluctuation of Population

According to past 3 years data from 1985 to 1988, there are 6 don-districts where the population increased by more than 50%, and they are all located near the Anyang Chong.

The areas, where the populations are decreasing, are recognized in the right bank basin area.

The fluctuation of the population is very high, more than 30%. One of the remarkable characteristics in this region is that the settle down rate is very low, and it must be investigated.

This may be caused by the follows.

- Employees of manufacturing industries are many.
- Residences are few.
- Transportation systems are insufficient.

The population tends to increase in the area near Anyang Chong except the manufacturing industry zone. This is because the large-scale housing development have been executed.

(4) Concentration of Manufacturing Industry

Along Anyang Chong, especially in the right bank area, many factories are concentrated. There are manufacturers having 40,000 employee, facing the river, in the middle basin area. In the downstream basin area and its hinterland, the employee number is approximately 150,000 persons in the right bank area, and approximately 20,000 persons in the left bank area.

There are 3 ku-districts where the number of employees is more than the population, and there are 5 ku-districts where the ratio exceeds 50%.

3.1.3 Matter of Issue

This area requires the countermeasure on the environmental field especially because of the high concentration of the manufacturing industries.

For example, the protection against river pollution and the improvement of the recreation facilities for the daytime population are required.

People's demand to the public open space should be very keen, because the residential lot area is very small and there are little farms and forest around this area.

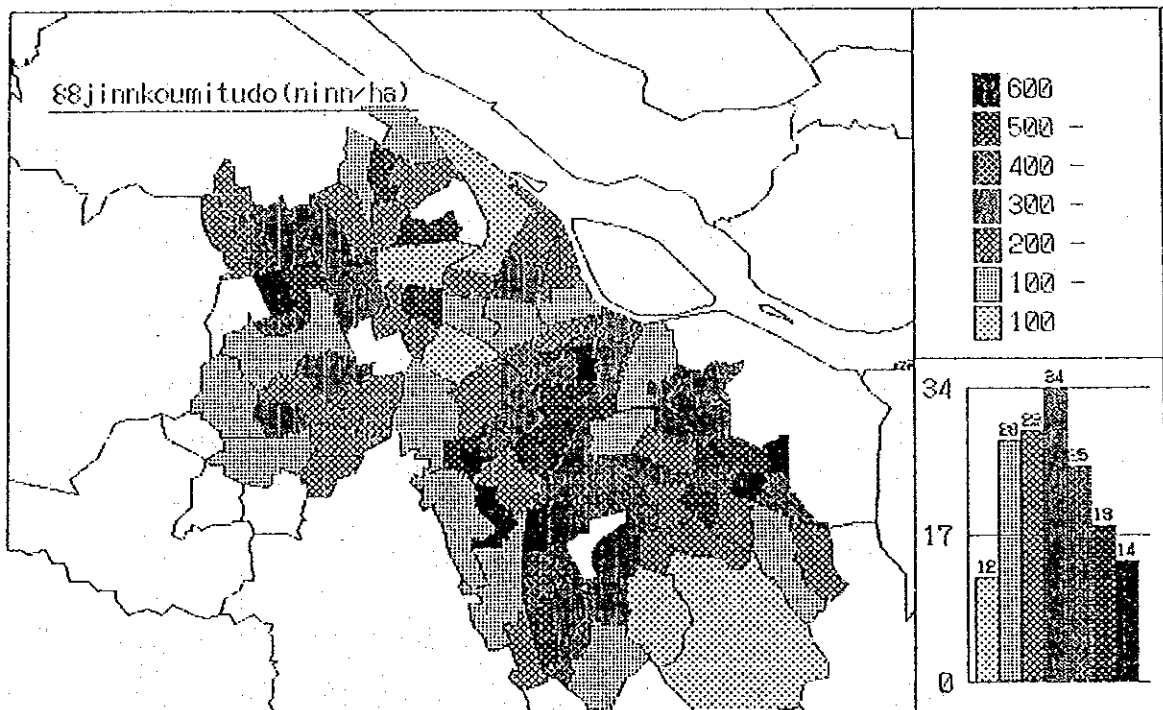


Fig.3-1 Population Density in 1988

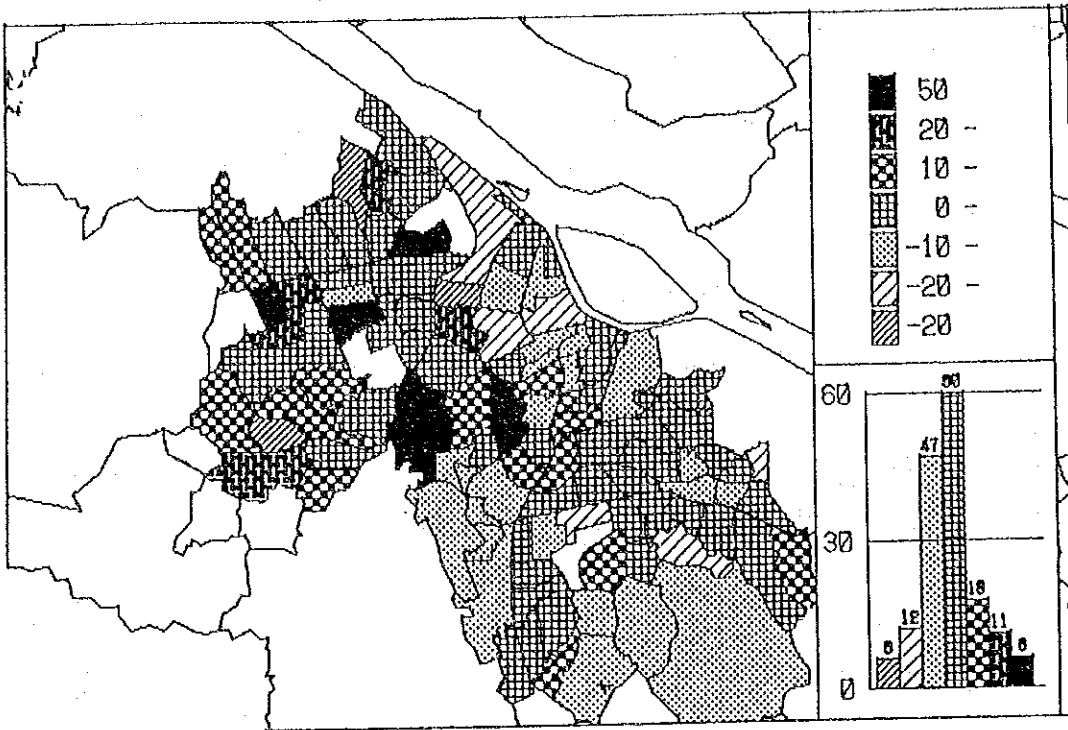


Fig.3-2 Population Increase Rate 1985 - 1988

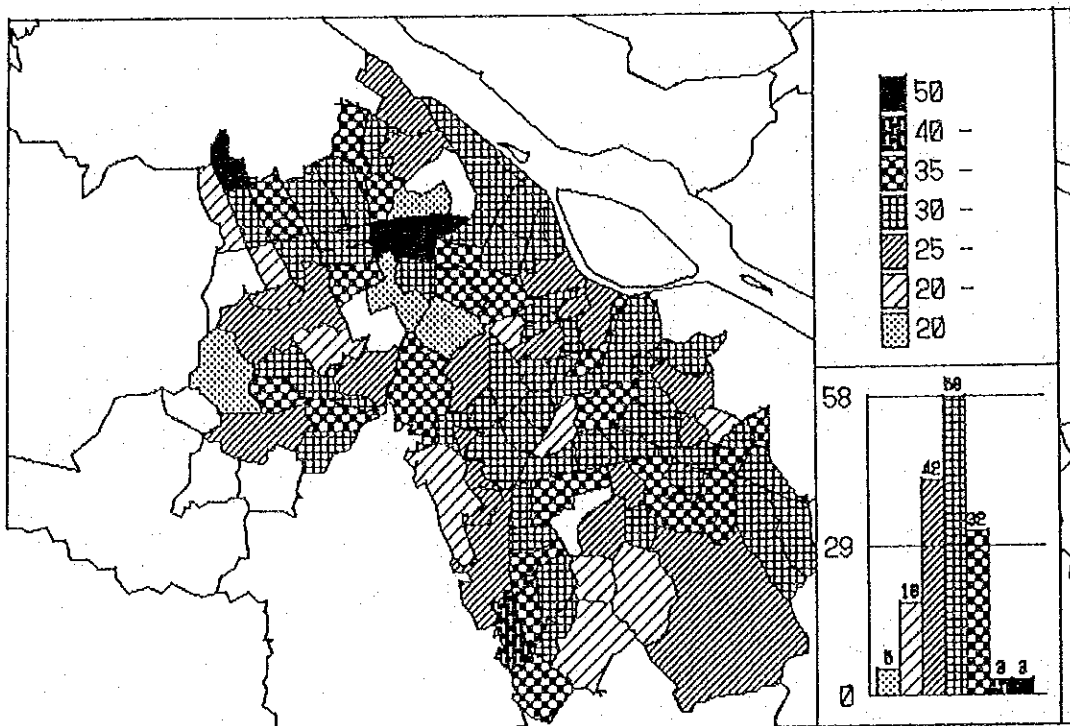


Fig.3-3 Population Movement (Flow out and in)

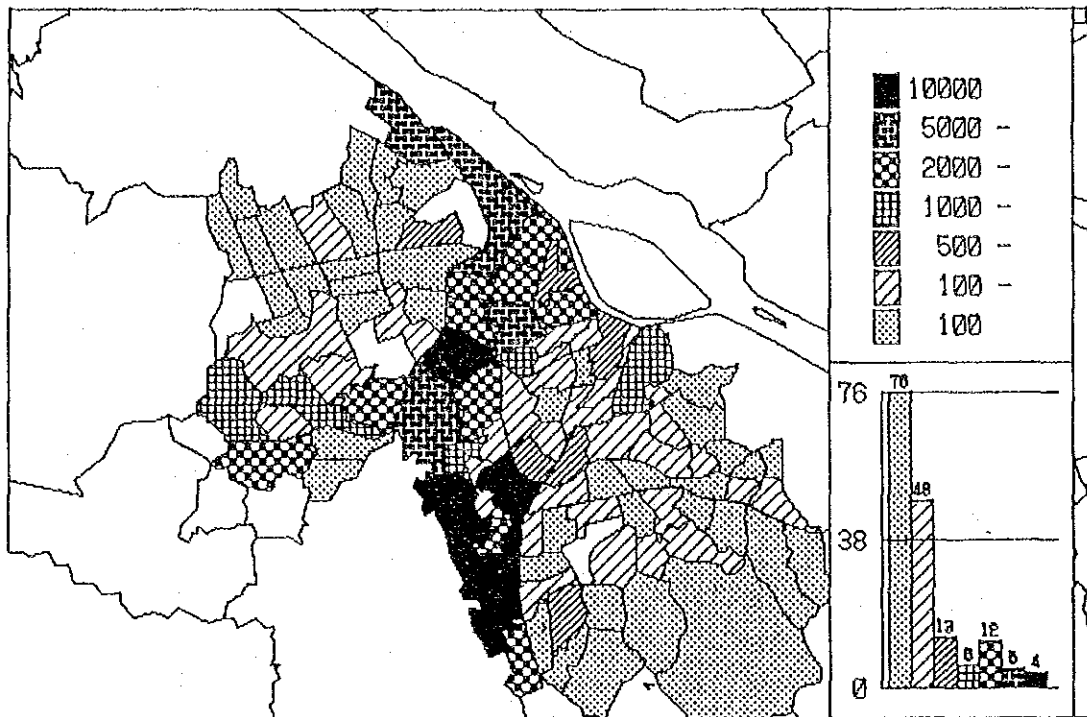


Fig.3-4 Manufacturing Industry Employee in 1988

3.2 Yangjae Chong Basin

3.2.1 Socio-economic State of the Basin

(1) State of Town

In 1980 the population density of this area was the lowest, 54 p/ha, among the 14 ku-districts. The population increased by 62.6% for 5 years between 1980 and 1985, and the increase rate was the highest in Seoul, same as Kangdong-gu. This is because the development project was in peak in Kangnam.

From 1985 to 1988, the population increased by 13%.

The population density was nearly 100 p/ha in 1988, and it still belonged to the lower groups in Seoul. There are still quite great deal of forest and farms remaining in this area, and the farms occupies the most area in the upstream basin.

The net average population density in this area is in the lower group,

and it may be because pleasant environment is maintained through the planned development of this area.

(2) Function Formation of Town

Looking at the concentration condition of commercial functions by the population per store, it is recognized that the Socho-gu is the third highest concentration after Chung-ku and Chongno-ku. This is an evident even without having the basin studied.

There are no particular concentrations of the manufacturing industries in this basin.

According to the present construction project situations, the project quantity is greatest in Seoul, and the commercial and the business buildings occupy 70%. In future, this area will be the new central district of Seoul.

3.2.2 Socio-economic State along River

(1) Land Use

The land use states are very similar throughout the whole river length. The residential zone is major in both banks. The others consist of the natural green zone, the park zone and the commercial zone.

(2) Population Density

The population density by don-district is 500 person/ha. In the downstream area and the upstream area, they are 150 p/ha. The recent development is forming the town to have the population density of 400 p/ha.

(3) Fluctuation of Population

As for the recent population fluctuation, population increase in the middle basin and decrease in the left bank of the downstream basin are observed.

The population fluctuation is very high, approximately 35%, despite of the new towns.

(4) Concentration of Manufacturing Industry

The concentration of manufacturing and commercial industries are not recognized in particular, because this area is mainly a residential zone.

3.2.3 Matter of Issue

This area has the most pleasant environment among the 4 rivers studied. The towns along the river were developed intentionally, and the park area rate is maintained at a certain level.

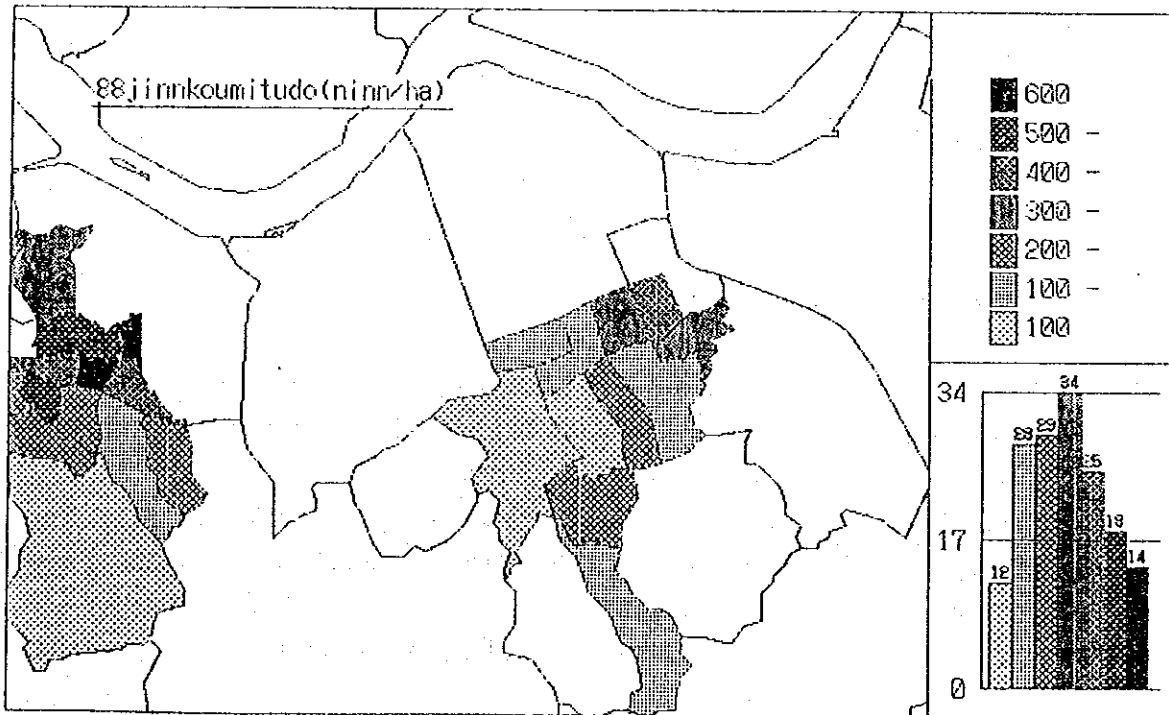


Fig.3-5 Population Density in 1988

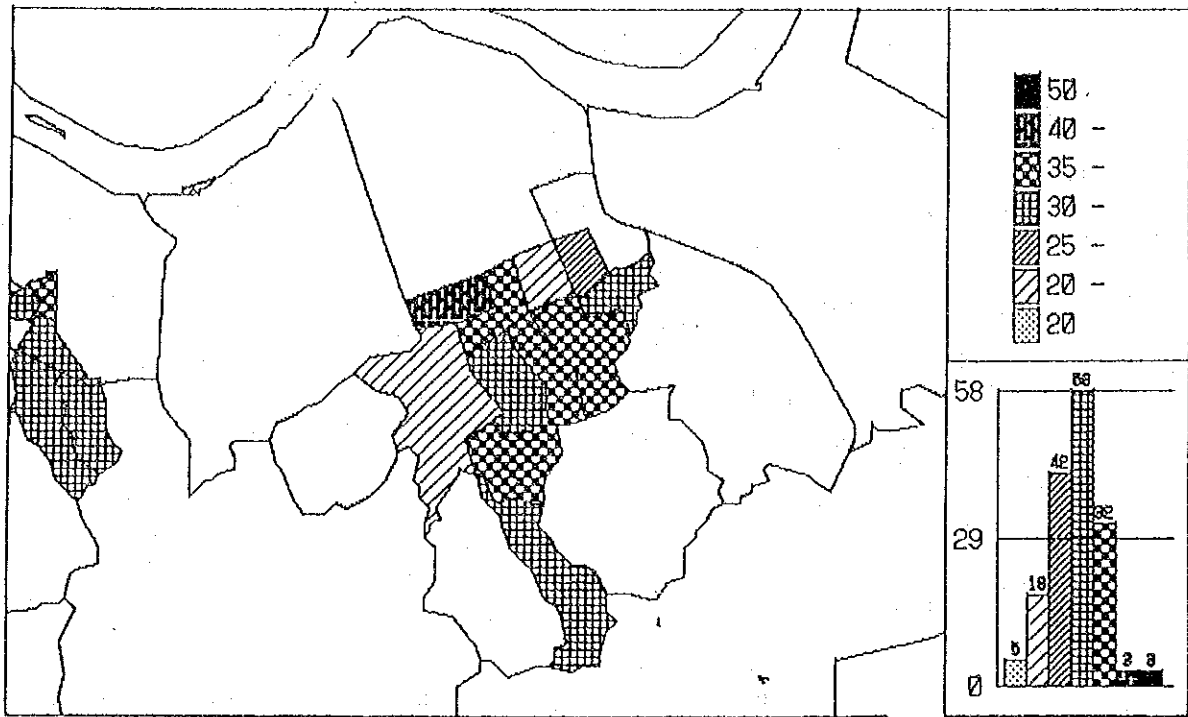


Fig.3-6 Population Movement (Flow out and in)

3.3 Ui Chong Basin

3.3.1 Socio-economic State of the Basin

(1) State of Town

The Ui Chong Basin include parts of Songbuk-gu and Nowon-gu in the downstream basin and also a part Dobong-gu in the upstream basin.

Songbuk-gu in the downstream was urbanized in the earliest period. The population density was 242 p/ha in 1980. It was the second highest after Tongdaemun-gu. However it decreased to 240 p/ha in 1985 and 236 p/ha in 1988. There is an evident acceleration in population decrease.

Dobong-gu is located in the outside of the town area, and its

population density was low. However this increased by 21% in the past 3 years from 95 p/ha in 1980 to 165 p/ha in 1988.

The net population densities are 564 p/ha in Songbuk-gu, 542 p/ha in Dobong-gu and 750 p/ha in Nowon-gu. These are extremely high.

Forest zone still occupies more than 50% in Dobong-gu and Nowon-gu, and 38% in Songbuk-gu, however the area which can be converted from a farm to residential land is only 18% and only in Nowon-gu. There are no other areas remaining for development except the slope ground in the Ui Chong Basin.

(2) Function Formation of Town

Residences are concentrated in this area, the commercial and manufacturing industries.

The construction activities per person are the most in Dobong-gu and the least in Songbuk-gu.

Housing projects occupies 78% of the construction projects in Dobong-gu. In Songbuk-gu and Nowon-gu, commercial building projects occupy more than 50%.

3.3.2 Socio-economic Condition along the River

(1) Land Use

The left bank area is consist of the residential zone, the quasi-industrial zone, the natural green zone and the park zone.

The right bank area consists of the residential zone, the commercial zone, the natural green zone and the park zone.

Both bank areas are primarily by the residential zones.

The upstream area is facing the abundant nature of Pukansan National Park.

(2) Population Density

The population densities are high at certain districts, facing Songbuk-gu, and in the downstream area. It is less than 100 p/ha in the both banks in the middlestream area, but more than 300 p/ha in the upstream area.

The reason why the town development did not advance is because the major roads were not improved sufficiently.

(3) Fluctuation of the Population

Looking at the increase of the population from 1985 to 1988, it is remarkable that the population increased at the middlestream basin and along the edge. By contrast, the population remarkably decreased in the upstream area.

The fluctuation of the population is stable in the whole area, however it is quite high in the upstream area.

The large scale housing development projects are under construction, hence the population in this area is predicted to increase rapidly.

(4) Concentration of Manufacturing Industry

The concentration of manufacturing industries is recognized in the upstream area, and has approximately 8,000 employees.

In the other areas, only small factories exist in scattering.

The high movement ratio of the population in this area is probably due to the large number of factory employees existing.

3.3.3 Matter of Issue

Ui chong consists of the various kinds of urban environment, such as the historical town at the downstream, the latest developed town at the middlestream, the developed town at the upstream and the famous

natural zone at the most upstream area.

These different zones are considered to have been developed independently. Ui Chong and its river environment improvement program will play the role to associate them on the whole.

It is desired that the old residents are associated with the new residents having the different intention through the river.

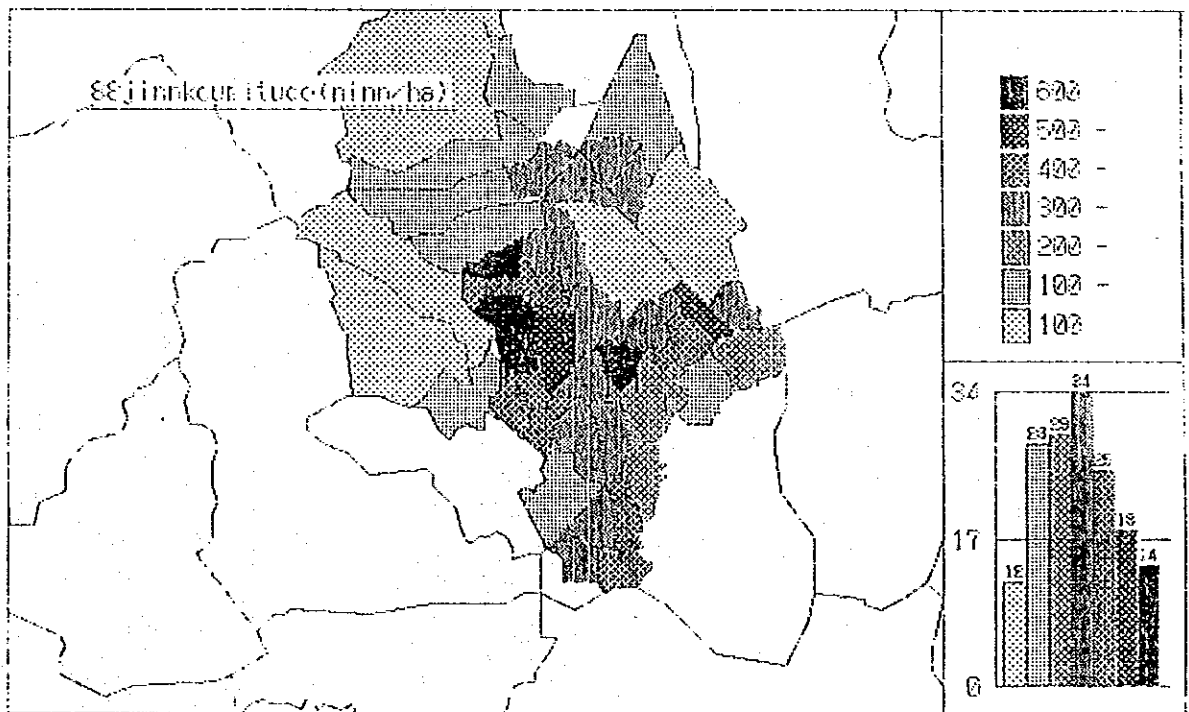


Fig.3-7 Population Density in 1988

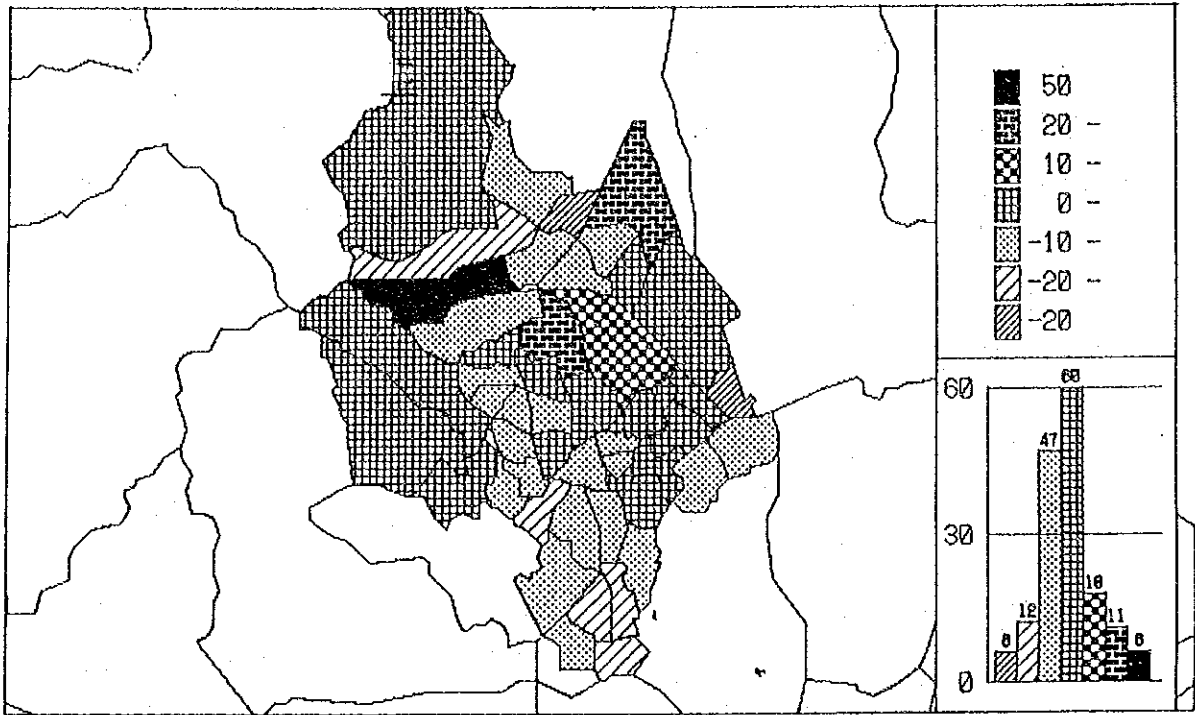


Fig.3-8 Population Increase Rate 1985 - 1988

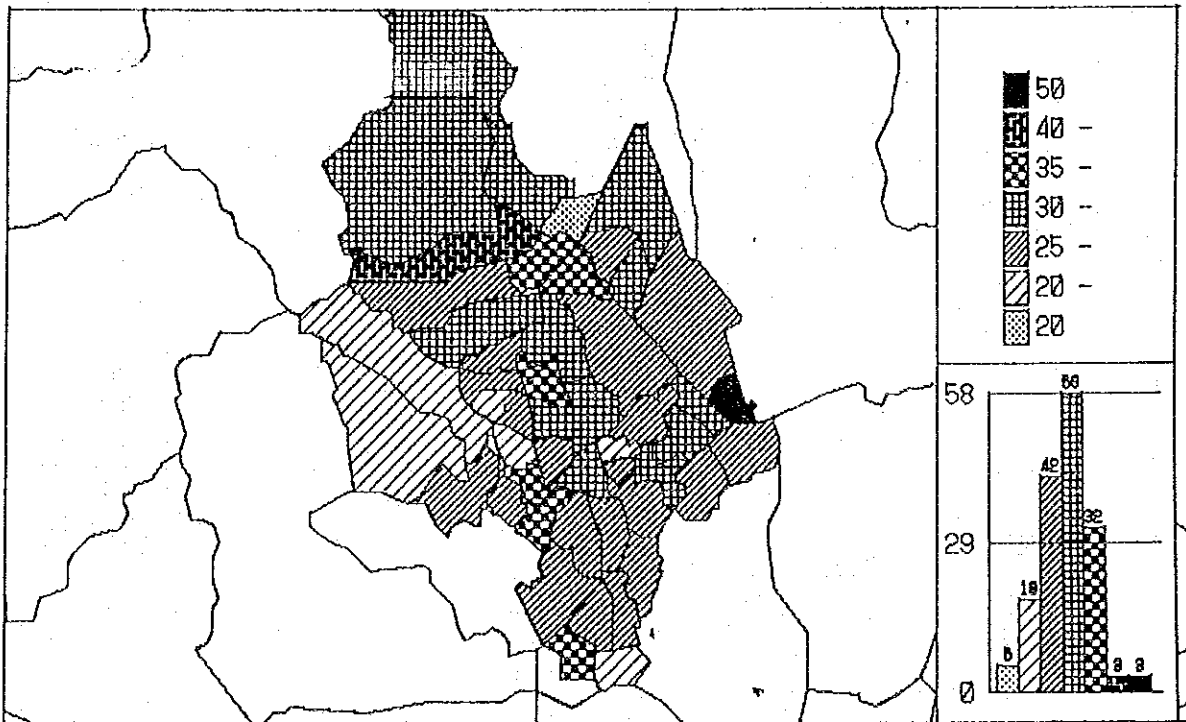


Fig.3-9 Population Movement Rate (Flow out and in)

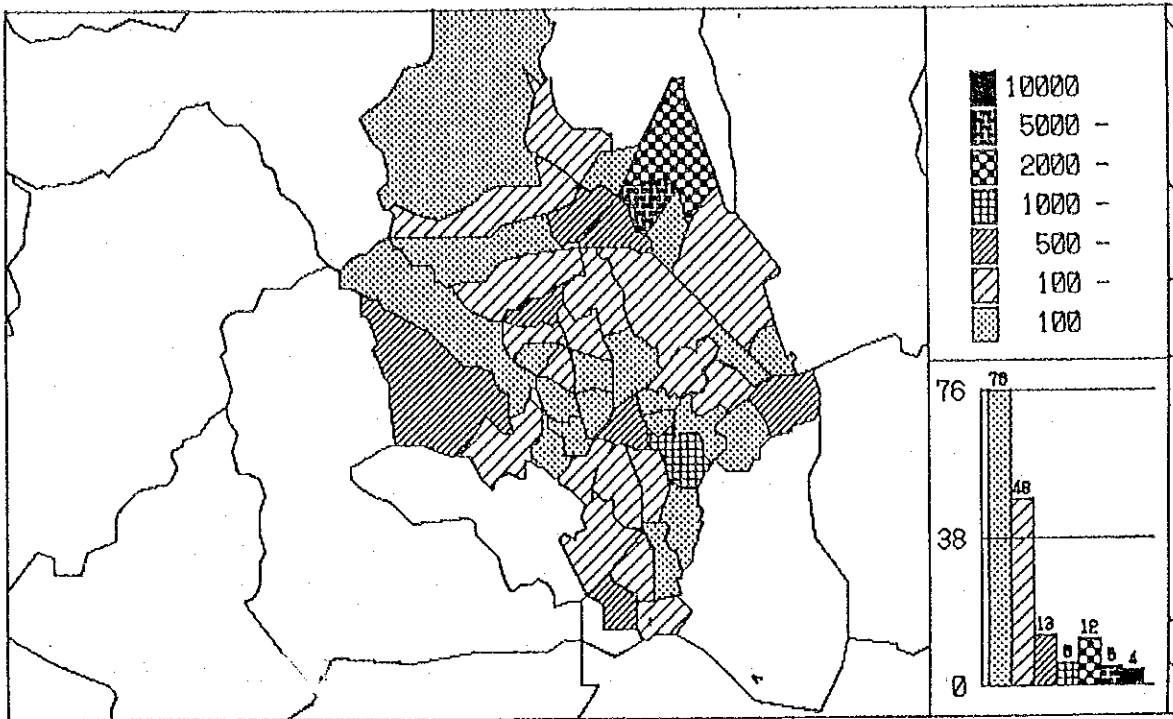


Fig.3-10 Manufacturing Industry Employee in 1988

3.4 Chungroung Chong Basin

3.4.1 Socio-economic State of the Basin

(1) State of Town

Chungroung Chong has the basin in Tongdaemun-gu, Songbuk-gu and Wolgok Chong, the tributary of Chungroung Chong, has the basin in Dobong-gu.

Tongdaemun-gu and Songbuk-gu, which adjoin the center of Seoul, were urbanized in the earliest time. They had high population densities, 259p/ha and 242p/ha respectively. Tongdaemun-gu had the highest population density at that time.

Population decreased from 1980 to 1985 in Songbuk-gu but continued to increase in Tongdaemun-gu. However, recently it began to decrease in

Tongdaemun-gu as well and in Songbuk-gu, the decrease accelerated.

In 1988, the population densities were 351 p/ha in Tongdaemun-gu and 236 p/ha in Songbuk-gu. Tongdaemun-gu still has the highest population density Seoul.

In terms of a net population density, they are lower than the 700 p/ha of a new town. This is due to a lesser number of high and middle rise apartments.

There are no remaining spare lands for development because the residential area has already been extended to the slope areas.

This basin is the most urbanized area among four basins studied.

(2) Function Formation of Town

Tongdaemun-gu is a rather commercial center in terms of the ratio of population to a store. Songbuk-gu does not have a centered function because it is adjoins large centered accumulations.

As for manufacturing industries, small enterprises are the majority in this basin, in other word it does not have any outstanding concentrations.

Focusing on ongoing building projects in Songbuk-gu has the least in Seoul. However, since 53% of the building under construction are for business purposes, Sonbuk-gu shall be acquiring central functions.

3.4.2 Socio-economic State of the River

(1) Land Use

There is no substantial difference through out the whole planning site. Land use consists of mainly a residential area and others, such as a scenic area, a park, a commercial area and so on.

(2) Population Density

High density districts is continue from downstream through middlestream along the river. There are six districts in the middlestream where population densities are more than 600 person/ha and the average population density is much higher than 400 person/ha.

(3) Fluctuation of Population

The trend of population fluctuation for the last three year (1985-1988) shows a decrease. In the four districts in the downstream areas, it decrease 10-20% during the past three years. The movement rate of population is relatively low in the downstream and high middlestream areas and extremely low in the upstream area.

(4) Concentration of Manufacturing Industry

There is no accumulation of industry except small and medium size factories scattered in the whole planning site.

3.4.3 Matters of Issue

The river space itself forms an important axis because it links the towns. In addition, it functions as a core of a regional community. Only this river, among the four rivers studied, plays a symbolic role in this region.

This area is in the process of function reform.

Chapter 4 Basic Frame of the River Environment Improvement Plan

4.1 Future Projection of the Study Area

(1) Population

Population began to increase greatly since 1970s in Seoul Metropolitan. The town area expanded along the valley beside the developed town are and finally to the southern part of Han River.

Seoul can be divided into two areas by the Han River, the northern area, which was developed long ago and has a high population density and commercial and business function concentrations. And the southern part which was recently developed according to the plans and it does not have a very high population density yet.

Population is decreasing in the old developed districts such as Chung-gu, Tongdaemun-gu, Chongno-gu, Songbuk-gu and Yongsan-gu, and their functions are shifting from a service industry to a business industry.

There are six ku-districts which have more than 600 p/ha of population density per residential land, and it is said that the whole area is generally has a very high dense residential condition. It is especially evident in the new developed districts, such as Dobong-gu, Nowon-gu, Kuro-gu and Yangchon-gu.

There are few lands remaining, in the town area, for residential development, and it is said that the space remaining for people to settle down is very limited because the business space demand for the town function expansion is rather strong.

1) Population Increase Pattern

It is predicted that the population increase will proceed in the following pattern.

- To develop the area remaining in the southern part of Han River.
- To utilize the vacant land in the developed districts and to

redevelop the factory site.

- To develop the few farm lands remaining in developed areas.
- To expand the vertical space in the old developed districts and to execute a redevelopment.
- To promote the reform of high dense districts around a station.

2) Future Projection of the Basins

Anyang Chong

In the right bank area, the population will slightly increase due to the development of the remaining vacant land around the industrial zone facing the river and also by the town re-development of Yongdungpo-gu around the downstream, which shall increase increasing the functions of the town.

In the left bank area, the population will increase greatly by the progress of the planned farm development. This area can be expected to become a high density town area. Population is also expected to increase greatly in this area due to the conversion of the land from farms to towns, because farms are still plentiful in Kwangmyong-shi and Anyang-shi.

Yangjae Chong

The population will increase due to town developments. However, the environment of the town will be preserved in good condition because the population density will not become so high. The farms in the suburbs shall not be developed because it is specified as a development restricted zone.

Ui Chong

The population will increase greatly by the planned development of the middle stream area and the farms. In the downstream area, except around the stations, the population will tend to decrease. In the upstream area, the population will increase by due to the fractionating of the residential lots.

Chungroung Chong

The population will decrease in the whole area. The re-development projects, which will include the development of the commercial zone and the residential zone, will not lead to an increase in the population. It will be too difficult for the residential zone to stay due to the bad environmental condition and the expensive price of land.

(2) Industry

Commercial bases in Seoul are divided into two districts, one is the old town districts such as Chung-gu, Chongno-gu and Tongdaemun-gu, and the other is the planned developed areas located in the newly developed districts such as Socho-gu and Kangnam-gu.

The National Capital region plans basic policy proposes to spread population and commercial functions to a wide region. Kangnam-gu is proposed to hold management and information control functions and serve as a contact point.

It is said as its characteristic that Seoul possesses abundant commercial space along its streets but has only a few commercial bases.

As for the industry concentration, Kuro-gu is recognized to be center of industrial concentration in Seoul, followed by the ku-districts facing the Han River, such as Songdong-gu, Yongdungpo-gu and Kangso-gu.

Industry tends to flow out from the Seoul region because the installation of new factories is restricted by the Act of the National Capital Region Improvement and the Act of the Industry Redistribution. However installation conditions of an information business and a research business must be improved because at present there is a strong demand for them.

Since most industrial zones have been developed and only a few districts remain, it is thereby expected that the re-development of factory sites will be a necessity to satisfy land demand.

1) Future Projection of Commercial Pattern

Expansion of commercial functions will continue and will in particular be concentrated in Kangnam-gu.

A commercial base will be formed around a railway station.

The existing industrial concentration will be reformed into a high value added industry by way of an industrial reform. It will lead to increase in employment in the industrial area.

Industry standing in the old town areas will decrease and small enterprises which will not be able to produce economically in a town will be given other functions. However industries which are suitably operated in a town area will remain and eventually expand.

2) Future Projection of the Basin Studied

Anyang Chong

The industry will expand by shifting to high value added industry such as electric machines and information tools and the number of employees will increase.

Yangjae Chong

The commercial functions will extend as a life infrastructure. Concentration will veer away from the manufacturing industry will not concentrate.

Ui Chong

The concentration of the commercial zone will expand to the area around the station in the middle stream. The concentration of the manufacturing industry in the upstream area will continue by the trend

of the employee increase. However the manufacturing industry located in the other areas will decrease.

Chungroung Chong

The commercial zone will expand, especially, around the downstream area. The minor enterprises in the town area will decrease, except for the particular industrial categories, such as vehicles maintenance and printing.

(3) Land Use

The total area of Seoul Metropolitan is 605.4 km² and the development possible area is 389.4 km². The developed area is 389.4 km² and it occupies 85.1%.

The development possible areas are 29.8 km² for a residential zone, 3.0 km² for a commercial zone and 20.7 km² for green zone respectively. Among them, the development possible area was approximately 39% of green zone, and the remainder were mostly small vacant lands in 1985.

Land area to be supplied is obviously insufficient for land demands which is increasing. Therefore supplementary measures, such as effective use of old residential land, vertical expansion of the old developed towns, and various improvement projects will be carried out in order to attain it. However, a green zone and a development possible zone will be maintained as much as possible.

1) Future Projection of Land Use

Increase of residential land demand will lead to a corresponding increase in land price and will restrict the installation purposes. It will bring about an inaction of land use and mixing land use.

The whole Seoul area will be dense.

The vicinities of the northern part of Seoul need infrastructure improvements, therefore a vertical expansion of lands and redevelopment of the area will be promoted by a strong force of business demand.

In its outer part, mixed functions shall proceed and an effective use of vacant lands will be implemented.

Increase of permanent population and concentration of commercial functions will rapidly accumulate.

A high dense town will be formed through improvement projects around a railway station.

A development restricted zone will be basically protected.

2) Future Projection of the Basin Studied

Anyang Chong

There will hardly be any vacant land and the town zone will expand. The manufacturing industry will be concentrated on the right bank side and the high density towns will continue in the left bank side.

Yangjae Chong

Middle density towns with a comfortable environment will be formed, except for certain areas.

Ui Chong

High density towns, having various function will grow. In the upstream area, the fluctuation of the residential lots will proceed, and the different land utilization zones will proceed to mix in the upstream and the downstream area.

Chungroung Chong

The mixed state of the land utilization and the high grade utilization

of the land will proceed. In the downstream area, certain business zones will tend to decrease the extension speed. Around the study basin area, the highest density town will be formed.

4.2 Future Frame

(1) Population Frame

The population of the Seoul Metropolitan area is not expected to increase greatly because vacant lands for new development are scarce. The population of the year 2001 was intentionally determined at 12 million for the Seoul Metropolitan area, including some part of Kyonggi-do, by the Basic Town Plan established in 1990. As this study was referred to the Basic Town Plan, the future frame of the population in 2010 was determined as follows by means of the logistic curve.

Table 4-1 Population Estimation of the Basins

unit:1,000 persons

	1988	2001	2010
Seoul Metropolitan	10,364	11,800	12,600
Anyang Chong Basin (within Seoul)	2,306	2,207	2,375
Yangjae Chong Basin	225	476	528
Ui Chong Basin	376	390	409
Chungroung Chong Basin	603	552	567
Total for Basin	3,510	3,625	3,879

The predicted population of the year 2001 is an intentional figure and the predicted population of the year 2010 was calculated by extending its figure. The figure of the year 2001 has been proven by policies and plans. However the figure for the year 2010 has not been considered.

It is too difficult to estimate the projection of Seoul Metropolitan in 2010 because various functions are rapidly concentrating in it and the town is greatly changing. However we deemed that this estimation was accurate enough as an assumption for this sort of a study.

(2) Industry Frame

The state of the industry in 2001 was predicted by the Basic Town Plan, same as the population. As this study was referred to the figure of the Basic Town Plan, the future frame of the industry in 2010 was determined as follows.

Table 4-2 Future Distribution of Employees
unit:1,000 persons, (%)

classification	1996	2001	2006	2010
Agriculture & Fisheries	12(0.3)	5(0.1)	5(0.1)	5(0.1)
Mining & Manufacturing	1,029(26.2)	1,131(25.0)	1,182(23.5)	1,301(23.4)
Service	2,886(73.6)	3,389(74.9)	3,847(76.4)	4,263(76.5)
total	3,927(100)	4,525(100)	5,034(100)	5,570(100)

(3) Land Use

Future land use is referred to the present determined land use zone and ku-district. The most legal development possible areas are expected to be converted to a residential zone by 1996. It is assumed that the land demand will be studied and reform of the town function shall be based on that.

It is also assumed that the release of a development restricted zone will not influence much of this plan, because it is restricted only for only planned development projects.

Table 4-3 Specified Area of Land Use

(by Basic Town Plan of Seoul Metropolitan published in 1988)

classification	area
Residential zone	307.62
Commercial zone	21.55
Quasi-industrial zone	30.92
Green zone	348.30
Development restricted zone	250.90
Development possible zone	457.39
Total	708.39 km ²

Demand for land as the assignment of land utilization is assumed as follows.

Table 4-4 Future Frame of Land Demand

classification	2001	2010
Employee for secondary industries (1000p)	1,131	1,301
Total land area (ha)	2,254	2,751
Employee for tertiary industry (1000p)	3,389(3,502)	4,263(4,393)
Total land area (ha)	1,603	2,219

cf 1: The figures in () of the tertiary industry include the administrative portion, 10%, of the secondary industry.

cf 2: Total land area of the secondary industry exclude the basic industrial categories for daily life.

cf 3: Total land area of the tertiary industry is the area having the center or the sub-center function of the town, excluding the area related to daily life.

The area of a quasi-industrial zone has been specified at 3,092

hectare. It is expected to be enough for the year 2010 if it can be utilized effectively.

The area of a commercial zone has been specified in 2,155 hectare. It is expected to be sufficient it is enough for the year 2001 but not the year 2010.

Estimated population by gu unit: thousand men(%)

	1996	2001	2010
Total	11,087(100)	11,800(100)	12,600(100)
North area	5,426(48.9)	5,550(47.0)	5,742(45.6)
Chongno	320 (2.9)	340 (2.9)	361 (2.9)
Chung	230 (2.1)	240 (2.0)	255 (2.0)
Yongsan	395 (3.6)	420 (3.6)	446 (3.5)
Songdong	745 (6.7)	740 (6.3)	740 (5.9)
Tongdaemun	481 (4.3)	470 (4.0)	470 (3.7)
Chungrang	409 (3.7)	400 (3.4)	400 (3.2)
Songbuk	465 (4.2)	440 (3.7)	440 (3.5)
Tobong	515 (4.6)	568 (4.8)	603 (4.8)
Nowon	537 (4.8)	592 (5.0)	629 (5.0)
Unp'yong	460 (4.1)	465 (3.9)	494 (3.9)
Sodaemun	400 (3.6)	400 (3.4)	400 (3.2)
Map'o	469 (4.2)	475 (4.0)	504 (4.0)
South area	5,661 (51.1)	6,250 (53.0)	6,858 (54.4)
Yangch'on	377 (3.4)	407 (3.4)	451 (3.6)
Kangso	458 (4.1)	493 (4.2)	547 (4.3)
Kuro	675 (6.1)	660 (5.6)	660 (5.2)
Yongdungp'o	480 (4.3)	485 (4.1)	538 (4.3)
Tongjak	440 (4.0)	450 (3.8)	499 (4.0)
Kwanak	560 (5.1)	560 (4.7)	621 (4.9)
Soch'o	778 (7.0)	985 (8.3)	1,092 (8.7)
Kangnam	707 (6.1)	895 (7.6)	992 (7.9)
Songp'a	615 (5.5)	677 (5.7)	751 (6.0)
Kangdong	579 (5.2)	638 (5.4)	707 (5.6)

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