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AN ESSAY ON THE NATIONAL STRUCTURE[1]

This chapter is a tentative proposal for urban configuration in Japan, and adopts a position critical of the "urban sprawl theory" widely promoted during and immediately after World War II. Following on from the previous chapter, this essay, although slightly abridged, brings together the theme of "gradated construction of state and city."

Large cities facing overpopulation and high-density industry are condemned for various reasons; conceivably, small residential zones could be dispersed throughout the countryside if physically urban enlargement merely involved a merging of the manmade environment; however, this is impossible in Japan due to limitations regarding land and population. With this in mind, I critique the theory of urban structure Ishikawa Hideaki developed in works including the wartime "Constructing the City for the Empire" [*Kōkoku toshi no kensetsu*]; I focus on medium-sized cities of between 100,000 and 200,000 people with residential and urban structure units of fixed populations, where work and home are intimately connected and support a cultural life, and I propose this as the fundamental unit for the national structure. Accordingly, rural areas are composed of carefully positioned medium-sized cities that residents of the entire region routinely use as cultural and economic centers; meanwhile very large urban city complexes serve as regional and national hubs, and are created by locating together medium-sized specialized-function cities or a group of such cities in a coordinated organization that rationally allocates functions. In each case, these urban units are separated by rural zones or at the very least by green belts, and this prevents the formation of sprawling megacities. Even if not everyone knows each other, a completely stable regional community of at most 200,000 is created. This evaluates from a certain critical perspective theories proposed by Ishikawa to develop Japan that ignore urban lives and press ahead with urbanization and the devastation of the regions—theories that call for gradated formation of urban areas to bring together daily, weekly, monthly, seasonal and annual rhythms of life, by investigating first of all the "bustling city center" and then emphasizing functionality revolving around business, economics and culture; it could be said that [my] tentative proposal builds on this, yet adds revisions to accommodate Japanese conditions which demand a more concentrated national structure. This proposal in principle has been devised based on conditions that meet the rhythm of daily living, or of that over slightly longer periods, in economic and cultural centers that can support a certain population size; but the slightly less important conditions for urban formation—industry location and transport structure—are generally left somewhat abstract. Not that these conditions are ignored. Rather, the fact is that to counter overconcentration, ever more urban sprawl, chaos, and congestion in a growing city when these conditions are left to develop unchecked, stress has been placed on trying to meet the condition of restoring prosperity to people's lives when striving for [urban] reconstruction. Moreover, this tentative proposal is a broad attempt to sketch out the parameters for the all-important large cities in regional areas throughout the long and narrow Japanese archipelago, based on the model that was studied.

Incidentally, there is a marked difference when comparing this tentative proposal for the reconstruction of the nation, and the actual state of national development that occurred in the following two decades. This is obviously because several important conditions upon which this plan was based, things such as transport technology and agricultural problems, developed in a completely different direction. Uncertainty also arises as to whether this difference fundamentally undermines the framework of the pattern for national reconstruction presented here, so it cannot simply be set aside.

For instance, modes of transport are determined by the underlying factor of the size of local configurations, so this plan only allows for foot traffic or bicycles in the lowest ranked hamlets (C1) and villages (C2). Therefore hamlet size is designated at a maximum radius of 4 km. If motorcycles or four-wheeled vehicles are considered, then a local configuration of a much larger scale must be adopted, and constructs at the C1 and C2 level must be enlarged. Moreover, if high-speed transportation systems such as aircraft and super express trains come into consideration, projections that anywhere in Japan can now be within one day's travel from, or a return day-trip to, the nation's capital, will become a distinct possibility; so rather than the proposed layout for 12 regional urban centers, a configuration is also conceivable where the capital becomes more concentrated, more centralized. Also with regards to people's lives, rather than nodal points in the form of central facilities (plazas) being successively developed to create a piled-up pyramid formation, if more emphasis is placed on creating national-level flows, perhaps the expansion of residential areas and urban facilities will follow along traffic axes, and the national formation will be more of a network configuration instead of a nodal-point configuration. And with respect to agriculture, when integrating the perspective of linking the urban environment to the countryside with that of industrial agriculture being based on boosting systems of food self-sufficiency, what comes to mind in any case is to produce fresh foodstuffs in the periphery of large cities; but in reality this depends on the development of specialized production localities and rapid transport systems, and the trend is to reject that way of thinking.

Saying this though does not mean simply accepting the present reality, and some points made in this tentative proposal are somewhat unrealistic and require fundamental revision. At present further study is being made of these points, and while slightly overlooked elements of these new ideas have been added, this chapter is being included in these collected works largely as originally published.

Furthermore, what has largely been omitted at this time of publication is the problem of where to settle the future growing populace, in this network of cities arranged in a regional formation to handle expansion of industry and population. In this regard, to keep pace with industrial construction the original publication considers only the required number of new builds specified in yearly plans, of standard cities of 100,000 to 200,000 people which are integrated into surrounding agricultural areas. This will be impossible unless the structure of society is advanced further by the overall economy through national plans, but it must be noted that even if such conditions are fully met, it will be quite difficult.

In any case, this tentative proposal is somewhat outdated with regard to specifics. However, since some of the issues raised here are conditions that must be considered in future conceptual planning for the national structure, I decided to include it in my collected works.

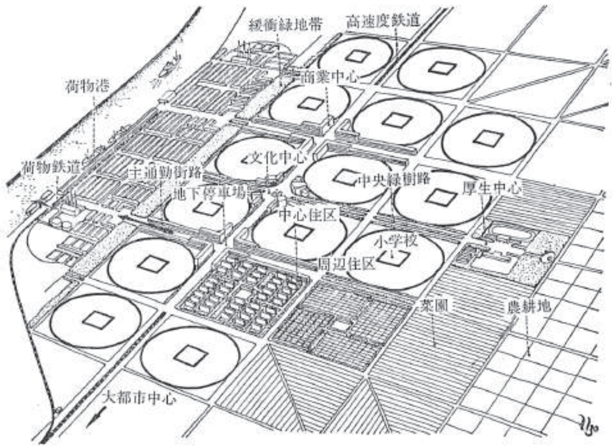
(Originally published as "Atarashiki kokudo kensetsu" [The New National Construction], in *Shin Kenchiku*, June 1946.)

1. Control over the Planar and Contiguous Urban Environment

The theory of the so-called megacity was closely examined in the previous chapter, and was clearly found to be lacking. However, the fact that peripheries surrounding large cities are merging into conurbations, as seen in regions such as the Tokyo–Yokohama and Kyoto–Osaka–Kobe areas where this is becoming a reality, does not mean we should accept this situation as valid. Rather, we should point out conditions that are gradually stifling the people's lives, from every angle including the growing gap between city and countryside, and in the lifestyle, culture, and material prosperity of urban residents, and quickly uncover ways of concrete reform.

In order to clarify the facts, let's start by trying to discuss what is actually happening.

The reality is that, of the nation's major cities, four regions including the Tokyo–Yokohama and Osaka–Kobe area, and Nagoya–Kitakyushu have enormous concentrations of people (for instance: Tokyo–Yokohama, 10 million, Osaka–Kobe, 5 million), and are clearly out of balance when compared to our national population of 70 million; as a result these regions overall are



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緩衝緑地帯	Buffered greenbelt
高速度鉄道	High-speed rail
荷物港	Cargo harbor
商業中心	Commercial center
荷物鉄道	Cargo rail
主通勤街路	Main commuting road
文化中心	Cultural center
中央緑樹路	Central boulevard
厚生中心	Public welfare center
地下停車場	Underground carpark
中心住居	Central residential zone
小学校	Primary school
周辺住区	Peripheral residential zones
菜園	Vegetable gardens
農耕地	Farmlands
大都市中心	Large city hub

Figure 57 Model plan for unitary single-function industrial city (example of 16 residential zone configuration)

urbanizing contiguously and completely overrunning the administrative boundaries of surrounding districts and municipalities; they are completely filling this space and establishing massive continuous urban environments that transcend existing concepts of the city; and the creation of very unfavorable circumstances for industry and national defense is an indictment of the so-called megacity.

However, as we have already seen, certain conditions are required to bring about the establishment of a megacity, and not all these must necessarily be rejected. There is an aspect to concentration that means progress and raising productivity. Also, in order to abandon concentration, given that population capacity in rural areas is already approaching saturation, we must return to fundamental principles: unless we curb further growth of our population itself, this mass of people must be moved to existing big cities, or other cities, or even new cities. Even if this is carried out in partial stages, and limited by the extent to which we prevent further growth of our nation's megacities, it will be impossible in practice to build new cities that offer a rich rural environment.

So what aspects of the development of the megacity environment must we reject?

These may be summarized by the following two points:

A. Creating a "continuous" urban environment; and
B. Hectic lifestyles (congested traffic) occurring in vast residential zones.

Urbanization and a tightly crammed life environment are not desirable for urban living. The low-rise, high-density residential configuration seen particularly in Japan's cities must be improved upon by restoring easy access to

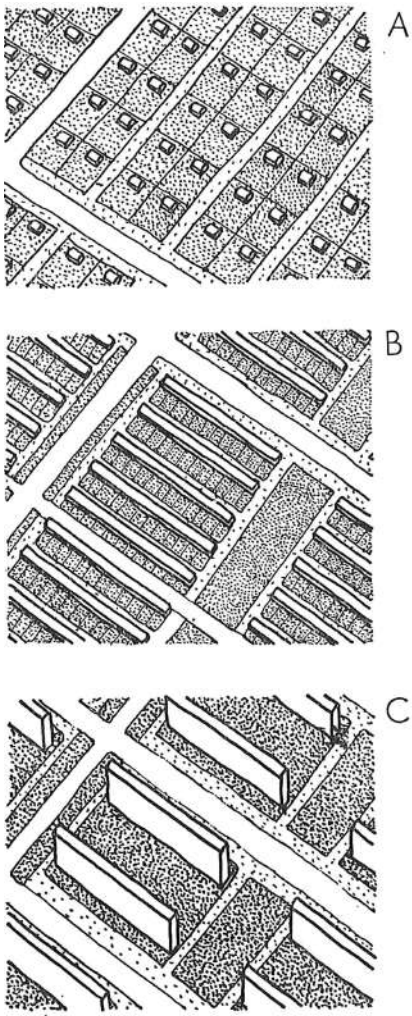


Figure 58 Various styles of pastoralizing the residential environment

The simplest method to pastoralize the residential environment is to locate housing in the middle of the countryside. However, this makes urban life impractical. To make urban life viable while recreating the same conditions, each residence must be enclosed by a broad green space, in other words method A. In the first place, though, this method requires each residence to have an extremely large yard, and therefore a large plot, and the burden placed on road surface area and traffic facilities, etc. to satisfy these enlarged plots is ludicrous and out of the question. Ultimately, only a small number of extravagant and self-indulgent, luxurious residences in the past could realize this style; the geographical and economic conditions our nation faces at present mean that even in the future, realizing this as the people's housing is impossible. Conceivably, an alternative method would be not to provide each residence with a rural setting, but to concentrate residences together in groups and apply it to these. By doing this, groups of residences produce a high residential density on small plots, and also allow sufficient space to be enclosed by green areas, and would probably make life in a rural environment possible. This is the only method that would pastoralize the residential environment for the people's housing. In other words, methods B or C.

nature. There are two ways to do this. One involves moving our lives into the countryside (Figure 58 A), the other is to moderate the spread of urban areas, divide up each urban tract, and insert these throughout the countryside. The first "easy-going" method brings about unwanted expansion of city size, and is simply not desirable. What is needed is to simply rearrange the haphazard placement of uncontrolled small-scale low-rise houses, and with a flexibility afforded by reforming them into a more reasonable format, introduce even more of these more-rural elements (Figure 58 B, C). However, there are of course limits to this method. In which case, when employing the second method, namely further dividing up the rural environment while placing certain limits on these urban areas, we must consider avoiding the formation of continuous urbanization.

While the second objective also attacks the various theories on megacities, there is no problem with this criticism per se. What is problematic, however, is criticism of the conditions or qualities associated with the megacity.

Ishikawa raises functional alienation and traffic congestion as economic disadvantages of the megacity. Building a megacity environment at the heart of the big city is premised on creating a uniform living structure for each section; this increases traffic between each section, multiplies functionally unnecessary direct and other traffic between each, especially the central districts; and produces unnecessary congestion and alienation. However, this is not a defect of the "mega" nature of the megacity, but arises from the spontaneous and illogical placement configuration of each section's components. The problem is how to correct this illogical placement, and recommendations for urban decentralization merely increase distances, and probably exacerbate alienation and traffic difficulties. Therefore dispersing small urban areas is not a method to resolve this defect. To the contrary, if the structural elements of the megacity are tightly linked and configured as components with an ever closer bond to each other, the resultant unitary zone—that takes on the character of its structural elements, and probably acts as a specialized or single-skilled zone in the operation of the city as a whole—can reduce traffic congestion to a minimum even if it can't be eliminated altogether when placed to allow ever closer participation in the structure of the overall city's multifunctional tasks; moreover, relocation to small urban areas will probably secure unforeseen and highly efficient interconnecting traffic between components.

From this perspective, this author would like to propose three points for methods of handling the megacity: 1) Gradated construction of the life base; 2) Megacity created by association of single-skilled unitary life bases; and 3) Allocation of green land.

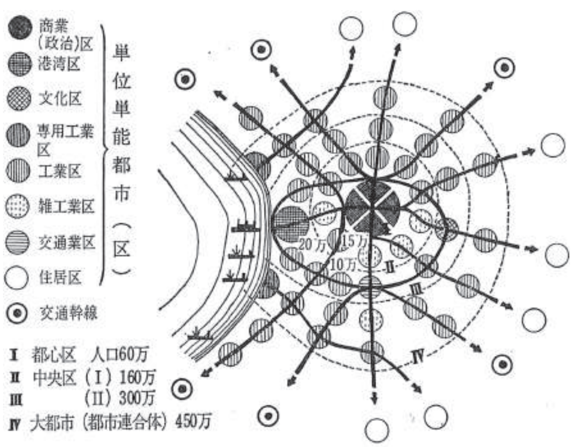
1.1. Gradated Construction of the Life Base

The most rational and comprehensive way to realize the viewpoint that things with the closest connection to urban residents' lives (in terms of frequency of interaction and usage efficiency) be placed as close as possible to where they live, and those that are less connected be placed further away, is to conduct a gradated construction of the life base as a pyramid-shaped unitary collective.

This was clarified earlier with regards to constructing housing collectives (see *Collected Works*, Vol. 1, Chapter 26), but for the lowest (the most basic construction) unit at the urban scaling phase, we can look to the primary school residential area, namely an area where daily life facilities are brought together around a primary school. Within this area, residents carry out their daily consumption lives.

However, in order for residents to support their "spending" lives, they must maintain productive (social labor) lives. The daily commute to do so involves their most frequent and most important use of transportation. However, work places employ more than residents from merely a single primary school residential area. Generally, several residential areas are dependent upon a single place of employment (such as an industrial zone, or commercial business zone). As a result, occupational zones or the highest collective zone for housing become conceivable. What determines the scale of this unit is the scale of the workplace (production) facility collective.

This may depend on the type of business, but in industry a relatively well-organized production facility unit requires at least a central factory, or an industrial complex (Rus. *kombinat*), and associated subsidiary subcontracting factories or group of small workshop units; therefore the total number of employees can be upwards of several thousand, and at times there may be more than a few instances where it is several tens of thousands. Accordingly, if we assume that the population of a primary school residential area is between 5,000 and 10,000, then industrial zones can be constructed that support at least several or at times a dozen or so such residential areas.



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Unitary single function city (zone) (単位単能都市（区）)
Commercial (political) zone
Harbor zone
Cultural zone
Specialized industrial zone
Industrial zone
Miscellaneous industrial zone
Transport industrial zone
Residential zone
Transport branch line

Text: key

I.	City center zone, population 600,000
II.	Central zone (I) 1.6 million
III.	Central zone (II) 3 million
IV.	Large city (association of cities) 4.5 million

Figure 59 Structural model for a large city hub comprising an association of unitary cities

The number of people employed in commercial workplaces will vary according to the size of the city, but in the central district of a large city of one or several millions, this will of course probably mean constructing more than a dozen such areas.

This occupational unitary zone includes only facilities directly connected with carrying out a certain profession, so it may be considered as single-skilled. However, when this zone is of considerable size and made up of several or several dozen residential areas, cases may arise, depending on how it is connected to the city's central business district, where it may need to have its own independent commercial center, a secondary city center.

1.2. Megacity Created by Association of Single-Skilled Unitary Life Bases

The aforementioned unitary zones each have their own particular professions, and can be on the scale of a small to medium city with a population of several tens of thousands up to 100,000 or more; but it could be argued that a megacity is a premium collective made up of an association of these unitary zones.

However, the megacity is not merely an aggregation of these unitary zones. A special feature, as well as a mission, of the megacity with its vast congregation of people, is the focused and advanced development of its industrial, economic and cultural roles (i.e.: administrative hub). It becomes a focal point for the enterprises and people from every type of commercial and manufacturing business that depend on this. Therefore, within these unitary zones it must possess the various functions—downtown commercial district, high-quality entertainment district, commercial, financial and administrative centers, general industrial zones, as well as areas in charge of the special functions of this city, etc.—needed to realize on the whole the special features of the megacity. Of course, these functions can be sorted and put together according to their characteristics, and brought together into single-skilled zones. However, if the overall unitary life base, including residential areas for associated staff, is not to exceed desirable limits, unitary zones with some combination of these functions must be permitted; indeed it would be beneficial. Above all, special consideration is required when constructing the downtown unitary zone that combines the functions of an administrative hub: sophisticated downtown commercial, economic, and financial affairs center, as well as public administration center. The existence of this highly concentrated downtown area is probably the greatest feature of the "megacity."

Incidentally, what would be the suitable size for the unitary zone referred to here?

Commuter traffic is considered the most important limiting factor. A large and extremely disproportionate volume of traffic is concentrated in a short period of time (the so-called rush hour), so the use of public transport is uneconomical. Therefore foot traffic should be used where possible. This means that if the distance, one-way, to the place of employment is at most around 1.5 km, then the maximum range housing may be placed is at a depth of two residential zones. It also means that the unitary zone size will be between a minimum of 6 and a maximum of 20 residential areas, varying slightly depending on the total extension of the workplace district, or the positioning of residential areas, in single-, double-, or multi-sided placement. (See Figure 60.)

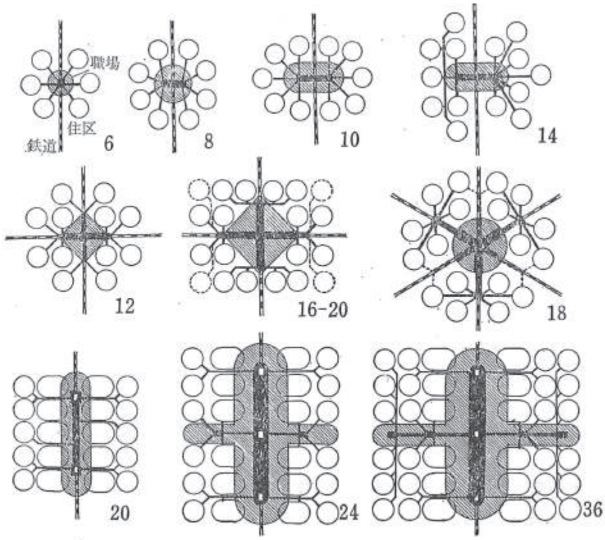
However, in a megacity the downtown district, described above, is likely to be rather large. In this case, two courses of action are conceivable: one is to subdivide the megacity's downtown area by function (for instance, a central administrative district, commercial business zone, entertainment district, etc.); and the other is to locate some workers in general *kombinat* areas to be discussed later, while placing residential areas at some distance from the workplace for other workers who can use long-distance rapid transit systems. No generalization can be made as to which of these to adopt. Therefore, various solutions are possible.

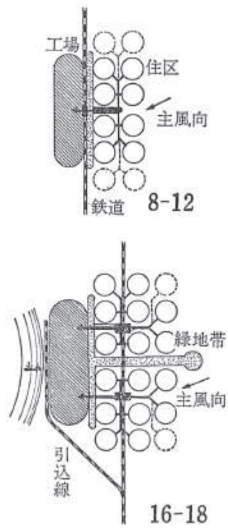
In addition to this, existing megacity zones all feature large-scale and rapidly developing manufacturing with dependent secondary cooperative industries. Securing adequate space for this wide variety of general industry is also an essential condition in building up a megacity. The growth of the megacity is made possible by the development of general industrial zones, and it can be anticipated that such zones will be needed in the future even though their setup may vary. Residential areas catering for workers in these general industrial zones, depending on the scale of the industry, are not necessarily limited to the aforementioned single-skilled unitary zones. As much as possible they should be reorganized and arranged together at the unitary-zone scale; but where this is not possible, for such areas only dedicated work zones (production facility area and residential area) should be detached and relocated, and it will become necessary to resolve this by placing rapid mass transit systems to connect the two. This zonal configuration that separates work and home will also become a particular aspect of the formation of the megacity.

From this investigation, it is possible for the megacity to be a single general life base collective that brings together constituent parts, namely specialized single-skill unitary zones like the city center, dedicated industrial (or general industrial) districts and dedicated residential districts. However, if each of these single-skilled unitary zones that make up the megacity are connected via rapid transit systems and heavy freight distribution systems tailored to suit every one of their particular specializations, it should be possible to have the megacity functioning at peak efficiency with no disruptions whatsoever and transfers with a minimum of effort.

1.3. Allocation of Green Land

A large city's functions are secured by establishing single-skill unitary zones which make up the city as well as transit systems that service and bind them





Text (6): from top

Place of employment
Residential zone
Railway

Text: (8–12): from top

Factory
Residential zone
Prevailing wind direction
Railway

Text (16–18): from top

Green belt
Prevailing wind direction
Sidetrack (railroad)

Figure 60 Structural model for a unitary single-function city

Numbers refer to the number of residential zones. The upper forms show residential zone placement in a capital-like city that fulfills, among other things, commercial, economic and administrative functions; while the lower two are for industrial single-function cities whose industry, etc. require housing to be completely separate. In addition, there are cases where it is possible that housing and place of employment are in the same building, and are connected vertically to each other, above and below. Oval-shaped residential areas shown in the bottom row of capital-like cities refer to overlapping forms. In these cases, it is possible that the number of residential zones will be greater than the number indicated.

together; however, another important factor which differentiates the form of the megacity made by this association of unitary zones from that of the conventional big city, is that its building blocks, namely the unitary zones, are each surrounded by green land, and each residential area is in easy reach of the rural environment. This resembles the previous installment of green belts often proposed as a way to improve the urban environment, except this is different from grid-like or radial forms of urbanization, because they serve as elements which set boundaries around independent unitary zones.

The precise shape of green lands, found between the city center unitary zone and the unitary zones surrounding it, should be of the narrowest possible width because of their mutual proximity and traffic, a green belt of trees so to speak; however, traffic has less impact the further away from the center it is, so a rather extensive and productive green belt can be put in place.

It is unclear to what degree the idea will prevail that the foodstuffs and agricultural products a city requires be supplied by local production; however, when it comes to issues of food self-sufficiency the notion of being able to supply at least fresh vegetables from neighboring suburban areas is a reasonable objective. In this case it is preferable that, transport conditions permitting, green land separating single-skill unitary zones be as large as possible; however, if for instance 60 m^2 is needed to provide fresh vegetables for one person, and population density in built-up areas is 100 persons per ha. or 1 per 100 m^2, the ratio of productive green land to built-up areas would be 10:6, i.e.: the area of productive green land must be 37.5% of the total city region.

2. Gradated Construction of Cities (Human Collectives)

Compared to various theories on forms for ideal cities noted so far, the construction guidelines discussed in the previous section appear to be relatively pragmatic. In order to clarify their relationship with current theories on the ideal city, let us examine two or three other issues.

2.1. Regarding Theory on Making the Single-Function City Smaller

During the war it was widely proposed to decentralize large cities out of concern for air raids; there would not be enough time to evacuate non-essential persons—for instance, those collecting pensions, and recognized mistresses—and calls were made to relocate the primary causes of densely populated districts, namely factories, schools, and government organs, etc., to the countryside. The so-called decentralization and reduction of large cities was advocated, whereby Tokyo and other cities would function solely as administrative centers, or they would become industrial cities by relocating government organs and schools because of the difficulty in moving industrial facilities.

If the megacity is to be disavowed, then this assertion becomes even more justified.

However, are there no flaws to this assertion?

If small single-function cities are created to handle the limited roles arising from breaking up responsibilities concentrated in the megacity, firstly can these various single functions formed after the dispersion really exist independently? Secondly, as the result of "the decentralization of the megacity," and given how cramped our nation is, can these small single-function cities be dispersed and yet remain effectively useful while compensating for declines in efficiency?

Naturally, the function of government administrative center at present performed by Tokyo will exist as long as Japan exists, even if it is not located in that vast city. Therefore it would also be possible to relocate it to the mountainous region of Hakone. However, if this were to happen, even if there were slight changes in circumstances in the future, not only would government agencies need to be relocated, but the need would also arise to relocate commercial firms such as banks, trading companies, and industries. Furthermore, their employees would also have to move, along with their subsidiary companies and service industries, and the various secondary subsidiary employees.

Also, the decentralization and dispersal of the single-function city means the overlap of downtown business area with downtown district would no longer be the foundation of the single-function city; if functions are decentralized and connected to each single-function city, the "downtown area" that makes up the traditional Japanese city center will disappear.

Travel distances will not be significant if the city is decentralized and dispersed throughout Japan even to its steeply sloping forests; however, the negative effect of functional alienation caused by this dispersion is exacerbated, and there is probably no positive benefit at all other than the psychological effect of being close to the countryside. If a megacity with a population of 10 million were to be divided into small- to medium-sized cities with an average size of 100,000 people, 100 such cities would be needed. For instance, to spread these throughout the 3,200 km^2 of the Kanto region, each city would require an area of 32 km^2, and the distance between the center of each would be little more than just under a mere 6 km. If the size allocated to these cities of 100,000 were to be 10 km^2, the space between cities could only be in the scant 2.5 km range.

Ultimately though, this decentralization and dispersion by accentuating single function is only a pipe dream. This will clearly be impossible to realize unless, as proposed by this author, the large city is divided into medium and small-sized cities with single functions, which are then formed into a close association to reconstruct the megacity.

Nevertheless, the following is conceivable.

Regardless of how things are at present, if we assume Japan in future is to be a part of the world economy, our nation is likely to become East Asia's industrial center. In that case, at the very least several general industrial complexes will probably be needed within our territory. To bring these into existence, residential areas for large masses of people will of course be necessary. These residential areas or large cities must be made multi-functional, as is to be expected. These residential areas housing large populations will then be more comfortable, and can be managed more efficiently. Let us consider the large city in this light, and discover the positive benefits of this general multi-functional area.

2.2. Regarding the Theory of Dispersing the City

The argument for population dispersal, namely extensively reducing the population in megacities by spreading people throughout the nation, was one of several popular theories universally known during and after the war.

Two forms of this theory can be found.

The first is the idea to boost the rural population, in line with a short-lived trend following our defeat that Japan must be an agrarian nation. However, this idea is plainly unprogressive: Japan's agricultural sector has become dominated by intensive small-scale farms, and even if, for instance, there was sufficient capacity to expand arable land by 30%, in the event that plans are made to raise labor productivity, rural villages would have limited scope to absorb more population.

The second is not so much a matter of turning people into farmers, but simply returning them to the countryside. Various small- and medium-sized sideline industries, such as watchmaking, are being promoted in villages, and people are being urged to make a living from them. However, this is a mistaken view. Cramming the majority of these people being forced to work in inefficient small- and medium-sized industries into a semi-feudal rural environment feels purposefully reactionary. And there is also something irresponsible about this view, to suggest that starving people be forced out of sight into the countryside and the mountains because they are an eyesore in busy entertainment districts.

A more theoretical and systematic version of this second idea has been set out in a theory for dispersing the small city by rebuilding the life zone in the regions.

Let us critique the small city dispersion theory by its quintessential proponent Ishikawa Hideaki, who expanded upon construction methods for the rural life zone in his work "State Planning" [*Kokudo keikaku*].

According to Ishikawa's "Life Zone Placement of the City for the Empire" [*Kōkoku toshi no seikatsuken teki haichi Jinko mondai kenkyujo*] ("Constructing the City for the Empire" [*Kōkoku toshi no kensetsu*], p. 198), the main points for their life zone planning are:

Table 9.1 Life zone placement of the city, according to Ishikawa

(1) Hub function	*(2) Maximum travel time*	*(3) Transport means*	*(4) Distance*	*(5) Adjusted distance*	*(6) Administrative function*	*(7) Hub function*	*(8) Population limit (tentative)*
5. Daily	30 mins.	By foot	2	2	Village hub city	5	Smallest city, 20,000; average city, 50,000 to 100,000; large city, 300,000
4. Ditto		Bicycle	10	5	Town hub city	4+5	
3. Weekend	1 hour	Bus	20	15	Local hub city	3+4+5	
2. Monthly	1.5 hours	Car	50	50	Area hub city	2+3+4+5	
1. Seasonal	2 hours	Train	100	100	District hub city	1+2+3+4+5	

Source: Hideaki Ishikawa, "Constructing the City for the Empire" [*Kōkoku toshi no kensetsu*], p. 198, "Life zone placement of the city for the Empire." See Figure 61.

Table 9.2 Various factors for the life zone structure, according to Ishikawa

Hub function	*(1) Zone radius (km)*	*(2) Zone area (ha)*	*(3) Paddy field area, within zone (ha)*	*(4) Rice yield, (40* koku★*/ha)* (koku*)*	*(5) Max. population supported*	*(6) Acceptable number of farm households (1 household per* chō★*)*	*(7) Ditto, population (Col. 6 multiplied by 5)*	*(8) Non-agrarian population supported (Col. 5 minus col. 7)*
Daily	1.5	706	141	5,640	5,000	141	705	4,300
Ditto	5.0	7,854	1,570	62,800	63,000	1,570	7,850	54,000
Weekend	15.0	70,686	14,136	565,400	565,000	14,136	70,690	494,000
Monthly	45.0	639,174	127,834	5,112,360	5,112,000	127,838	639,170	4,473,000
Seasonal	135.0	5,725,666	1,145,132	45,805,280	45,805,000	1,145,132	5,725,600	40,079,000

(★Translator's note: 1 *koku* = 5.12 bushels; 1 *chō* = 9,917 sq. m.)

(9) Population needed in rural villages (equals rural population)	*(10) Population of hub city (tentative) (10,000)*	*(11) Population of cities within zone (10,000)*	*(12) Population needed for industry (Col. 11 minus col. 9) (10,000)*	*(13) Population for industry, in hub city (10,000)*	*(14) Max. population supported (Col. 5 minus col. 11) (10,000)*	*(15) Population of hub city, after distributing people from unplanned rural industry cities (10,000)*
705	–	–	–	–	–	–
7,850	2	2	1.2	1.0	3	1
70,690	5	17	10.0	3.0	32	3
639,170	20	134	70.0	10.0	313	15
5,735,666	100	1,018	444.0	70.0	2,882	80

Source: Hideaki Ishikawa, "State Planning—Designing the Life Zone" [*Kokudo keikaku—seikatsuken no sekkei*] (August 1942).

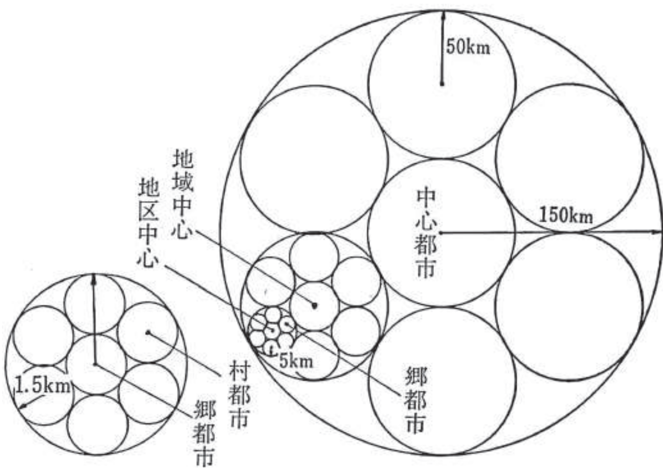
(a) Keeping people in their place of birth, while having them contribute to the nation's total industry [?][2]
(b) Allowing them also to enjoy the culture generated by the large city; and
(c) On a national level, having urban residents retain an awareness of the countryside, while integrating this as was previously done in the large city.

Putting aside arguments that have already been examined critically, those which apply to rural villages are little more than ostensibly cultured "humanistic" charity that in the end allow even those villages left behind by urban civilization to benefit from urban culture.

The structure of urban placement according to the life zone planning that brings together these arguments is basically shown in Figure 61; and the numerical data reflecting the relationship between hub city and regional layout are shown in Tables 9.1 and 9.2.

The inferences worthy of particular note in these tables are (9) where it is expected that the number of people from the non-agricultural sector needed in rural villages will equal the number from the agricultural sector, and (10) estimates for the population of the hub city. "Population needed in rural villages" and "Population supported by rural agricultural sector" are mentioned with respect to the former, but the people needed in other industries connected with the agricultural sector would be represented by something slightly larger than an ordinary hub small city or town.

Those inferences with respect to the latter are merely assumptions, but if the construction of the life zone were to be realized, the results would appear something like Table 9.3 below.



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地区中心	Local hub
地域中心	Area hub
郷都市	Town city
村都市	Village city
郷都市	Town city
中心都市	Hub city

Figure 61 Ishikawa Hideaki's diagram of the life zone concept
Source: "Constructing the City for the Empire" [*Kōkoku toshi no kensetsu*], p. 253.

Table 9.3 Population distribution ratios, by city rank, in Ishikawa's life zone concept

	Unitary city population	*Number of cities within local zone*	*Allocated population (10,000)*	*Allocated population, as ratio (%)*
1. Village	–	–	573	40.7
2. Town hub city	20,000	216	432	30.8
3. Local hub city	50,000	36	180	12.9
4. Area hub city	200,000	6	120	8.5
5. Regional hub city	1,000,000	1	100	7.1
All regional zones		259	1,405	100.0

Notes: 1. The number of cities has been calculated whereby each zone includes those below it apart from the hub zone.
2. Although not indicated in the original source, the population in villages can be considered to be the total agrarian industry population. It is possible the original author [Ishikawa] intended that a considerable number of agrarian industry workers be included also in the hub city population, but because it is not explicitly stated, these are estimated.

That is, if for the moment we consider the subconstruct for the regional areas as it appears in standard drawings with a number of inscribed circles, the regional hub city would comprise 216 township hub cities with a population of 20,000 each; and if 40% from a total population of 14 million (if total area is calculated at 56,800 km^2, population density would be 247 per km^2) were in the agricultural sector, 30% would reside in township hub cities, and 71.5% of the total population would live in small towns and villages no larger than 50,000.

The following impressions may be gained from the overall results.

(1) First of all, overall population density in regional zones is low.

Regardless of cultural development throughout villages within the regional areas, the overall population density will be 247 per km^2. Nationally, our population density was 191 per km^2 in 1940, so there is only a 30% margin to reach the level designated in this plan on a national scale. Moreover, regions able to attain this type of development, statistically, will only be those so-called underdeveloped regions outside the Kanto, Tokai, and Kinki regions. In these three regions, for instance, no matter how much regional hub cities are expanded, they will be unable to absorb the population on the level of an advanced city as described in this life zone construct.

Therefore, the construction of these regional areas will be rather ineffective in solving the issue of overcrowded cities.

(2) Second, the priority for population distribution is biased towards the smallest cities of 20,000.

Combined with the rural population, 70% of the population lives in cities of 20,000 or less. However, according to statistics for Japan's population by type of

Table 9.4 Population density, by statistical zone

Census zone	*1930*	*1935*	*1940*
Hokkaido	35	35	37
Tohoku	98	104	107
Kanto	427	474	523
Hokuriku	163	166	170
Tosan	123	125	127
Tokai	297	321	343
Kinki	362	408	436
Chugoku	169	176	181
Shikoku	176	179	178
Kyushu	216	226	236
All Japan	169	181	191

municipality, in 1940 66% of the population lived in cities, towns or villages with 50,000 people or less, and overall 30% lived in cities of 100,000 or more.

While lower figures must be allowed for these statistics where the municipal unit is an administrative area, nevertheless compared to the aforementioned life zone construct, the population is markedly biased towards small towns and villages.

In other words, it shows that this population dispersion model, despite ensuring a relatively broad distribution, cannot absorb a lot of the population.

Therefore there are only two options available: to allow the development of the megacity regardless, based on this dispersion rationale (the placement of small cities); or to do away with the megacity altogether, and increase the number of city gradations to two or three to bring about complete dispersion. The former option is simply a repudiation of the small city dispersion theory. As for the latter option, dispersed city construction would result in difficulty providing suitable urban facilities for every person, would place an extremely heavy burden on transport facilities (for production and freight use, and of course consumption life) connecting these small centers roughly 10 km apart, and would cause grave concern this might lead to a retrogression of the people's economy.

In other words, even if small city dispersion is carried out while taking into consideration the introduction of urban culture into rural villages, the total capacity of hub cities to absorb population will not be great should they be limited to the range of one million inhabitants, therefore the megacity issue will not be resolved. Moreover, the inefficient dispersal and placement of this population will place a very heavy burden on the transport and urban infrastructure of the people's economy.

Frankly, this author believes the population of small cities must nonetheless be standardized at the 100,000 range. The priority for population placement must be medium-sized cities of 100,000 (or between 50,000 and 200,000). Furthermore, on the subject of these medium-sized cities, essentially they are not very different from single-function unitary areas (unitary cities, with a population from tens of thousands to several hundreds of thousands, as previously stated) that constitute a megacity. In other words, in substance the megacity is composed of these medium-sized cities. The megacity (also could be called an association of large cities) was the overall designation for an area that had such characteristics—a rather densely packed concentration of these medium-sized cities, extremely closely tied to each other through their functional loads, and among which was an area that functioned as the city center, a distinctive element of the megacity of the past.

To put it another way, regardless of whether a city is large- or medium-sized, it would nonetheless be composed of single-function urban areas in the 100,000 range (50,000 to 200,000); and a group of medium-sized cities deemed an association whose relative density is determined by a placement reflecting their mutual functional loads, would be called a large city, while urban zones where areas are placed at some distance apart and retain a high level of independence, would be designated medium- and small-sized cities.

The nation would be composed of these single-function medium-sized cities placed in a varying pattern of density along transport lines.

Achieving this degree of city unit size would make it possible to provide extremely efficient urban cultural facilities; furthermore, the transport load would probably be kept within acceptable limits.

2.3. Reappraising the **Ku**

It may even be redundant, but I would like to propose a reexamination of the *ku* or administrative ward that currently exist in large cities.

The traditional *ku* or ward is little more than a division of land at the district level based on administrative procedures to deal with local factors and population spread; I would actively encourage adopting a *ku* imbued with a new meaning: a graded local unit that is combined with the concept of constructing the large city from an association of single-function medium-sized cities. In other words, clarify it as a life zone space that functions totally as an organic first stage, without terminating the existing *ku*. It would then possess the characteristics of the unitary single-function city described above. By so doing, the existing value of the *ku* would be made clear as the lowest constituent element of the large city that also functions as a highly independent unitary zone.

With regards to the composition of the megacity, on the one hand it is the gathering of a number of *ku* or medium-sized cities, but at the same time it also gives rise to areas such as the city central district or general industrial estates that vastly exceed the scale of standard unitary zones. In order to carry out construction and facility placement more systematically in these areas, it may also become necessary to consider these as *ku* that bring together several unitary zones, in other words a "*ku* association," and as a combination of units that form an intermediate stage before the large city.

3. Constructing the New Nation—Pattern of Population Dispersion and Concentration

In the previous two sections, I clarified my thoughts on proposals for the megacity and the reconstruction of the standard city. A simple summary of this is as follows:

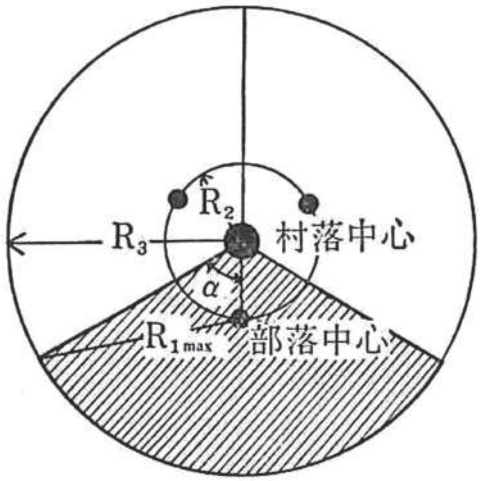
(1) All non-agricultural industries make up the urban area, and this is where they are located. They are unitary life bases predominantly for a single function, including manufacturing, mining, and commercial businesses (either agricultural or urban).
(2) The size range for a unitary city is between 50,000 and 200,000, with the average being around 100,000.
(3) Housing areas in the city are made of primary school residential districts, and one city ward is made up of several or a dozen or so such collectives.
(4) Unitary city wards will vary according to whether there is a commercial district within public transport range, the character of that district, and how far away it is, but each will have its own business and cultural center to cater for life's essentials.
(5) For the nation as a whole, it is conceivable there will be several megacities: groups of associated unitary city wards that are located close together, each with a high degree of specialization, and inextricably linked to the location of general industrial complexes.
(6) The placement density of unitary city wards is thick around the central zone of the megacity area, and becomes sparser the greater the distance from the center. The upper threshold for this density is standardized at 60% productive green land per urbanized area; while the lower threshold for the degree of sparseness is limited by the need for inward transport from adjacent rural areas to the city—for instance, Ishikawa's so-called weekend center standard is an hour per one-way journey, or a 10 km radius.

The limits on unitary city placement are expressed fairly concretely in these six points, but within these upper and lower thresholds, what type of placement is in fact conceivable? This will depend on factors such as a region's previous development circumstances and geographical conditions, and the state of population distribution throughout the nation as a whole, so let us now carry out a more detailed numerical analysis.

3.1. Minimum Construction for City Placement, Viewed from the Village

C1 Hamlet or small village

Many farmers live in unitary population centers, namely dispersed rural settlements, and in order to bring about an improvement in residents'



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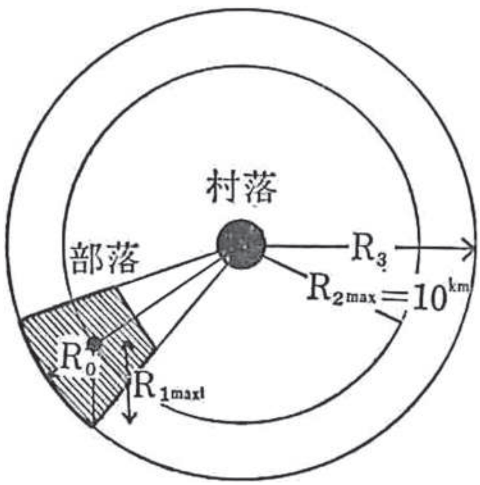
Village hub
Hamlet hub

Figure 62 Radial view of village



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Village
Hamlet

Figure 63 Radial view of village (largest case)

cooperation and life, clustering these settlements together is considered fundamental.

The scale of the village is determined by the "commuting" distance from the residences to the field.

The ideal is within 20 minutes one way, with a maximum of one hour, and an average walking distance of 1.5 km (max. 4.0 km).

C2 Village

A village is made up of several central facilities for daily life (primary school, distribution center, association office, etc.) that are clustered together.

From this "daily hub," all residential homes are ideally within 20 minutes one way, at most 30 minutes; a walking distance of 1.5 km (2.0 km); or a cycling distance of 6 km (10 km).

Calculations based on the above conditions for the area covered by a hamlet and its outer radius are as follows:

Commuting distance by foot:

R_1^2 max $= R_3^2 + R_2^2 - 2R_2R_3 \cos \alpha$, where
$R_2 = 1.5$ km, $R_1 =$ max 4.0 km, $\alpha = 60°$, $\cos \alpha = 0.5$
Where the number of villages outside the central area is 3,
$\alpha = 60°$, $R_3 = 4.61$ km, area $A_2 = 66.7$ km^2.

Likewise:

4: $\alpha = 45°$, $R_3 = 4.98$ km, area $A_2 = 77.9$ km^2.
5: $\alpha = 36°$, $R_3 = 5.16$ km, area $A_2 = 83.6$ km^2.
6: $\alpha = 30°$, $R_3 = 5.26$ km, area $A_2 = 86.9$ km^2.
In other words, the outer radius of a hamlet is around the 5 km range.

In cases where usable land is in long and narrow strips such as in mountainous regions, if the average distance by bicycle to the daily hub is 10 km, R_3 is 14 km. As for the number of hamlets in a village, if each hamlet has an area of 50 km^2 (a circle with maximum outer radius of 4.0 km), an area $A_2 = 615$ km^2 (radius of 14 km) will have 12 hamlets; if each has an area of 28.6 km^2, there will be 22 hamlets. However, in mountainous regions with these long narrow strips, the land does not extend in all four directions, therefore if villages are 28 km long and 8 km wide with a total area of 224 km^2, and each hamlet has an area of 28.6 km^2, the number of hamlets per village will be 7.8. In other words, it is probably best to presume that villages in these long narrow mountainous regions will have at most around 15 hamlets, and an average of around eight.

Now what about the population capacity of these hamlets?

From a total area of 380,000 km^2, arable land in Japan accounts for six million ha. (about 60,000 km^2). If the maximum area of arable land is taken as 80,000 km^2 by adding a currently planned 1.7 million ha. of reclaimed land, the ratio of arable to total land will be 21%.

However, since this will be far lower in mountainous regions, if we assume it will be one-half to one-third of the overall average ratio, namely between 10% to 7% (the lowest national arable land ratio is in Wakayama Prefecture, with 10.2%), village populations calculated based on these three arable land ratios will be roughly between 1,000 to 2,500 people per hamlet, and roughly between 1,600 and 7,000 people per hub village.

The total population allocation for villages will be between 8,000 (4 hamlets) and 10,000 (7 hamlets) if the arable land ratio is 21%, and between 13,000 (4 hamlets) and 17,000 (7 hamlets) if the ratio is 35%; if people travel by bicycle, it will be a maximum of 24,000 if the arable land ratio is 7% and 35,000 if the ratio is 10%.

If the population of a favorably constructed daily hub is a minimum of 10,000 and an average of 15,000, a formation of 4 hamlets (hub hamlet and 3 adjacent hamlets) will be too small and unsuitable; however, this formation may be possible in areas on the plains where arable land is plentiful; and in regions with around 21% arable land, formations will need to be as large as 7 hamlets (1 hub and 6 adjacent). Furthermore, those with 10% arable land will have a maximum population of 13,000, and a hub village population of 3,700.

C3 City Ward

The village's weekend hub. One-way journey of 90 minutes, in other words one hour from the village center. If the distance is 12 km by bicycle, 20 km by bus, or 36 km by train, the traveling time from any village residence will be at most 90 minutes.

While being the hub for a considerable number of villages, and a regional hub city with a substantial level of cultural facilities, it is not just an agricultural center—an agricultural center alone cannot sustain the scale of population needed to support sufficient facilities—but is expected to be an independent single-function city for industry or other activity. To support this function, at the very least it ought to be on a rail trunk line.

In addition to rail, if supplementary traffic is taken into consideration, such as transport facilities including bus services (four direct lines to the center, in both directions) or bicycle routes, see Figure 64 for a schematic representation of a rural regional zone within one hour's traveling time from the center of such a city.

To summarize simply, it has a radius of around 25 km, and contains 20 villages (19 villages and one city). The formation of villages, based on previous tables (not shown here), are, for example, 7 (21% arable land, 7 hamlet formation); 10 (7% arable land, 7 hamlets); 2 (35% arable land, 4 hamlets); 8 (35% arable land, 7 hamlets); 18, 19 (transport by bicycle, 7% arable land, 16 hamlets); and 17, 20 (ditto, 10% arable land). Calculations for total regional populations and hub city populations can be found in Table 9.5.

However, since the village radius is between 10 and 14 km in examples below 17, it would be difficult to place 20 such villages within an hour's distance.

Accordingly, where a hub city has a population of 100,000, 50–70% of the region's total non-agricultural population live concentrated in the hub city, and the non-agricultural population ratio ranges from 45.5% in cities with 7 adjacent villages and 29.3% in those with 20 adjacent villages, or roughly 40%.

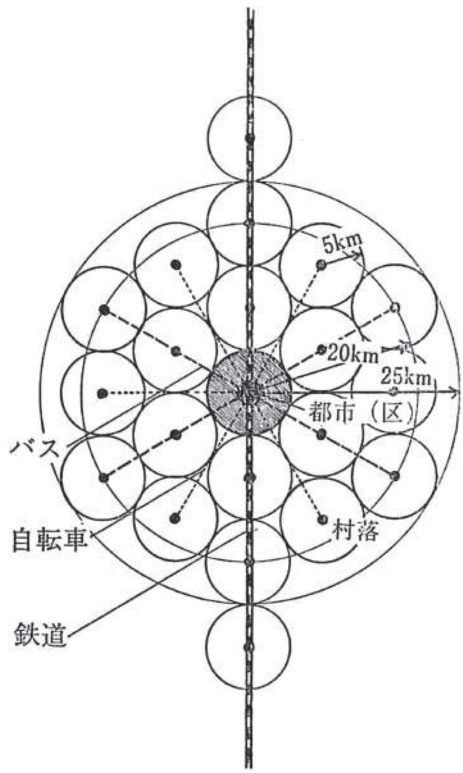
Table 9.5 City zone population structure

Village configuration	*Village agrarian industry population*	*Village hub population*	*Village total population*	*Total city zone population*	*Total city zone agrarian industry population*	*Hub city population (tentative)*	*Ditto, associated non-agrarian industry population*	*Village non-agrarian industry population*	*Total village non-agrarian industry population*	*Total city zone non-agrarian industry population*	*Total city zone population*	*Non-agrarian industry population, ratio*
7	8,270	3,252	10,340	206,800	165,400	100,000	96,748	2,070	41,400	138,148	303,548	45.5
10	10,180	3,684	12,725	254,500	203,600	100,000	96,316	2,545	50,000	147,216	350,816	41.1
2	10,600	5,300	13,250	265,000	212,000	100,000	94,700	2,650	53,000	147,700	359,700	41.0
8	13,820	5,436	17,280	345,000	276,000	100,000	94,564	3,460	69,200	163,764	440,164	37.2
17	14,280	3,993	17,850	357,000	285,600	100,000	96,007	3,570	71,400	167,407	453,007	36.9
18	14,360	4,017	17,950	259,000	287,200	100,000	95,983	3,590	71,800	167,783	454,983	36.9
19	19,550	5,570	24,438	488,760	391,000	100,000	94,446	4,888	97,760	192,226	583,226	32.9
20	27,960	6,992	24,950	699,000	559,200	100,000	92,088	6,990	139,500	231,588	791,088	29.3

Note: If one city zone comprises 19 villages and one city, and the city population is tentatively set at 100,000, of which those with the same character as those living in villages are designated as village population, then all others are non-agrarian industry population.

According to the National Census in 1930 the ratio of agricultural workers to total workforce in Japan was 47.7%, while census figures in 1920 showed the ratio of agricultural families as determined by the occupation of the head of household was 44.2% (accounting for 50% of the population); population policy drafted during the Pacific War adopted the fixed target of a 40% ratio for the agricultural population in the home islands, therefore apart from regional-hub single-function cities, the ratio shown here reveals how ample numbers of non-agricultural workers remained for general commercial and industrial bases, or megacities.

The non-agricultural sector population, excluding those tasked with key village functions, represent 9.5% of the total population of 100,000, and even an employment rate of 40% would yield 43,000 workers. If we assume that, of these, 50% are locally employed in services for that city's residents (see Table 9.2), then we are able to conclude that 22,000 workers can deliver the city's specialized function. Arguably, then, this is a reasonably adequate size to maintain an independent production base.



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都市（区）	City (*ku*)
バス	Bus
自転車	Bicycle
村落	Village
鉄道	Railroad

Figure 64 Structural diagram of unitary single-function city zone

C4 Large City

Regional hub city. The most-densely populated regional, or at times national or even international, hub city—organized with advanced cultural, commercial, economic, and administrative functions—is connected to the city ward (that serves as a regional hub city) by rapid transit facilities (maximum 90 minutes one way, or 3 hours for the associated rural population, by adding 90 minutes to their travel time from rural residences to the city ward center).

This is Ishikawa's so-called "end of the month" city, or "end of the season" city. It is located within reach of the furthest flung rural residences around the nation, making even a day trip possible (3 hours into the city; visit of 3 hours; and 3 hours return journey).

If rapid transit facilities can attain 50 km per hour, the distance from this center to the C3 city ward will be 75 km. If the city ward's area of influence spreads to a radius of 25 km, this large city's total area of influence will have an external perimeter of 100 km. If the traveling time threshold is extended by one hour, this becomes 150 km. In cases where the center has complete influence over a 100 km radius, and no other large city, or in its stead a regional subsidiary center, is nearby within a 150 km radius, this becomes a secondary region within this area of influence. Let's refer to the former as a local sphere, and the latter as a complex local sphere. An area of 100 km radius will have slight protuberances, but 19 city wards are possible in a proscribed circle.

This is the minimum number of city wards (C3) a large city (C4) can have. A 150 km radius can have approximately 40 cities. A large city with around 30 subsidiary city wards could be considered an intermediate size.

However, this number of cities is the minimum threshold for rural regional centers in agricultural regions and their hinterland. *Ku*, or unitary cities that make up a large city, are not included in this number. Also, city wards will be broadly dispersed as the nation becomes industrialized, and will boost this number.

3.2. Component Levels in All Regional Areas

3.2.1. The Scale of Large Cities

By arranging a region's component levels from C1 hamlets to C4 large cities, the distribution by place of residence of the population of a regional area associated with one large city (namely, its total hinterland) is shown in Table 9.6, based on trial calculations in the previous section.

In other words, the rural population for one regional area is 7,262,000.

In comparison, how large is the population of the non-agricultural sector? Assuming the entire nation is composed of regional areas of the kind given here, then the distribution ratio by industry of the entire population can be thought to be the same as that for all regional areas. Therefore, changes to the

Table 9.6 Structure of regional zones

Level of residential area	*Population scale and range*	*Average*	*Of which, agrarian industry population*	*Average zone radius (maximum)*	*Lowest component*	*Number of, in 1 large city*	*Total population (1,000)*	*Of which, agrarian industry population*
C1 Hamlet	1,000–2,500	2,000	2,000	2.0(4.0)		$3,000C_1$	6,000	6,000
C2 Village	3,000–7,000	5,000	2,000	5.0(15.0)	$C_1(4–7)$	$600C_2$	3,000	1,200
C3 City (*ku*)	50,000–200,000	100,000	2,000	25.0(35.0)	$C_2 \times 20$	$30C_3$	3,000	60
C4 Large city	1,000,000–	x	2,000	100.0(150.0)	$C_3 \times 30$	C_4	X	2
All regional zones							X+12,000	7,262

Table 9.7 Changes in national population, population by industry type, and large city hub population

Year	*Number of years, when 1945 = 0*	*Forecast population (1,000)*	*Agrarian industry population (tentative)*	*Agrarian industry population, ratio (%)*	*Total population in 1 regional zone*	*Large city hub population*
1945	0	78,986	35,000	44.3	16,388	4,388
1955	10	90,107	35,000	38.8	18,696	6,696
1965	20	101,609	35,000	34.4	21,082	9,082
1975	30	111,453	35,000	33.0	23,125	11,125
1995	50	122,328	35,000	31.5	25,381	13,381
2015	70	118,493	35,000	29.6	24,585	12,585
2045	100	111,777	35,000	31.4	23,192	11,192

Note:
1. Population forecasts are National Institute of Population Research estimated values from 1941.
2. It is believed the current agrarian industry population of 26.5 million will increase by 8.5 million to 35 million, due to reclamation of 1.7 million hectares, but that there will be no expansion of arable land beyond this. Urban acreage will increase as urban population rises with this population growth, but it is thought that this will mostly make use of steeply sloping land in mountains and forests so as not to waste arable land acreage; and it is believed the agrarian industry population will not increase beyond 35 million, due to concentration of agrarian industry business.
3. Regional zone population is calculated by dividing the total agrarian industry population in all regional zones of 7.262 million by the agrarian industry population ratio.
4. Hub city population is calculated by subtracting the sum total of the population of C1, C2 and C3 of 12 million from this population.

population distribution over the next 100 years can be found in Table 9.7, assuming the estimated population in 1945 was 79,985,589, and arable land was 1.7 million ha. of cleared territory; and if the estimated total rural population is 35 million and remains at a fixed level thereafter; and also, in accordance with estimates from the National Institute of Population Research [*Jinkō mondai kenkyūjo*].

According to this, the rural population ratio in 1945 was 44.3%, and is projected to be 33.0% thirty years later. Using an inverse calculation of this ratio for X in Table 9.6, the total population for the regions according to the ratio in 1945 is 16 million; the large city population is 4.39 million if we assume medium-sized cities have a population of 100,000, or 2.89 million if they have 150,000. If large cities that perform as regional centers are made up of unitary single-function city wards each comprising around 100,000 people, then 30 or 40 of these will lead to an immense association of city wards. If five of these cities of 100,000 are amalgamated to form a combined *ku* of 500,000, then it follows that a large city can be made up of an association of 6 to 8 of these *ku*.

The above calculations are for the case where a regional area has 30 rural hub cities; but where there are 20 cities within a 100 km radius, the large city

Table 9.8 Designated population ratio, by level of city

Level of city	*Unitary city, where population is 100,000*		*Unitary city, where population is 150,000*	
	Population (10,000)	*Ratio (%)*	*Population (10,000)*	*Ratio (%)*
C1 Hamlet	600	37.5	600	37.5
C2 Village	300	18.7	300	18.7
C3 City (*ku*)	300	18.7	450	28.1
C4 Large city	400	25.0	250	15.6
Total	1,600	100.0	1,600	100.0

population is 4 million if the unitary city has 100,000 people, and 2.5 million if the unitary city has 150,000. Suppose now that the unitary city has 100,000, and the population of the large city is 4 million. Table 9.8 shows calculations for population ratios by designated city division; in those with more than 100,000 urban residents, the ratio is 43.7%, and in those with less than 250,000 hamlet and village residents, the ratio is 37.5%.

3.2.2. Limits to the Large City

In the above calculations, in order to work out the scale of the large city, it is assumed the size required to maintain the central facilities of the C3 city ward, the economic and cultural heart of the regional and rural area, is around 100,000 (or 150,000); the non-agricultural population, apart from those allocated to city wards in the regional centers, may be presumed to be located in the large city at its center. In fact it doesn't matter where the non-agricultural population belonging to this large city is situated; nevertheless, locating them in the large city creates a more concentrated population and thereby lifts the profitability of urban facility operations, and is also more beneficial to residents' consumer lives.

However, there are limits to the benefits that accompany such enormous urban expansion. I suspect there is probably some economic constraint at play.

First of all, ever-greater urban growth, regardless of what form the constructed city takes or how dense it is, will mean that each part becomes further separated from the others depending on the planar expansion, and it will be difficult for a specialized industry within the city to work as a unified functioning system; ultimately, the city ward will probably differ little from a chaotic amalgamation that spreads continuously throughout the entire regional area.

Moreover, if the scale itself of each division that operates a specialized function becomes too large, close mutual contact also becomes difficult, and the benefits of specialization diminish.

In other words, urban expansion on an extreme scale doesn't always mean concentration becomes a positive factor for running highly efficient urban businesses.

Also, even though coordination is needed to maintain a balance between each part (and type) of facilities that make the large city a multi-functional body, if the city expands without restraint, then parallel improvements to newly added facilities will be needed to match frequent improvements to existing facilities, and this will be close to impossible to achieve. Therefore, to what extent must the scale of the megacity be calculated? In other words, we need to examine target limits for the "large city."

Let us look at several of these conditions below.

3.2.2.1. CITY DIMENSIONS

No matter what form the architectural constructs of the city take, and even if there are high-density residential arrangements, increases in urban population will result in expansion of the city's dimensions; continuous expansion of this urbanized land will probably be unrealizable, because in the end the convenience arising from more concentration will not compensate for integrated transport difficulties. What is the nature of these limitations?

When considering rail as the transport system, if traveling time to the hub is within 30 minutes (or one hour if connection times and commuting to the station are added), and trains travel up to 50 km per hour, the urban zone will have a 25 km radius, and its area will be 1,870 km^2.

If the gross residential density in urbanized areas is 100 people per ha., the population will be 18.7 million, but taking into account that the integration of other elements such as productive green land to supply vegetables, and bodies of water, will account for 40% of the urbanized area, the total population will be 7.48 million or approximately 7.5 million.

3.2.2.2. LOAD ON TRANSPORT FACILITIES

From the number of cars per person and the capacity of major roads, Ishikawa has estimated the upper threshold of the population of Tokyo to be 2 million, using empirical relational expressions for traffic volume on major roads and the number of parked vehicles in the city. (See "Constructing the City for the Empire" [*Kōkoku toshi no kensetsu*], p. 62.) However, there are significant problems with this.

Aside from this, I examined how, due to special circumstances in Japan, rapid urban transit favors rail rather than auto transport.

I calculated volumes for travel by those from adjacent regional areas to the city center, and travel by residents of a large city into the city center, as follows:

The carriage carrying capacity per single rapid transit line per hour (5-carriage trains, each carriage holds 150, trains 3 minutes apart)—15,000.

If the volume per hour during rush hours is 25% of the volume over a 24-hour period, the daily carrying capacity—60,000.

If traffic into the city center is concentrated on weekends, with Sunday four times and Saturday three times that of normal times, then the total carrying capacity per week is multiplied by 12/4—180,000.

If 40% of residents (roughly the ratio of adults in employment) travel into the city center once per week, the passenger load on a single rail line is multiplied by 100/40—45,000.

Therefore, the ideal configuration for a radial rapid rail system requires seven lines in a large city of 3 million; 10 lines in one of 4.5 million; and 14 lines in one of 6 million.

However, this accounts only for residents within the large city; outside the city, there will be 12 million people in nearby regional areas (or 13.5 million, if each unitary city has 150,000 people.) If residents in the periphery travel at the rate of one trip per month into the city center (in other words, the equivalent to one quarter of that of the city's population), this converts to an urban population of 3 million, and will require a further 7 to 8 rail lines.

By combining these two components, a city of 3 million will require 15 rail lines, and one of 6 million, 21 rail lines. Furthermore, if each rail line has an hourly capacity during rush hour of 15,000, then the former will require open spaces and roads able to handle the flows of 225,000 people per hour. (Although basic calculations are made here, the widths of rapid rail lines and major roads are not determined by city size conditions, but to the contrary must be decided instead conceptually by the capacity of transport systems rather than city scale.)

3.2.2.3 SIZE OF THE CITY CENTER WARD

A megacity is made up of multi-functional elements, but it is desirable to concentrate those that handle commerce and economics in the city center ward.

When a city becomes huge, the city center ward that is packed with commercial industries itself becomes enormous, and there is a risk that this highly intensive function will become paralyzed. If the maximum size of the city center is restricted to one combined ward of 500,000 (i.e., five [unitary] cities of 100,000) to avoid falling into this predicament, then the total workforce participating in city center business will be 100,000, given a 40% ratio of employed workers and a 50% ratio of workers in external industries (500,000 X 0.40 X 0.50 = 100,000). On the other hand, applying figures from 1935, the ratio of the commercial industry workforce in large cities was 32% while that in medium-sized cities was 27%; if this difference of 5% is thought to correspond to the function of the large city, and this 5% represents 100,000 of a total workforce of 2 million, or an employment ratio[3] of 40%—then we can perform a reverse calculation to arrive at 5 million for the large city's total population.

The above calculations are all estimates based on the large city as a single concentrated center; however, there are at present other forms of independent centers such as the Kinki regional area, with Osaka as the focus for commerce and industry, Kobe as its center for port facilities and industry, and Kyoto as the hub for culture and welfare. In this case, the central functions are dispersed, so the above calculations probably produce higher values. However, what is needed is a transport system able to connect these spread-out centers, and some skillful planning for an integrated transport network to handle this dispersion of the center.

3.2.3. Population Growth and Urban Distribution of Population

If limits to the size of the large city are imposed according to the calculations in the previous section, how must we proceed to distribute these extra people across Japan's cities when the population grows? Naturally, this is determined by the placement throughout our nation of industries serviced by the non-agricultural workforce, so what happens if we make considerations excluding these conditions?

According to National Institute of Population Research estimates of future population forecasts, 50 years from now Japan's total population will reach a peak of 122.33 million. The rural population ratio will fall to 28.6%, and calculating with the same method used two paragraphs above, the population in all regional areas will be 25.38 million, and 13.38 million in medium-sized cities (or 11.88 million, in cities of 150,000). Compared to the examination conducted in the previous paragraph, this is clearly excessive.

If the population of the large city is held in check at the 6 million level, the remaining 7.38 million (or 5.88 million) will have to be placed somehow in places outside the hub city.

There are three conceivable methods of handling this.

First, don't keep the size of the unitary city at 100,000, but increase it further.

A solution based on this method will alter the size of the unitary city to 350,000. Enlarging cities that were originally devised to have 100,000 (or 150,000) will mean that urban facilities undergoing such drastic changes are unable to meet their assigned targets.

Second, raise the placement density of unitary cities.

It would be fine to increase the number of cities in an area from an initial 30, to 104 cities (increase by 74, or three and a half times). If the distance between cities is halved, in other words if new ones are created consecutively between existing cities until the total number is quadrupled, this method should resolve the matter.

If the city is considered to be a complete organism, and provisions are made to construct it as a unit, this method is the most suitable.

Third, construct ancillary hub cities, or subdivide regional areas.

There are instances where it is beneficial to create an ancillary hub city in a place that, while still in the same regional area, is somewhat distant from the large hub city for topographical or other reasons, or features a rather dense concentration of unitary cities. Also, there are regional areas with an existing large city at their center where [urban] dispersion is extremely sparse. New regional hub cities can be promoted in such places, and conceivably this might soon be a way to create a new regional area independent from a long-established regional sphere. The surplus non-agricultural workforce of 7.38 million (or 5.88 million) is clearly a sufficient number of people to build a new large city hub.

Of these three methods, I believe the latter two should be actively implemented. Which of these is used depends on factors such as: trends in locating industry throughout the nation; the layout of transport networks; geographical and historical circumstances in each regional area; and the relationship between the regional area and the nation as a whole. However, future population growth must be dealt with by one of these methods—further upgrading the hub city through concentration and accumulation; building ancillary hub cities; subdividing regional areas; or increasing the placement density of cities—to relocate the non-agricultural population, not by dispersing them throughout villages and hamlets, but as urban dwellers through the creation of unitary city wards.

3.2.4. Placement Density of Unitary Cities that are Large City Hubs

In the previous paragraph, the structure of the regional area has come to be thought of as the arrangement of an enormous large-city hub of unspecified size and 30 unitary cities within the regional zone; however, as has already been stated many times, the large city is merely constructed from unitary cities, except that they are arranged tightly together. Therefore, it is possible to reconsider the unitary city placement density in all regional areas.

Let us consider two cases for the unitary city: (a) population of 100,000; and (b) population of 150,000.

First, let us examine closest-possible placement distances when taking into account vegetable self-sufficiency.

If the population density for urbanized land is 100 persons per ha., the dimensions of the city (total urbanized area) will be 1,000 ha. (1,500 ha.), with a radius of 1,784 m (2,185 m). If available urbanized land, namely land available for effective use, is 50%, then this will be 20 km^2 (30 km^2), and its external diameter will be 5.05 km (6.18 km) if the land is circular, or 4.81 km (5.89 km) if it is hexagonal. Arable land needed for supplying fresh vegetables will be 20 *tsubo* (0.0066 ha.) per person, and if arable land represents 20% of the entire area, the city's total land needs will be 3,300 ha. (4,950 ha.), and the distance between cities will be 6.18 km (7.57 km).

Table 9.9.1 Designated population ratio, by level of city

City scale (10,000)	*Acreage (100 persons/ha) (ha)*	*City radius ($r=\sqrt{A/\pi}$)(m)*	*Vegetable gardens (66ha/10,000 persons) (ha)*	*Total city acreage*			*Distance between cities*		
				Arable land 12% (ha)	*20% (ha)*	*33% (ha)*	*Arable land 12% (km)*	*20% (km)*	*33.3% (km)*
5	500	1,261	330	2,750	1,650	990	5.64	4.37	3.88
10	1,000	1,784	660	5,500	3,300	1,980	7.79	6.17	4.73
15	1,500	2,185	990	8,250	4,950	2,970	9.76	7.56	5.86
20	2,000	2,523	1,320	11,000	6,600	3,960	11.28	8.73	6.76

Note:
1. The required acreage for urbanization is 100 persons per hectare, and for vegetable gardens is 66 hectares per 10,000 persons, or 20 *tsubo* per person [1 *tsubo* = 3.3 sq. m.].
2. Regarding distance between cities, the city is assumed to be a perfect hexagon and connected with one another; $D^2 = (2/\sqrt{3})A$, from which the formula $D = 1.075 \sqrt{A}$ was calculated. (See Figure 68, p. 258.)

Table 9.9.2 Width of green belt between cities, when vegetable self-sufficiency is attained

Total effective land acreage ratio		*80%*	*50%*	*30%*
Required total city acreage per person (assuming 0.0166 ha/person)		0.0208ha	0.0332ha	0.0553ha
Required urban space acreage per person		0.0125ha	0.0200ha	0.0333ha
Unitary city (10,000)	Total city (diameter)	4.90km	6.20km	8.00km
	Urban space (diameter)	3.80km	4.81km	6.21km
	Green belt width	1.10km	1.39km	1.79km
Unitary city (15,000)	Total city (diameter)	6.00km	7.58km	9.79km
	Urban space (diameter)	4.66km	5.89km	7.59km
	Green belt width	1.34km	1.69km	2.20km

Therefore the placement distance between cities where the minimum amount of green land (for fresh vegetable supply) is allocated, will average 6 km with around 50% land available for effective use, and the width of green land will be around 1.5 km.

The ratio of land available for effective use will be even greater in the heart of the plains where large city hubs are found, and conversely the ratio will be lowest in the peripheries of regional areas; therefore, for the three different ratios of land available for effective use (namely, 80%, 50% and 30%), calculations for the distance between cities, and the width of green belts, is shown in Table 9.9.2.

This is the average minimum spread when placing unitary city (wards).

Now, if we imagine the structure of the large city with the city center urban ward at its middle point, it is desirable for city wards in the so-called association of city wards to be within half an hour or around 25 km of the city center. Suburban city wards (a large city's suburban neighborhoods) are placed on its outskirts, connected by one-way journeys under an hour; and located further beyond these are unitary cities that form the hub of adjacent regional areas.

Assuming several graded ratios of land area available for effective use (or arable land ratio), and calculating the region's city placement capacity based on a few conditions such as vegetable and staple food supply for the region's population, a concrete representation for the model of these placement correlations can be seen in Table 9.10.

However, the reality of our nation's topography means that there are few instances where land simply stretches out all around the periphery of a regional hub city; and because of the proximity of the heartland for large cities to bays and seas, considerable areas of water are included whether you measure the regional area with a radius of 25, 50 or 75 km, making it difficult to attain the urban land dimensions shown in Table 9.9.2. Naturally, the degree of "shrinkage" due to these bodies of water and other factors varies in

Table 9.10 Regional zone acreage and number of cities in groupings

City designation	*Zone radius (km)*	*Arrival time (hours)*	*Total acreage (km^2)*	*Number of 10,000-person cities within zone*		
				Vegetable self-sufficiency (0.007 ha arable land per person)	*Main foodstuffs self-sufficiency (0.0833 ha)*	*Ditto (0.11 ha)*
			Arable land ratio (%)	33.3	50.0	50.0
				20.0	30.0	30.0
				12.0	20.0	20.0
			Effective land ratio (%)	83.3	56.0	55.0
				53.3	33.6	33.0
				32.0	22.4	22.0
			10,000-person city acreage (km^2)	19.8	166.5	220
				33.0	277.7	367
				55.0	416.5	550
1. Large city hub	25	0.5	1,870	94.4	11.2	8.5
				56.7	6.8	5.1
				34.0	4.5	3.4
2. Large city association	50	1.0	7,840	396.0	47.1	35.6
				237.5	28.2	21.4
				142.5	18.8	14.3
3. Regional zone	75	1.5	27,600	1394	165.7	125.5
				836	99.4	75.2
				502	65.5	50.2
4. Overlapping regional zone	150	3.0	110,400	5574	662	502
				3344	398	301
				2014	265	201

Note: 1. Required city acreage is calculated from required arable land acreage per person, and arable land ratio.
2. For required arable land acreage per person, it is assumed 20 *tsubo* (0.0066 ha) per person for vegetable self-sufficiency. For main foodstuffs self-sufficiency, two sets of figures have been used. (a) On the somewhat generous side, it is calculated as 0.0833 ha per person, or 1 ha per 0.9917 X 21.5 X 0.61/1.076 = 12 persons, where rice paddy per arable land acreage is 60%; rice consumption volume is 1.076 *koku* per person; and rice production volume is 2.15 *koku* per *tan*. (b) It is calculated as 0.11 (0.1113) ha per person, or 1 ha per 0.9917 X 19 X 0.52/1.1 = 8.9 persons, where the rice paddy ratio is 52%, rice consumption volume is 1.1 *koku* per person, and rice production volume is 1.9 *koku* per *tan* (statistics for 1939).
3. For total effective land ratio in all cases, since urbanized land (100 persons per ha, or 1 person per 0.01 ha) is added to arable land, multiply the arable land ratio by 0.017/0.007 for vegetable self-sufficiency; 0.0933/0.0833 for main foodstuffs self-sufficiency in the case of (a); and 0.12/0.11, in the case of (b). The results are shown in the table.
4. The number of cities is obtained by dividing total acreage by urban acreage.

each regional area, but it is conceivable that roughly 80–90% of land is available for effective use in a 25 km radius, 75–80% in a 50 km radius, and 60–70% in a 75 km radius. Furthermore, in a radius of 150 km where regional areas overlap, the degree of "shrinkage" will increase because neighboring areas extend into it as well as these bodies of water, and a ratio of 20–30% is conceivable.

In order to create mock-up values right now, let us assume actual effective area ratios of 85%, 80%, 70%, and 30%, and population distributions of 5 million for a large city hub, 7 million for an association of large cities, 10 million for a regional area, and 11 million for total[4] regional areas; the results can be seen in Table 9.11.

Accordingly, 20% arable land (ratio of total land available for effective use around 53%) in the central regions would make vegetable self-sufficiency possible, while 50% arable land (effective use ratio, around 56%) in an association of large cities would make 50% self-sufficiency in total foodstuffs possible, and 30% arable land (effective use ratio, around 33.6%) in all regional areas would mean complete self-sufficiency in foodstuffs.

In this case, the distance between cities for city wards of 100,000 is 6.1 km in the central areas (or 7.4 km for city wards of 150,000); 14.7 km in an association of large cities areas (or 18.0 km); 24.6–25.3 km in regional areas (or 30.1–30.9 km). (See Figure 67, p. 258 [p. 111].) In all cases, the distance between city wards does not exceed 30 km, which is roughly half the city ward catchment area radius of 50 km calculated previously, so we can see how they are useful as weekend hubs for nearby villages scattered about between cities.

Population density per square km ranges from 3,145 in central areas, to 1,196, 517, and 443, respectively. The population density for all rural areas is lower than the 523 per square km for the Kanto plain area (in 1935), but is higher in all other areas. Arguably, this is one model for placement that satisfactorily increases city density.

4. Regional Area Hubs across the Entire Nation—Placement of Megacity Associations

If we explore our nation for areas that clearly are, or might be, composed of a regional area with an association of large cities as its hub, examples emerge such as the Kanto region with Tokyo–Yokohama at its center, or the Kinki region centered around Kyoto–Osaka–Kobe. Although the following have much less sway compared to these two above, additional candidates can be found such as the Tokai region with Nagoya as its hub, and the region of Kyushu (including the western tip of the Chugoku region) centered around the Kitakyushu Industrial Belt.

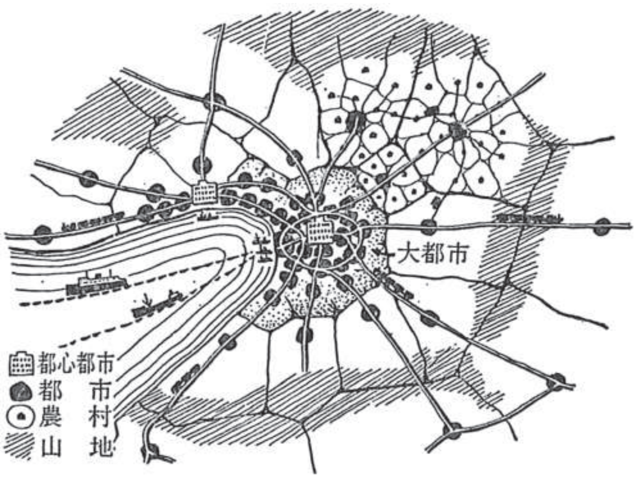
For convenience' sake, if we check the differential figures for the statistics of the area and population (in 1935) for the first two regions, their populations are 16.87 million and 11.87 million respectively, and the latter is close to the aforementioned model. Their areas are 32,226 km^2 and 27,221 km^2

Table 9.11 Regional zone city arrangement structure

City designation	*Actual acreage ratio (%)*	*Ditto, assumed average (%)*	*Total acreage (km^2)*	*Estimated number of cities*	*Number of cities in zone*	*Ditto, acreage (km^2)*	*Acreage per city (km^2)*	*Distance between cities*	*Population density, within city zone (persons/km^2)*	*Population density, within entire zone (persons/km^2)*	*Distance between cities, for cities of 150,000 (km)*
1. Large city hub	80–90	85	1,590	50(58.9×0.85)	50	1,590	31.8	6.06	3,145	3,145	7.42
2. Large city association	75–80	80	6,270	75(93.8×0.8)	25	4,680	187.1	14.70	534	1,196	18.00
3. Regional zone	60–75	70	19,320	100(143×0.7)	25	13,050	522.0	24.56	455	517	30.08
4. Overlapping regional zone	25–30	30	24,800	110(367×0.3)	10	5,520	552.0	25.25	181	443	30.93

Note:

1. The actual acreage ratio is the ratio where actual regional zone assigned acreage is reduced by the filling in of topographical features such as water surfaces, and neighboring regional zones, and also by the total area of a circle inscribed with a regular zone radius.
2. In the case of figures devised for cities with 100,000, the estimated number of cities is presumed to be as in Table 9.9, with predicted possible effective land ratios, based on calculations of the number of cities by effective land ratio. In other words, the level of placement estimates where: in one zone, 20% of arable land (total effective rate of 53%) allows vegetable self-sufficiency; in two zones, 50% of arable land (total effective rate of 56%) allows 50% self-sufficiency in main foodstuffs; and in three zones or an entire regional zone, 90% of arable land (total effective rate of 34%) is more than adequate for complete self sufficiency in main foodstuffs.
3. For distance between cities, if cities are spaced equally apart, then $D^2 = (2/\sqrt{3})A$, from which the formula $D = 1.075 \sqrt{A}$ was calculated. (Same as Table 9.9.)



Text: diagram

Large city

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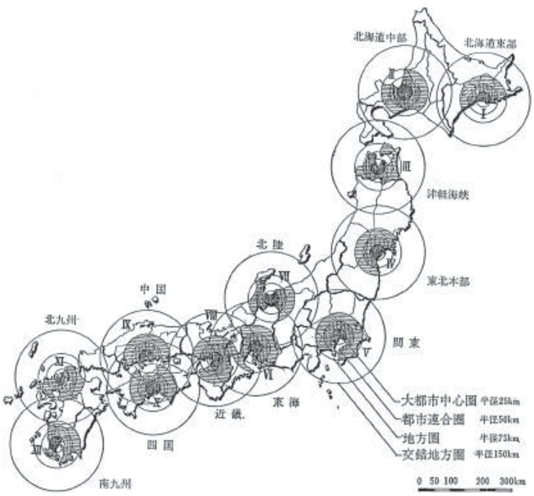
Capital city
City
Village
Mountain area

Figure 65 Model for fixed residences centered around a large city



Text: map of Japan

I. Hokkaido eastern region
II. Hokkaido central region
III. Tsugaru Straits
IV. Tohoku
V. Kanto
VI. Tokai
VII. Hokuriku
VIII. Kinki
IX. Chugoku
X. Shikoku
XI. Kitakyushu
XII. Minamikyushu

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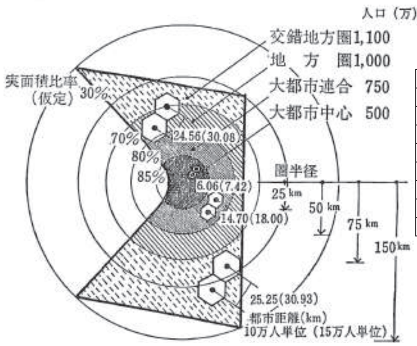
Large city hub zone	radius 25 km
City association zone	radius 50 km
Regional zone	radius 75 km
Overlapping regional zone	radius 150 km

Figure 66 Regional zone placement map

respectively, which are slightly larger than the 24,840 km^2 cited in the model. Therefore, the population density of the former is much higher than that for all regional areas, while the latter is roughly at the same level. However, the arable land ratio for the former is 25.3%, but for the latter it is an extremely low 10.1%. This ratio is higher in the former than the model, but its population density is relatively high; conversely, the population density in the latter is close to that in the model, but its arable land ratio is relatively low and only



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人口（万）	Population (10,000)
交錯地方圏１１００	Overlapping regional zone 1,100
地方圏１０００	Regional zone 1,000
実面積比率（仮定）	Actual acreage ratio (estimated)
大都市連合７５０	Large city association 750
大都市中心５００	Large city hub 500
圏半径	Zone radius
都市距離	City distance
１０万人単位（１５万人単位）	100,000 person unit (150,000 person unit)

Figure 67 Model map of regional zone structure

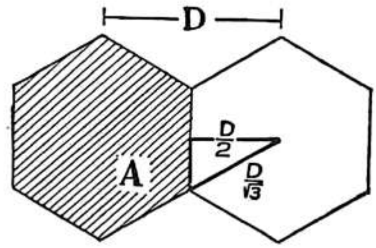
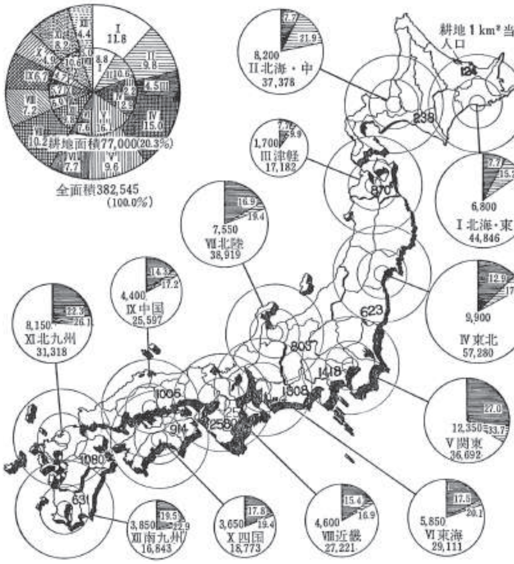


Figure 68 Diagram of distance between cities

Table 9.12 Acreage, population and population density, by statistical zone

Statistical zone	*Acreage (km²)*	*Population (in 1940)*	*Population density*
Hokkaido	88,775.04	3,272,718	37
Tohoku	66,911.21	7,164,674	107
Kanto	32,225.83	16,866,093	523
Hokuriku	25,292.37	4,288,554	170
Tosan	28,586.70	3,638,779	127
Tokai	18,616.33	1,383,235	343
Kinki	27,220.69	11,870,453	436
Chugoku	31,679.19	5,718,434	181
Shikoku	18,772.83	3,337,102	178
Kyushu	42,078.99	9,936,690	236
All Japan	382,545.42	73,114,308	191



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Arable land acreage 77,000 (20.3%)
Total acreage 382,545 (100%)

Text: map of Japan

Population per 1 km^2 arable land
I. Hokkaido, east
II. Hokkaido, central
III. Tsugaru
IV. Tohoku
V. Kanto
VI. Tokai
VII. Hokuriku
VIII. Kinki
IX. Chugoku
X. Shikoku
XI. Kitakyushu
XII. Minamikyushu

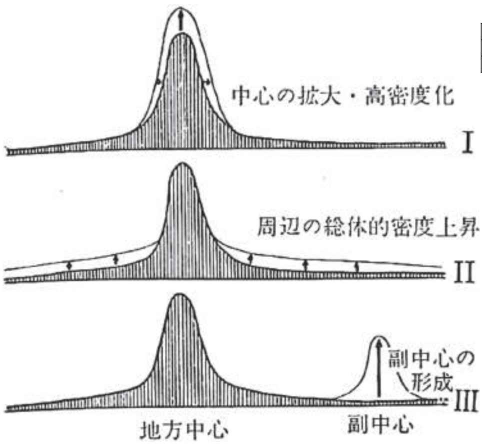
Figure 69 Arable land ratio and population density, by regional zone
Note:
1. Round key shows acreage. Base height represents population density per arable land acreage.
2. Dark shading shows arable land acreage for 1935; but combined with the area in the light shading, this shows the present (1938) latest arable land ratio after expansion of arable land; pie charts for total arable land acreage show latest arable land acreage.
3. Numbers on the map show arable land population density maximums.

half that of the model. Consequently, neither region is able to attain food self-sufficiency.

In other words, if the aforementioned model is used as the standard, these two regions are clearly overdeveloped. Now if we draw 150 km-radius circles around each of the regional areas with existing cities as their hubs examined above (see Figure 66), the Tokai and Kinki regions heavily overlap as shown in the figure, but large gaps can be seen between the other regions, and large swathes of land not included at all in the abovementioned regional areas are revealed.

Therefore, we can see how in future these gaps and spaces must be filled, and that it is desirable megacity associations be established in new regional areas in this middle ground.

This development strategy seems like a proposal to build a hub in this open space, simply because there is something missing in the middle of the countryside. All things being equal, such as requirements including where to locate industry, then naturally this way of thinking is plausible. However, in reality the factors behind locating industry vary according to region, and these



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I. Hub expansion, high densification
II. Overall density increase in periphery
III. Secondary hub forms; regional hub; secondary hub

Figure 70 Models for population concentration and population density increases
In I. there is no increase in hub density, and indeed there are cases where it declines. In other words, where a hub zone changes its character from an area used for both work and residences to one solely for workplaces, one can find examples where the central zone of a former large city often fragments. However, such phenomena are only seen on a small scale; in the big picture, as expected, there are many cases where hub regions continue to grow (although it is inevitable that growth rates will decline). That is, I. represents the typical situation for large city development at present.

differences are what give rise to the remarkable development in the Kanto and Kinki regions at the present time, and the relative lag in other regions. Despite some leeway in areas that are already developed, if we believe that the situation where a part of the nation is overdeveloped and too densely populated must on the whole be corrected in the future, then a proposal of this nature is feasible.

Considered in this light, if new hubs were to be sought while taking into account topographical and historical factors in each region, we could conceive of a total of 12 areas, including: hubs in Chugoku, Hokuriku, Tohoku, and Hokkaido; parts of Shikoku separate from Chugoku; Minamikyushu, separate from Kitakyushu; Tsugaru Straits region and the eastern Hokkaido region, separate from the central Hokkaido region. Problems may arise when terrain and climate factors are taken into practical consideration, but it is conceivable that by constructing these regional areas, a dispersion arrangement may be possible to rebalance the nation industrially and culturally.

These 12 areas differ from traditional statistical-area regional subdivisions. By establishing borders for these new regional areas around the prefectures shown first of all in Figure 66, and for each of these regions include figures for area; population; population density; amount of arable land (as of 1936); and arable land ratios; then, Table 13 is produced when calculating for each region the

Table 9.13 Arable land expansion ratios, by region

Region	*Total acreage (1930) (km^2)*	*Arable land (1939)*			*Extra arable land from expansion (1938)*			*Extra arable land from expansion ratio (%)*
		Paddies (ha)	*Farmland (ha)*	*Total (ha)*	*Paddies (ha)*	*Farmland (ha)*	*Total (ha)*	
Hokkaido	88,775.036	211,028	747,480	958,508	120,000	500,000	620,000	64.8
Tohoku	66,911.215	558,924	340,490	899,414	106,222	201,789	308,111	34.3
Kanto	32,243.184	416,863	535,878	952,741	59,311	182,039	241,350	25.3
Chubu	66,467.546	687,157	403,185	1,090,342	60,445	90,066	150,511	13.8
Kinki	32,985.995	395,066	121,469	516,535	19,241	33,171	52,412	10.1
Chugoku	31,672.623	334,842	135,725	470,568	39,208	54,846	94,054	20.0
Shikoku	18,772.679	147,883	116,788	264,666	7,580	20,387	27,967	10.6
Kyushu	42,050.541	467,324	438,216	895,541	55,520	94,764	150,284	16.8
All Japan	382,264.904	3,209,088	2,869,529	6,078,729	473,029	1,153,750	1,626,779	26.7

Note:
Arable land acreage is taken from the Koseikai's "National land development for Greater East Asia" [*Dai Tō-A no kokudo keikaku*], vol. 1.
Total acreage is from the 1930 national census report.

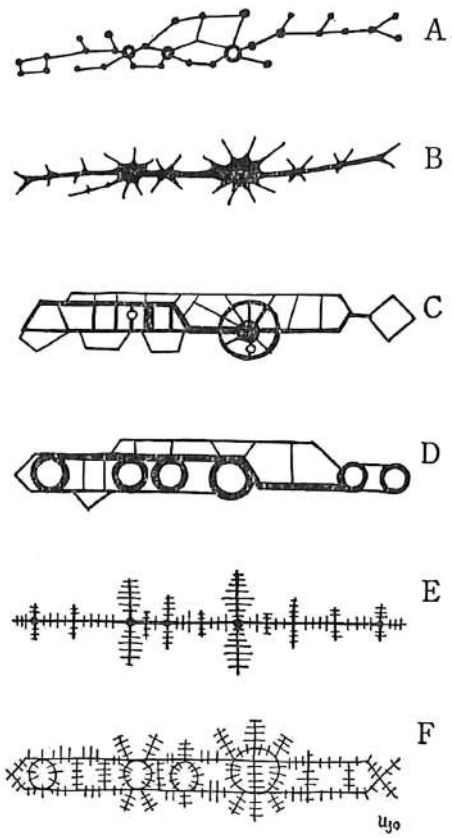


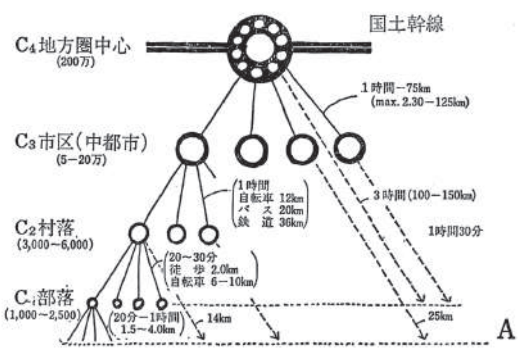
Figure 71 Structural models for Japanese land development
B: Natural-growth radial structure
C: Nishiyama Research Lab, "Design for Life Space in the Nation" [*Kokudo ni okeru seikatsu kūkan no kōsō*], *Shin Kenchiku*, March 1966.
D: Atsushi Ueda, "Design for Nation and City" [*Kuni toshi no kōsō*], *Mainichi Shimbun*, March 1968.
E, F: Spinal formation, and its compound formation.

final amount of arable land—after adding postwar projections for 1.7 million ha. of reclaimed land nationwide—and their respective ratios. The above table shows trial calculations of regional placement for areas indices only, and no allowance has been made for climate and other geographical disparities and conditions in San-In, Hokuriku, Tohoku, Hokkaido, etc. so it would be a mistake simply to use this raw data; however, the following information can be acquired from the table: the state of development of each regional area, and its development ranking, from figures for population density and population density per arable land (referred to as arable land population density); and their relative development reserves, or new urban dispersion reserves. From this, it will be clearer in which regions the nation's population and industries must be distributed in future.

Accordingly, we can remodel and reorganize regional area hub districts and their regions in existing developed areas such as Kanto and Kinki; at the same time we can carry out the urban arrangement of megacity alliances that will be the hub districts of new regional areas, and design the reorganization of transport networks to handle these new key formations.

5. Appendix

As discussed in the first half of the introduction, in the present chapter the principle objective of this tentative proposal for national formation is the gradated construction of residential areas; but it resembles an unusable outdated pattern because: the location of industry which is intrinsically linked with this issue has been disregarded; and technological innovations mainly in transportation, such as subsequent rapidly changing motorization, developments in airplanes, and the possibility of high-speed rail, have not been coordinated. However, in the national development that is actually being carried out, these technological advancements are being used by highly advanced monopolistic capitalism as a tactic or strategy to intensify overconglomeration, and there is a strong tendency that the warped state of the nation should simply be accepted. In this respect, this proposal sets aside the issue of the location of industry but nevertheless does discuss those conditions that check such issues, and cannot be said to be without significance. However, if we consider advancements in transport technology, several revisions are necessary in future designs. Also, as for the character of the city and the construction of residences, I later devised several propositions to revamp the aforementioned proposal. These do not appear in my collected works, so I add them here as a brief supplementary explanation to make up for any shortcomings.



Text: A, from top

National trunk line
C4 Regional zone hub
1 hour; 75 km (max. 2 h, 30 min; 125 km)
C3 City zone (middle-sized city) (50,000–200,000)
1 hour; bicycle 12 km, bus 20 km, rail 36 km
3 hours; 100–150 km
C2 Village (3,000–6,000)
20–30 min; by foot 2.0 km, bicycle 6–10 km
1 h, 30 min
C1 Hamlet (1,000–2,500)
20 min–1 hr; 1.5–4.0 km
14 km
25 km

Figure 72a Zone area structure for Japanese land (A: original proposal; B: revised proposal)

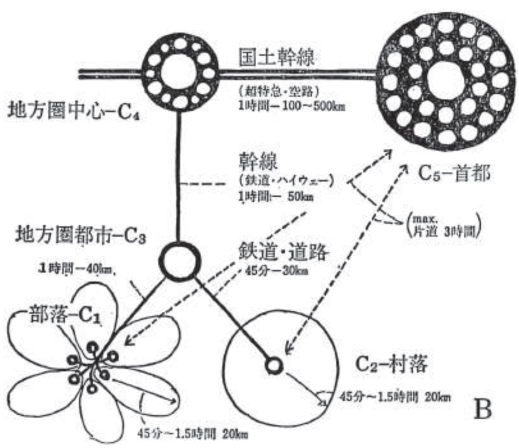
(1) In rural areas, foot traffic and bicycles are the main form of transport, but due to the systematic adoption of motorization, regions are expanding more, and furthermore it is possible to increase urban-style accumulation to bring about a better life.

(2) Because of this, it is possible to convert the gradated formation of cities from *C4–C3–C2–C1* (Figure 72A) to the formation of **C4–C3** / **C2** \ **C1** (Figure 72B).

(3) By strengthening C4 trunk-line rail links, the nation as a whole becomes more integrated; and with the necessary connections, the entire nation can be included in the "day-trip zone" of the nation's hub C5 (the capital city).

(4) The pyramid-shaped organization of regional formation appears to be constructed in a radial link pattern (concentric circle formation); however, Japan's long and massive land mass, its trunk-line rail lines that follow the shoreline, and a topography that features steep mountainous areas crisscrossed virtually at right angles by rivers, valleys and plains, mean to the contrary that a spinal formation or its compounded form (Figure 71, E and F) should probably be the basic configuration.

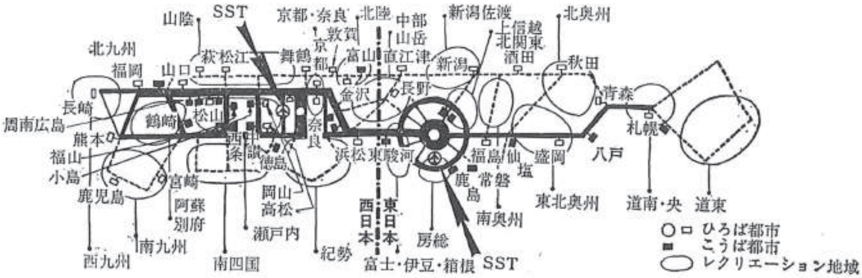
(5) The national rail network and the C3 aggregations, component elements of C4 and C5, form the backbone of a spinal or ladder shaped formation where the national rail lines run through the capital city and regional hubs; and in the central large city regions, perhaps a ringed formation encircling a "bay area" could be the framework, rather than a radial pattern.



Text: B, from top

National trunk line
(Super express; air route) 1 hour; 100–500 km
C4 Regional zone hub
Trunk line (rail; highway) 1 hour; 50 km
C5 Capital city
C3 Regional zone city
1 hour; 40 km
Railway; roads
45 min; 30 km
(max. one-way 3 h)
C1 Hamlet
C2 Village
45 min–1 hr 30 min; 20 km
45 min–1 hr 30 min; 20 km

Figure 72b (continued)



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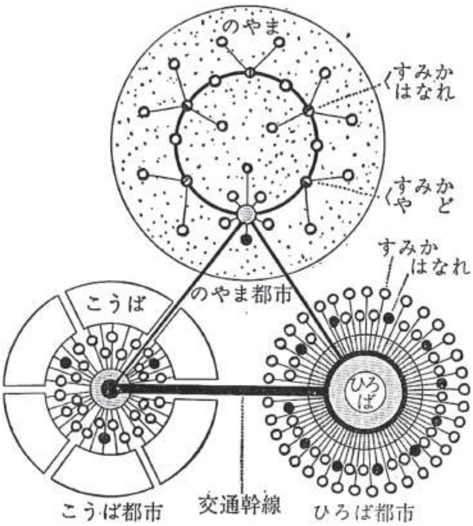
山陰	Sanin	東駿河	Higashisuruga
京都・奈良	Kyoto-Nara	福島	Fukushima
北陸	Hokuriku	仙塩	Sen-En
新潟佐渡	Niigata Sado	盛岡	Morioka
北奥州	Kitaoshu	八戸	Hachinohe
敦賀	Tsuruga	札幌	Sapporo
中部山岳	Chubu Sangaku	小島	Oshima
上信越	Joshin'etsu	宮崎	Miyazaki
北関東	Kitakanto	岡山	Okayama
北九州	Kitakyushu	西日本	Nishi Nihon
荻	Ogi	東日本	Higashi Nihon
松江	Matsue	鹿島	Kashima
舞鶴	Maizuru	常磐	Tokiwa
京都	Kyoto	鹿児島	Kagoshima
富山	Toyama	阿蘇別府	Aso-Beppu
直江津	Naoetsu	瀬戸内	Setouchi
新潟	Niigata	高松	Takamatsu
酒田	Sakata	南奥州	Minamioshu
秋田	Akita	東北奥州	Tohokuoshu
福岡	Fukuoka	道南・央	Donan-O
山口	Yamaguchi	道東	Doto
長崎	Nagasaki	西九州	Nishikyushu
鶴崎	Tsurusaki	南九州	Minamikyushu
松山	Matsuyama	南四国	Minamishikoku
金沢	Kanazawa	伊勢	Ise
長野	Nagano	房総	Boso
青森	Aomori	富士・伊豆・箱根	Fuji-Ise-Hakone
周南広島	Shunan Hiroshima		
熊本	Kumamoto	**Text: key, bottom right**	
西条	Saijo	Plaza city	
中讃	Chusan	Factory city	
徳島	Tokushima	Recreation area	
奈良	Nara		
浜松	Hamamatsu		

Figure 73 National land framework, binangle structure
(Source: Nishiyama Research Lab, "Design for Life Space in the Nation" [*Kokudo ni okeru seikatsu kūkan no kōsō*], *Shin Kenchiku*, March 1966.)



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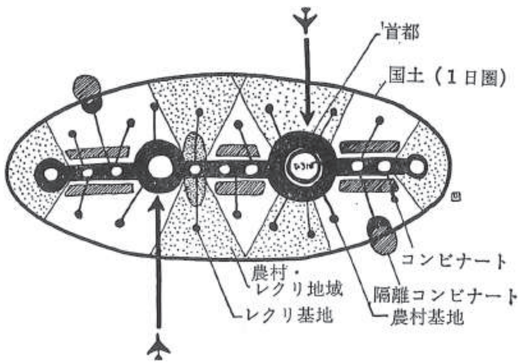
野山	Fields and mountains
すみか　はなれ	*Sumika* and *hanare*
すみか　やど	*Sumika* and *yado*
すみか	*Sumika*
はなれ	*Hanare*
のやま都市	Rural or mountain city
こうば	Factory
ひろば	Plaza
こうば都市	Factory city
交通幹線	Traffic trunk line
ひろば都市	Plaza city

Figure 74 Permanent residential model for national land space



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首都	Capital city
国土（1日圏）	Entire nation (one-day zone)
コンビナート	*Kombinat* (industrial complex)
農村・レクリ地域	Village-recreation area
レクリ基地	Recreation base
隔離コンビナート	Outlying *kombinat*
農村基地	Village base

Text: handwritten, in thick circle

ひろば　Plaza	

Figure 75 Structural model for the nation

(6) Every part of these networks must be designed, according to their function: airplanes, high-speed rail, railways, [green] belts, and walkways; and a general connection system of roads and canals to supplement these.

(7) Residential areas or housing are rather compact for daily use, in order to manufacture high-density life spaces; so to get some relief from these, facilities to allow every person adequate access to travel, a change of scenery, or recuperation, must be incorporated into the network of residential areas. In contrast to permanent residences (*sumika*), detached cottages (*hanare*) for holidays and recuperation, and inns (*yado*) for trips to get away for a while, must be allocated and secured in every region.

(8) The C3 city can be roughly categorized into three different types: (a) the "factory" city that combines industrial production with the *kombinat*; (b) the "plaza" city that handles distribution, management, research and education, etc., and performs the central functions of politics, economics, culture and information; and (c) the "open field" city that is a primary producer connected to farming, forestry and fisheries, as well as being a hub for open area recreational zones. C3 cities are dispersed among all regions throughout the nation. (Figure 74.) Figures 71 to 75 provide a simple schematic view of the above points.

However, the structural patterns here are not provided to demonstrate that the actual situation in our nation can be converted in this manner easily or spontaneously; naturally, this proposal merely offers a target to reform two opposite images: the chaotic capital city area and the megalopolis belt along the Tokaido corridor that, due to overcrowding, are in fact gradually turning into uninhabitable environments; and on the other hand, the growth of sparsely populated zones that are becoming increasingly neglected.

Notes

1 Translated from *Nishiyama Uzō chosakushū 3* [The collected works of Uzō Nishiyama, volume 3], *Chiiki Kūkan Ron* [Reflections on Urban, Regional and National Space] (Tokyo: Keisō Shobō, 1968). "Dai 9 shō, Kokudo kōsei no shiron" [Chapter 9, An Essay on the National Structure], pp. 225–266.
2 Question mark inserted by Nishiyama.
3 Nishiyama's note: The terms employment ratio, external industry workforce ratio, commercial industry workforce ratio, etc., were examined in Chapter 2.
4 Translator's note: Nishiyama uses the term "total regional areas" [全地方圏] in the text. This refers to "overlapping regional zone" [交錯地方圏] in Table 9.11, Column 1.