

Chapter 4

The Value of Grey



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Abstract Modern urban planning, initiated in Western Europe and North America at the dawn of the twentieth century, framed the concept of “city” as an area where no agricultural land uses should be included. In Japan, however, the demarcation between the city and countryside was ambiguously “grey” in comparison to that of Western cities. This ambiguous mixture of urban and rural land uses characterized both the fringe and the interior of Japanese cities as well. Edo, the former name of Tokyo, was already the largest city in the world in the eighteenth century with more than one million people; but at the same time, welcomed and was quite compatible with a vast amount of agricultural land that covered more than 40% of the city.

Detesting an ambiguous “grey” mixture and adoring homogeneity and clear “black-and-white” separation of land were the precepts of modern urban planning; that is, how modern urban planners framed the problem of building sustainable cities. According to such an urban planning concept, the Japanese mixed land use has long been regarded as a premodern and deniable use of land. One key feature of the 1939 Comprehensive Parks and Open Space Plan of Tokyo was developing a green-belt surrounding Tokyo to clearly differentiate the central core of the city with its urban land uses from the surrounding countryside with its rural land uses. The City Planning Act in 1968 also aimed at achieving a clear separation of urban and rural land uses by designating Urbanization Promotion Areas (UPA) and Urbanization Control Areas (UCA) in each local municipality.

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Cities are regarded as an entity that never creates but merely absorbs natural resources, especially food. The threat of natural disasters in Western European and North American cities is extremely low in comparison to Asian cities, and thus systems to transport food can be expected to operate with virtually little or no disruption. Cities in Asia, including those in Japan, are not afforded this luxury. They frequently suffer from sudden disruptions in transportation infrastructure caused by earthquakes, tropical hurricanes, and other natural disasters that are part of everyday life. Such a situation should therefore motivate Asian cities to maintain a redundant food supply system that can supply food even in emergencies, when logistics are disrupted for an inordinate period of time, by planning for both internal and external food supplies. Agricultural land in the city – the land likely perceived as an ambiguous “grey” mixture from the non-Asian perspective – should therefore be regarded as a reasonable and prudent land use rooted in the Asian environment. Agricultural lands also provide ecological services and are thus a crucial element for creating a sustainable city.

One conventional framing of modern civilization is its “digital approach”, which tries to deductively identify fundamental elements in a “black or white” manner and then inductively synthesize such elements to re-build the entity. From such a two-value approach, the multi-value approach of “grey” has been regarded as an incomplete stage that should further be analytically identified as an entity composed of black or white elements. However, the land use mixture identified in Asian cities conveys the need for a new framing that restores and nurtures the value of grey, especially when planning for the sustainable future of the city and its surrounding region by respecting their vernacular landscapes.

Keywords Urban and rural land uses · Redundancy · Natural disaster · Urban agriculture · Food system · Resilience

4.1 Introduction

Basic theories of modern urban planning were initiated at the dawn of the twentieth century in Western Europe, where almost no threat of natural disasters as earthquakes, tsunami and tropical hurricanes was identified. Cities in the world, including those in Asia, have been taking such theories as the standard and developing themselves according to the theories. However, are the theories initiated in disaster-free Western Europe cities applicable for Asian cities frequently suffering from natural disasters? Shouldn't there be alternative planning theories suitable for Asian cities? As natural disasters in European and North American cities are also increasing due to the global climate change, are planning theories initiated in Asia not suitable for their sustainable future as well? This chapter discusses an alternative framing for sustainable urban planning from one Asian perspective.

4.2 Layer Model

4.2.1 Dichotomy Versus Grey

Dichotomy is probably one of easiest approaches to understand and plan complicated issues. When faced with complexity, people usually try to understand the issue by locating it in a very simple dichotomous structure: yes or no, black or white, right or wrong, ad infinitum. Such a dichotomous concept has been applied to urban and regional planning. Cities in medieval Europe, often surrounded by a wall and moat, had a clear boundary between its dense urban fabric with virtually no green, and its surrounding wide-open rural landscapes filled with diverse types of greenery (Fig. 4.1).

Rooted in such a legacy, one key concept of modern urban and regional planning initiated in Western Europe at the dawn of the twentieth century was to differentiate urban fabric from surrounding rural areas to ensure efficiency both in urban developments in the city and agricultural production in the rural areas. At the end of the nineteenth century Ebenezer Howard (1850–1928), an English urban planner, proposed the concept of Garden City (Fig. 4.2), a city in which people live harmoniously together with nature. In his concept Howard stated that town and country should be married and become a couple together, but he never meant that the two should be mixed.

Even though Howard said that the town and countryside should be planned together, a distinct boundary between the two remained intact in his concept. Then

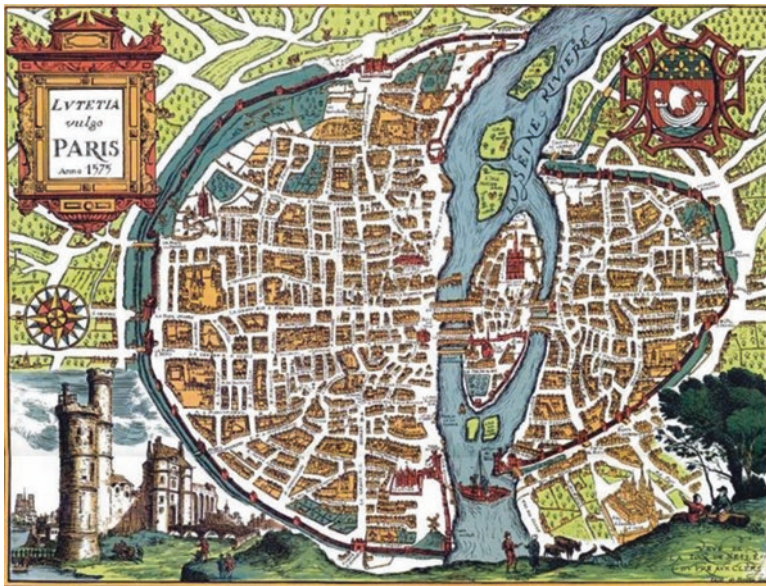


Fig. 4.1 Paris, France in sixteenth century

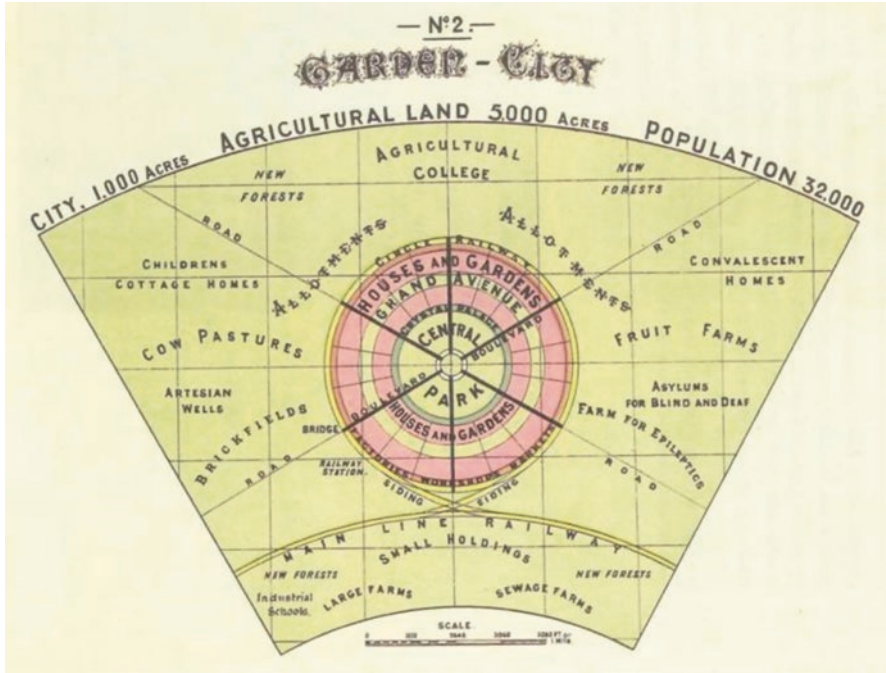


Fig. 4.2 Garden City proposed by E. Howard

came Sir Patrick Abercrombie (1879–1957), an English urban planner in charge of the Greater London Plan in 1944. In the plan Sir Abercrombie installed a greenbelt, surrounding London to curb urban expansion and clearly differentiate the urban fabric from the surrounding rural areas (Fig. 4.3). Dichotomous land use patterns came to be the international standard for modern urban and regional planning in the West. Today, many regions in the world and their cities are following the same planning system based on this dichotomous land use concept.

What can commonly be found on the fringe of Japanese cities, on the contrary, is a small-scale mixture of urban and rural land uses, which we define as “grey” landscape (Fig. 4.4). From the perspective that prefers dichotomous solutions, “grey” is often regarded as ambiguity and/or disorder. “Grey” indeed has been synonymous with uncontrolled, uncivilized, and thus undesirable solutions.

However, although a dichotomous approach provides a simple and clear but rather static and even persistent solution, “grey” allows for various shades of lightness between the extremes of black and white. If a planning concept is based on a “grey” approach, the result becomes flexible to a given condition, which leads to adaptable solutions that successfully provide “resilience” to cities and regions. The growing concern regarding natural disasters as a result of global climate change has forced cities and regions around the world to seek a new planning concept that pro-

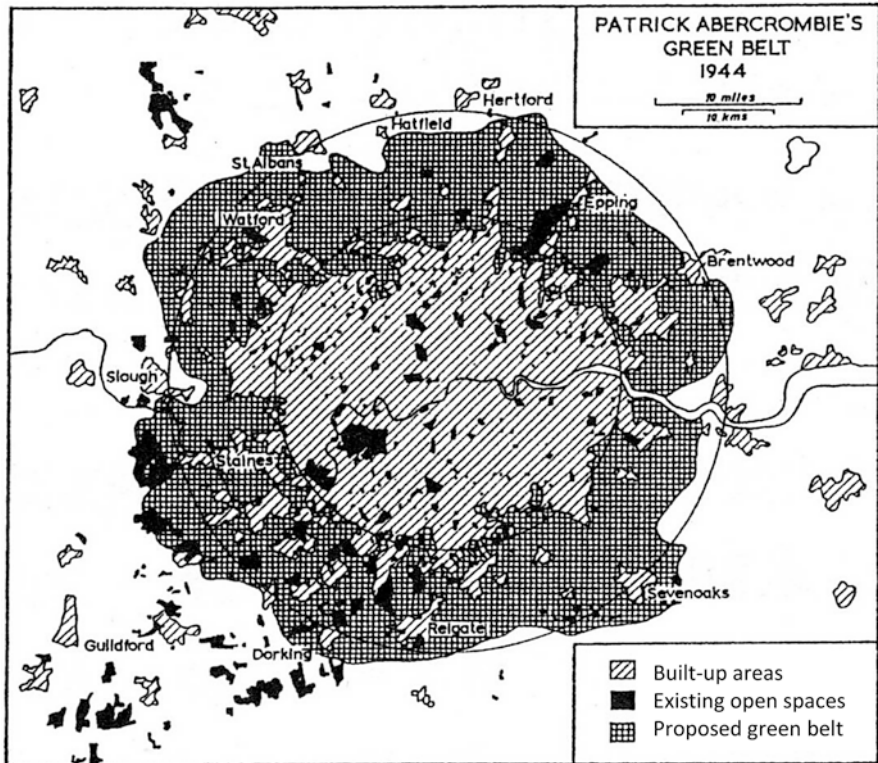


Fig. 4.3 London green belt by P. Abercrombie

vides resilient solutions in responding to unanticipated catastrophes which could very well directly affect them soon. The “grey” approach is one practical answer to such demand.

4.2.2 Landscape Patterns in Three City Regions

To clarify the differences in landscape patterns of city regions in the West and East, we examine three major cities and their suburbs: New York City, Paris, and Tokyo. Some 15 km northwest from the center of New York City, Central Park on Manhattan Island, is a place called East Rutherford, New Jersey (population: 10,000; 10 km²). What you find in this quaint town is a typical American suburban landscape mostly comprised of *detached houses*, free-standing structures one or two stories high surrounded by wide open lawn (Fig. 4.5). Some 15 km northwest from the center of Paris, Cite Island, brings you to Argenteuil, Ille de France (population: 100,000+; 17 km²).



Fig. 4.4 “Grey” landscape in the fringe of a Japanese City



Fig. 4.5 East Rutherford, NJ, 15 km NW of New York City (Source: Google Earth)

Although the design and size of houses differ from those in East Rutherford, a similar suburban landscape with detached houses awaits (Fig. 4.6). Concerning Tokyo, however, the landscape differs somewhat. Some 15 km northwest from the city center, the Imperial Palace, lies Nerima Ward (population: 100,000+; 48 km²), which is still a part of the core area of Tokyo called *23 Wards*. Nerima



Fig. 4.6 Argenteuil, Ile de France, 15 km NW of Paris (Source: Google Earth)



Fig. 4.7 Nerima Ward, 15 km NW of Tokyo (Source: Google Earth)

is a typical residential neighborhood in the suburb of Tokyo, but includes small parcels of farmland in addition to houses (Fig. 4.7). Nerima is still in Tokyo, one of largest cities in the world that accommodates and home to more than 10 million people. Even so, within its boundary farmland parcels remain a trait of Tokyo's dense urban fabric.

Travelling 40 km northwest from New York City lies Pyramid Mountain, NJ. In addition to small villages, what is mostly found in this area is forest (Fig. 4.8). Some 40 km northwest from Paris is a village called Vigny, an area which is mostly farmland (Fig. 4.9). As for Tokyo, 40 km northwest of center city brings you to a city called Kawagoe, where you find a landscape virtually the same as that of Nerima: a landscape characterized by a small-scale mixture of urban and rural land uses (Fig. 4.10).

In New York City, representing North American cities, and in Paris, representing Western European cities, a distinct boundary between urban land use and rural land use is fixed somewhere in between 15 and 40 km from the city center. In Tokyo, which represents Japanese cities, though, no such distinct boundary



Fig. 4.8 Pyramid Mountain, NJ (US), 40 km NW of New York City (Source: Google Earth)



Fig. 4.9 Vigny (France), 40 km NW of Paris (Source: Google Earth)



Fig. 4.10 Kawagoe City (Japan), 40 km NW of Tokyo (Source: Google Earth)

between urban and rural land uses can be identified because a small-scale mixture of urban and rural land uses continues the entire distance from 15 to 40 km, and even beyond.

4.2.3 Legacy of Mixture

Edo, formerly Tokyo, is known as a city which used to be the largest in the world, accommodating over one million people at the beginning of the eighteenth century. The population density of the city was nearly five times higher than that of Tokyo today, even though houses were mostly one or two stories high. However, despite having such a massive and dense urban fabric, more than 40% of the land inside the administrative boundary of Edo was designated for agricultural uses (Fig. 4.11). Moreover, such farmland parcels were integrated into the urban fabric, not merely surrounding the city as is common in western urban design. Though an administrative boundary has existed, no physical boundary which visually separates the urban fabrics from surrounding rural land uses could be identified on the fringe of the city.

Such a legacy still continues. Today, even in the core area of Tokyo which is comprised of 23 Wards, 11 wards still maintain farmland parcels in their territory.

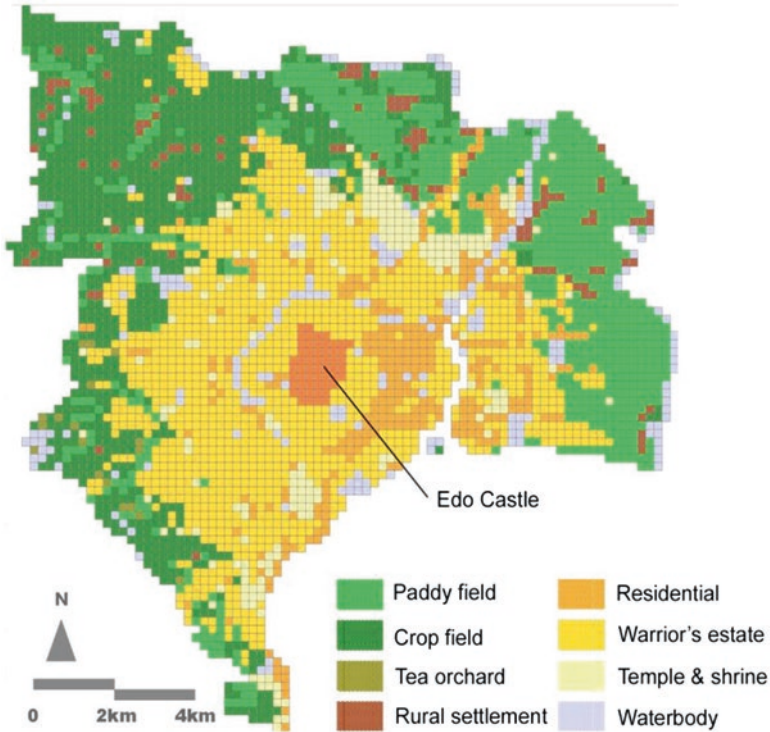


Fig. 4.11 Land use of Edo, formerly Tokyo, in early nineteenth century (Source: Fujii et al. 2002)

The amount of farmland parcels is limited: only around 3.5% of all Tokyo and 1% of the 23 Wards core area. However, although the amount is limited and the size is very small – sometimes as small as 500 m², smaller than a 50 m swimming pool – these farmland parcels are mostly active farmland still owned and maintained by professional farmers, not farming area for urban hobby farmers or retirees (Fig. 4.12).

4.2.4 Layer Model

What land use models are behind these realities? The Western land use model starts with drawing a clear boundary between urban and rural zones, and then cuts the land into units with homogeneous land uses. The model can therefore be characterized as a system which provides ordered and well-controlled land uses. Japanese planners once applied this rationale to Japanese cities including Tokyo. In 1939 Comprehensive Parks and Open Space Plan of Tokyo was proposed, and one key feature of the plan was a greenbelt surrounding Tokyo to stop *urban sprawl* – the rapid expansion of the geographic extent of cities and towns – and thus realize a distinct separation of urban and rural land uses (Fig. 4.13).



Fig. 4.12 Farmland remaining in Tokyo

However, installing a greenbelt did not prove to be a success. Even if you were to look at Tokyo today from a satellite, not even a one remnant of the belt can be found. What is visible is a large-scale maze of urban fabric continuously sprawling all the way towards the mountain ranges surrounding Tokyo.

Other Japanese cities including Osaka and Nagoya also tried to install a greenbelt but they all failed because of the lack of efficient policies on the land use. Instead of a greenbelt, cities in Japan changed their policy to draw a boundary line surrounding each local municipality and not around the entire metropolitan area. The Urban Planning Act, revised in 1968, was designed to achieve such a separation. According to this Act, each local municipality was required to designate land as either one of two types: Urbanization Promotion Area (UPA), or Urbanization Control Area (UCA). UPA is the area for urban developments; UCA is, in principle, primarily for agricultural uses without conventional urban development.

But once again, distinct separation failed to be achieved. What actually happened was an incomplete separation even though a line to designate UPA and UCA was drawn around the city. Why did such a failure occur? We would argue that this situation occurred because of the layer model which the Japanese planning system had been maintaining, and not because of an inadequate application of the City Planning Act of 1968.

In short, two major layers characterize the model. First is, of course, the “Urban” layer, based on the City Planning Act of 1968, but this is not the only layer. The



Fig. 4.13 Green belt planned in the 1939 Tokyo Parks and Open Space Plan

second layer which defines the land use in Japan's urban fringe is a "Rural" layer based on the Agricultural Land Act of 1952. The Japanese agricultural system had long been based on a landlord-tenant farmer system, which prohibited Japanese agriculture from becoming modernized and thus caused tenant farmers to endure extremely low income. The Agricultural Land Act aimed to eliminate such a system and modernize agriculture by making farmland available to all tenant farmers. The Act, however, also prohibited non-farmers from owning their own farmlands because the former landlord-tenant farmer system could very well have been revived if farmlands were bought by non-farmers, especially by enterprises, and rented out to farmers.

The Agricultural Land Act can therefore be interpreted as an act that aimed to draw a line between *people*: sharply differentiating farmers and non-farmers. The Urban Planning Act of 1968 was an act to draw a line between *land* use differentiating urban (UPA) and rural (UCA) land uses. Japanese did not ignore but have carefully been obeying the regulations. However, because these two layers followed different orders – people-oriented versus land-oriented – a chaotic-looking situation occurred when these two were overlaid. The situation should not be labelled "disordered" because each layer is well controlled albeit following different orders. Order is there, but is not visible at a glance. The layers must be separated to understand the order of each layer, which is called an underlying "hidden order" (Ashihara 1989).

4.3 Shaping the “Grey Urban Environment”

4.3.1 “Grey” in Urban Context

“Grey” in Sect. 4.1 mainly focuses on the mix of urban land uses (residential, commercial, and industrial) and rural land uses (farmland, forest, etc.). In the Sects. 4.2 and 4.3 we take a closer look into the urban area, “Grey” is interpreted more broadly: (1) diverse types of “grey”, not only “urban-rural”; (2) mix of uses, forms, and densities; (3) border between private and public; and (4) flexible transformation of land uses. These represent the elements of adaptable planning embedded in the Japanese urban planning system.

4.3.2 *Grey Urban Environment in Tokyo*

The view of inner-city and suburban areas of Tokyo from the observatory of the Tokyo Metropolitan Government Building located in Shinjuku, one major urban center in central Tokyo, well illustrates the grey urban environment of Tokyo (Fig. 4.14). A mix of buildings – large buildings along skeletal roads and small buildings of different sizes and uses – is seen. The difference between this view and the view of European or North American cities from tall buildings is immediately noticeable.

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In a residential area near Ikebukuro, another major urban center in central Tokyo a little north of Shinjuku, large-scale redevelopments stand in contrast to existing small-scale urban environment (Fig. 4.15). A few minutes east from that location, an urban environment in transition is found: aging buildings and unmanaged vacant plots (Fig. 4.16). To the south of the Ikebukuro urban center, construction of a new road along existing streetcar tracks is in progress (Fig. 4.17), and is also changing surrounding land uses and buildings. The road is being constructed *after* urbanization, so many existing buildings must be demolished to construct the new road, a prime example of modern infrastructure.



Fig. 4.14 Inner-city and suburban areas of Tokyo



Fig. 4.15 Residential area near Ikebukuro urban center



Fig. 4.16 Few minutes walk from the site of Fig. 4.15



Fig. 4.17 New road construction in an existing urban area

About 10 km northwest of the Ikebukuro urban center is a unique urban landscape: a mix of farmlands, detached housing, apartments, and condominiums in an ongoing urbanizing area (Fig. 4.18). Typical urban sprawl results in the mix of land use and vulnerable infrastructure. Toward the edge of the urban area is a mix of unmanaged buildings and vacant plots caused by population decline and aging (Fig. 4.19).

But, not all urban areas in Tokyo are grey. Master-planned urban (re)developments and the installation of skeletal infrastructures are found in existing urban areas. Okata and Murayama (2011) describe Tokyo's urban form more in detail.

4.3.4 Japanese Urban Planning System

The Japanese urban planning system consists of four elements: (1) master plans for city planning areas and municipalities; (2) land use regulations (area division and zoning); (3) development of urban infrastructure such as roads, parks, water works, and sewage systems; and (4) urban development projects such as land readjustment and redevelopment (see MLIT (2003) for the details of the Japanese urban planning system). It should be emphasized that urbanization often progresses prior to formal urban planning and development under such a system because urbanization was rapid. The illustrations of urban planning and



Fig. 4.18 10 km NW of Ikebukuro urban center



Fig. 4.19 Fringe of Tokyo's suburban city

development in an actual city show that urban development and road development occur in small segments, resulting in a patchwork of various urban areas connected by a continuously expanding road network.

The land use planning concept is shown in Fig. 4.20. First, the City Planning Area where the City Planning Act is in effect is designated. We divide the City Planning Area into Urbanization Promotion Area (UPA) and Urbanization Control Area (UCA). UPA is divided into 12 land use zones including 3 commercial, 3 industrial, and 6 residential zones. District Plans are developed for some areas that need more detailed, special regulations and projects. Buildings are regulated through density and from regulations. We must emphasize that most zones within UPA in the Japanese land use planning system allow a mix of uses including agricultural even in Urbanization Promotion Areas. That is, the nature of the Japanese urban land use system itself includes grey or vague aspects. Murayama (2016, 2017) explains the Japanese urban land use planning system and practices more in detail.

Urban development projects in the Japanese urban planning system contribute to shaping the grey character of the Japanese urban environment. One such urban development project is called “mini” development. Residential or agricultural

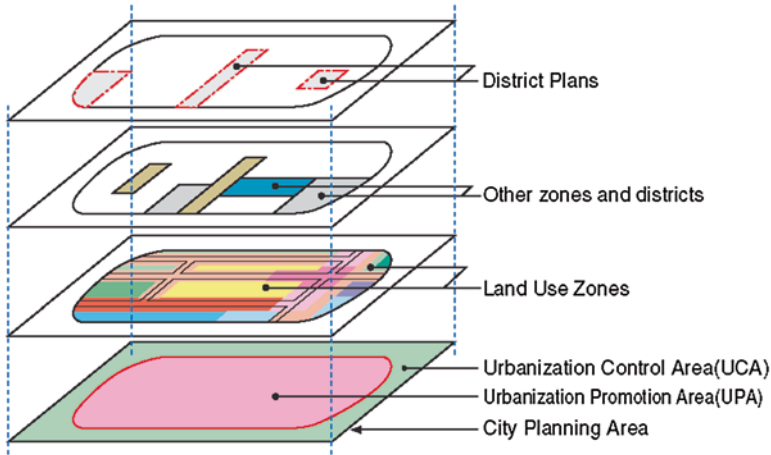


Fig. 4.20 Concept of urban land use planning (Adapted from “Introduction of Urban Land Use Planning System in Japan, City Bureau, Japanese Ministry of Land, Infrastructure and Transport (2003) 国土交通省都市局都市計画課提供)

plots of less than 1000 m² can be developed as, for example, 8 housing plots with a dead-end street generally 4 m wide or a bit wider. Urban sprawl areas such as Tagara in Nerima Ward, Tokyo, a former agricultural area, are urbanizing through “mini” developments in tandem with incremental development of streets and parks (Fig. 4.21). At the same time, some farmers continue to maintain their farmlands to produce vegetables and fruits. As urbanization advances, streets and parks are developed incrementally, thus slowly transforming an agricultural area into an urban residential area. Arterial roads – high capacity urban roads – are also constructed. In this kind of incremental development, new houses are constructed little by little over a long period of time. Home-buyers mostly in their 30s and 40s will move into the area gradually thus contributing to the diversity of resident age groups. In addition, this kind of development leaves opportunities for urban farming.

4.3.5 Uniqueness of Japanese Urban Planning

Japanese urban environment can be characterized as the islands of planned development in the sea of urban sprawl where urbanization occurred without master-planned infrastructure. The formal approach of Japanese urban planning and development has been to increase the areas of planned development through urban development projects and to install skeletal infrastructure in already-sprawled urban areas. What results is vast areas of grey urban environment.

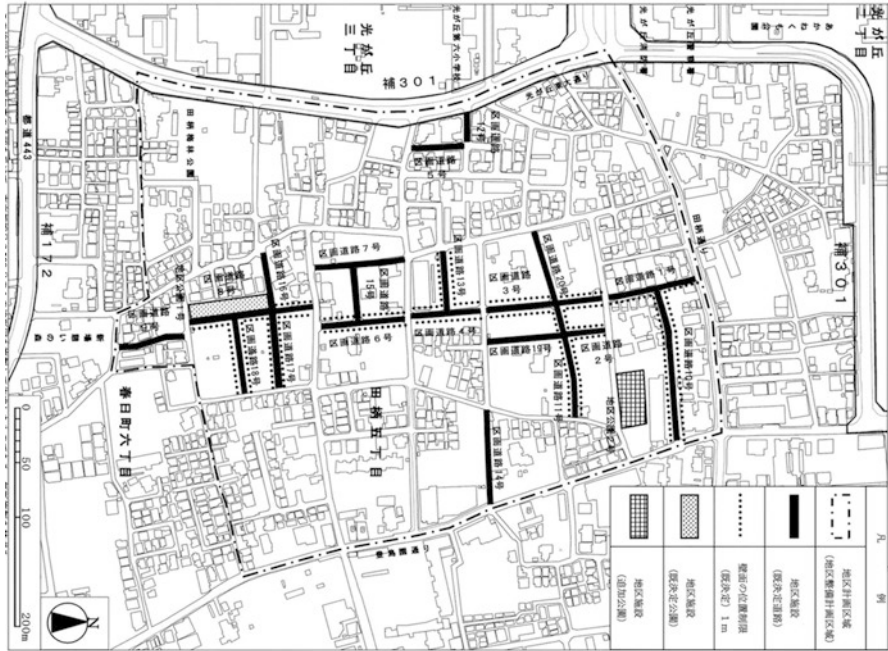


Fig. 4.21 District plan in urban sprawl area (Example in Tagara, Nerima Ward, Tokyo from Nerima Ward website)

4.4 Enhancing the Values of Grey Urban Environment

4.4.1 High Density Urban Areas in Tokyo

In the previous section, we introduced the urban sprawl area of Tagara. Returning more toward the center of Tokyo, a belt of high density urban areas where urbanization and densification occurred without master-planned infrastructure (Fig. 4.22) is found. These high-density urban areas are vulnerable because of the susceptibility of fire especially when major earthquakes occur. The Hanshin-Awaji Major Earthquake in 1995 is an excellent example. Since then, much effort has been put into improving the physical environment of these high density urban areas: widening roads, creating additional open spaces, redeveloping wooden buildings, among others.

Despite the vulnerability, this kind of high-density urban area is popular because of good access to urban centers of central Tokyo, small-scale urban environment; and the availability of affordable housing, active commercial areas, walkable neighborhoods, urban culture, etc. This vibrant commercial area in

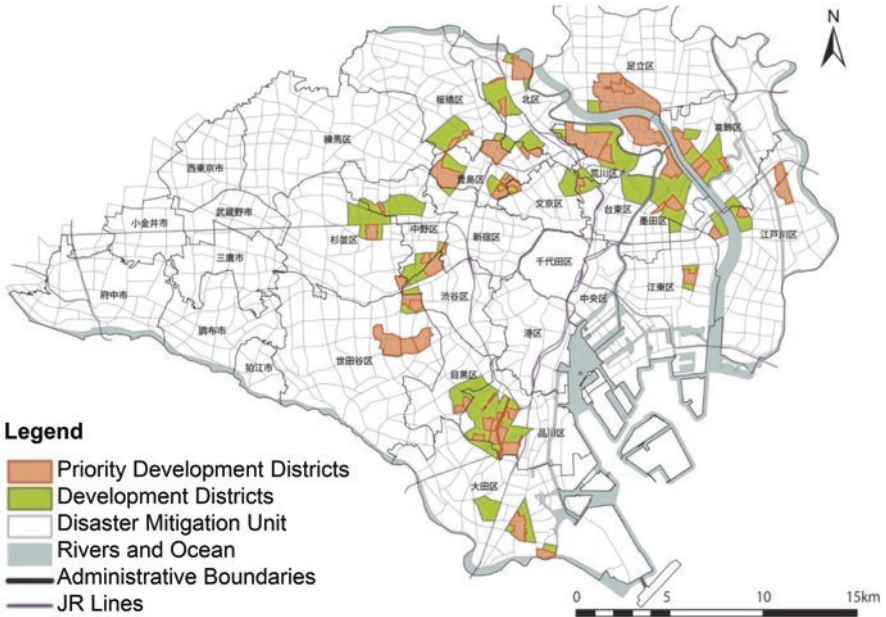


Fig. 4.22 Tokyo's 23 wards and some western suburban cities (Source: Bureau of Urban Development, Tokyo Metropolitan Government 東京都都市整備局提供)

Koenji, Suginami Ward, Tokyo is grey in a way (Fig. 4.23). The border between private and public is unclear, and merchandise, and tables and chairs are illegally placed on the street. This borderless relationship between shops, restaurants, and the street is attractive for urban dwellers. But in formal urban planning, a plan has been developed a long time ago to modernize this commercial area by constructing a new road in the existing urban area. If this road is actually developed, most of the shops and restaurants will be relocated resulting in a totally different urban environment. The modernized commercial area will have wider roads that clearly separate pedestrians and automobiles, and larger buildings. Thus, the characteristics of the vibrant, small-scale commercial area that urban dwellers enjoy now will disappear.

4.4.2 Modernization: The Only Solution?

Jane Jacobs (1906–2006), a famous North American journalist and activist who often wrote about preserving urban neighborhoods, raised this question in the 1960s. She fought against new big-money developments and emphasized that existing urban areas with higher population density, mixed uses, older buildings, and



Fig. 4.23 Vibrant and grey commercial area (Example in Sugunami Ward, Tokyo)

short blocks are much more attractive than the redeveloped sites and should be protected from modern redevelopment.

In recent years, North American cities have come to recognize the value of urban farmland. This mix of residential and agricultural land is already common scenery in sprawling urban areas in Japanese cities. Many Japanese planners consider sprawled urban areas – “grey” urban environment – as a failure of modern urban planning, and try to improve or even redevelop these areas. Re-evaluating the positive aspects of this grey urban environment may very well provide alternative solutions to a sustainable and resilient city.

4.4.3 New Values and Ideas to Stay Grey

At this point we would like to introduce three cases with new values and ideas to ensure a grey urban environment. The first case is a residential area with urban farmland. Many of the sprawled suburban areas in Japanese cities are residential areas with farmlands like Nishi-Tokyo City, Tokyo (Fig. 4.24). Here the loss of urban farmlands or productive green spaces is related to the individual circumstances of aged farmers. Once a plot of urban farmland can no longer be maintained by a farmer, it will likely become a “mini” development of small-detached houses for economic benefits.

But recently, the market for detached houses seems to be declining because of the increase in construction costs and the changing attitudes toward home ownership. An alternative approach to deal with the loss of urban farmland must be found. Urban farmlands are important in maintaining the quality of sprawled urban area because the area is unequipped with sufficient streets and parks.

Area South of Hoya Station (Nishi-Tokyo City)

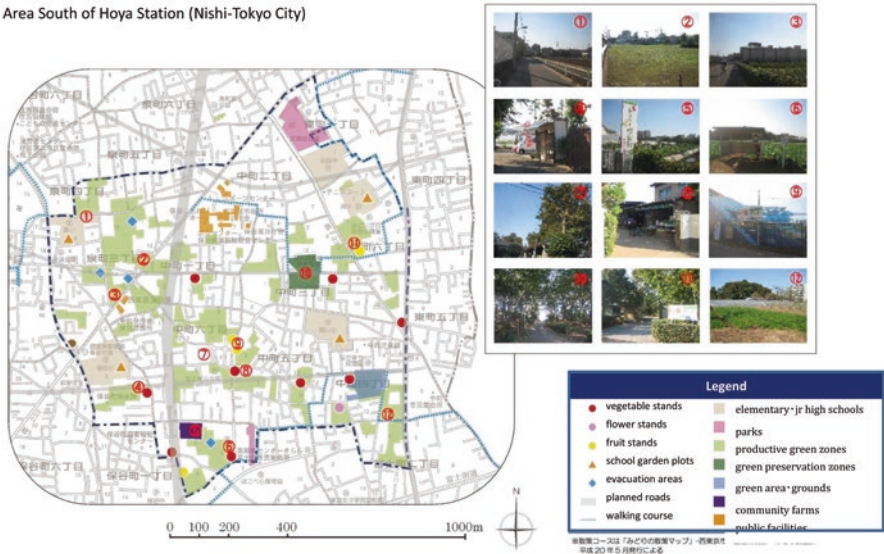


Fig. 4.24 Urban farmland in Nishi-Tokyo City, Tokyo (Source: *Model Plan for Urban Development: City and Farming Industry Co-Exist* (2010) Nishi-Tokyo City Government 「都市と農業が共生するまちづくりモデルプラン」 西東京市生活環境部産業振興課, 2010年)

Using the transfer of development rights, a technique that encourages the transfer of growth from places where a community would like to see less development to places where a community would like to see more development, is one idea for conserving productive green space (Fig. 4.25). A mix of productive open space and mini detached houses represents the present situation. If no action is taken, productive green space will be lost to mini-detached housing developments; or in the case that no market for mini detached houses exists, land will undoubtedly be abandoned. Presupposing the existence of a market for eco-collective housing for rent or sale, higher density housing could be built along newly constructed arterial roads. Arterial roads are already planned and are to be constructed to form a better road network. Through the transfer of development rights, green space inside the superblocks surrounded by arterial roads can be conserved, thus contributing to the overall quality of the urban area.

The second case is a low-density residential area with community-managed forest. Fujimaki-cho in the eastern hills of Nagoya City, Aichi Prefecture, is designated as an area for a future urban park (Fig. 4.26). But the park is unlikely to be developed because of the shortage of public funds. Nearly 200 households live in the future park area with a minimum urban infrastructure. Streets are partly unpaved and houses are not connected to the city’s sewage system. The forests in Fujimaki-cho are maintained by resident volunteers. The community workshops we organized there conducted lengthy discussions about the current issues and the future scenario of Fujimaki-cho. When a city has no public funds to purchase and maintain such land for the future

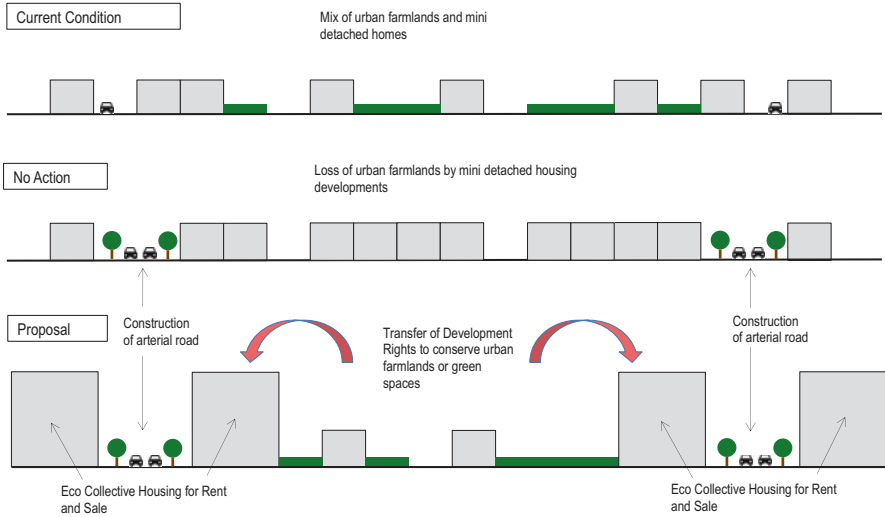


Fig. 4.25 The concept of transfer of development rights in urban sprawl area



Fig. 4.26 Low density residential area in undeveloped urban park (Fujimakicho, Nagoya City, Aichi Prefecture)

park including the plots of nearly 200 existing households, the help of residents and citizens is indispensable for any realistic solution that conserves urban forests.

A scheme is now in place that postpones urban park development in the highly inhabited part of the future park, and reduces the area of urban park development (Fig. 4.27). In the downsized area, the implementation of the city's urban park development plans can be accelerated. Before such urban park development starts

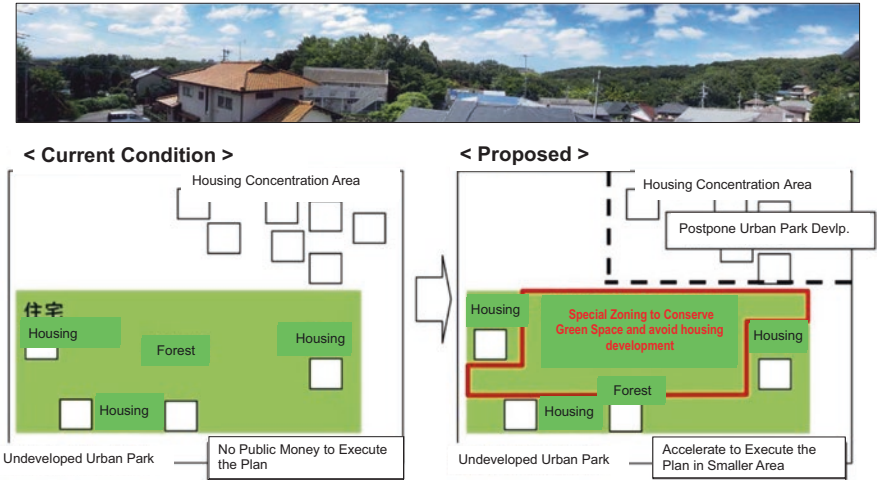


Fig. 4.27 Reorganization of urban park and residential area (Source: Greenification and Public Works Bureau, Parks Department, Parks Project Division, Nagoya City 名古屋市緑政土木局緑地部緑地事業課提供)

- Integration of properties
- Greening of vacant properties

- Trade of properties in the chance of reconstruction

- Housing design with increasing open spaces

Detached housing design by architect Katsutoshi Sasaki
 22nd Aichi Urban Landscape Architecture Award (2014)

Fig. 4.28 Re-design of de-intensifying suburban residential area (Source: 名古屋市緑政土木局緑地部緑地事業課提供 Greenery Section, Green Policy Engineering Dept. Nagoya City)

in the forest area, however, a special zoning rule that conserves the forest and prevents new housing development should be designated.

The third case is about managing depopulating suburban residential areas (Fig. 4.28). If no action is taken, unmaintained buildings and land parcels will be generated unpredictably because of population decline and aging, thus decreasing the property value of the residential area. Through well-planned measures, creating

a managed suburban residential area with lower density and higher ratio of green space is possible. Such measures will also contribute to making the entire urban form of the city more compact. The measures include, but are not

limited to, the assembling of neighboring plots, the greening of vacant plots, the trading of plots in the chances of building reconstruction, and housing design with more open spaces.

There should be many other ideas to re-evaluate and manage a grey – actually “green” in a sense – urban environment to create sustainable urban neighborhoods. In any case, such transformation of space or physical environment should be well planned and well designed.

4.5 Shaping the “Urban-Rural Grey”

4.5.1 *Land Use Transformation in Suburban Tokyo*

The National Population census reported that Tokyo experienced rapid population growth from 3.7 M in 1920 to 11.4 M in 1970 mainly due to rural migration (Statistics Japan 2000). During this period, urban expansion continuously occurred in peri-urban rural areas. Through the process of urban expansion, the rural areas developed before World War 2 have already been integrated into the current urban fabric of Tokyo center. The rural areas developed after World War 2, however, have formed the current residential bed-town communities in suburban Tokyo.

Figure 4.29 shows an example of typical land use changes in suburban bed-town communities. The aerial photos cover the urban fringe of Funabashi city in Chiba prefecture some 30 km east from Tokyo’s center (Imperial Palace). In 1947, Funabashi’s urban fringe was rural: farmland and forest dominated. Tokyo’s urban expansion had reached Funabashi between 1947 and 1970, and residential communities had developed along with construction of inter-city railway infrastructure. Up until 1997, residential development continued and this shapes the foundation of current urban fabric. Between 1997 and 2016, urban expansion moderated because of stabilization of the increasing population, but small housing developments still continue to appear. Consequently, a scene typically in Funabashi is a small-scale mixture of farmland, forest, and housing. It seems that the mixture is a result of urban sprawl on rural land without any (or ineffective) concern for land use regulation.

4.5.2 *Area Division System and Agricultural Promotion Regions*

However, urban-rural mixed land is basically controlled by land use regulations, from both urban and rural planning perspectives. Area Division System (ADS) is the land use regulation designed to make a boundary between urban and rural areas

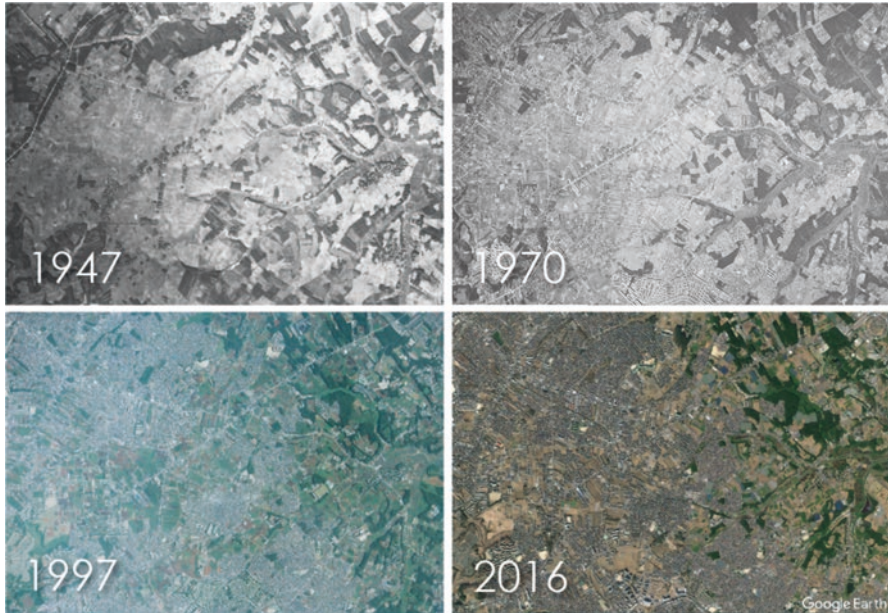


Fig. 4.29 Land use changes from World War 2 to present (Location: Funabashi, Chiba, Japan). (© Geospatial Information Anthology of Japan (1947, 1970, 1997) © 2017 Google, ZENRIN (2016))

from an urban planning perspective. In 1968 when urban sprawl was accelerating, the City Planning Act was amended to initiate an area division system. Under this system, a local municipality can divide an urban planning area into two areas: UPA (Urbanization Promotion Area) and UCA (Urbanization Control Area) (Nakai 1988) (Fig. 4.30). UPA is the area where urbanization is promoted and aims to be developed within 10 years. Once farmland or forest is included into UPA, the land is regarded as potential land for future development.

Expectations of future development lead to drive land prices up significantly which leads to easier conversion of farmland or forest to housing or other urban land uses. UCA, on the contrary, is an area where urbanization is regulated and which aims at conserving rural settings and agricultural activities. Land prices in UCA are considerably lower compared to those of UPA because of land use regulations concerning future development. The top-right illustration of Fig. 4.30 shows the actual implementation of area division system to the urban fringe of Funabashi. Because the separation looks like a line drawn between UPA and UCA—commonly called “senbiki” in Japanese, which literally means “draw a line”. Even the shape of the line is not simple: the line makes a sharp contrast between UPA and UCA in terms of building density or farmland ratio, for example.

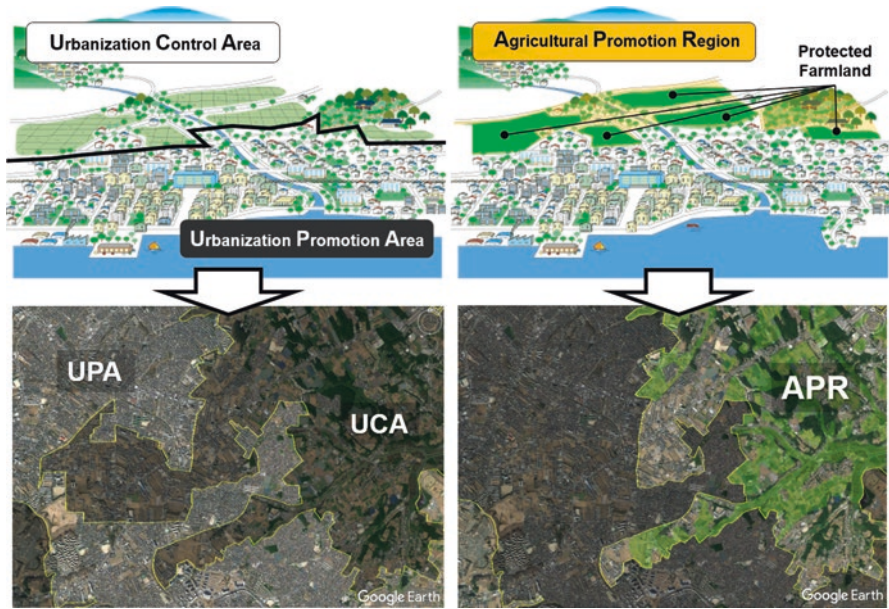


Fig. 4.30 Implementations of the land use policies (Location: Funabashi, Chiba, Japan). (© Ministry of Land, Infrastructure, Transport and (Top illustrations) © 2017 Google, ZENRIN (Bottom aerial photos))

Another dimension of land use control is rural planning. Designating an area as an Agricultural Promotion Region (APR) is the measure with most impact. APR is basically a zoning for promoting agriculture in rural areas. When applied to peri-urban areas, though, farmland protection takes on a more significant role. Once an area becomes APR-designated, the productive farmlands inside APR are protected which, in principle, may not be changed to any other land use (Fig. 4.30). Protected farmland is crucial for farmers who want to continue agriculture near cities. Rice farmers especially can conserve irrigation systems by designating protected farmland. The bottom-right illustration of Fig. 4.30 shows the implementation of APR and protected farmland in Funabashi. Comparing the ADS and APR systems reveals that these two systems are like two sides of a coin. Overlapping designation of UCA and APR is the strictest control of land use, whereas sole designation of UCA permits urban-rural mixture.

4.5.3 Productive Green Land

Although UPA is an area for urban development in theory, small farmland patches can be found in UPA and this makes a unique landscape which is a farmland-residential mix. Most such farmlands are protected as Productive Green



Fig. 4.31 Distribution and scenery of productive green lands (Location: Kashiwa, Chiba, Japan). (© City Planning Section, Kashiwa City (Top left) © 2017 Google, ZENRIN (Top right))

Land (PGL), which is the special protection for farmland in UPA based on the Productive Green Land Act established in 1974 and amended in 1991 (Fig. 4.31). Extremely high land prices and taxes of the Tokyo region makes keeping farmland in UPA nearly impossible (Yagasaki and Nakamura 2010). At the same time, however, some farmers in UPA are willing to continue their agriculture livelihood. The most significant role of the act is to reduce the tax burden on landowners (farmers). Once their farmlands are designated as PGL, land may not be sold and used for any other purpose. The farmers also must continue agriculture for at least 30 years from the designation. Most PGL were designated in 1992, the year the act was enforced (Tsubota 2006). Accordingly, there is possibility that a great number of PGL will be dissolved around 2022 because of the 30-year mark from the initial 1992 designations. This predictable issue is called the “2022 Productive green land problem” and recognized as a critical problem for farmland protection in cities (Terada 2017a).

4.5.4 *Hidden Order in Planning System*

Peri-urban landscape in Tokyo looks like chaotic urban-rural land use mixture, but as explained previously, the fact is that the mixture is controlled from both urban and rural planning points of view. Japanese land use control systems are strictly implemented, and overlapping of the systems permits urban-rural mixture as a case

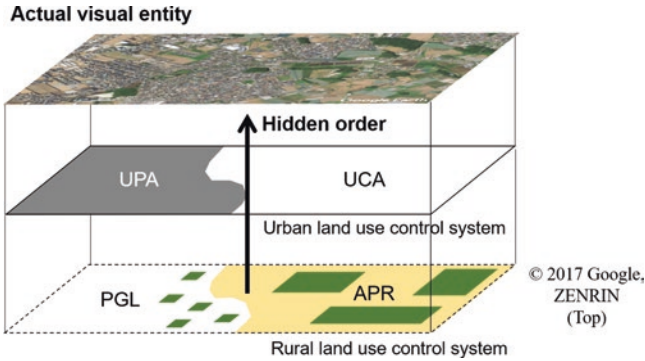


Fig. 4.32 Land use control systems creating hidden order in actual land use pattern

of Productive green in UPA (Fig. 4.32). The variety of overlaps creates several patterns of urban-rural mixture, but each land use control system is well coordinated to be compliant. This phenomenon is called “hidden order” in landscape, an idea originally developed by Japanese architect Yoshinobu Ashihara, applying to Japanese architecture as a metaphor for culture to explain an insider’s look at the apparent lack of order of Tokyo (Ashihara 1989).

4.6 Enhancing the Value of Urban-Rural Grey

4.6.1 Growing Vegetables as a Retiree Lifestyle

Japan has a rapidly aging population. Many elderly people living in the suburbs of Tokyo belong to the baby boomer generation born just after World War 2 (Fig. 4.33). They worked in Tokyo and commuted to their companies from their suburban home. Currently, the number of retirees is increasing and quite a few people have started growing vegetables in their neighborhood as a part of their retiree lifestyle. This is partly because of the proximity of their homes to farmland in urban-rural mixture of suburban Tokyo.

Those who want to start farming have several options. If they seriously intend to contribute to the agricultural industry, they can support a professional farmer as a part-time worker. Or, nowadays they can even become professional farmers with the support of local municipalities. However, the easiest option for becoming involved in farming is becoming a hobby farmer, a person who enjoys farming for leisure and as a non-profit activity. A reasonable option for a hobby farmer to start farming is to rent a small plot(s) of allotment gardens (10–30 m²) which are currently provided by various organizations including municipalities, agricultural associations (Japan Agriculture Cooperatives), or even private industry entrepreneurs (Fig. 4.34). Most commonly, allotment hobby farmers grow vegetables by themselves, but currently an alternative includes expert guidance by a professional farmer or gardening expert from a private company.

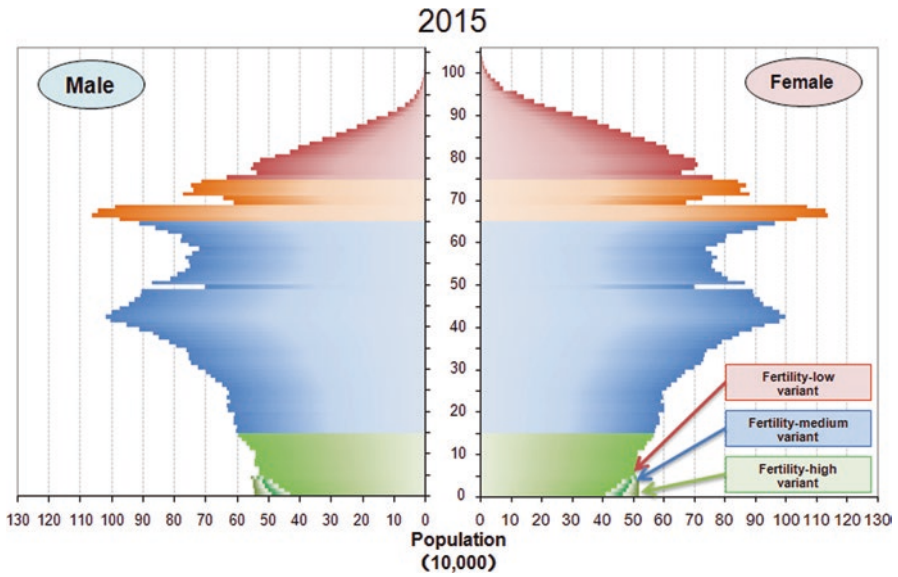


Fig. 4.33 Population pyramid for Japan in 2015. © National Institute of Population and Social Security Research. (Sources: Census (1920–2015))

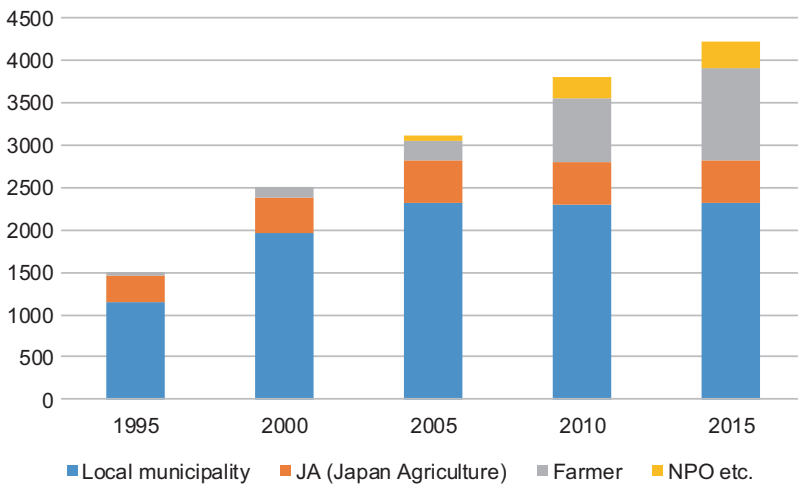


Fig. 4.34 Changes in the number of allotment gardens in Japan. (Source: Ministry of Agriculture, Forestry and Fisheries)

4.6.2 Food Provisioning from Hobby Gardens

Hobby farming in allotment gardens reaps a variety of benefits, the most direct of which is access to fresh food (Pothukuchi 2004). While quantifying food production in allotment gardens is regarded as a valuable assessment, it remains unknown (Gittleman et al. 2012). Therefore, we tried to identify actual yield from two selected allotment gardens in the Tokyo region (Tahara et al. 2011). One is the Hagidai garden in Chiba city, which is a typical allotment farm without guidance of professionals (non-guided type). The other one is the Shiraishi garden in Nerima ward, which is Japan’s first allotment garden with farmer’s guidance (guided type) (Fig. 4.35).

The types of vegetables planted in each garden are diverse (Fig. 4.36). Warm climate and four distinct seasons enable gardeners to grow both summer vegetables (tomatoes, eggplants, edamame, okra, corn, etc.) and winter vegetables (potatoes, daikon radish, broccoli, onions, cabbage, etc.). The allotment farmers plant a large variety of vegetables in small amounts characteristic of hobby farming. Yields were identified from direct weight measurements by gardeners randomly selected from each garden (Fig. 4.37). For the guided type, farmers carefully prepare soil before planting to be rich and homogeneous for all plots, and decide the vegetable planting pattern commonly applied to all allotments.

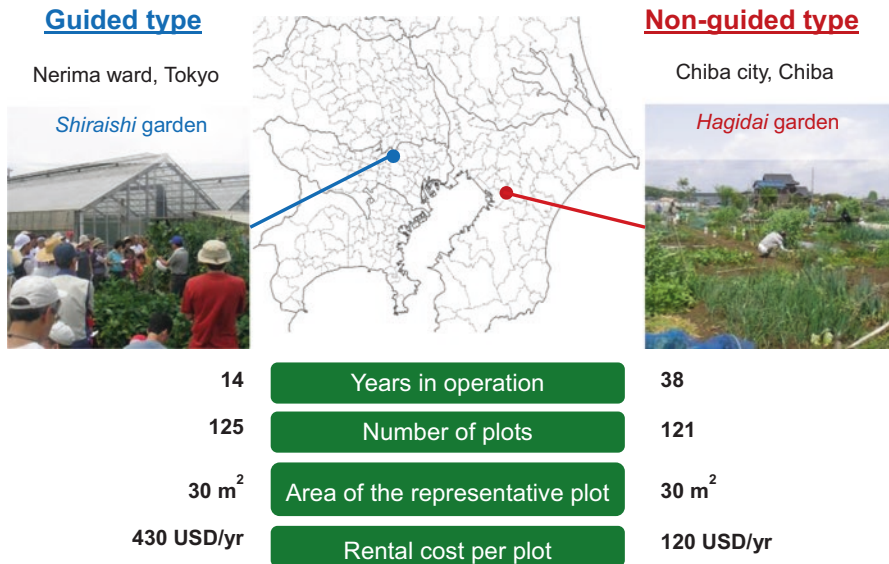


Fig. 4.35 Location and basic figures of the case study gardens (Tahara et al. 2011)

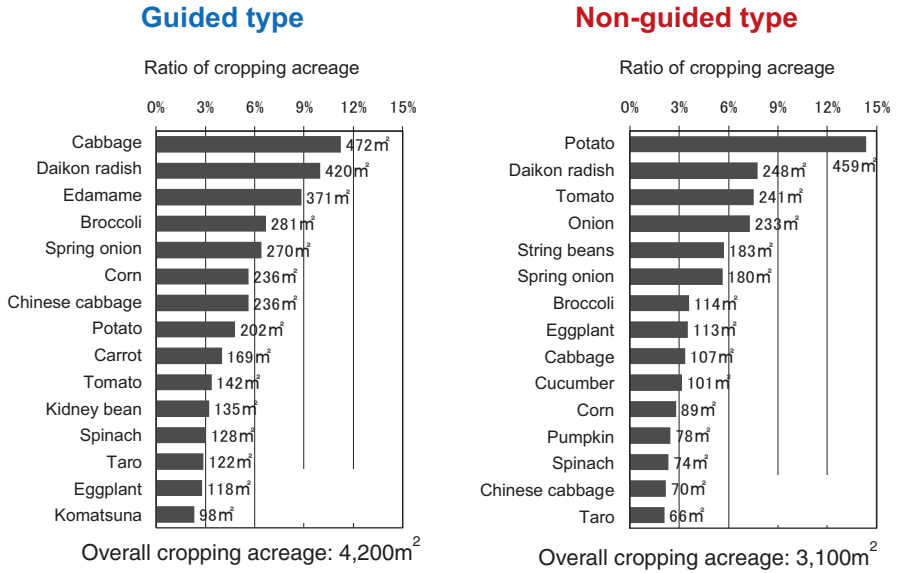


Fig. 4.36 Summary of the vegetable planting patterns of the case study gardens (Tahara et al. 2011)

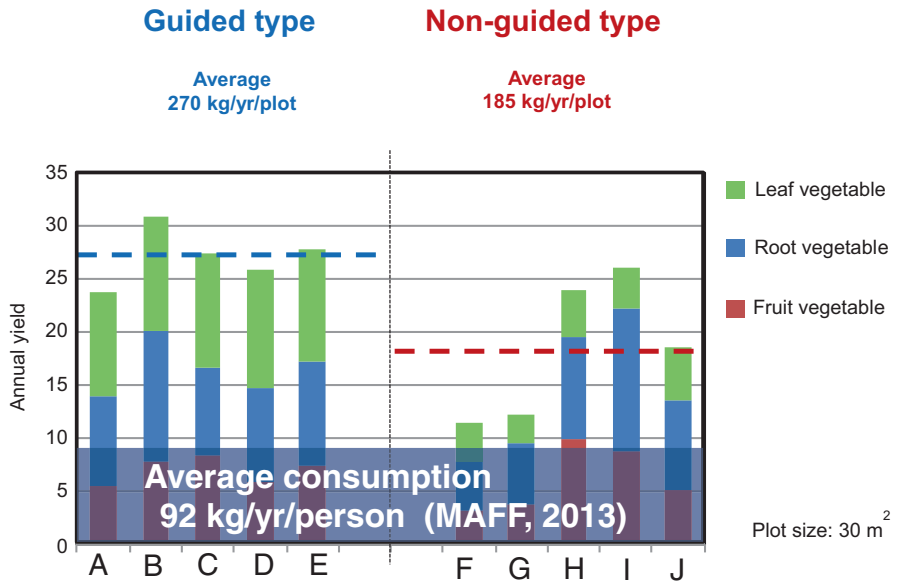


Fig. 4.37 Annual vegetable yield of the selected 10 examinees (Tahara et al. 2011)

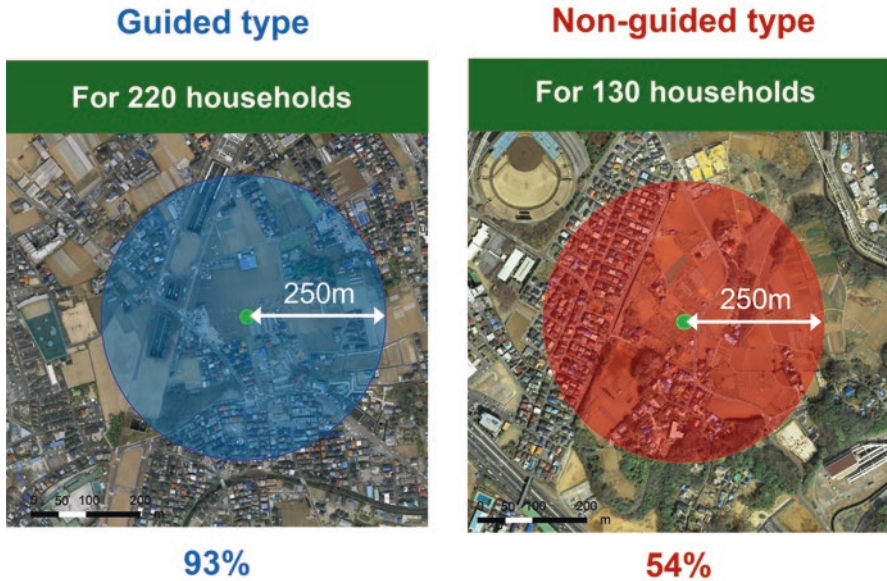


Fig. 4.38 Self-sufficiency in vegetables in a neighborhood community (Tahara et al. 2011). (Aerial photos © Geospatial Information Anthology of Japan)

Such farmer guidance improves the yield and stability of guided-type hobby farms. Compared to the current amount of average vegetable consumption per person (89 kg/year) (MAFF 2016), guided-type hobby farms can produce three times more. The non-guided type can produce only two times on average. Simply speaking, at least both garden types can produce enough vegetables for self-consumption for the hobby farmers themselves; and in most cases, they can share their excess with family or neighbors.

Japanese allotment gardens are vegetable-oriented. When considering food security in cities, allotment gardens can contribute to producing emergency food and nutrients for neighborhood community, especially when the food transportation is disrupted by natural disasters (Sioen et al. 2017). The numbers in Fig. 4.38 shows the ratio of self-sufficiency in vegetables supplied from the two example gardens to meet the demand (current vegetable consumption) of the immediately surrounding communities (Fig. 4.38). The numbers are considerably high, although the gardens are located in the densely populated Tokyo region. Allotment gardens may not just be a substitution for urban greenery or urban open spaces, but be part of the productive landscape (Viljoen and Howe 2012) that links urban farming and the local food system.



Fig. 4.39 Typical scenery of abandoned Satoyama

4.6.3 Satoyama Woodland as Community Biomass Energy Source

Forest is also one agricultural land use. Tokyo suburbs used to be rural areas, thus existing forests in Tokyo's present-day suburbs were historically maintained by the agricultural community. Such forest is called *satoyama* woodland. Satoyama is a word coined by combining village (*sato*) and mountain (*yama*). Satoyama woodland is the woodland that rural communities historically maintained for harvesting fuelwood or other organic materials to sustain their livelihood. Traditional management practices create habitats for diverse flora and fauna that can survive only under human disturbance. Satoyama woodland is a biodiversity-rich semi-natural ecosystem that benefits both human and nature (Takeuchi et al. 2012).

The widespread use of fossil fuels in today's world has caused many satoyama woodlands to lose their role of producing biomass fuels. Most satoyama woodlands today are abandoned because of the loss of economic value. This leads to changes in the ecosystem that had been maintained by human disturbance. Declining biodiversity in satoyama woodland is regarded as one crisis in the National Biodiversity Strategy (MOE 2010), and this abandonment causes social problems including illegal dumping (Fig. 4.39).

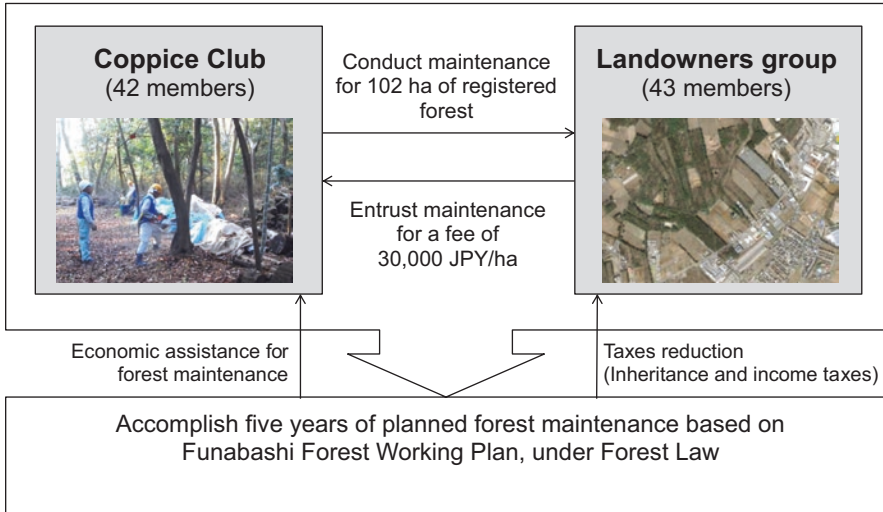


Fig. 4.40 Schematic overview of Funabashi Forest working plan (Terada 2017b)

Many citizen groups endeavor to address this issue of re-maintaining satoyama woodland as an urban productive landscape. Coppice Club, satoyama-friendly group organized by retirees in Funabashi, Chiba is a prime example of such citizen groups. They are attempting to restore the maintenance of an abandoned satoyama woodland of some 100 ha based on a contract with landowners (Fig. 4.40) (Terada 2017b). As a result of active maintenance, these retirees are producing a large amount of biomass. If their maintenance techniques were applied to the entire forest in Funabashi city (720 ha), around 1000 tons of biomass are estimated to be harvestable, contributing to a 10% self-sufficiency in heat energy in the neighborhood communities in urban-rural mixed areas (Matsumoto et al. 2011).

The biggest barrier in making biomass utilization feasible is the high cost of biomass transportation. Proximity of satoyama woodland and urban areas may tackle this barrier by minimizing the distance between satoyama woodland and biomass heat or electricity plants in urban areas. Related to this, it is estimated that the biomass obtaining costs (including transportation cost) in peri-urban Tokyo is 15% lower than those in mountainous areas (Terada et al. 2010).

After the tsunami-related accident of Fukushima nuclear power plant in 2011, using renewable energy became more widespread and creating distributed local energy supply systems has become an essential need for shaping a resilient society in Japan. Satoyama woodland should not be thought of as simply urban greenery, but as a unique productive landscape that can link ecological restoration and a community energy system.

4.7 The Value of Grey

4.7.1 *Natural Disasters and Layer Model Advantages*

When planning Japanese cities the threat of natural disasters must never be ignored. Only within a recent couple of decades has Japan experienced four major earthquakes and a tsunami; Kobe in 1995, Niigata in 2001, Northeast Japan in 2011, and Kumamoto in 2016. Floods and typhoons also frequently ravage Japanese cities, not only earthquakes and accompanying tsunamis. The *Comprehensive Risk Index* developed by Munich Reinsurance Company (see References) includes all possible risks that cities in the world face, and rates each city. Most cities in Western Europe and North America are a very low number (e.g. Paris 25, London 30, and NYC 42). Compared to European and North American cities, however, Tokyo is an astronomically high 710. This index clearly indicates a fundamental difference in the scale of disaster risk between European and North American cities and those in Japan.

Cities need food. If a distinct boundary exists between urban land use and rural land use and thus the city becomes an entity without agricultural land uses, no food can be generated within its boundary and thus the city will become a place completely dependent on external food supplies. As long as transportation systems are operating normally, cities will avoid any major problems of completely depending on food supplied by rural areas and international markets. However, once a major natural disaster occurs, transportation systems will most likely be seriously damaged, and the external food and energy supply will also most likely be suddenly disrupted. If the city has been completely depending on external food and energy supply, then the loss of transportation systems may inevitably result in the loss of food and energy, and the city will suddenly be caught in a serious situation.

To be prepared for such unpredictable and fatal occurrences, the layer model provides a resilient solution to how land should be planned. Under ordinary conditions, preference can simply be given to the urban layer, and the influence of the rural layer can be minimized. However, when the transportation systems suddenly cease to function because of natural disasters and food supplies have been disrupted, cities shall be able to take advantage of the rural layer and generate its own food inside, or nearby, the city limits. Such a redundant system in food supply based on the layer model, which includes intra- and peri-urban food supplies, may seem inefficient but has the advantage of adaptability to unpredictable changes, and thus highly contributes to a city's resilience. To maintain such a redundant food system, the rural layer should always be embedded in the area as "seeds" to enable immediate response to sudden demands on local food supplies. Japanese cities have realized an increasing probability of such a situation suddenly happening, and the layer model unintentionally maintained high potential to make cities resilient. The advantage of the layer model can be found in its adaptability to a given condition, especially to unpredictable changes such as those caused by natural disasters.

4.7.2 *Value of Grey*

According to the layer model, the boundary between urban and rural land uses is not as clear as that of a conventional dichotomous model. Also, the boundary should be regarded as in constant flux. The zone between constantly fluxing boundaries may be called a Grey Zone, where an extensive micro-scale mixture of urban and rural land uses is found. In the Grey Zone, the physical entity may change according to changing emphasis on the layers, but the system to control different layers should be there. The key of the layer model is embedded in its intangible system, not in the tangible entity.

Such a system with changing tangible entity controlled by an eternal intangible system can commonly be found in Japan's cultural heritages. Ise Grand Shrine is an excellent example. The Ise Grand Shrine is one of the oldest shrines in Japan, which is well known for more than 1300 years for maintaining a system of rebuilding the shrine buildings every 20 years. Authenticity of the shrine has been embedded in its unique system which has survived over 1000 years, not in its physical entity.

"Grey" stands not for an uncontrolled, uncivilized, or undesirable condition. "Grey" is a keyword that represents an adaptable system where tangible entities may change but the authenticity is embedded in the intangible system itself, and such a system with "grey" character will undoubtedly provide resilience to cities. Usefulness of a planning concept with "grey" can be shared by many cities around the world that also frequently suffer from natural disasters.

Figure 4.41 illustrates the seismic risk hazards and the location of major cities in the world. Red, orange, and yellow show areas with a high risk of seismic hazards; black circles represent the size and location of cities. Many major cities in Asia are obviously situated on terrain where the risk of earthquake is very high. It is expected that not only Japanese cities but cities which share such a high-risk situation will also discover and appreciate the "value of grey" in an effort to make themselves resilient. In recent years, however, such a concern about natural disasters is starting to be shared by cities in the West as well. Because of global climate change, cities along a coastline – no matter where they are located – are now facing the threat of serious storms and coastal flooding, and thus starting to seek an alternative planning concept that may effectively provide them with the needed resilience. The concept of "grey" should also be appreciated not only in Japan but also in the whole world.

Dichotomous landscape with a clear separation of urban and rural land uses is indeed simple, clear, and often beautiful. Such a concept is also efficient provided no sudden or major changes occur. A "grey" landscape with a micro-scale mixture of urban and rural land uses may look chaotic and disordered. However, grey landscape maintains high adaptability to unpredictable and sudden changes, and thus contributes to making cities resilient. "Value of grey" should be appreciated for its resilience and the potential that it holds for the sustainable future of our world.

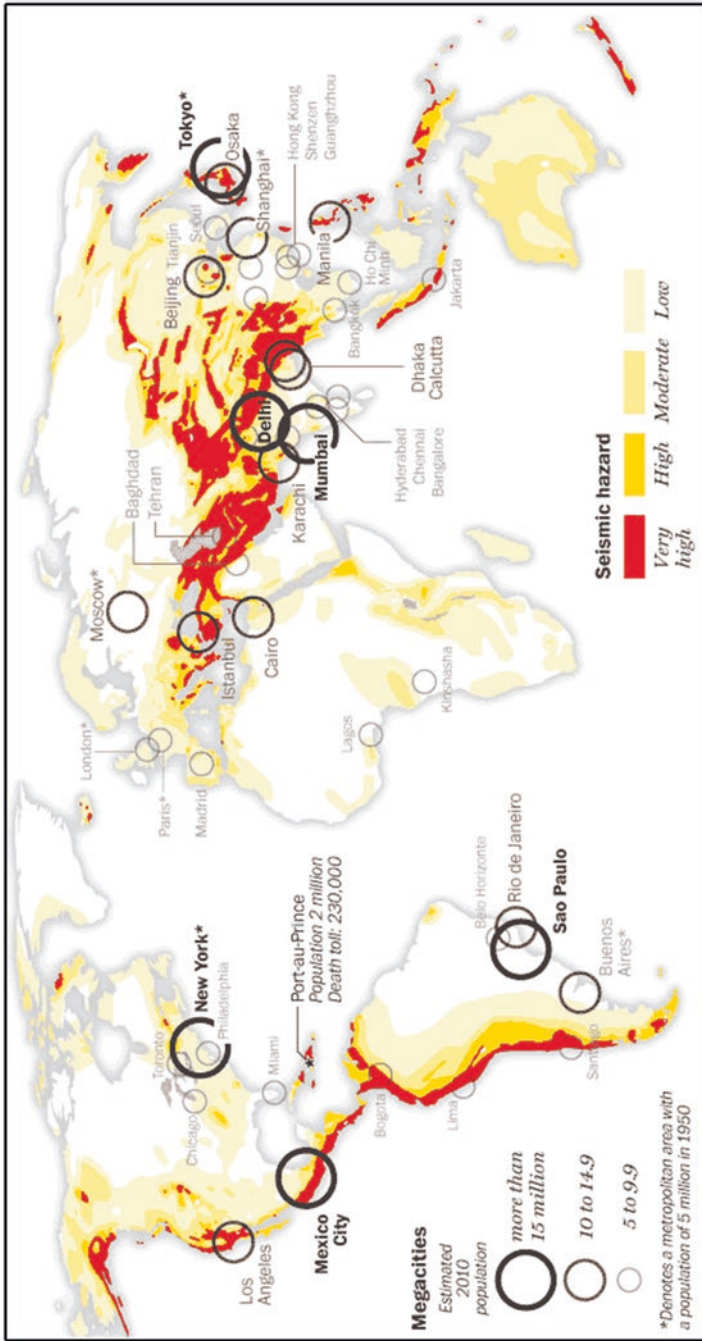


Fig. 4.41 Megacities and seismic hazards in the world. (Source: Global Seismic Hazard Assessment Program, United Nations Population Division)

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