

Progressing Suburbanization and the Controversial Land Use Management in a Japanese Local City -A Case Study of Miyakonojo City, Japan-

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Abstract: Today Japanese cities are suffering numerous development problems, including deteriorated city centers and expanding suburban areas. Further, Japan today faces a shrinking and aging population. Thus these cities should seek better balance between proper land use and economic vitalization. This paper examines the long-term development trend for 1985-2011 in Miyakonojo City and evaluates that city's latest land use guidelines to offer the following conclusions: 1) During 1995-2011, the number of building applications transitioned between 600 and 800. Half were in the *un-zoned area* where suburbanization is being caused mainly by housing; 2) The collective housing is increasing in these *un-zoned area* as well as in the *zoned areas*; 3) Concentrations of development are emerging in the *un-zoned areas*. 4) The Land Use Control Guideline shows the direction of future land use management. Although the guideline will manage suburbanization, housing development remains stake.

Keywords: Development trends, Provincial cities, Suburbanization, Japanese land use management, City Planning Act, Miyakonojo City

1. INTRODUCTION

Japanese cities today are suffering from many problems, including deteriorated city centers, inefficiently utilized former industrial areas, traffic congestion, hollowing of housing districts and expansion of suburban areas without sufficient infrastructure, deteriorating agricultural land and destruction of nature. These are all issues to those other developed countries are facing. Japanese cities are also having to deal with new and expanding trends in globalization, privatization, deregulation, decentralization and others. Actually, these phenomena and their associated problems are found in many countries and have been discussed for their various aspects (*e.g.* Burchell *et al.*, 2000).

Further, Japan faces a shrinking and aging population that is especially severe in the small provincial cities. 'Shrinking cities' has become a new and common focus for the city planning, especially in Japan and Germany (Oswalt *et al.*, 2008). However, the shrinking issue seems to be different for Japan and Germany. Shrinking populations and simultaneous expansion of low-density urban areas is more severe in Japan, when derived from its city planning systems and rapid population decline. Thus, it is important to observe the suburbanization of Japanese cities to pursue better planning system including the countermeasure against urban expansion in population decline.

The Japanese City Planning Act (hereinafter, CPA), the primal act for land use regulation, was amended in 2000 to address these issues. Based on the CPA 2000, local governments received alternatives for having strict and less strict regulations for their land use

management. It was assumed that municipalities with shrinking populations did not necessarily have to hold to strict regulations for their economic vitalities. However, under the current market/competition circumstance, local governments, especially those in areas of lower development opportunities, were likely to use tax funding for their budgets and thus likely become oriented toward having less strict regulations for development.

Further, the CPA 2000 amendment was accompanied in 2000 by the ‘Act on the Measures by Large-Scale Retail Stores for Preservation of Living Environment’. Although this Act principally aimed let local governments avoid the degradation of living environment caused by large-scale stores, it had no power to restrain the development of new large-scale stores. Thus, after 2000, the number of large-scale stores increased, especially in the less-strictly regulated areas of CPA 2000.

As a reaction to this problem, the CPA was further amended in 2006 to control in particular the development of large-scale stores to address the concept of a ‘compact city’, an epochal focus in the Japanese planning history. However, CPA 2006 had little effect in those cities that already had those stores. Further, since CPA 2006 includes the same regulation systems as CPA 2000 for other purposeful development, such as housing and industry, the possibility of having an actual ‘compact city’ may still be doubtful. Indeed the effects and problems of CPA 2006 should be discussed in more detail.

Miyakonojo City, a typical small city in the provincial area of Japan, is the ‘key city’ used here to investigate the effects/problems of land use regulations. It was exceptionally deregulated in 1988 in the same manner that the CPA 2000 suggested. The authors previously investigated the development trend for 1985-1999 (Maesako *et al.*, 2002), which indicated a controversial situation for land use, and analyzed building applications using the Geographical Information System (hereinafter, GIS). Consistent suburbanization expansion was thus observed as a countertrend to the compact city concept.

However, the recent development trend for the city has not been clarified. As stated, the CPA was amended in 2000 and 2006, the former changes for more relaxation-orientation, and the latter to tighten the regulations for development. The purpose of this paper, therefore, is to investigate the suburbanization trend in the city (2000-2011) and compare it to the former trend (1985-1999). Under the ongoing progression of city-center decline, depopulation, and development of the large-scale stores, new phenomena may be identified and indeed found to reveal certain problems produced by the CPA 2006.

The study area here is thus the ex-Miyakonojo city (the city merged with four municipalities in 2006) so as to analyze the overall period (1985-2011). As shown later, although various studies have investigated the suburbanization of provincial cities, few other studies have dealt with long-term development trends. Thus, the current study is likely unique in its focus.

In the international context, the case of Miyakonojo City will provide specific planning knowledge on the effect of long-running less strict land use regulation in a provincial area currently facing population decline. Other cities in the developed countries will also face similar ‘shrinking’ sooner or later. Although the cities in developing countries such as Asian cities are now experiencing tremendous growth, their own shrinking and aging problems are also expected in near future. These problems will also be more severe in the provincial small cities than in the huge cities.

2. JAPANESE LAND USE MANAGEMENT

2.1 The Framework for Land Use Management in Japan

The City Planning Act stipulates the basic regulations for land use and development in urban and suburban areas in Japan (Ministry of Land, Infrastructure, and Transport, 2003). Figure 1 presents that spatial model. The *city planning area* is ‘the area which includes a built-up areas located in the center of municipalities meeting necessary conditions for the levels such as population, number of employed population, etc. and which integrated improvement, development, and preservation as unified urban areas is necessary’.

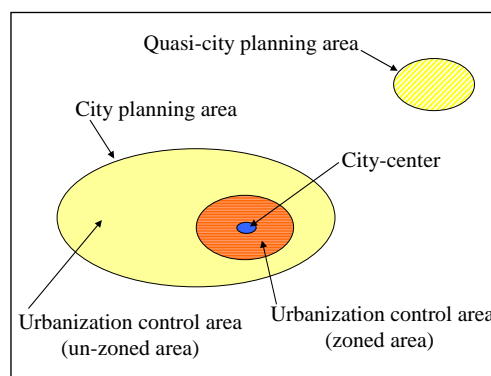


Figure 1. Spatial model for *city planning*

The *quasi-city planning area*, newly stipulated in the CPA 2000, is ‘those areas outside of *city planning areas* where a considerable degree of housing or other building construction or land preparation is actually taking place or is scheduled to take place, and where it is recognized that city improvement, development or preservation may be hindered in future if land use is allowed to continue in a disorderly manner’.

Prefectural governments are allowed to divide the *city planning areas* into two areas: An *urbanization promotion area* and an *urbanization control area*. In the *urbanization promotion areas*, the use-zone system is applied. The regulations applied in the use-zones refer to land use, building-to-plot ratio, and floor-to-plot ratio. In the *urbanization control areas*, any development or changes in land use for purposes other than agriculture are basically prohibited.

Before 2000, the division of the *urbanization promotion/control areas* was a quasi-duty for the prefectures, and actually was effective in preventing undesirable development in suburban areas within the *city planning areas*. However, according to the CPA 2000, the prefectures may choose either division or non-division of these areas. In cases where municipalities do decide on non-division of the areas, the *city planning area* is divided into *zoned areas* and *un-zoned areas* (*‘Shirochi’*). Miyakonojo City chose this non-division system in 1988, as an exception of the quasi-duty system (before the CPA 2000).

In the *un-zoned areas*, use control is not applied, and regulations are less strict than those applied to the *zoned areas*. This area might have available room for developments. Actually, after 2000, many prefectures/municipalities, especially in the provincial areas, sought cancellation of this use division. Public involvement, based on the pressure of interest groups, could promote this non-division system, and the present economic recession might also support it. Suburbanization in Miyakonojo City, the study area for this paper, strongly relates to this problem. On this issue, the CPA 2000 provided several tools to use to control land use in the *un-zoned area*. Both *special use restriction districts* and *district plans* are now applicable in the *un-zoned areas*. The former can restrain development for limited purposes as defined by the local ordinances.

The *quasi-city planning area* does not use a division system. Municipal governments, however, can provide a use-zone system, as necessary. In fact, the authority for designating a *quasi-city planning area* was taken from municipal governments by the prefectural governments in 2006 because municipal governments did not sufficiently utilize the *quasi-city planning area* system for fear of diminishing development opportunities in their areas.

One more problem related to land use management is the *outside city planning area*. Actually, these *outside areas* are almost free from regulation by the CPA. In these areas, although several acts related to agriculture and nature are still applied, it is basically difficult to prevent or control developments. In some regions, undesirable developments in these areas

have become a serious problem.

CPA 2006 includes the important features of the ‘compact city’ concept, which includes strict regulations for *urbanization control areas*, *un-zoned areas*. That is, CPA 2006 principally prohibits the development of large-scale stores in the *urbanization control areas*, *un-zoned areas*, and any *non-commercial zones* in the *urbanization promotion area* (or the *zoned area*). Actually, the development boom of large-scale stores in the *loose regulation areas* seems now to have calmed. However, the effect of CPA 2006 on suburbanization itself is still unclear.

Further, since 1999, the central government has drastically promoted municipal mergers. The number of municipalities thus decreased to 1,730 in 2010 from 3,229 in 1999. In many regions, this merging caused controversial problems related to land use management, for example, plural *city planning areas* in one municipality with different tax standards, coexistence of *city planning areas* with/without a division of *urbanization promotion/control areas*. Miyakonojo City has experiences similar problems.

2.2 Literature Review of Previous Studies

Suburbanization has been analyzed and discussed particularly in the U.S. and European countries for several decades. Today, suburbanization is often discussed in the context of the definition of a ‘compact city’ (e.g. Dieleman *et al.*, 2008; Rahman *et al.*, 2008).

In Japan, suburbanization is the phenomenon often observed, regardless of the inside/outside *city planning areas* and the *strict/loose regulation areas* in *city planning areas*. Suburbanization in the *strict regulation area* (*urbanization control area*) was discussed by Sugiki, *et al.* (2001) for Maebashi City using GIS. Suburbanization outside the *city planning area* (*loose regulation area*) was reported by Yoshitake, *et al.* (2003) for Kiyotake Town using GIS. Although these focus areas differ from ours, it is interesting that housing complexes were pointed out as the cause of suburbanization in both papers.

There are numerous previous studies on suburbanization that occurs in the *loose regulation areas*. Several have analyzed the chronological changes in the total size of the suburbanized area and discussed the problems of land use management (Miyake and Nakade, 1993; Wada, 1994; Fujimaki and Nakade, 2000). Other studies have analyzed the suburbanization trend based on each individual development (using GIS) and discussed both their ongoing problems and desirable land use management (Maesako *et al.*, 2002; Ishimura *et al.*, 2006).

Recently, several studies have focused on the actual operation of development control (Wada, 1998; Furuta *et al.*, 2006), as well as local policies and *district plans* (Iwamoto *et al.*, 2006; Uchikoba *et al.*, 2011) for *loose regulation areas*. Further, several studies have started discussion about land use management for plural city planning areas both with and without a division of the *urbanization promotion/control areas* after the municipal mergers (Matsukawa *et al.*, 2007; Koyama *et al.*, 2009).

Applying an overview of these studies completed over the last two decades, it is clear that the focus of any discussion on *loose regulation area* seems to be shifting to planning and management from its earlier analysis of the development trend/situation. However, few studies yet have analyzed the actual suburbanization trend over the last two decades. Actually, these decades have a background of both serious recessions and several significant legislative changes, such as both CPA 2000 and 2006, and these aspects are expected to influence the development trend over time. Thus, the long-term actual development trend should be clarified so as to understand suburbanization expansion in terms of its historical background and issues for the future.

3. CASE STUDY ON MIYAKONOJO CITY

3.1 Research Design

Based on the above discussion, this paper analyzes the actual long-term suburbanization trend based on development actions using GIS. The study area for this effort is ex-Miyakonojo City. Although the city merged with the surrounding municipalities in 2006, the study area remains limited to the area of ex-Miyakonojo City to have the most effective long-term analysis. The study term is the period of 1995-2011. In terms of fixed-point observations, this analysis is expected to provide detailed development data on the suburbanization of this area.

This paper starts by offering an overview of Miyakonojo City. In Section 3.2, the city's geography, demography, population, and framework for city planning are introduced. General city planning problems are also explained. Further, the features of the latest *City Master Plan* and *Land Use Control Guideline (provisional)* for the city are also summarized. Based on earlier experience with the expansion of suburbanization after utilizing the non-division system in 1988, the city has recently come to seeking a positive path toward having a 'compact city'.

Secondly, the building applications issued by the city authority for the period of 1995-2011 are surveyed here to investigate development trends. This application process is a legal obligation for developers/landowners in the *city planning area*. As shown in Section 3.3, suburbanization is occurring in the *un-zoned area* in the *city planning area*. Therefore, a survey of these applications can further clarify the situation of suburbanization for the city.

The research process is summarized below. Investigations c)-d) were conducted using GIS.

- a) Analysis of population, total numbers of building applications, and the purpose of these building in the *zoned-area* and the *un-zoned area*. This analysis indicates the overall trend of development in the *city planning area* (see Section 3.3).
- b) Analysis of the distribution of size of development plots in the *zoned* and the *un-zoned areas*. This analysis reviews the nature of the development in the suburbanization (*un-zoned*) area (see Section 3.3).
- c) An overview of the development locations for the whole of ex-Miyakonojo City. This examination shows the actual process of suburbanization (see Section 3.4).
- d) Detailed investigation of the developments in several districts of the *un-zoned area*. The purpose here is to analyze the features of the suburbanization on the district level (see Section 3.5).
- e) Evaluation of the city planning and land use management in the ex-Miyakonojo City area (see Section 4).

3.2 Overview of Miyakonojo City

Figure 2 shows the location of Miyakonojo City. The city is located in the Southwest region of Miyazaki Prefecture, Kyushu Island. The population was 170,955 in 2010 and thus, it was the second largest city in the Miyazaki Prefecture. Miyazaki City, the prefectural capital, is the largest city with a population of 395,593, while Nobeoka City is the third largest with a population of 135,182.

Miyakonojo City was established in 1924 by the merger of several villages and a town.

Figure 3 shows the municipal structure before and after that 1924 merger. In 1969, the city divided the *city planning area* into *urbanization promotion/control areas*. At that time, only the area around the center of the original Miyakonojo City was designated as an *urbanization promotion area* (see Figure 3). Since developments and new buildings were prohibited in the *urbanization control area*, depopulation and aging problems eventually emerged and became a serious issue for the area. Thus, in 1988, the division of *urbanization promotion/control area* was abolished, and the *urbanization promotion area* was re-categorized as a *zoned area*. The *urbanization control area* was re-categorized as an *un-zoned area* with less strict regulations in place than in the *zoned area*. This historical background and its effects have already been reported in detail (Abe, 1999).

Although the city authority provided a ‘down-zoning’ regulation in the *un-zoned area* in 1988, the actual/practical result was the expansion of suburbanization. The author’s previous study (Maesako *et al.*, 2002) clarified the development trend for the period 1985-1999, which showed continuous development of housing and shops along the trunk roads. In the *un-zoned area*, a mixture of agriculture fields, and housing and cost for the maintenance of the infrastructure and welfare service, etc., were recognized as a serious problem by the city authority.

Considering this situation, the city authority published its *City Master Plan* (Miyakonojo City, 2009) in 2009 and a *Land Use Control Guideline (provisional edition)* in 2012 (Miyakonojo City, 2012). These two publications have produced development control in the *un-zoned area* based on strong concerns for the expansion of suburbanization and also considering the city’s depopulation and aging problems. Here, Miyakonojo City decided to orient its planning direction toward a ‘compact city’ structure. The *City Master Plan* shows the future structure of the city (see Figure 4). It designated most of the *un-zoned area* as green zones for nature and agriculture, and only limited several places were designated as local cores for living functions other than the developed area (*zoned area*). Major activity such as commerce, business and industry is should be in the *urban human activity zone (zoned area)* and several *local living cores (suburban human activity zones)*.

Additionally, as stated, Miyakonojo City was merged with four surrounding municipalities (Yamanokuchi, Takajo, Yamada and Takasaki) in 2006. Since the focus of this paper is the Miyakonojo city planning area, hereafter, this paper deals only with the ex-Miyakonojo City area.

3.3 The Development Trend

Figure 5 shows the population of ex-Miyakonojo City.



Figure 2. Location of Miyakonojo

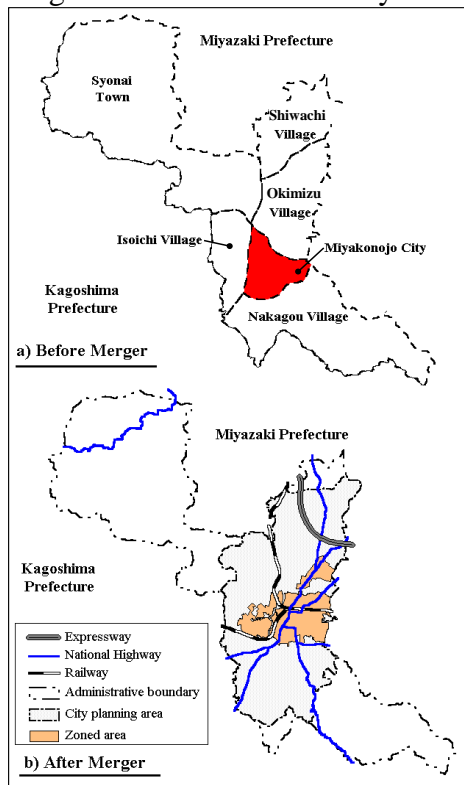


Figure 3. Structure of ex-Miyakonojo City

The total population became nearly stable during the period of 1995-2010. What should be noted here, however, is the population in the *un-zoned area* increased by more than 3,000 during these same fifteen years, whereas the population in the *zoned area* slightly decreased by 700 over the same timeframe .

It is also important to notice the development trends. Figure 6 shows the number of building applications for 1995-2011, which applications varied between 600 and 800, even though those in 1995 and 1996 totaled more than 1,000. Further, the tendency toward nearly half of the total applications being in the *un-zoned area* has continued since 1997. It is notable also that the number of applications has been increasing again since 2007. In this sense, the suburbanization pressure appears to have become stronger.

Here in the *zoned area*, the population is almost stable (see Figure 5) with the constant development of ca. 400 buildings (see Figure 6) while in the *un-zoned area*, the population slightly increased (Figure 5) with the increase of building activities (see Figure 6). It can logically be presumed then that new developments occurred more often in the *un-zoned area* than in the *zoned area*, while the re-developments/buildings occurred more often in the *zoned area* than in the *un-zoned area*. The agriculture/nature fields were eaten away during the same period in the *un-zoned area*.

The purposes of these buildings are shown in Figure 7 and Figure 8 for both the *zoned-area* and the *un-zoned area*, respectively. At first glance, most developments were housing in both areas. However, the number of commerce and business purpose building was larger in the *zoned-area* than in the *un-zoned area*. In this sense, urban functions such as commerce and business and industry were still slightly more oriented toward the urban districts (*zoned-area*), while housing was scattered in the *zoned* or *un-zoned areas*. Further still, housing increased steadily in the *un-zoned area*. Thus, suburbanization was caused mainly by housing.

Were there then any differences between housing in the *zoned* and the *un-zoned areas*? Figure 9 shows the distribution of size for these housing plots. To understand the chronological change, Figure 9 a) and Figure 9 b) show the housing situation for the *zoned* and *un-zoned areas*, respectively,

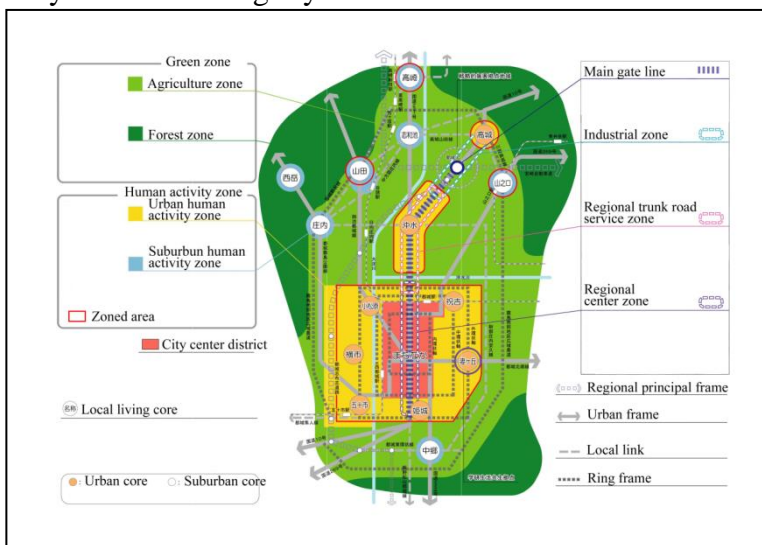


Figure 4. Future structure of Miyakonojo City (Miyakonojo City, 2009)

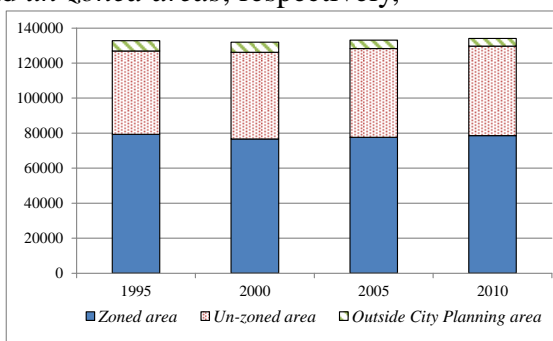


Figure 5. Population of ex-Miyakonojo City

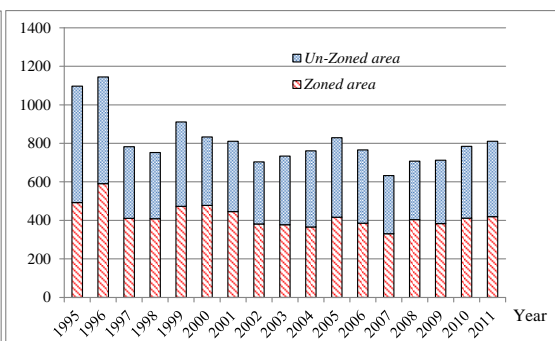


Figure 6. Number of building applications for the city planning area

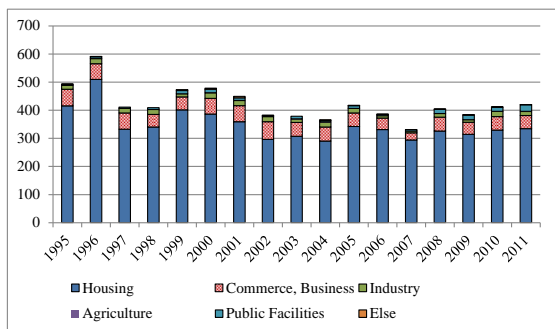


Figure 7. Purpose of buildings in the zoned-area

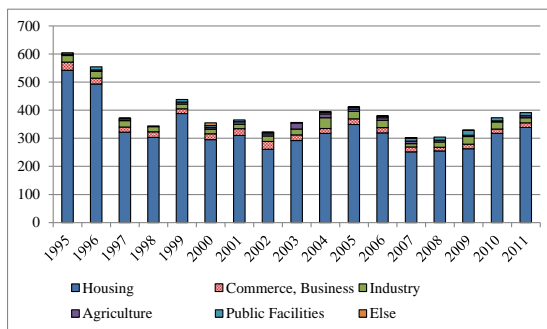
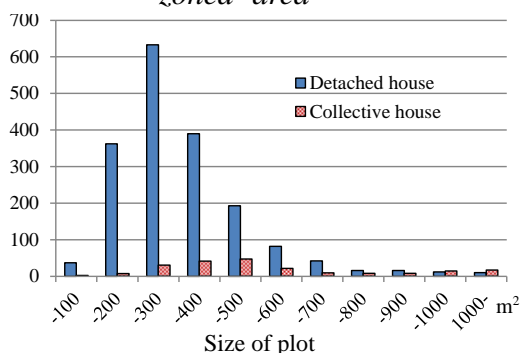
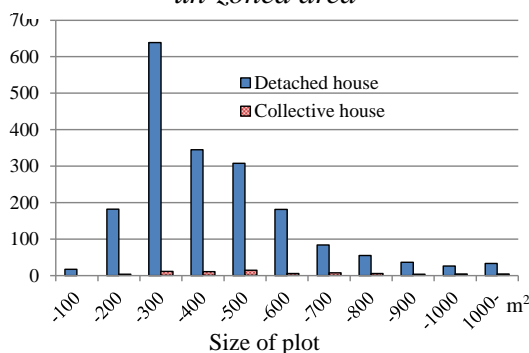


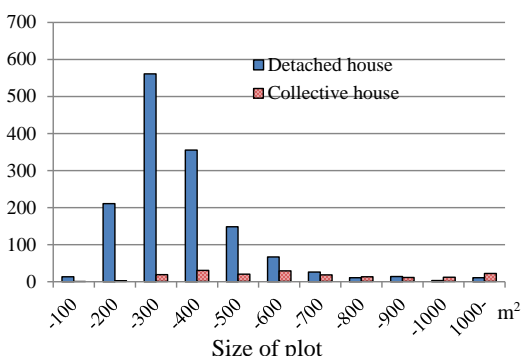
Figure 8. Purpose of buildings in the un-zoned area



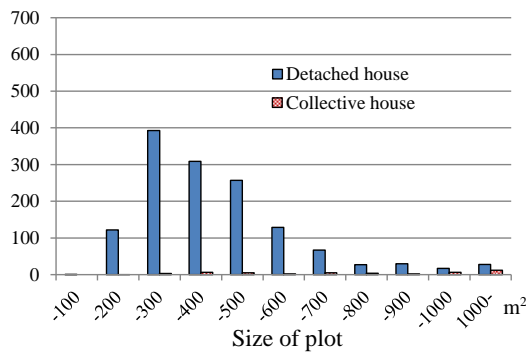
a) Zoned area 1995-1999



b) Un-zoned area 1995-1999



c) Zoned area 2007-2011



d) Un-zoned area 2007-2011

Figure 9. Distribution of the plot size for housing

for the first five-year term (1995-1999), while Figure 9 c) and Figure 9 d) show the situation for those areas for the last five-year-term (2007-2011). Basically, the housing plots in Miyakonojo City were larger than housing plots in other cities. In both the *zoned* and the *un-zoned areas*, the mode plot size was 200-300 square meters for detached (single-family) houses during both time periods. However, the size of detached housing plots was larger in the *un-zoned area* than in the *zoned area*. The average housing plot size in 2011 was 419.1 and 361.6 square meters for the *un-zoned area* and the *zoned area*, respectively. Although the number of collective (apartment) houses was small, these houses did appear more frequently in the *zoned area* than in the *un-zoned area*. Comparing b) and d), large-scale collective houses emerged in the *un-zoned area* only recently.

The residents were able to get wider housing in the *un-zoned area*, which indeed became the inducing factor that led to greater suburbanization expansion.

3.4 Geographical Distribution of Development –A Suburbanization Trend–

Figure 10 shows the geographical distribution of the developments during 1995-2011. The

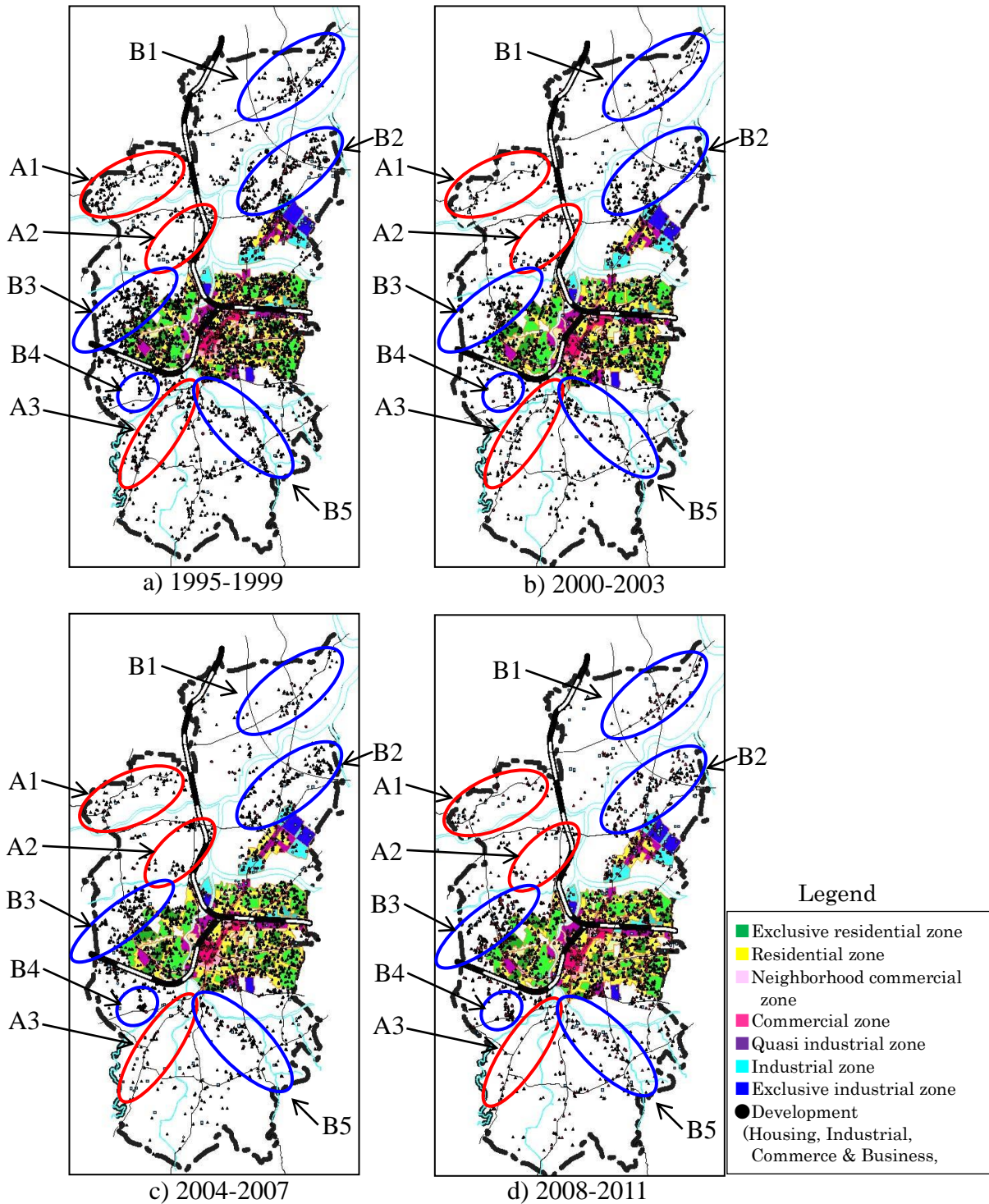


Figure 10. Geographical distribution of building activities

figure provides maps for every 4-5 year period. The colored zone is the *zoned area*, and the non-colored zone is the *un-zoned area*. When comparing these maps, in spite of the long period of time (17 years) and the large ups and downs in national economic conditions and the revisions of the CPA, no significant changes in the geographical distribution of the developments occurred.

Here therefore, let us have a look at the *un-zoned area*, the focus of this paper. There are several concentration zones for development, A1-A3 and B1-B5. In districts A1-A3, there were many developments in the early period (1995-2003). However, these activities calmed

down in the last eight years examined (2004-2011). On the other hand, in districts B1-B5, development activities did continue throughout the entire observation period.

The western part of A1 and the eastern parts of B1 and B2 were the central districts of the town and villages that merged into Miyakonojo City in 1924. It is obvious that the decline of the area that had once been part of the *urbanization control area* was improved. However, at the same time, these districts became the cores of suburbanization. Actually, their developments spread along the roads that emanated from these core areas.

District B2 is characterized by the interchange for the expressway. The development spread along the truck road (national highway) in the neighborhood of the interchange. Districts B4 and B5 are characterized by trunk roads. Development there constantly occurred along those roads. That is, these districts attracted people (mainly residents of detached houses) because of convenience, cheaper land prices, and country -style life, further accelerated by loose land use regulation.

B3 is the controversial district because it rests adjacent to the *zoned area*. B3 is a very convenient district because residents could make use of the urban services provided in the adjacent *zoned area*. The living circumstance was also quite similar to that found in the *zoned area*, in spite of which residents could enjoy the cheaper land prices and loose land use regulations. The development pressure seems to be the greatest in the A and B zones. The problem is that the city authority cannot currently afford to provide a sufficient infrastructure and welfare services in these zones.

3.5 Districts Experiencing Suburbanization Pressure

As stated above, development activities in B1-B5 have continued. There are three districts with a notable development trend, namely, B2, B3, and B5, as shown in Figure 11.

Looking at the B2 district, (Figure 11 a), it is obvious that the development extends along the road. Although most are housing, the developments of commerce and business are found along the roadside, as shown by the blue circles. The development of industry (factories) is also found mainly on the east side of the interchange in the yellow circle, without development for other purposes. In this sense, the development of industrial facilities is relatively well managed. Also, there are several districts with housing agglomerations, shown as red circles. Actually, in accordance with Article 41 of the CPA, developments over 1,000 (3,000 ordinary) square meters have a limitation of height, building-to-plot ratio and floor-to-plot ratio in the *un-zoned area* that was first introduced in 1988 as a down zoning regulation. However, these incremental developments of single (small) developments form large-scale residential development without any sufficient infrastructure as a result. This phenomenon is a serious problem that needs to be addressed to control suburbanization.

Figure 11 b) shows the detailed distribution in the B3 district. As stated above, this district is problematic because many of the developments have continued. This district is convenient because it is adjacent to the *zoned area*. People can receive the benefits of the *zoned area* along with relatively cheaper land prices, and further, have no *city planning tax* levy. The red circles show the housing agglomerations. There are more red circles here than in both B2 and B5. Further, several shops are found in the blue circle. These shops are located here because the neighborhood population is a market, and they provide further convenience for successive developments. This zone seems to be heading toward a steady urbanization rather than suburbanization. The problem is that this zone is not accompanied by any infrastructure provision. In the future, the residents would have a strong demand for infrastructure, which will increase public costs.

Figure 11 c) shows the situation for the B5 district. The housing there is spread between

two trunk roads (in the blue circle). However, the housing agglomerations are limited to four. In the B5 district, although suburbanization there has been caused mainly by each detached housing development, a large-scale residential area (blue circle) was formed as a result. Further, several industrial developments were found in the same area. This kind of naturally built-up residential area has a disordered and mixed-use spatial structure and thus not enough sufficient infrastructure. This situation will cause serious problems in the future and the same situation as that found in the B3 district.

4. DISCUSSION

4.1 Concerns related to suburbanization

The analysis in the previous section illustrates the suburbanization trend for ex-Miyakonojo City. Although the CPA was amended several times and the national economy changed during the observation period, suburbanization progressed at the same pace and very steadily. The main factor behind this suburbanization is housing. Furthermore, although the CPA 2006 principally prohibits the development of large-scale stores with more than 10,000 square meters in the *un-zoned area*, shops under that regulated size have been located along the trunk roads in several districts.

The major concerns derived from such suburbanization thus are the following:

- a) The people will claim a need for provision of infrastructure when the population in

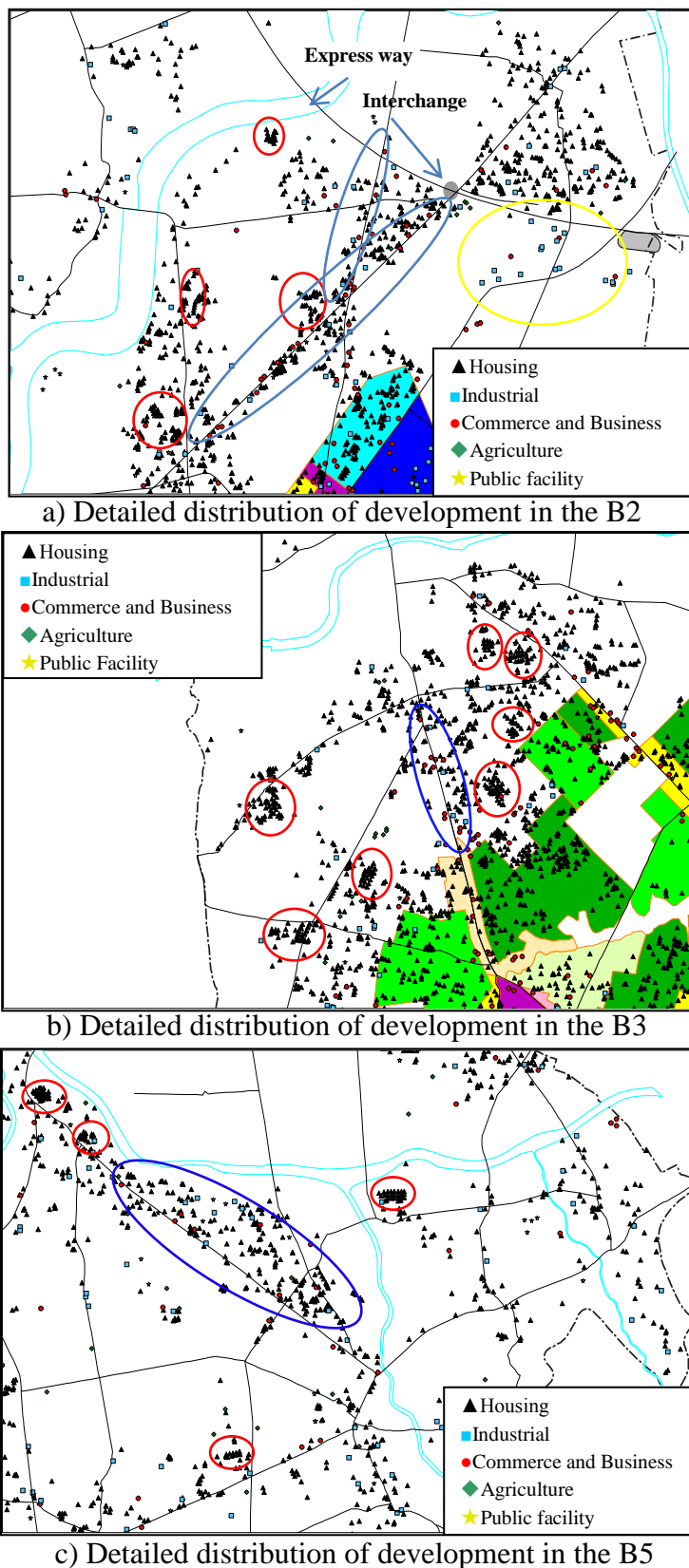


Figure 11. Detailed distribution of development in the B1, B3, and B5 districts

these suburbanization districts becomes large.

- b) Since daily life in the suburbanization area is based on car transportation, the living environment will become severe when the people become old and cannot drive their cars. Public transportation, similar to other public services, is difficult to maintain because of less demand in spite of long-distance operations.
- c) To deal with these above issues, namely, a) and b) as infrastructure, public services including transportation and welfare, are required. However, the city authority cannot afford these services because of the limitations of public finances. In fact, the *city planning tax* levy, the resource for urban infrastructure, is not applied presently in the *un-zoned area*.
- d) Since the purpose of development is not limited in the *un-zoned area*, a mixture of housings, commerce and business, factories, and agriculture including animal husbandry, is possible at any time. This circumstance degrades the conditions for each land use purpose. The agriculture and forest areas thus become vulnerable.
- e) Thus, effective management of suburbanization is an urgent issue for the city. At the same time, the city authority has to seek economic vitalization to address future depopulation and an aging society. Strict land use management may also degrade vitalization. The city authority thus has to seek a balance of both aspects.

The concerns b), c) have been discussed especially for public transportation (*e.g.* Koike, 2014). Many research efforts have also discussed the cost of suburbanization (urban sprawl) in relation to b) and d) (*e.g.* Siedentop, *et al.*, 2008; Burchell, *et al.*, 2000). Concern a) would be intensive in Japan because of the large population in the housing agglomerations developed by private companies in the *loose regulation areas*. However, considering that concerns b), c), d) are found in many countries, the claims/pressures for the infrastructure and public services from the communities in the fringe areas are also realistic in many other countries regardless their own social/legal situations. Further, especially under the decentralization and local autonomy system, local governments have to compete with each other to attract population/economic activities (Sørensen, 2004), which essentially strengthens concern e). Thus, these concerns should not be thought of as peculiar only to Japanese local cities. However, considering the current population decline trend, the problems will become severe in Japanese cities. Further, as stated before, even growing cities in developing countries are expected to face population decline.

4.2 Land Use Control Guidelines

Based on these documented concerns, the city authority, as stated in Section 3.2, published its *Land Use Control Guideline (provisional edition)* in 2012 (Miyakonojo City, 2012). This guideline is the first attempt to counteract the effects of suburbanization in the *un-zoned area* as well as address restructuring of the urban area (*zoned area*).

Figure 12 shows the land use direction in this guideline. The map covers the merged area and also the ex-Miyakonojo City area. The *zoned area* is designated as an urban district where infrastructure will be provided to pursue city vitalization. In the urban district, the use-zone system will be reconsidered so as to reflect current actual land use purposes. For example, in several districts, use zones are expected to be changed from commercial, business, and industry development to residential-oriented zones so as to introduce more population into the urban district.

The *un-zoned area* is designated in the guideline as a *countryside residential area* which consists of a *special use restricted district* and a *countryside provisional district*. The former has six districts, including a *countryside living core district* and a *countryside roadside district*.

The *country living district* occupies the large portion of the *country residential area* (*un-zoned area*).

The principal land use direction for the *countryside residential area* is to introduce additional land use regulation to prevent degradation of present living conditions, vitalize agriculture and maintain green friendly living conditions. To achieve this principal land use direction, the six districts are expected to introduce several regulation alternatives, including incorporation into a *zoned area*, *district plans*, and *special use restriction districts*.

Looking at Figure 12, most of the A, B districts in Figure 10 are designated as certain *special use restricted districts*. The west side of A1, and the center of B1 and B5 are colored to indicate a *countryside living core district*. Parts of A2, A3, B2, B3, and B4 are also covered by *countryside roadside districts* and *countryside interchange districts*.

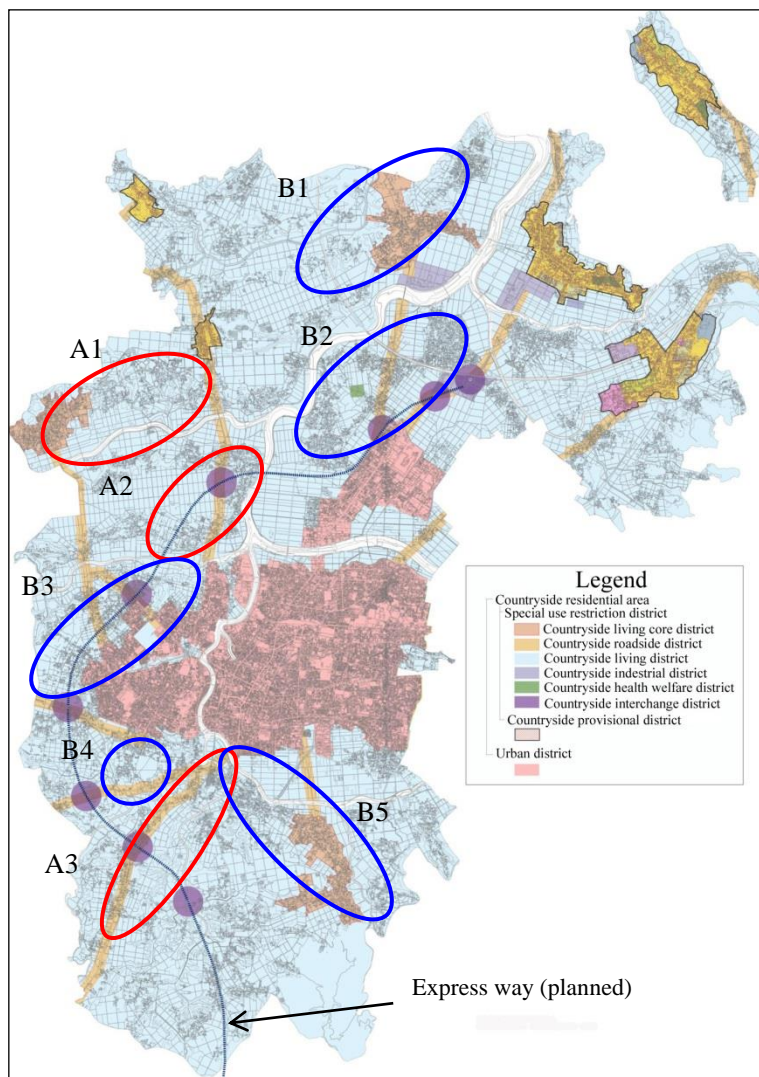


Figure 12. Land use direction from the Land Use control

In the *countryside living core district*, although additional infrastructure provision is controlled, small-scale shops (less than 1,000 square meters) are allowed, while entertainment facilities, factories, and livestock barns are controlled with certain exemptions based on the consideration of neighborhood circumstances. The building-to-plot ratio and the floor-to-plot ratio are 70% and 200%, respectively, and remain the same as the present regulation. In the *countryside interchange district*, future developments that utilize the convenience of the interchange are expected, and a balance between developments and housings should also be considered. Thus, only stores (larger than 1,000 square meters), entertainment facilities, and large-scale livestock barns (larger than 3,000 square meters) are restricted. Moreover, the guideline supposes the application of *district plans*.

The *country living district* covers most of the *city planning area*. This district will remain green and devoted to agriculture with specious housing. In this district, only small shops (less than 500 square meters) and livestock barns are allowed, while entertainment facilities and small factories are controlled with certain exemptions based on a consideration of neighborhood circumstances. The building-to-plot ratio and the floor-to-plot ratio are 50% and 150%, respectively, which are less than the present regulations (70% and 200%, respectively).

4.3 Discussion

The most forceful tool to utilize against suburbanization is even now the application of an *urbanization control area*. However, in Miyakonojo City, that application is not realistic because the people did experience negative effects like depopulation in the *urbanization control area*. In a provincial municipality, negative effects tend to be more severe in today's age of national depopulation and aging. Even if the control of suburbanization is achieved without the application of the *urbanization control area*, it should be avoided that strong regulations produce negative effects. The adjustment between the control of suburbanization and the future vitalization of the city is thus a key issue.

In this sense, the *Land Use Control Guideline (provisional edition)* delivers a well thought-out direction using other tools than the *urbanization control area*. The B2 and B3 districts can be covered by certain *countryside use districts* and thought of as potential districts to be incorporated into the *zoned area*. Other A and B districts are also covered by the other *countryside use districts* so as to restrain land use that potentially requires further infrastructure determination. Additionally, the application of a *district plan* is also considered. The *Land use Control Guideline* is thus an important step to control suburbanization, especially considering that there have been no amendments to the land use plan since the abolishment of the *urbanization control area* in 1988.

Still, certain possible concerns remain as follows:

- a) According to the guideline, those districts where developments do progress beyond a certain level are incorporated into the *zoned area* if public consensus is achieved. B2 and B3 districts are candidates. However, since this incorporation accompanies a *city planning tax* levy for the residents, those residents will not likely agree to such incorporation until actual degradation of the living environment becomes more serious. Provision of an infrastructure after the consensus is established will cost a great deal. If no consensus can be reached, the situation will only continue to worsen.
- b) The introduction of the *district plan* has a similar problem because that plan requires the agreement of most of the people in the concerned district. When residents finally recognize the necessity of the *district plan*, it may be too late to improve living conditions. As a result, disordered districts may possibly increase with *special use restriction districts*. Even if a *district plan* with strict regulation is approved, the subsequent developments will possibly just avoid the planned area, a choice that can cause further suburbanization in cases where development pressure is high.
- c) When comparing Figure 10 and Figure 12, one can see that several districts are covered by the *countryside living district* and its loose regulations even though there have been many developments in these districts, such as the northwest area of the B5 district. In these districts, disordered and mixed use development possibly will occur in the future. When those residents recognize the degradation of their living conditions there, it may again be too late, similar to the above a), b) scenarios already discussed above.
- d) The *special use restriction district* can only regulate limited undesirable land use and cannot regulate the total amount of development. Thus, any resultant large-scale development via incremental small development is still possible in the *un-zoned area*. This resultant large-scale development will create a demand for further infrastructure and add similar problems to the issues noted above.
- e) Although the *special use restriction district* is made up of several *countryside use*

districts, all of these districts do not have any regulations for housing except for a building-to-plot ratio and floor-to-plot ratio. Considering that about half of the total developments in Miyakonojo City have been occurring in the *un-zoned area* and most of these developments are housing, these loose regulations for housing in the *un-zoned area* remain controversial. The situation where people can enjoy cheaper land prices with loose regulation in the *un-zoned area* than they can in the *zoned area* thus remains. These same housing developments also promote shops and other purpose developments, which causes further suburbanization.

- f) Although the completion year for the expressway is not yet announced, the planned expressway and its interchanges will also influence suburbanization. Developments in the interchange neighborhoods will also likely become core districts for the expansion of suburbanization.

Considering all of the above-mentioned concerns, continuous monitoring of ongoing development is required to provide prompt counteraction against undesirable situations. At the same time, the result of this monitoring should be delivered to the residents/public to build an early consensus for any additional necessary counteractions, such as incorporating the *un-zoned area* into the *zoned area*, passing amendments to the regulations in the *special land use restriction district*, and the *district plan*. Continuous enlightenment of the public about this land use management system is also needed to gain an early consensus.

5. CONCLUDING REMARKS

This paper investigated the long-term development trends in Miyakonojo City based on building applications of 1985-2011 using GIS. The paper clarifies the nature of the current expanding suburbanization. Since few studies have analyzed that long-term suburbanization trend, this study delivers basic needed information on the progress of suburbanization in a provincial city. Further, this particular city's *Land Use Control Guideline* is discussed, as it relates to the suburbanization trend. The research conclusions based on this analysis are the following:

- 1) During 1995-2011, the total number of building applications varied between 600 and 800. The tendency where nearly half of the total applications were in the *un-zoned area* has continued since 1997. Most of the developments are housing in both the *zoned area* and the *un-zoned area*. This housing development is increasing steadily in the *un-zoned area*. Indeed, today suburbanization is caused mainly by housing growth.
- 2) In both the *zoned* and the *un-zoned areas*, the mode plot size is 200-300 square meters for detached houses. However, the size of detached housing plots is larger in the *un-zoned area* than it is in the *zoned area*. Although the number of collective houses is small, this housing pattern is still increasing in the *un-zoned area* as well as in the *zoned area*.
- 3) There are several development concentration districts in the *un-zoned area*, including central districts of the town and villages that merged into Miyakonojo City, the neighborhood area near the interchange of the expressway, the area along the trunk roads, and the adjacent areas to the *zoned area*. In some of these districts, development concentration has continued during the observation period (1995-2011) for this study.
- 4) In the neighborhood district of the interchange and the adjacent district to the *zoned area*, housing agglomerations were found. These agglomerations were formed by

incremental developments of single (small) developments, which generated a large-scale residential area without sufficient infrastructure as a result.

- 5) Since the city has not applied the *special land use restriction district* in the *un-zoned area*, the *City Planning Act 2000* did not affect this development trend.
- 6) A comparison of the *Land Use Control Guideline* published by the city to the result of this current analysis indicates that the guideline does offer a well thought out direction for city land use management using various tools other than only the application of an *urbanization control area*. However, implementation of this direction does require a public consensus. To obtain this consensus in the earlier stage of suburbanization, a monitoring system for developments and better enlightenment of the public regarding effective land use management system is needed.

The suburbanization/sprawl phenomena and the derived problems have been discussed worldwide for several decades. Additionally, for sustainable cities, the concept of the compact city is being widely discussed in both advanced and developing countries. However, the countermeasures are naturally different for growing cities versus declining/stagnant cities. Furthermore, growing cities will probably step into a declining/stagnant situation sooner or later in the future. In this sense, suburbanization/sprawl and its countermeasures to undertake in declining/stagnant situation cities should be discussed in many cities.

Miyakonojo City is a case where loose land use regulations were applied in the suburban area for a long period of time. Although the intent was to secure the vitalization of the city in one respect, suburbanization as a side effect did progress seriously. Thus, Miyakonojo City recently became to orient compact city and published a land use guideline. Although now is not the most suitable moment to evaluate the effect of this land use guideline, the continuing loose regulation of housing and the attitude of community are now controversial points.

In the international context, this case study will provide new information/knowledge about the expectations of suburbanization caused by long-term loose land use regulations in a provincial city as well as the difficulties encountered when trying to control suburbanization once a city accepts loose regulations.

Recently, the Japanese government required municipalities to establish a new 'Location Control (*Ricchi Tekiseika*) Plan' using the concept of 'Hub and axis' in line with the definition of a compact city. Miyakonojo City will also provide this plan. As a future topic, the trend and effect of such new land use management for Miyakonojo City should be carefully and continuously observed. Needless to say, any advanced land use management including further regulations should be devised based on just such further analysis.

REFERENCES

- Abe, J. (1999) Process and results of abolishing the area division in the Miyakonojo planning area. *Papers on City Planning*, No.34, 271-276. (in Japanese)
- Burchell, R., Listokin, D., Galley, C. (2000) Smart growth: More than a ghost of urban policy past, less than a bold new horizon. *Housing Policy Debate*, Vol.11, No.4, 821-879.
- Dieleman, F., Wegener, M., (2004) Compact city and urban sprawl. *Built Environment*, Vol.30, No.4, 308-323.
- Fujimaki, S., Nakade, B. (2000) Study on the process of urbanization and the land use control at the fringe of built up area in the non-area divisionized local city – Case study on Kashiwazaki City -. *Papers on City Planning*, No.35, 319-324. (in Japanese)

- Furuta, T., Ikaruga, S., Kobayashi, T. (2006) Actual situation of the housing development, based on the technical standards, in the loose regulation area - Research on technical standards in the Chugoku, Shikoku and Kyushu District -. *Journal of Architecture, Planning and Environmental Engineering (Transaction of AIJ)*, No.605, 135-142. (in Japanese)
- Ishimura, T., Ikaruga, S., Nakade, B., Kobayashi, T. (2006) A study on the land use trend with abolishing the area division in Pref. Kagawa. *Journal of Architecture, Planning and Environmental Engineering (Transaction of AIJ)*, No.607, 103-110. (in Japanese)
- Iwamoto, Y., Matsukawa, T., Nakade, B., Higuchi, S. (2006) A Study on the Presentation of Land Use Policy in the Non-Planned Area at City Planning Area Master Plan - Considering the Relationship between Prefectures and Local Authorities -. *Papers on City Planning*, No.41-1, 61-71. (in Japanese)
- Koike, H. (2014) Mobility perspective for a local city in Japan. *IATSS Research*, Vol.38, 32-39.
- Koyama, M., Iwamoto, Y., Matsukawa, T., Nakade, B., Higuchi, S. (2009) New introduction of area division and integration of area division and non-area division city planning area according to transition to city designated by cabinet order – Case with Shizuoka City and Hamamatsu City in Shizuoka Prefecture-. *Papers on City Planning*, No.44-3, 667-672. (in Japanese)
- Maesako, S., Kobayashi, H., Yoshitake, T., Deguchi, C. (2002) Development trend in Miyakonojo-city after abolishing urbanization control area. *Papers on City Planning*, No.37, 697-702. (in Japanese)
- Matsukawa, T., Iwamoto, Y., Nakade, B. (2007) Possibility and issues of the correction method of land use control gap around area designated city planning area - For Matsumoto city planning area and its surroundings -. *Papers on City Planning*, No.42-3, 793-798. (in Japanese)
- Miyake, T., Nakade, B. (1993) Study on the development condition and its subject in the loose regulation areas at the outside of the local city. *Papers on City Planning*, No.28, 841-846. (in Japanese)
- Miyakonojo City (2009) *Miyakonojo City master plan*. <http://cms.city.miyakonojo.miyazaki.jp/display.php?cont=120905152546>, accessed on June, 6, 2013.
- Miyakonojo City (2012) Result of the public comment, *Miyakonojo land use control guideline*. <http://cms.city.miyakonojo.miyazaki.jp/display.php?cont=130206153049>, accessed on June, 25, 2013.
- Ministry of Land, Infrastructure and Transport (2003) Introduction of urban land use planning system in Japan. <http://www.mlit.go.jp/common/000234477.pdf>, accessed on June, 25, 2015.
- Oswalt, P. *et al.* (Eds) (2008) *Shrinking cities: Complete works 3 Japan*. Project Office Philipp Oswalt, Berlin.
- Rahman, G., Alam, D., Islam, S. (2008) City growth with urban sprawl and problems of management for sustainable urbanization. *44th ISOCARP Congress 2008*, http://www.isocarp.net/data/case_studies/1203.pdf, accessed on June 25, 2015.
- Siedentop, S., Fina, S (2008) Urban sprawl beyond growth: from a growth to a decline perspective on the cost of sprawl. *44th ISOCARP Congress 2008*, http://www.uni-stuttgart.de/ireus/publikationen/ISOCARP_Paper_Siedentop-Fina.pdf, accessed on June, 25, 2015.
- Sørensen, M. T. (2004) Retail development and planning policy change in Denmark. *Planning Practice and Research*, Vol. 19, No. 2, 219-231.
- Sugiki, N., Aoshima, N., Shima, K., Furusawa, K., (2001) A study on urban development

Trend and the suburbanization using the geographical information system in a local city. *Proceedings of the Eastern Asia Society for Transportation Studies*, No.3, 257-270.

Uchikoba, M., Matsukawa, T., Nakade, B., Higuchi, S. (2011) Study on district plan system applied outside the zoning area in non-area divided city planning area. *Papers on City Planning*, No.46, No.3, 547-552. (in Japanese)

Yoshitake, T., Deguchi, C., Suga, S. (2003) The development trend and the land-use management in a local suburban area - Based on an analysis of Kiyotake-Town, JAPAN-. *Journal of the Eastern Asia Society for Transportation Studies*, Vol. 5, 2759-2774.

Wada, O. (1994) Study of development condition and development control in the loose regulation area - Case study in Kanagawa Pref. -. *Papers on City Planning*, No.29, 259-264. (in Japanese)

Wada, O. (1998) Development control in the loose regulation area – The amendment to Urban Planning Law in 1992-. *Papers on City Planning*, No.33, 517-522. (in Japanese)