

УДК 711.4(520)

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**PLANNING METHOD OF PUBLIC PRIVATE PARTNERSHIP HOUSING
TOWARD INTEGRATED COMPACT CITIES
- THE CASE OF TOME CITY IN MIYAGI PREFECTURE**

Abstract. Because of the severe population decline in regional cities, it is necessary to aim for the formation of intensive compact cities. Therefore, it is effective for municipalities to provide public rental housing in order to guide residents. However, the planning method of public rental housing considering the future urban structure has not been established yet. In this study, in order to reduce the financial burden on municipalities in the development of housing, we propose a "Public Private Partnership Housing" based on the policy needs by introducing private-sector vitality. A program was developed to estimate the number of houses needed for Public Private Partnership Housing using public statistical data from the government in order to understand how much Public Private Partnership Housing is needed. In order to create an intensive compact city, we will present a layout plan to determine where to build Public Private Partnership Housing. From the above, the planning method of Public Private Partnership Housing toward integrated compact cities is shown.

Keywords: compact city, population decline, housing by private sector, public private partnership

Introduction. In local cities, the declining birthrate, an aging population, a declining population, and an increase in maintenance costs due to the aging of the social infrastructure are putting pressure on municipal finances. Therefore, it is necessary to aim at the formation of intensive cities.

Public rental housing plays a major role in guiding residents to build intensive cities. However, no method has been established to plan public rental housing considering the future urban structure. In particular, in local cities where the area of the city has expanded as a result of mergers, it is necessary to reorganize the town by promoting residential guidance through the development of public rental housing. In addition, in order to reduce the financial burden on municipalities, it is necessary to consider the introduction of private-sector vitality in the development of public rental housing. The purpose of this paper is to develop a planning method for public rental housing (The following is Public Private Partnership Housing.) that introduces the vitality of the private sector in order to form an intensive city, based on Tome City, Miyagi Prefecture, where 9 towns merged.

1.Designing private public partnership housing type

Based on interviews with municipalities, 3 points were identified as needs for public rental housing in municipalities: A: migration and settlement promotion, B: promotion of living in the city, and C: development of safety-nets (fig.1). In addition, in order to reduce the financial burden of municipalities, a civil-linked housing type was

devised based on a business scheme that employed three types of funding: (1) municipal income; (2) national expenditure ; and (3) private sector funding. The scheme using (3) was examined in a joint research with private enterprises, and its validity was evaluated by business feasibility evaluation. Based on the above, in consideration of the needs of public rental housing units A to C, three types of housing units were devised using the funds from (1) to (3). In addition, considering the target households, a total of 9 types of civil-cooperative housing were devised. To meet needs A, we devised a community revitalization house for families with small children. Among them, a rental housing type (a) was devised for migration promotion, a rental housing type (b) for settlement promotion, and a transferable rental housing type (c) for households who wish to own their own house in the future. To meet needs B, we devised a private finance initiative excellent rental housing in the region (Hereinafter, PFI excellent rental housing in the region). Among them, we devised a child-rearing support type (d), which requires a room layout of 3LDK or more, which is difficult to supply commercially in private rental housing, and a life support type (e) for elderly people. In response to Needs C, in addition to the reconstruction (f) and renovation (g) of public housing, a vacant house utilization type (h,

i) was devised for those who are eligible to move in public housing and who cannot move in due to a shortage of public housing, such as child-rearing households and elderly households.

policy housing needs	Private Public Partnership housing	
migration and settlement promotion	community revitalization house	(a)migration promotion rental housing type
		(b)settlement promotion rental housing type
		(c)Resettlement promotion transfer type rental housing type
Promotion of living in the city	private finance initiative(PFI) excellent rental housing in the region	(d)PFI childcare support house type
		(e)PFI elderly life support housing type
Development of safety nets	safety net housing	(f)reconstruction of public housing
		(g)renovation of public housing
		(h)childcare support utilizing empty house type
		(i)elderly life support child rearing utilizing empty house type

Fig.1. Private Public Partnership housing types

2.Estimation of the number of private public partnership housing units required The number of housing units required for each type of private public partnership housing was calculated by region. In this study, the area was the former 9 towns before the merger. In order to calculate the number of households required for estimation, a program was created to calculate the number using public statistical data for application to all municipalities (fig.2). For housing types (a-e), the estimated number of units required is calculated by multiplying ①the number of households subject to estimation by the ratio of ②①assuming the number of households moving in, and ③the difference between the number of units supplied. ③Number of housing units supplied for housing type (f, g) was calculated based on the simulation of realignment of public housing in 2040 based on the previous study 1). The number of housing types (h, i) (f, g) was calculated as the estimated number of housing types (h, i) by multiplying ① the number of households subject to estimation in the future by the ratio based on the assumed number of households in ②①, and ③ multiplying the estimated number of necessary housing

3-3. Suitability of area types and private public partnership housing types

The housing types in Chapter 1 are arranged according to the area types in Chapter 3-2 (fig.4). The restructuring policy of public housing followed the previous study [2] . Housing type (a) is suitable for central residential areas and residential maintenance and guidance areas. The housing type (b, c) is suitable for the central residential area and the residential maintenance and guidance area, and the intensive settlement area is slightly suitable. The housing type (d, e) is suitable for the central residential area and slightly for the residential maintenance and guidance area. For residential types (f, g), renovation and reconstruction will be considered in central residential areas and residential maintenance and guidance areas, and only renovation will be considered in village intensive areas. The residential type (h, i) is a residential type that compensates for the shortage of residential type (f, g) and therefore does not consider compatibility with the area type. From the above, the suitability of area type and housing type was clarified. In accordance with the suitability, the number of units required for each type of house calculated in Chapter 2 shall be considered. If the housing type (a-e) is not suitable, the required number of houses is 0. If housing types (d, e) do not match, reallocate the required number of units to the matching area. From the above, the number of required housing units for each area was clarified (fig.5).

housing type \ area type	community revitalization house			private finance initiative(PFI) excellent rental housing in the region		safety net housing	
	a	b	c	d	e	f g	h i
(I)central residential area	○	○	○	○	○	reconstruction or renovation	make up for the shortage of public housing
(II)residential maintenance and guidance area	○	○	○	△	△	reconstruction or renovation	
(III)intensive settlement area	×	△	△	×	×	only renovation	
(IV)reduced area	×	×	×	×	×	only maintenance or abolition	
Legend	○ : highly suitable			△ :slightly suitable		×	

Fig.4. Suitability of area types and private public partnership housing types

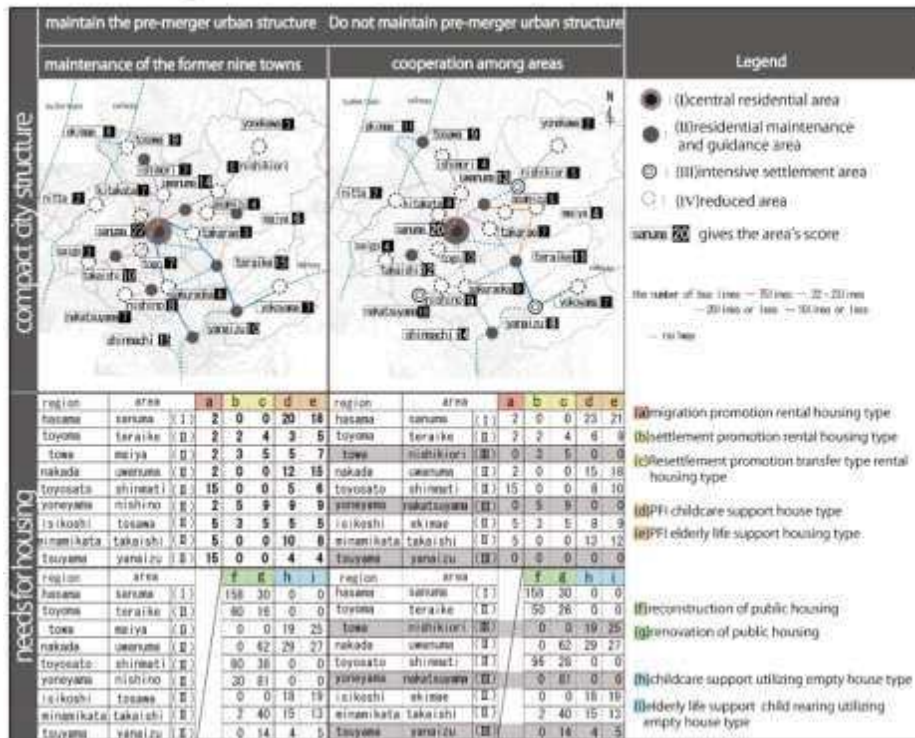


Fig.5. Proper layout of private public partnership housing for integrated compact cities

Conclusion. From the above, the planning method of the private public partnership housing for guiding the residence for the integrated city formation in the merged municipality was clarified. The plan revealed how many private public partnership houses which reduce the financial burden on municipalities should be built and where in order to create an integrated compact city. Based on the results of this study, we will consider the creation of the development program to enable the planning of private public partnership housing in local cities other than Tome City and to actually carry out the project in the future to examine the feasibility and validity of the plan.

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**МЕТОД ПЛАНИРОВАНИЯ ЖИЛОЙ ЗАСТРОЙКИ
ГОСУДАРСТВЕННО-ЧАСТНОГО ПАРТНЕРСТВА
В ИНТЕГРИРОВАННЫХ КОМПАКТНЫХ ГОРОДАХ
НА ПРИМЕРЕ ГОРОДА ТОМЕ ПРЕФЕКТУРЫ МИЯГИ**

Абстракт. Из-за резкого сокращения населения в городах регионального значения необходимо стремиться к формированию более компактных городов. Следовательно, муниципалитетам выгодно предоставлять государственное арендуемое жилье, для того чтобы управлять городским хозяйством. Однако, метод планирования государственного арендного жилья, с учетом будущей структуры города еще не создан. В этом исследовании, с целью уменьшить финансовую нагрузку на муниципалитеты в развитии жилищного строительства предлагается развитие "жилья государственно-частного партнерства", основанного на необходимости удовлетворения жизнеобеспечения частного сектора. Была разработана программа для подсчета количества домов, необходимых для строительства в рамках государственно-частного партнерства. При этом использовались статистические данные, предоставленные правительством. Для того чтобы создать объединенный компактный город, мы предоставим план строительства со схемами расположения домов. Суммируя вышесказанное, исследование представляет метод планирования жилой застройки государственно-частного партнерства в объединенных компактных городах.

Ключевые слова: компактный город, сокращение населения, застройка частного сектора, государственно-частное партнерство.