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THE PROPOSAL FOR THE MAP OF FUTURE VACANT HOUSES IN SMALL LOCAL CITIES – THE CASE STUDY IN SHI-MOKAWA TOWN, HOKKAIDO

Abstract. In Japan, the number of vacant houses is increasing in small local cities as the population decreases. Therefore, it is necessary to take systematic measures, and it is important to grasp the vacant houses in the future. In recent years, there have been many studies on the prediction of vacant houses, but the probability of the occurrence of vacant houses for each house has not been clarified. Also, no urban planning using the prediction of vacant houses has been proposed. In this study, we investigate the probability of the occurrence of vacant houses for each house in Shimokawa Town, Hokkaido, and propose a plan for vacant house countermeasures.

Keyword: vacant house, population decline, the probability of the occurrence of vacant houses for each house.

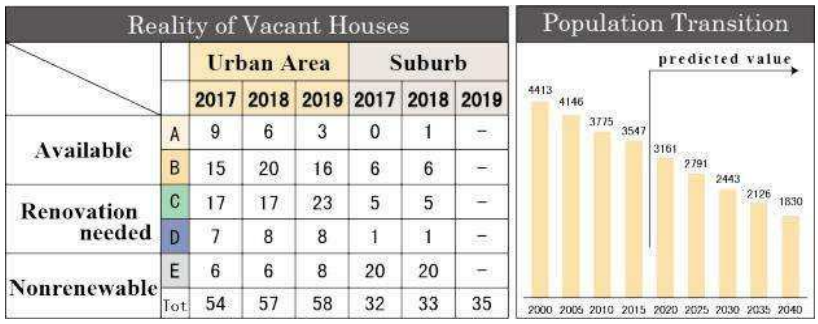
Introduction

In Japan, the number of vacant houses is increasing due to the decrease in the regional population. As unregulated vacant houses have a negative impact on the local communi-ty, each local government needs to deal with them systematically. Research on the pre-diction of vacant houses has been conducted on the prediction of the rate of vacant houses over a wide area, but no research has been conducted on the prediction of the probability of the occurrence of vacant houses per house. Shimokawa Town, Hokkaido, is actively involved in a project to deal with unoccupied houses, but it does not consider future unoccupied houses.

In this study, therefore, the occurrence probability of vacant houses is estimated for each house using the field study and house information, and the urban housing situation in 2030 is clarified. Then, it is an object to propose a planning theory of vacant house countermeasures using the generation prediction of vacant houses for each house.

1.The Present Situation of Shimokawa Town

The number of vacant houses is increasing in Shimokawa Town, and is expected to in-crease in the future based on population trends (Fig. 1). In order to promote the use of vacant houses and their demolition, the town has conducted a survey on the actual con-dition of vacant houses and has ranked them according to their construction and loca-tion. In addition, many people moved in from outside the town, and there is a strong demand for moving into high-ranked vacant houses (Fig. 2).



Reality of Vacant Houses

		Urban Area			Suburb		
		2017	2018	2019	2017	2018	2019
Available	A	9	6	3	0	1	–
	B	15	20	16	6	6	–
Renovation needed	C	17	17	23	5	5	–
	D	7	8	8	1	1	–
Nonrenewable	E	6	6	8	20	20	–
	Tot	54	57	58	32	33	35

Figure 1 Population Trends and Vacant Houses in Shimokawa Town

	Selling Records of Vacant Houses		Occupancy Rate of Vacant houses	Moving Household	
	A	B		in	out
2017	3	1	50	162	139
2018	2	6	80	133	126

Figure 2 Utilization of Vacant Houses and Population Movement

2. Analysis of Vacant House Characteristics

Here, the possibility of vacant houses according to characteristics is grasped by referring to the vacant house score calculation used by Akiyama et al.

(1) Vacant house characteristics (Age of building and living area) of buildings obtained from house information were classified so that the total number of houses was an ap-propriate sample number from 2017 to 2019 (characteristic categories).

(2) The number of vacant houses surveyed was calculated for each year by characteristic category.

(3) For each year, the number of surveyed vacant houses for each characteristic category was divided by the total number of houses for that category (the survey vacant house rate.). The vacant house score of the characteristic category in which the survey vacant house rate is the highest was set as 100, and the ratio of the survey vacant house rate of the other characteristic category was set as the vacant house score of the characteristic category.

(4) The average value of vacant house scores for each characteristic category for three years is taken to calculate the average vacant house score (Fig. 4).

(5) For the score of each house, the average vacant house score of the characteristic cat-egory corresponding to the age of the house and the residential area was used.

Fig. 4 shows that houses built between 50 and 60 years ago are the most likely to be va-cant, and those with a living area of less than 90 m2 are the most likely to be vacant. On the other hand, the average vacant house score is decreasing after 60 years of age. Since 64% of the data on the retirement of vacant houses were abandoned more than 60 years ago, it is considered that the retirement had an effect.

Figure 3 Flow of calculating vacant house scores

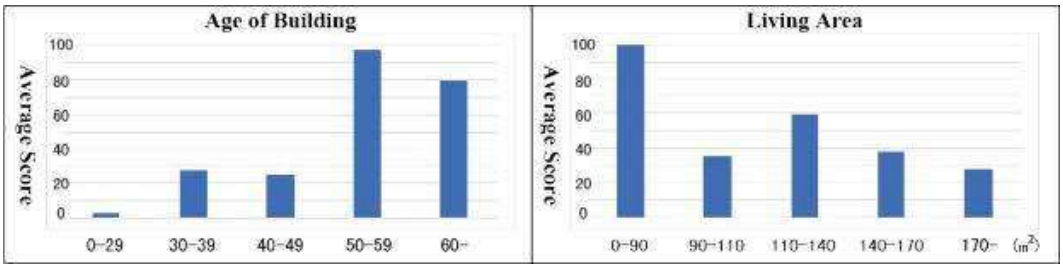


Figure 4 Average score by characteristic categories

3. The Probability of the Occurrence of Vacant houses

Multiple logistic regression analysis was performed using the 2019 survey vacant house as the objective variable and the average vacant house score as the explanatory variable to clarify the probability of the occurrence of vacant house for each house (Fig. 5). The magnitude of the probability of the occurrence of vacant house shown in Fig. 5 was de-termined on the basis of the average value (probability average) 5.75% of the probability of the occurrence of vacant house of the entire house in 2019.

		x : Living Area				
		x<90	90≦x<110	110≦x<140	140≦x<170	170<x
y : Age of Building	y<30	1. 99	0. 87	1. 20	0. 90	0. 79
	30≦y<40	3. 71	1. 64	2. 22	1. 69	1. 49
	40≦y<50	3. 49	1. 54	2. 01	1. 59	1. 40
	50≦y<60	18. 56	8. 98	11. 87	9. 23	8. 24
	60≦y	12. 71	5. 93	7. 92	6. 10	5. 43

Figure 5 The probability of the occurrence of vacant houses

[Evaluation of the Analysis]

Residential and surveyed vacant houses in 2019 were assessed on the basis of probabili-ty average (5.75%).

Among the vacant houses in the survey, the probability of occurrence of vacant houses was less than the probability average in 14 cases. Since these houses are relatively small in age and some are vacant because elderly people move to their children's houses, it is necessary to analyze the intention of moving out.

[Probability Distribution of Vacant Houses in 2030]

Based on the values in Fig. 5, the probability of the occurrence of vacant houses for each house in 2030 years was calculated according to the age of the house in 2030 years. The probability of the occurrence of vacant houses for each house in 2019 and 2030 are arranged on a map (Fig. 6). On the basis of probability average (5.75%), the probability of the occurrence of vacant houses was divided into 4 ranges by color.

According to the distribution of the probability of the occurrence of vacant houses, there are vacant houses by house in ❶ commercial districts, ❷ flag pole lot, and ❸ distant land, and vacant houses found together in neighboring areas or blocks such as ❹ corner lot, ❺ dense areas, and ❻ industrial areas. Also, in entire urban area, there is a high probability of vacant houses in Asahi town and Kita town on the north side of the na-tional highway. Tyuseiminami town and Suehiro town, which are

located south of the national highway, have many houses with low probability of being vacant.

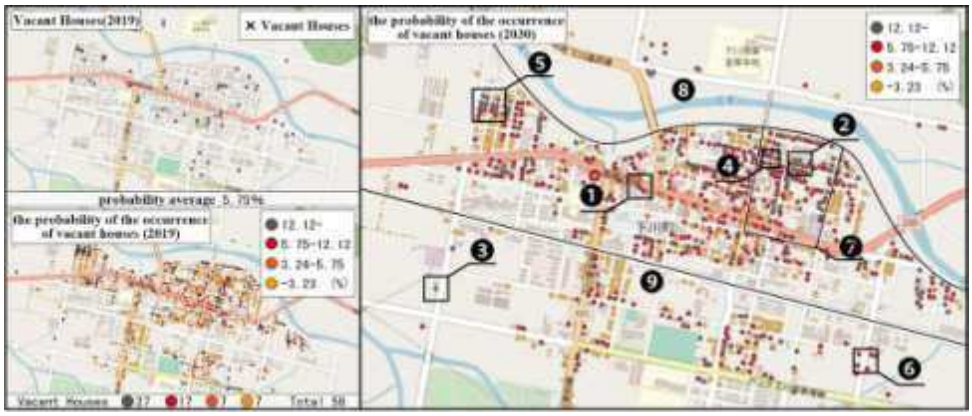


Figure.6 Surveyed vacant houses in 2019 and the probability of occurrence of vacant houses in 2019

Conclusion

Using the distribution of the probability of the occurrence of vacant houses shown in Chapter 3, the planning of vacant house measures by surrounding environment and scale is shown in Fig. 7.

By using the distribution of the probability of the occurrence of vacant houses for each house in this way, it is possible to plan measures for vacant house across the scale, from utilization by house to a wide-area plan for entire urban area.

In the future, the accuracy of the prediction method for the occurrence of vacant houses will be improved by taking into account resident information such as the household composition and age.

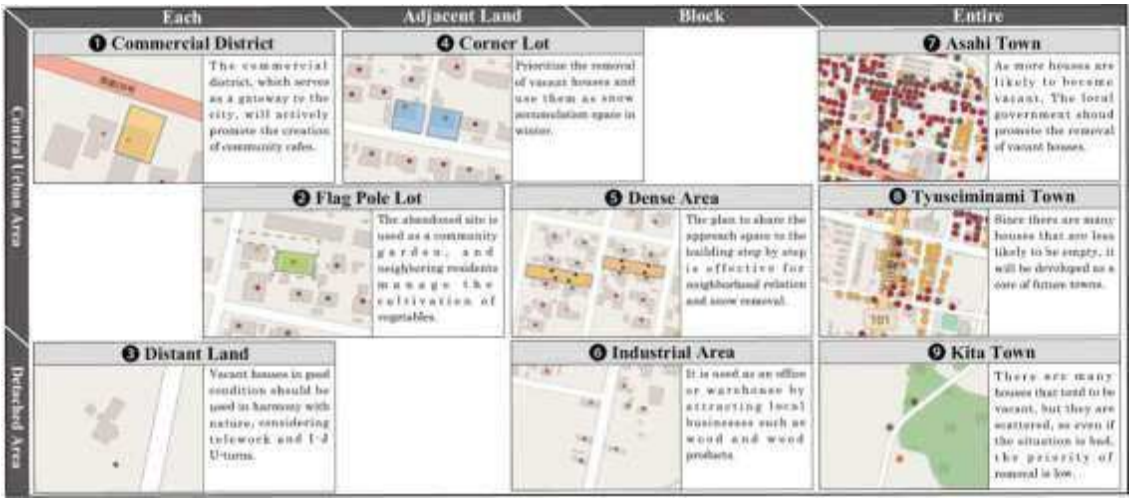


Figure 7 Planning of measures for vacant houses by surrounding environment and scale

Bibliographic references

1. Yuki Akiyama. (2018). Monitoring of spatial distribution of vacant houses using municipal public data in Kagoshima prefecture. Journal of Architecture and Planning, 83,744,275-283
2. Shimokawa Town (2014). House information in Shimokawa Town
3. National Institute of Population and Social Security Research (2018). Projected population of japan by region.

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ПРОЕКТНОЕ ПРЕДЛОЖЕНИЕ ДЛЯ ДОМОВ, КОТОРЫЕ ОПУСТЕЮТ В БУДУЩЕМ В ГОРОДАХ МЕСТНОГО ЗНАЧЕНИЯ -НА ПРИМЕРЕ ГОРОДА ШИМОКАВА, ХОККАЙДО

Абстракт. В Японии число опустевших домов в малых городах увеличивается по мере снижения населения. Поэтому необходимо систематически принимать меры, для того чтобы заселить их в будущем. В последние годы проводилось много исследований по проблеме пустующих домов, но вероятность их заселения не была рассчитана, как и не делались расчеты городского планирования. В этом исследовании мы изучим вероятность заселения каждого пустующего дома в городе Шимокава, Хоккайдо, и предложим меры для предотвращения их появления.

Ключевые слова: пустующие дома, снижение численности населения, возможность заселения каждого пустующего дома.