

Characteristics of the Disaster Prevention Group Relocation Promotion Project in the Great East Japan Earthquake and Evaluation on Residential Environments after Relocation

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1. Introduction

In promoting reconstruction after the Great East Japan Earthquake of March 11, 2011, the Disaster Prevention Group Relocation Promotion Project (hereinafter referred to as "Prevention Group") has been widely applied as one of the reconstruction methods for promoting relocation to higher ground and for moving inland. Although the size of residential housing complexes after relocation in the conventional Prevention Group is said to require 10 or more houses, there is a special case in which 5 or more houses in the disaster area of the Great East Japan Earthquake can be relieved.

With the passage of time since the earthquake, it became possible to confirm the completion of superficial projects, such as Prevention Group public housing projects (hereinafter referred to as disaster public housing) and the installation of peripheral facilities. In anticipation of future disasters and throughout the process of selecting appropriate projects for reconstruction, understanding the characteristics of reconstruction projects applied after the Great East Japan Earthquake is considered to contribute to future reconstruction.

In this study, we investigate and analyze the residential environments in the prevention area using GIS and discuss their relationship with the Prevention Group.

Various research has been conducted on the Prevention Group, but each study employs survey analysis methods in limited municipalities and districts¹⁾ and, although research focusing on convenience and residential environments is accumulating, this study is unique in that it surveys and analyzes convenience and residential environments in multiple prefectures, municipalities, and districts and discusses their relationship with the Prevention Group implementation from a bird's eye view.

2. Characteristics of Prevention Group implementation after the Great East Japan Earthquake

We selected Otsuchi Town, Rikuzentakata City, Minami Sanriku Town, and Onagawa Town as research target municipalities because of the following conditions.

1. Multiple municipalities that are under similar circumstances
2. Those with a large number of project implementation districts and housing supply units.
3. Those in the Sanriku Region where the human and property damage was the most violent comparing to Sendai Plain and Fukushima Prefecture.

We focused on the reconstruction project combination, relocation type, the number of dwelling units. In the reconstruction project combination, there are many (1) Prevention Group only and (2) Prevention Group + disaster municipal housing districts, while in the relocation type, there are many (A) same type, (B) integrated type, and (C) divided type districts (Fig.1); therefore, the study areas are (1) Prevention Group only and (2) Prevention Group + District of Disaster Public Housing for reconstruction project combinations and for the relocation type. As a result, we were able to select 80 districts as research areas.

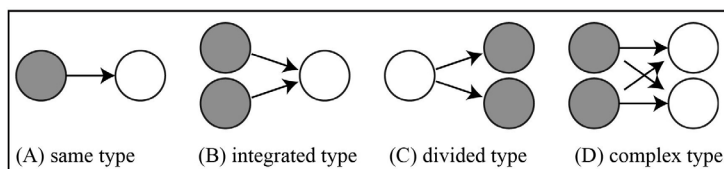


Fig.1. Image of relocation type

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Table 1. Reconstruction project combination / Relocation type / Number of districts / Supplied dwelling units

		Reconstruction project combination			
		(1) Prevention	(2) Prevention + Disaster	(3) Prevention + Disaster + District	(4) Prevention + District
Relocation type	(A) Same type	28 districts 5 to 54 units	10 districts 7 to 25 units		
	(B) Integrated type	7 districts 6 to 40 units	1 district 164 units		
	(C) Divided type	25 districts 5 to 69 units	9 districts 29 to 405 units	4 districts 560 to 1560 units	1 district 48 units
	(D) Complex type		1 district 152 units	1 district 194 units	

※ The bold frame indicates the study area.

※ "Prevention" is Prevention Group, "Disaster" is disaster public housing, "District" is a Land Rearrangement.

3. Consideration and evaluation of residential environments after group relocation

In this study, there are significant differences according to the development of Prevention Group housing complexes, and convenience is subject to residential environment evaluation. The residential environment evaluation index is shown in Table 2. Scoring is conducted in 5 stages for each indicator. The standard for the stages, based on the concept of relative evaluation of the score in this research area, is divided into 5 stages according to the score of each indicator, thus 5 ... 7%, 4 ... 24%, 3 ... 38%, 2 ... 24%, 1 ... 7%, with fine adjustment of the reference value to create a new standard. The residential environment is represented by district with a radar chart.

Table 2. Convenient residential environment evaluation index

Item	Index
Local Government Facility	Distance to administrative facilities
Community Facilities	Location of community facilities
Medical, Welfare	Locations of medical institutions, elderly support facilities, welfare facilities
Child-rearing, Education	Location of nurseries / kindergartens / infant schools, child-rearing support facilities, elementary / junior high schools
Convenience Facility	Location of cultural facilities (libraries, physical education facilities, etc.), commercial facilities (supermarkets-convenience stores, etc.), post offices, banks, parks
Transportation	Distance to nearest railway station, locations of bus stops

Examining the correlation between each indicator, it was clear that there was a strong correlation between completion of child-rearing/educational facilities and lifestyle convenience facilities. In addition, it became clear that there was a positive correlation between most indicators. In other words, the location of various convenience facilities is influenced by the location of other convenience facilities.

The relationship between the Prevention Group's implementation and residential environment evaluation is analyzed. The relocation types were highly evaluated in the following descending order: (C)divided type, (B) integrated type, and (A) same type. Regarding the evaluation of project combinations, only the (1) Prevention Group was evaluated higher. The high evaluation of (C)divided type is considered to be due to the fact that the implementation district is close to the municipal center and, therefore, maintains cohesion. The reason why (a) Prevention Group only is highly evaluated but (2) Disasters + disaster public housing is not is because it is difficult to secure the site when disaster public housing is being maintained by "plug-in" relocation, and it is necessary to develop a new housing complex, which is complicated by the belief that the necessary facilities are not in place.

References

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