

# Actual Situation and Its Problems of Post-Disaster Reconstruction Process in “Shrinking Cities”

Emergence of Ultra-low-densely Used Land in the Whole Region

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## 1. Introduction

The tsunami after the Great East Japan Earthquake hit the northeast region of Japan, Tohoku region, and caused a lot of damage with more than 21,600 people dead or missing and more than 127,000 houses completely destroyed. Approximately three and a half years have passed since then and the reconstruction planning and implementing processes are being made in the most of the affected municipalities despite severe criticism against the delay of it.

However, it has been gradually cleared to be very difficult to make many projects secure the population estimated in the early phase of its planning process shortly after the disaster. Tohoku region had already been faced with the problems of population decline before the disaster. Additionally, some of the victims have left for other places beyond the boundary of municipalities because of the stagnation of industrial activities in the affected area, because of the fear of coming back to the affected area, or because of the delay of accomplishment of reconstruction projects. This phenomenon makes the tendency of population decline much stronger.

The aim of this paper is to report the actual formation state of ultra-low-density urban area in the affected area of GEJE and to propose the countermeasures against the emergence of vacant lots.

## 2. Classification regarding land use and its regulation

Most of the municipalities finished making recovery plans in the first year after the GEJE. They have been engaged in the planning process of the detailed implementation plans on the district level since then.

The main contents of the recovery plans regarding physical plan can be summarized as follows; Land protection, through coastal levees, should take place against the “level 1” tsunami, occurring with frequencies in the range between once every several decades and a hundred years (“tsunami protection level”). Protection against the largest-scale tsunami, “level 2” tsunami, which occurs once every several hundred or more years, should be guaranteed from both structural and non-structural aspects (“tsunami diminishing level”). The inhabitable area is limited to an expected inundation height of less than approximately 2 m in the case of “level 2” tsunami. The areas whose expected inundation height is higher than 2 m are designated as disaster hazard area, and its residential use is forbidden. Some municipalities designate as it much wider areas, the whole inundated areas by the tsunami in 2011. The reason for that is rather to support the residents who want to move from those areas which were inundated in

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2011 as described later than to secure the safety of the residential area from L2 tsunami. In these cases, the land regulation for those areas, whose expected inundation height is lower than 2 m, are relatively loose and the land owners can build their houses so long as they meet the requirement of the gradual regulation.

Areas closely related to recovery spatial plan can be categorized into four patterns from the aspect of land use and its regulation while referring to above described points.

- disaster hazard area, in which land owners must not build their houses
- disaster hazard area, in which land owners can build their houses under certain condition
- on site recovery area, in which land readjustment project is planned
- on site recovery area, in which no urban development and improvement projects are planned
- relocated residential area

### 3. Present situation of land use in the affected area and relocated residential area

#### (1) Disaster hazard area, in which land owners may not build their houses

This is the area, which was affected by tsunami and mostly severely damaged. Since the expected inundation height by L2 tsunami in this area is more than 2m, local governments designate the area as relocation promotion area as well as disaster hazard area at the same time, in which rebuilding of houses is prohibited because of the risk of tsunami and relocation of houses to the hill is promoted. The local governments should purchase the target lots of collective relocation promotion project in this area.

However, the target lots are limited to those which were used for residence before the disaster; the local government don't purchase the lots which were used for industrial or commercial or agricultural use before the disaster. The spatial distribution of land ownership will be, therefore, dispersed, which will be a hurdle to use those public lands efficiently all at once.

#### (2) Disaster hazard area, in which land owners may build their houses under certain condition

This is the area, which was affected by tsunami and was severely damaged in some cases and was hardly damaged in the others. Although the expected inundation height by L2 tsunami in this area is less than 2m, in which the ratio of washed-out houses is not high, some local governments designate these areas as group relocation promotion area as well as disaster hazard area by regulating the height of loading. The affected people can, therefore, relocate their residence to the hill or safer inland, or rebuild their houses on site.

This policy has the advantage that the affected people can choose where to live according to the desire of them. It has, however, the disadvantage that the ratio of rebuild in the area, where is designated as disaster hazard area, is extraordinary low. This lead to the inefficient land use with low density. Nobiru district in Higashi Matsushima city is a typical example (Photo).



Photo 1. The state of reconstruction in Nobiru district in Higashi Matsushima city

- (3) On site recovery area, in which no urban development and improvement projects are planned

Some of the affected area will be secured safety from L2 tsunami by constructing levee or secondary levee. In such cases, the affected people may rebuild their houses in the original place.

However, when the degree of damage is high, the affected people hesitate to rebuild their houses there. The ratio of reconstruction of houses remains, therefore, very low. Watanoha district in Ishinomaki city is one of such cases.

- (4) On site recovery area, in which land readjustment project is planned

In those affected area, whose safety from L2 tsunami is secured by constructing levee or secondary levee, and who has at the same time the problem of insufficient infrastructure, the local government plan land readjustment project. In these areas, the affected people obtain new lots in the original place after the accomplishment of the project, and they can rebuild their houses there.

However, as is the case with the area, in which no urban development and improvement projects are planned, many of the affected people are afraid of tsunami and they hesitate to rebuild their houses there. The ratio of reconstruction of houses is predicted to be very low. In Shin-Kadonowaki district in Ishinomaki city where land readjustment project is planned, for example, 35% of the land owners (50% on area basis) want to keep their land in the area, while rest 65% (50% on area basis) want to sell them and move out of the district.

- (5) Relocated residential area

Based on the act on special financial support for promoting group relocation for disaster mitigation, the local government develop new residential area for the relocation mostly on the hill. The area is originally designated to correspond to the demand; the number of household which intended to rebuild their houses there.

However, the intension of the affected people changes as time passes. As they came a collision with a reality of difficulty of house rebuilding since they were refused a loan because of the age for example, some of them give up to rebuild by themselves. In Yamamoto town, for example, Shin-Yamashita housing complex will be fulfilled approximately 60 % and it is expected that there will be many vacant lots from the early beginning of accomplishment of the project.

Furthermore, the rate of aging is estimated to be high especially in the small settlements. It is, therefore, predicted that some of the sites will be vacant in a short term and the residential density of the settlement will decrease.

#### **4. Proposal of solutions**

Most of the recovery plans of the affected local governments stipulate “construction of compact city” as one of the fundamental principles. However, as mentioned above, ultra-low densely used land will be formed throughout the affected area in the reality. Therefore, it is necessary to reconsider the necessity of the land use.

The problem of this sort is not limited to the affected area of the Great East Japan Earthquake. Similar situation is observed in New Orleans in the United States, where was hit by Hurricane Katrina in 2005. In Lower Ninth Ward, one of the most severely damaged wards in

the seventeen wards of the city, the houses located in the northern part of the ward were completely washed out because of the storm surge. Although nearly 10 years have passed since then, reconstruction of the area has scarcely been made progress and ultra-low-density residential areas with many vacant lots are formed. Furthermore, it is not limited to the disaster-struck areas. In industrialized countries, where the decrease in the population further progresses, both in local small and medium-sized municipalities and megacities have same problems, though the condition is less extreme compared to that in the affected areas.

This paper contains two proposals as countermeasures against the emergence of vacant lots.

The first one is the necessity of land readjustment project for these areas. There are two main objectives for this project; consolidation of land use and abolition of infrastructure. It is important for the promotion of efficient land use not to make the land uses and ownerships spatially scatter but to make them consolidate. It is also important to abolish the unused infrastructure rather than to develop it. There may be, for example, no need to develop parks 3% of the area as an exception of the regulation of the law.

The main element of this kind of project should not be construction works, but land substitution. It shouldn't cost much for this project, since the main objective of this project is not to promote the positive land use but to reduce the maintenance cost in low demand area for land.

The second proposal is the land use management under local community initiative.

The vacant lots abundant by the land owners and those used ineffectively may cause the problems to the close neighborhood or living environment (external diseconomies).

It is, therefore, necessary to part the right to use the land from the right to own the land. The latter should belong to the land owner as before, while the former should belong to the local communities which plan the land use of the area and in charge of the management and maintenance of it.

**Keywords:** *emergence of vacant lots, land use consolidation, land use management under local initiative, post-disaster reconstruction*

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