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program by categorizing of public housing
provision after disaster

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Integrated Viewpoint for Housing Recovery Program by Categorizing of Public Housing Provision after Disaster

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Abstract

The task of building the recovery system for areas damaged in disaster is common in various countries around the world. In the case of mega disasters, it is necessary to provide public housing because of the lack of housing stocks for victims.

Although some housing recovery cases after disasters around the world have been reported, there are few comparative studies from the viewpoint of provision method and geographical layout characteristics. This article shows the housing recovery differences in the public policy and the geographical layout after disasters. To clarify, firstly I described case studies of recovery after recent disasters housing recovery. Second, four cases (Mexico 1985, Kobe 1995, Turkey 1999, Tohoku 2011) were picked up and I analyzed the public housing provision characteristics from a viewpoint of site layout, which affected urban recovery process and housing recovery support. In order to examine them, I collected data such as research papers, report documents and statistics about housing provision.

The result shows that there are two main policy methods for recovery housing, i.e. supply of money for reconstruction house and supply of direct provision of houses to victims. On the other hand, there are two planning methods for providing housing, i.e. on-site reconstruction (non-moving) and another-site development (moving). I can classify the disaster housing recovery method using two axes and describe the characteristics and implication of the four resulting.

These perspectives are so important to plan for next disaster that we need to accumulate lessons learned from experiences.

1 Introduction

Natural disaster and Man-made disaster sometimes make the devastated area and huge housing loss. Recently, large-scale earthquakes have occurred in populated cities regardless of the degree of

disaster prevention measures. After the disaster, shelters and new dwellings must be built for those who lost their housing. Various of sectors sometimes have a role to provide them, and the metrology have been dicussed by specialists and researchers. “Shelter after disaster 2nd Edition” is a complete version of these allegations in the sheltering stage (Davis, 2015), and “Recovery from disaster” shows several models of recovering process of housing and area (Davis and Alexander, 2015).

The task of building the recovery system for areas damaged in disaster is common in various countries around the world. In the case of mega disasters, it is sometimes necessary to provide new dwellings by public sectors because of the lack of housing stocks for victims and the impossibility of response of the housing market stock. This article focuses a provision of housing by public sector after large-scale disaster. This clarified characteristics of the public housing provision system and affects to urban recovery and victims recovery.

2 Methods

Disaster recovery cases include many field issues and have own independent facts as the number of cases. So that, this study examined some case studies of the large-scale earthquake disaster in recent exploratorily.

Firstly, I described case studies of recovery after recent disasters housing recovery using research collect data (including field survey, statistic data, report document, interview and so on). This examination led to discussion points about public sector’s role at the stage of housing recovery.

Second, four cases (Mexico 1985, Kobe 1995, Turkey 1999, Tohoku 2011) were picked up and I discussed the public housing provision characteristics from a viewpoint of site layout, which affected urban recovery process and housing recovery support. A part of comparison analysis without Tohoku 2011 has already reported (KOSHIYAMA, 2011), so this considered focusing on the geographical characteristic.

Finally, I suggested discussion points connecting the methodology of housing provision by public sector after disaster using analysis result.

3 Characteristics of recent housing recovery

3.1 Mexico, 1985 Mexico Earthquake

Low-income housing in the center of Mexico City was damaged by this earthquake. Support was given through a government-initiated recovery plan for the rebuilding of approximately 95,000 units. Approximately 50,000 of these units were public housing; the work thus included the public-sector rebuilding of housing for low-income victims. The units were provided over two years in areas where victims of the earthquake had previously lived.

- The method allowed housing to be provided quickly at the site

As a measure to provide housing for low-income groups who would have had difficulty rebuilding their homes independently, land on which damaged housing stood was appropriated from the land owner, and new housing was provided (sold) by offering low-interest loans based on income to the tenants, who made up the majority of the victims.

The work generated by this house building served as a way of creating employment for residents affected by the disaster and as a program for participation in the planning of the units. In general, restoration was carried out at the site, and former community relationships were maintained to a certain extent.

- Disaster prevention through house building

The affected areas were inner-city areas where the elimination of substandard housing was an issue. Compulsory acquisition of land, construction of small-scale apartment buildings, and the selling of units to low-income earners are politically charged measures, but they resulted in the planned provision of good housing stock within the city and can be regarded as a way of merging the provision of housing after a disaster with city planning. Subsequently, most of the publicly provided housing stock served as housing for low-income earners, and a substantial amount of housing management was carried out by public-sector organizations.

- Summary

With almost no relocation of victims but with improved housing performance, improved urban environments, acquisition of future housing stock, etc., this can be regarded as a good example of Build Back Better, both for individuals and for the city as a whole.

3.2 USA, 1994 Northridge Earthquake

The city of Los Angeles suffered major damage as a result of this earthquake, and support was provided to approximately 400,000 households through measures implemented by the federal government and other organizations. The majority of the reconstruction aid took the form of grants for the housing reconstruction process, and there was hardly any direct construction of public housing. As a result of these support measures, most of the affected households had secured repair or alternative housing within four weeks of the earthquake, and reconstruction of housing was almost complete after about one year.

- Provision of grants to support victims from immediately after the disaster

As a measure for supporting temporary housing immediately after the disaster, the cost of emergency repairs to damaged houses was provided to both tenants and homeowners in the form of vouchers (limited-use coupons) in order to secure places to live as quickly as possible for about one and a half years. Costs for livelihood support, etc., were also provided in the same way.

- Simplification of payment procedure and flexibility of use

Loans, etc., were offered as a way to support housing reconstruction, but the application forms and processes were much simpler than usual, and this contributed to the speed at which reconstruction began. In addition, these loans could be used flexibly within the scope of housing reconstruction. These were comprehensive grants aimed at supporting housing reconstruction, and because they allowed the victims a large amount of freedom, they expanded the range of options for independent rebuilding strategies. This system made it possible for victims to undertake a reconstruction process that suited their individual circumstances.

- Summary

Housing reconstruction was promoted using the market's housing supply mechanism, rather than through the construction of public housing, and the measures for supporting housing reconstruction were focused on restoration and repair.

3.3 India, 2001 Gujarat Earthquake

The city of Bhuj in northwestern India and its surroundings were seriously damaged as a result of this earthquake. The housing reconstruction plan after the earthquake was centered on funding for reconstruction and repair for individuals, as well as on new village reconstruction plans that could be chosen by each village. In addition, to resolve the situation in the high-density, dangerous old town, four housing complexes were constructed in the suburbs, and building owners in the old town who wished to relocate were moved there.

Large makeshift camps were built as temporary housing near the disaster area, with each camp containing several hundred units. There were also simple self-build houses here and there inside the disaster area.

The new villages constructed after the disaster were built close to the old villages, and the housing complexes for people wishing to relocate were located on the periphery of the old town. This meant that the housing was positioned on the edge of the city, and the geographical relocation of victims was not very far.

3.4 Taiwan, 1999 Chi-Chi Earthquake

This earthquake caused major damage to small and medium-sized regional cities and villages in mountainous and rural areas. The housing reconstruction policy was centered on reconstruction funding for victims who owned their houses. However, public condominium complexes were constructed, and existing public housing was sold cheaply. One feature of the support measures was that although they were centered on support through reconstruction funds, this was combined with community rebuilding associated with urban development and improvement of the villages. The framework comprised the provision of reconstruction funds to individuals and the rebuilding of the environment under a regional plan.

Large temporary housing complexes were provided, each with assistance from private-sector support groups or the government, and living environments were maintained through a certain level of management. Distance from the disaster area was taken into consideration when deciding on the location of the temporary housing, but concentrated large-scale temporary housing complexes were quite common.

There were few cases of public housing being provided collectively, but it could be seen in the rebuilding of some ethnic minority villages and the rebuilding of small villages.

3.5 Turkey, 1999 Marmara Earthquake

Cities and villages throughout an area near the Sea of Marmara suffered devastating damage as a result of this earthquake. The objectives of the recovery from the earthquake were to improve the disaster preparedness of the cities and to adjust their scale. Restrictions were imposed on the height of buildings, including existing buildings, in urbanized areas, while post-disaster permanent public housing was provided, and urban functions were decentralized by continuing with existing new-town projects.

Post-disaster permanent housing complexes with high disaster preparedness were developed on a large scale in the new towns, achieving the objective of the rapid provision of housing. Although it is commendable that the recovery process plan was linked to future disaster prevention, building regulations made it impossible to secure the amount of housing that existed prior to the disaster for on-site reconstruction, and this delayed the pace of recovery somewhat.

Large temporary housing complexes were built on the outskirts of cities and in the suburbs, and many residents were relocated.

Similarly, post-disaster permanent housing was built mainly in the suburbs. This type of method involves the provision/sale of apartment buildings; large housing complexes were developed and provided in more than twenty locations. External funding, such as aid from the World Bank, was invested into these developments. Housing specifications and floor areas were standardized, public facilities and roads were newly constructed, and the developments were provided in the form of new towns.

3.6 China, Sichuan Earthquake, 2008

This was a major earthquake centered in a mountainous region of Sichuan Province in China. The number of houses requiring reconstruction after the disaster was reported (International Recovery Platform, Recovery Status Report 04) to be approximately 2.2 million in rural areas and 720,000 in urban areas, and a huge amount and variety of housing was provided for this single disaster. Characteristics of the damage included the collapse of housing due to seismic motion and the existence of areas where entire villages were totally destroyed by large landslides.

Large temporary housing complexes, not only near to the disaster area but also in the suburbs of cities that suffered relatively little damage, were surveyed, but it was not possible to grasp the complete picture.

House building since the disaster has been diverse, including large-scale apartment complexes developed integrally with new cities on the initiative of the government, apartment complexes in suburban/rural areas, and relatively small-scale apartment complexes; these appear to have been provided in accordance with the characteristics of the disaster area.

3.7 Comparison of Direct Provision by Public Sectors

There are few studies dealing with both temporary housing site and Provision site of the housing after disaster for comparison analysis among disaster cases. This analysis challenged the comparison of the housing site location for victims. Characteristics about three disaster housing recovery has been reported (KOSHIYAMA, 2011). In adding to which, this article examined the relationship between the quantity of the unit and geographical location.

Geographical characteristics of site locations in the area were different among cases and were associated strongly with urban reconstruction process after disaster. Mexico City's case indicated the possibility of the achievement of housing provision in the closed damaged urban area. In contrast, Turkey study indicated the implementation effect of the recovery housing provision as new settlement development. It is important to agree with victims at the point of the moving distance affected their life directly. Considering them, Japan's two cases was described as the limitation to the method of housing provision with only housing function.

Fig.1 Comparison of the housing provision site.

	1985 Mexico	1995 Kobe	1999 Kocaeli Earthquake					2011 Tohoku	
	Earthquake	Earthquake	Kocaeli	Sakariya	Duzce	Bolu	Yalova	Iwate	Miyagi
	Mexico City	Hyogo							
New Housing Units	48,800	25,421	17,776	7,826	8,470	1,734	5,476	5,833	15,823
Housing Sites	about 3000	236	15	3	5	1	3	158	312
units 0-100	most of all	163	0	0	0	0	0	139	270
100-1000	-	73	10	0	4	0	1	19	42
1000-	-	0	5	3	1	1	2	0	0
Site Location									
Near damaged area	most of all	70%	40%	0	40%	0%	0%	95%	95%
Far damaged area	0	30%	60%	100%	60%	100%	100%	5%	5%

3.8 Japan Housing Recovery after Disaster

Japan has experienced the large-scale housing loss by the earthquake disaster in the least 30 years. That indicated that post disaster management including housing recovery and urban planning was the most important issue for not only development country with vulnerable conditions but also advanced country with a different vulnerability. This shows Japan housing recovery problems discussing in the field of the housing recovery as follows.

- Diversification of support measures for those facing difficulties in the self-rebuilding process

In the Japanese system, the provision of public housing is the only support measure available for those facing difficulties in independently rebuilding their homes following a disaster. Upon close examination, this is a unique measure from a global perspective. This measure encapsulates issues based on findings of previous articles that have discussed the regular housing policy, the maturity of the private housing market, and the importance of diversifying the process through which the lives of disaster victims are reconstructed. The government must work towards increasing policy options that consider large-scale disasters that may occur in the future.

- The link between regional recovery and housing reconstruction is weak

Considering cases of disaster recovery in the world, the framework of the housing provision system during a disaster often revolves around supporting the reconstruction and recovery of local communities. In many cases, housing reconstruction clearly plays an essential role in rebuilding the lives of disaster victims and restoring affected areas to their former state. In addition, the relationship between housing reconstruction, community maintenance, commerce, the economy, and employment is linked with the support measures provided for those facing difficulties in the self-rebuilding process and the construction and provision of housing for disaster recovery. Compared to many cases in the world in which disaster victims directly participate in the regional planning and the process of housing reconstruction, Japanese support measures for those facing difficulties in the self-rebuilding process during disaster recovery is thought to prevent disaster victims from participating in the planning, which in turn restricts the recovery process.

- Deviation from urban safety planning

In areas where there is insufficient development in urban infrastructure due to disaster prevention efforts, housing reconstruction measures supporting disaster victims are only one part of the disaster recovery plan. It is necessary to determine the position of the housing reconstruction plan within the urban planning strategies geared towards disaster response and control. However, due to the excessive emphasis placed on the urgency of housing provision in Japanese cases of disaster recovery, the role played by housing stock as an element of a given city in the decades to come is not sufficiently discussed. Furthermore, the activities and operations involved in the urban reconstruction process in Japan proceed without adequate discussions on the future image of the city. Regarding this issue, it has been indicated that the recovery plan must be linked with both the basic and master plans. As such, it is therefore necessary for all members of society to share and recognize the importance of planning for the construction of a safe city, and for those executing the plan to strike a balance between housing reconstruction and the reconstruction of people's lives. Accordingly, it is also necessary to develop planning skills to manage the recovery process of society as a whole.

3.9 What are concerned with the housing provision method?

Base on the case studies, I pointed out factors which housing provision by the public sector after disaster was led.

a. Support Method

Cash (Acquirement through the market)

Direct housing provision

Into the market

on the unique market for victim or low-income

b. Provision Method

New Development (Role as a developer)

New town construction (Large-Scale Total Design Scale)

New village construction (Small community Design Scale)

Housing construction (Role as a house builder)

Hi-rise Apartments

Town house (small lots such as flats, corporative apartment)

c. Related Factors

- Area Damage characteristics by disaster
- Possibility to use again for dwelling (including disaster risk avoidance)
- Necessity of risk reduction measure
- Ability of management of land and lots and housing
- Availability of the remaining housing stock to use
- Costs to do
- Suffers opinion, desire
- Urban Policy toward post disaster
- Trend to the area environment (population, housing type, function, infrastructure..)
- Limitation by law, act, regulation ...

4 Discussion

The series of actions undertaken in the reconstruction of housing during a large-scale disaster not only entails the reconstruction of each person's individual life, but which is also connected to the process of rebuilding the entire city. If one examines cases of recovery thus far while reflecting on this relationship between housing and urban reconstruction, three points should be considered in terms of planning.

a. Whether to rebuild in the area where the disaster occurred

When devising the support measures for housing reconstruction, the first crucial step is to determine the type of location in which the affected housing stock can be rebuilt. There are three major ways to accomplish this: (1) rebuild the affected housing in its current location, then allow the former residents to move back in, (2) rebuild the same quantity of housing stock, but supply them to the general market rather than the disaster victims, (3) secure a new location and initiate housing reconstruction, or carry out the construction and provision of housing.

The solution to this issue is often determined by the mutual influences of factors such as the housing environment in the previous disaster-stricken area, the extent and magnitude of the damage caused by the disaster, the direction of urban policy following the disaster, the leadership and motivation of the heads of the local government, as well as the direction of the social economic conditions and the will of the people at the time of the disaster.

b. Whether to provide in-kind or cash payments

The support measures for housing reconstruction include a method of expanding the housing acquisition fund for disaster victims that allows them to initiate the reconstruction process on their own, along with a systematic method of reconstruction in which public institutions give priority to constructing and providing housing to disaster victims. The former refers to cash payments and the latter refers to in-kind payments. In general, the former is the most appropriate measure if the housing market mechanism is properly functioning, while the latter is often implemented when there is an insufficiency in the amount of stock needed, thereby necessitating a public supply of housing. In other words, although both are measures that significantly affect the housing market in the areas affected by the disaster, the former pertains to a planned economic measure while the latter is somewhat oriented towards the market economy.

The solution to this issue is often determined by factors such as the circumstances surrounding the housing stock and the characteristics of the disaster victims, the market's ability to supply housing after the disaster, and the public sentiment related to support for housing reconstruction.

c. Whether to protect properties or vulnerable people

The differences in the attitudes related to the aims of housing support measures are revealed in the support measures towards the protection of properties or the initiation of the self-rebuilding process as well as those implemented to assist vulnerable people. The former provides public support in the form of compensation for the housing properties that have been significantly damaged by the disaster, while the latter mainly provides support through public assistance to individuals or families without housing and in a dire situation. In the case of the former, the home owners are essentially the beneficiaries of the support. Conversely, in the latter case, the tenants are at greater risk of enduring poor living conditions than the owners; therefore, the policy is geared mainly towards the tenants of the rented properties.

Although the solution to this issue is largely determined by views of disaster response on a national level as well as the direction of housing reconstruction support, cases in which trends in the will of the people have impacted policy do exist.

d. How to provide housing by public sectors

There are two planning methods for providing housing, i.e. on-site reconstruction (non-moving) and another-site development (moving). I can classify the disaster housing recovery method using two axes and describe the characteristics and implication of the four categories. The First quadrant can be named as 'Support re-acquiring home in the damaged area' which located non-moving and cash. The second quadrant is named 'Support moving to another area' which located moving and cash. The third quadrant is 'Direct housing provision for victims' which located non-moving and direct provision. The fourth quadrant is 'New Settlement development' which located moving and provision.

Provision hardware factors consist of housing scale, housing unit type, location and the number of units, and policy factors consist of recovery vision, sufferer's opinion and desire, coordination in the organization and among organizations, system of laws, regulations and acts and affects on the housing stock in the area and so on.

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