Housing Recovery for Sustainable Disaster Recovery through the case studies of Hurricane Katrina (2005) and the Great East Japan Earthquake (2011)

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ABSTRACT

What kind of housing recovery can achieve a sustainable disaster recovery? This research examines multiple examples of housing recovery carried out after two mega disasters Hurricane Katrina and the Great East Japan Earthquake, in terms of sustainability aspects. It is common that the addition of individual self-help housing reconstruction and relocation cannot avoid scattering, sprawl, and a checkerboard situation, which is physically and economically unsustainable. Clustered housing recovery with the perspective of spatial planning by utilizing survivors' resilience is suggested as an effective model for sustainable disaster recovery.

Introduction

After a devastating disaster, the affected area loses all functions that are necessary for people to sustain their lives. One of the most important functions to recover is housing, which serves as a basis for human living and community. The author set the following research question: “what kind of housing recovery model can achieve a sustainable disaster recovery?" Smith and Wenger define sustainable disaster recovery as the differential process of restoring, rebuilding, and reshaping the physical, social, economic, and natural environment through pre-event planning and post-event actions[1]. This research examines multiple cases of housing recovery after two catastrophes through the concept of sustainability, based on continuing field surveys of housing rebuilding and interviews with homeowners in New Orleans after Hurricane Katrina since 2005 and Miyagi and Iwate Prefecture after the Great East Japan Earthquake of 2011.

Housing Recovery after Hurricane Katrina in New Orleans

Hurricane Katrina's storm surge washed over the levees and breached the floodwalls of the City of New Orleans. Water stood in over 80 percent of the city for nearly two weeks, and 180,000 housing units were severely damaged or destroyed [2]. Katrina resulted in the largest U.S. displacement of residents in all over the States. What kind of housing recovery has been implemented in New Orleans since 2005?

Checkerboard Housing Recovery

The author started an annual housing rebuilding field survey in September 2009, on the fourth anniversary of Katrina, covering more than 1500 housing units in New Orleans. The survey has been conducted in 2009, 2010, 2012 and 2013. The objective of the survey is to clarify the

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neighborhoods’ gaps in terms of housing rebuilding speed and property sales. Three neighborhoods were selected: Lakeview, Gentilly Woods and Holy Cross, all of which have almost the same housing damage as assessed by FEMA. The most distinctive trend in 2009 was that the housing rebuilding percentage in all neighborhoods was almost the same at 50%, and there was a significant difference in the percentage of abandoned housing and vacant lots [3]. The percentage of annual change between 2009 and 2010 in housing rebuilding was low, however, there was a wide gap between neighborhoods in terms of progress of housing rebuilding and property sales; the latter signifies a turnover in residents [4]. The neighborhood without decreasing blighted properties and with positive increasing vacant lots was found and this indicated the future widening disparity between neighborhoods. The non-decreasing blighted properties will cause deterioration of the dwelling environment and residents’ difficulties for returning to their neighborhoods. What elements influence these neighborhood gaps? It is expected that property values, lack of options for selling property, individual incomes and homeownership give an impact [5].

Through the annual survey, it was found that densely populated neighborhoods are coming back in bits and pieces, leaving some very sparsely populated which can be called a checkerboard housing recovery. What made this checkerboard situation? It is considered that this was triggered by a lack of a spatial planning perspective and neighborhood-based recovery strategy. Firstly, the largest housing compensation in U.S history, the Road Home Program, is only individual-based assistance and does not lead to neighborhood recovery. Secondly, there was no land use guidance or urban redevelopment projects by the local government which had the perspective of spatial planning regeneration approach at the neighborhood level. The only guidance for homeowners to rebuild their housing is elevation requirements from the National Flood Insurance Program administrated by FEMA.

Clustered Housing Recovery

There is one promising method to break through checkerboard housing recovery which is the Neighborhood Stabilization Program administrated by the New Orleans Recovery Authority (NORA). NORA works together with 14 consortium members, housing developers and non-profit housing developers such as community development corporations. This program holds the possibility to implement the "Elevate and Cluster" program proposed by Unified New Orleans Plan to encourage residents to rebuild in clusters at higher elevations to help ensure vibrant neighborhoods and more efficient infrastructure costs in the context of a smaller overall population [6]. The expected impact for this program is not only improved safety but also 1) continuity of prior communities, 2) housing rebuilding and restructuring community through flood-resistant designs and 3) restoration of community service coordinated with individual housing reconstruction. The strategy used by Broadmoor Development Corporation, one of the consortium members, is unique; a combination of interventions and resources in selected zones targeted for development including the renovation of occupied and vacant property, construction of infill development, and greening/maintenance of vacant lots [7].

Housing Recovery after the Great East Japan Earthquake

The Great East Japan Earthquake (2011) struck the Tohoku region where population decline and aging was serious even prior to March 2011. One of the crucial points for Tohoku recovery
is to regenerate community in social, economic, and physically sustainable ways with enhancing resiliency. After the Great East Japan Earthquake, strict land control for tsunami risk has been enforced by the government sector and an unprecedented area is planned to be designated as hazardous in which building is restricted[8]. One of the strong planning projects by government is group relocation to mountainside areas in order to reduce tsunami risk.

**Individual Self-help Housing Recovery with Relocation**

Based on a housing rebuilding field survey, questionnaire survey and interviews in Iwate and Miyagi Prefecture since 2012, individual voluntary relocation and housing reconstruction actions are increasing in coastal areas. Figure 1. shows the spatial distribution of newly constructed buildings in the City of Rikuzentakata on an individual relocation dot map, which indicate newly constructed housing after 3/11, clarified by using a ‘Housing Map’ (ZENRIN Co. Ltd) published before and after 3/11. There are approximately 2500 newly constructed buildings estimated as single family housing in the Cities of Yamamoto, Higashi-Matsushima, Ishinomaki, Onagawa, Minami-Sanriku, and Kesennuma in Miyagi prefecture and in Otsuchi, Ofunato and Rikuzentakata in Iwate Prefecture. Although all of these are not identified as the consequence of individual relocation by survivors, it is a high possibility because it is unlikely that newcomers increase in the disaster-stricken area. How do these individual self-help relocations result in the change of the urbanized area’s spatial structure? It is found that these individuals' housing rebuilding actions lead to physically unsustainable recovery in depopulated society, which triggers urban sprawl and low-density development. Looking in more detail, these housing rebuilding patterns can be categorized into the infill-development type and the scattered sprawl type. Infill development housing recovery is considered to be an effective model of housing recovery to avoid low-density and scattering development following a devastating disaster[9].

There are many risks ahead for recovery such as the risk of population decline which was emphasized by the Unified New Orleans Plan[10].

Figure 1. Spatial distribution of new building reconstruction estimated as single family housing in the City of Rikuzentakata(N=505) in 2013

Even if this housing rebuilding is physically unsustainable, these actions were the results of individuals' decision-making to sustain their living as quickly as possible and avoid tsunami risk to achieve a feeling of security which is considered socially sustainable. Based on a questionnaire survey, for approximately 200 homeowners' individual voluntary relocation, almost 50% of survivors decided to relocate within half a year after 3/11 when no post-disaster
recovery planning and no housing rebuilding subsidy program was decided by the government sector. Enabled by survivors' resilience, individual self-help housing recovery with relocation is the earliest housing recovery of the types of housing recovery after 3/11. However, resettlement areas are decided based on the risk of tsunami, affinity, convenience, and enabled by resourcefulness, which means that infill development cannot be achieved without spatial control.

**Conclusion**

What kind of housing recovery can achieve sustainable disaster recovery? Clustered housing recovery with the perspective of spatial planning by utilizing survivors' resilience is suggested as an effective model for sustainable disaster recovery. Not only urban development 'project' and 'control', it is important to utilize urban planning 'guidance' for housing recovery following disaster. Much further research is needed to examine what determines types of housing rebuilding, such as infill development or sprawl and low-density development. The hypothesis is that individual decision making, previous characteristics of urban structure, and local government land use planning and post-disaster recovery planning projects give influence, which leads to changes in urban spatial structure following a disaster. This research question is significantly important to enhance knowledge to promote pre-disaster housing recovery planning for a future mega disasters such as the Nankai Trough earthquake in Japan.

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