論 文 の 内 容 の 要 旨

論文題目　Role of Risk Sharing on Post-Disaster Housing Recovery Decision-Making in the Philippines
（フィリピンにおける災害復興時の住宅再建に関する意思決定に対するリスクシェアリングの影響分析）

氏　　名　オン　ジェームス　マイケール　ラカナリャ

Household-level decision-making in post-disaster housing reconstruction is only recently studied in literature. For the success of future housing recovery programs in extreme events, understanding how and why these residency patterns of vulnerable population are formed is essential (whether to rebuild in their original community or to move to another area). The study aimed to develop the behavioral decision-making framework of household agents on housing residency patterns in the context of financial resilience and temporal scale. More specifically, the research sought: (a) to determine the factors that affect the current mechanism of rebuilding-relocation decisions over time, (b) to compare cases in terms of available reconstruction approaches and location-based hazard types and (c) to assess the future tendency of the community to participate in a proposed property insurance program to improve their financial resilience.

Empirical case studies from two cities in the Philippines were chosen – (1) Tacloban City, Leyte Island (storm surge caused by supertyphoon Haiyan last 2013 focusing on relocation cases) and (2) Muntinlupa City, Metro Manila (extreme flooding caused by Typhoon Ketsana last 2009 focusing on rebuilding cases). In these project sites, four housing reconstruction approaches were identified and compared – (a) owner-driven on-site reconstruction outside the “no dwelling zone”, (b) community-driven relocation, (c) contractor-driven relocation and (d) transitional shelter relocation. Unfortunately, shelter assistances were misallocated and distributed to non-targeted residents which triggered rebuilding of houses even inside the no dwelling zone. Semi-structured questionnaires (n1= 575) were administered last March 2015 and 2016 in these coastal regions through two-stage cluster sampling and were supported by key informant interviews of community leaders and government officials. Extensive literature review with regards to models of individual decision-making, concept of local or community-based resilience and theories of migration was done to establish the variables tested. Furthermore, statistical analysis was performed to explore the relationships of the variables and further compare the different case sets. Finally, solution-testing was carried out through the discrete choice experiment (n2=201) to assess the feasibility of a proposed risk-sharing property insurance plan.

Principal component analysis by Varimax rotation revealed the key dimensions of the variables being tested as composed of the following: 1. financial resource or assistances, 2. community initiatives or engagements, 3. non-monetary rebuilding assistances, 4. non-monetary relocation assistances, 5. indirect impacts and 6. place-based sense of self-identity in which hazard characteristics and socio-demographic variables were cross-cutting among the extracted components.

Next, results of correlation analysis showed that generally the main dependent variables, length of time to rebuild and to transfer for relocation, were significantly affected, p(0.05), by the pre-existing internal system

recovery capacity, hazard characteristics, external coping responses and direct and indirect impacts (as outlined in the proposed integrated conceptual framework). , the mechanism of risk sharing, which involves both financial resource and community engagements variables, was investigated through the aspects of amount, delivery schedule, distribution scheme and usage in which cashflow analysis was used to incorporate the time value of money.

a. In the rebuilding vs. relocation case, the amount of financial resource (ρStart= 0.332; ρFinish= 0.354; ρRelocate= -0.356) significantly affected the rebuilding-relocation duration.
b. However, further cases stratification by location showed that the reconstruction in Leyte case was only significantly affected during the completion phase (ρFinish= 0.205), while Manila case was not significantly influenced in the entire duration. This finding can be explained by the insufficiency of amount received and late delivery of the monetary support.
c. Moreover, community initiatives highly influenced the reconstruction rate showing the strong relationships of frequency of community meetings (ρStart= -0.136, ρFinish= -0.164, ρRelocate= -0.151), level of participative leadership and community involvement in problem-solving or crisis management. However, Tacloban case was characterized with lower level of community initiatives due to the forced displacement of most households after the disaster (dispersion of original community members).
d. For the relocation cases, the community-driven type presented the financial aid amount (ρRelocate= -0.254) and frequency of community meetings (ρRelocate= -0.392) as significant variables due to the available cash-for-work program in the relocation sites designed by the funding agencies.
e. Finally, stepwise regression analysis showed that estimated housing damage level (Beta=0.315) and financial aid (Beta=0.269) for rebuilding and degree of risk acceptance attitude after the disaster (Beta=-0.319), livelihood (Beta=-0.235), number of family members (Beta=-0.238) and frequency of attending meetings (Beta=0.233) for relocation were the highest contributors to the variance.

In summary, the study provided empirically-supported determinants in the framework, which significantly affected the reconstruction decisions over time. Financial resources, community initiatives, non-monetary assistances, hazard characteristics, self-identity and indirect impacts of disturbance were found to have significant influence to shelter choice and duration to decide. Moreover, reconstruction approaches and location (related to hazard types and experience) had interactions with the respondents' decisions. To discuss the causal linkage of risk sharing, components of financial risk sharing mechanism were inferred to have an influence to the decision-making of rebuilding-relocation choices - Delivery Schedule, Distribution Scheme, Usage and Amount. However, due to the limited options of financial resource, the study further investigated the feasibility of disaster risk-sharing property insurance (involving agreement among private insurers, government and homeowners). Discrete choice experiment had he following outcomes on how their willingness to participate was affected by different factors:

a. Because of this dependency of the households to reactive risk transfer options of disaster risk financing, there were issues raised due to the dissatisfaction of the vulnerable population in terms of the existing system especially in the financial resources. Aside from this reliance to financial assistance, other barriers to the acceptance of the insurance system included the risk perception of the households (expectation of less frequent disasters in the future); lack of budget allocated for insurance and lack of trust in insurance providers. Hence, the future tendency of the households in Manila case to participate in a proactive or ex ante insurance scheme was done through discrete choice experiment.
b. Future tendency of the households placed the highest importance to settlement of claims or assessment system, service provider and premium rates as insurance attributes they prefer by direct ranking.
c. Moreover, the average respondent was willing to pay 4.8% more of the base values if the assessment type is the regular appraisal and further increase for the index parametric type. Moreover, the respondent was willing to pay 5.9% less of the base values for every point change in service provider from private to community, government and risk sharing tripartite agreement.
d. Based on logistic regression, the respondents' choices were also significantly influenced by flood frequency, savings capacity and educational attainment (as modifying factors).

Hence, with the significant interconnections of these factors in developing the future transformative capacity of households against disasters, these factors in a systems approach can be considered to ensure that the housing reconstruction programs promote the build-back-better principle and sustainable development in communities at risk.