

The Influence of Reconstruction Modality, Social Capital, and Community Satisfaction on Willingness to Participate in Resilience-Building Activities

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ABSTRACT

Resilience-building by community members is critical to withstand future disasters, and post-disaster reconstruction provides an opportunity to enhance rebuilding. Thus, a better understanding of what promotes or impedes willingness to participate in community resilience-building activities, such as community members attending meetings, helping neighbors with construction activities, creating emergency response plans, or reducing risk in other ways, is needed. Household surveys were administered to 12 communities impacted by Typhoon Haiyan in the Philippines to investigate how social capital, community satisfaction, and reconstruction assistance modality influence community members' willingness to take action to increase their resilience. Findings show social capital, or social relationships and networks, and reconstruction assistance modality, or method employed to assist with home reconstruction, had significant effects on whether households plan to take action to build their communities' resilience. The relocated communities who received donor-built houses indicated the highest willingness to participate in resilience-building activities, followed by the communities with donor-built houses that were reconstructed in place of their pre-disaster homes, and finally the communities who self-recovered through the local building sector. The results of this study inform research and organizational policy on the relationship between the elements of social capital, community satisfaction, and method of reconstruction assistance that encourage plans to action towards disaster community-wide resilience.

INTRODUCTION

The concept of community resilience has become increasingly influential in planning, engineering, and disaster management discourse in recent years. In addition to physical reconstruction, post-disaster humanitarian shelter and settlements programs aim to enhance resilience by preventing communities from reproducing their pre-disaster physical and social vulnerabilities (Blondel 1990) and building local capacity to withstand future disasters (Freeman et al. 2002). The United Nations Office for Disaster Risk Reduction has defined resilience as, "the degree to which the social system is capable of organizing itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures" (UNISDR 2004). This resilience, on a community level, is associated with community participation, capacity building, and knowledge sharing (Soden et al. 2015).

To effectively design and build more resilient communities after disasters, assisting

organizations and governments must consider the influence of reconstruction modalities and community characteristics, such as community social capital and satisfaction, on household participation in community resilience-building activities. In this study, community resilience-building efforts of interest include mobilization activities, such as community meetings focused on securing government support for improved infrastructure; physical actions, such as improving shelter or other infrastructure systems; and other efforts, such as engaging in activities to strengthen social capital and address community needs. This study seeks to understand how community characteristics and differing methods of reconstruction assistance influence how, and if, individuals are willing to take action to ensure their communities are resilient to future disasters by asking:

Research Question

How do reconstruction modality, social capital, and community satisfaction influence community members' willingness to take action through resilience-building activities?

BACKGROUND

In this study, we hypothesize that reconstruction modality, social capital, and community satisfaction will influence whether community members plan to take part in resilience-building activities.

Community Resilience-Building Activities

Improving community resilience requires that communities take action to address the various dimensions of resilience (Opdyke et al. 2018). Specifically, the resilience-building efforts of interest include those related to the physical, built environment (i.e., mobilization to improve built infrastructure systems, including shelter, sanitation, water systems); governance (i.e. attending meetings and participation in planning to improve disaster risk reduction (DRR) within the community); economic, (i.e., job creation and other efforts to improve economic opportunities); and social (e.g., volunteering in the community, participating in community meetings and events, and strengthening social networks). More research is necessary, however, to understand what community characteristics and construction program factors influence household decisions to take action to build their communities' resilience.

Reconstruction Modalities

A variety of shelter delivery modalities exist in post-disaster shelter and settlements programs; this study focuses on direct-build programs and assistance with self-recovery processes. In direct-build programs, governmental or non-governmental organizations (NGOs) assist households as they reconstruct through manual labor (i.e., hiring local carpenters or volunteers) and decision making (i.e., floorplan design). This study analyzes cases of direct-build programs that have been performed at the location of the original community, or in situ, and in relocated communities. In the cases of support for shelter self-recovery, assisting organizations aid by supplying materials, training or cash grants and vouchers. With increasing disaster severity and frequency, more NGOs are shifting their programs towards support for self-recovery, rather than direct-build, to assist in fulfilling the needs of the greater than seventy percent of households who do not typically receive enough support to reach their shelter needs in the first year following each disaster (Patrick et al. 2014).

Thus far, research on different methods of reconstruction assistance has focused on direct-build programs, rather than support for self-recovery (Goldwyn et al. 2019). Further, of the available studies, research on the differences between direct-build reconstruction programs performed in relocation sites and those performed in situ have focused primarily on satisfaction and recovery at the household level (e.g., Andrew et al. 2013). No studies have specifically focused on the differences between these in situ and relocated reconstruction programs in terms of willingness to take action to build community-wide resilience to natural hazards.

There have been contrasting views in literature (Goldwyn et al. 2019) on whether or not assistance from outside, helps or hinders community recovery (Jordan and Javernick-Will 2013). Although some studies have reported evidence that recovering with limited external assistance strengthens social trust and solidarity within communities (Maynard et al. 2017), research is needed to see if this trust and solidarity increases motivation to take action to improve their community's resilience. Overall, more evidence is necessary to evaluate if different reconstruction modalities affect the willingness of households to take part in community-wide resilience-building activities.

Social Capital

We hypothesize that social capital, or social relationships and networks, may affect willingness to take part in resilience-building in this context because social capital encompasses a community's capacity to engage in effective and efficient recovery through coordinated, collective efforts (Aldrich 2012). Thus far, one study has shown that strength of social capital, or the relationships within the community, is linked to participation in community-based disaster mitigation (Schilderman 2004). Specifically, that study observed that social capital enhanced the sharing of lessons learned from the past.

Social capital can be characterized as bonding, bridging, and linking capital (Aldrich 2012). For this particular study, we are focusing on bonding capital (i.e., horizontal links between households in a particular geographical location, who share similar ethnicity, religion, language, or other factors) and linking capital (i.e., vertical links between households and local leaders). Social support, or "interactions that provide individuals with assistance and embed them in a web of social relationships" (Akbar and Aldrich 2018 pg. 3), social cohesion and interaction (SC-IQ questionnaire, as in Grootaert 2004), and interpersonal trust (Brehm and Rahn 1997) have been identified as key characteristics of bonding capital. Linking capital includes connections with government officials (Aldrich 2012) and civic engagement (Aldrich 2012, Akbar and Aldrich 2018, Brehm and Rahn 1997).

Community Satisfaction

We further hypothesize that there may be a link between satisfaction with community planning, including infrastructure quality and access, and willingness to take action in planning and decision making at the community level. Previous work has found links between household satisfaction and active participation in construction and decision-making (Mazza et al. 2014). We pull from Mohit et al. (2010) to assess satisfaction with community features at five different levels: dwelling unit (e.g., living area), dwelling unit support services (e.g., street lighting), public facilities (e.g., community recreation spaces), social facilities (e.g., community security), and neighborhood facilities (e.g., schools and hospitals). Studies on this topic have primarily focused on satisfaction with individual household quality and construction processes (e.g. Ganapati 2013; Rameezdeen and Karunasena 2010). More work is needed to understand how

community satisfaction relates to the willingness of households to take action to increase their community's resilience.

METHODS

Data Collection

To evaluate how these different factors affect community willingness to take part in resilience-building measures, we developed, administered, and analyzed a survey that asked about households' social capital, community satisfaction, and plans or willingness to take part in community resilience-building activities. These questions were included as part of a larger survey that sought to understand household perceptions of safety and resilience (Venable et al. 2019). By examining these items, we are able to assess potential links between social capital and community satisfaction and community efforts to reduce disaster risk.

To address our research question, we administered a survey to 538 households who received shelter assistance in the Philippines after 2013's Typhoon Haiyan struck the nation in 2013, which destroyed over 1.1 million houses (Shelter Cluster 2014). Specifically, this paper analyzes survey responses from twelve communities in the provinces of Leyte and Eastern Samar, two of the regions most affected by Typhoon Haiyan. Each of the communities included in this study experienced similar levels of damage to shelter and community infrastructure.

Table 1. Measures of Social Capital, Community Satisfaction, and Resilience Action

Construct	Sub-Construct	Rating Scale
Social Capital	Social support Civic engagement Interpersonal trust Connection with local leaders	Participation ratings from "Not at all"/"A little bit" (0) to "Quite a bit"/"All the time" (1)
Community Satisfaction	Dwelling unit support services Public Facilities Social Environment Neighborhood Facilities	Satisfaction ratings from "Very dissatisfied"/"Dissatisfied" (0) to "Satisfied"/"Very satisfied" (1)
Resilience Action	Physical (e.g. Improving community infrastructure) Economic (e.g. Lending money to neighbors) Governance (e.g. Solving community problems) Social (e.g. Helping neighbors in need)	Planned participation in activities, ratings from "Not at all" (0) to "All the time" (3)

Ten of the twelve communities included in this study received direct-build assistance, *i.e.*, reconstructed homes provided by humanitarian, donor organizations. Of the direct-build cases considered here, half of the communities had their homes reconstructed by donors in situ and half were relocated to new communities. In the final two communities, donor organizations supported self-recovery processes by providing corrugated galvanized iron (CGI) roofing sheets,

which were difficult to procure locally, and cash vouchers to purchase other necessary building materials.

The survey was administered by four local research assistants in the local language, Waray-Waray, using Qualtrics software on handheld tablets from April to July 2018. To collect information from a representative sample of each community, we used a combination of simple random and convenience sampling. The survey was administered to every fourth house on the initial visit to the community; if households were absent during the day, we administered the survey to present households to reach the number of responses needed.

The survey assessed social capital, community satisfaction, and willingness to participate in community resilience-building activities on a Likert scale, with sub-constructs and ratings scales shown in Table 1. To measure social capital, we asked participants to rate their past participation on a scale from “Not at all” to “All the time” for a list of activities and statements. We assessed community satisfaction by asking respondents to rate their satisfaction on a scale from “Very dissatisfied” to “Very satisfied”. We asked respondents to rate their likelihood of participating in the resilience-building activities over the next year on a scale from “Not at all” to “All the time.”

Statistical Analysis

The survey data was coded and imported into the statistical software *R* for analysis. In accordance with the standard procedures for analysis of Likert scales, Likert items for social capital, community satisfaction, and resilience action were assigned numerical values and summed to create one Likert score for each scale. In evaluating resilience action, the number 0 represents the answer “not at all,” 1 represents “a little bit,” 2 represents “quite a bit,” and 3 represents “all the time.” Social capital responses were on the same scale, but answers were aggregated so “not at all” and “a little bit” were assigned the score 0 and “quite a bit” and “all the time” were assigned the score 1 in order to differentiate those who did and did not participate in activities to build social capital. For community satisfaction, “very dissatisfied” and “dissatisfied” were assigned a score of 0 and “very satisfied” and “satisfied” were assigned the score 1 because nearly all respondents avoided the more extreme rating choices. Thus, the highest possible sums for the resilience action, social capital and community satisfaction Likert scales were 24, 22, and 14, respectively. We calculated Cronbach’s alpha values between 0.70 and 0.93 for each of the three constructs, verifying test internal consistency and scale reliability (Gliem et al. 2003). Summed social capital and community satisfaction were treated as continuous independent variables and summed resilience action was treated as a dependent continuous variable. In addition, the reconstruction modality was treated as a categorical variable, distinguishing between communities constructed through direct-build programs performed in situ, communities relocated through direct-build programs, and communities constructed through self-recovery processes. We tested the associations between these variables using Pearson’s *r* correlation and one-way ANOVA and then performed a multiple regression analysis using a model comparison approach (Judd et al. 2009).

FINDINGS

The findings of this analysis reveal the influence of social capital, community satisfaction, and reconstruction on the willingness of households to take action to build the resilience of their communities. Findings reveal social capital has a significant Pearson’s *r* of 0.1. In a model that controls for reconstruction modality and community satisfaction, increased social capital had a significantly positive effect on resilience action ($t(1,512)=14.3$, $p<0.001$). An increase in the

rating of one Likert item on the social capital scale, which ranges 22 units, correlates to an increase in resilience action by roughly 0.7 out of the 24 possible points. However, there is not a significant relationship between community satisfaction and resilience action. The averages for summed resilience action scores by reconstruction modality are shown in Table 2.

Table 2. Average Resilience Action Score by Reconstruction Modality

Reconstruction Modality	Average Resilience Action Score (Out of 24 total units)
Self-Recovery	16.1
Direct-Build: In Situ	16.2
Direct-Build: Relocation	17.7

DISCUSSION

The findings of this study reveal reconstruction modality had significant impacts on willingness to take part in resilience-building activities, when considering the effect of social capital and community satisfaction. In the following section, we discuss our hypotheses related to these findings.

Influence of Social Capital and Community Satisfaction on Resilience Action

Firstly, these findings show a positive correlation between increased social capital and participation in community planning activities (Aldrich 2012; Mazza et al. 2014). This further supports the idea that social capital is a critical component that enables collective planning and informal, community-based approaches to DRR (Nakagawa and Shaw 2004; Schilderman 2004). These findings also reveal that, across all communities, satisfaction with community infrastructure quality and access is not a significant predictor of whether households are willing to take action towards building community resilience to future natural hazards.

We hypothesized that households who were very dissatisfied with their communities would be more highly motivated to take action. Particularly, we expected poor construction quality of community infrastructure and frequent flooding due to ill-equipped drainage systems would motivate households more to take action to improve their community's infrastructure. This study shows, however, that this correlation may not exist when the decision to take action to improve their infrastructure may be outweighed by past experiences or beliefs, like a lack of hope that their actions will actually impact the communities by leading to improvements towards further resilience. Further work is needed to understand when dissatisfaction with communal infrastructure leads to households feeling either motivated to or discouraged from participating in activities to make their communities more resilient to natural hazards.

Motivating Resilience Action After Relocation

Interestingly, the relocated communities, which reported the lowest social capital and community satisfaction out of the three reconstruction conditions, reported the greatest willingness to participate in resilience-building activities. Although relocated communities had the lowest measured social capital, this does not mean that there was no social capital. In fact, during the time of this survey, the Presidential Commission for the Urban Poor (PCUP) began working with relocated communities to help them create bonds in their communities and advocate for community services. The support from PCUP could be the catalyst for some

households' willingness to participate in resilience-building activities.

In addition, this unexpectedly high score for willingness to participate in community-wide resilience activities in the relocated communities could be attributed to this group having the lowest reported satisfaction with community infrastructure access and quality. These communities may have found a need to take action to reduce their communities' risk due to this lower satisfaction.

Motivating Resilience Action During Self-Recovery

Households in the self-recovery communities, who received small cash grants or material provisions, had the highest reported community satisfaction and social capital, but the lowest reported willingness to take part in resilience-building activities. This is an interesting finding because studies have shown communities with high social capital and satisfaction with community planning have the fastest recovery rate (Nakagawa and Shaw 2004). This shows that speed of post-disaster reconstruction and recovery may not necessarily correlate with the willingness of households to take action to improve their community's resilience to future households.

The low ratings of planned resilience action within these communities may be due to the fact that these communities had to invest significantly more of their time and resources into repairing or reconstructing their homes than the households in either of the direct-build conditions. In these communities, not having the financial resources was the main reason households gave for not being able to make additional modifications to their houses. If households lack the resources to improve the resilience of their own houses, they also likely lack the time and resources to improve the resilience of their larger communities. At a time when there is a shift in the humanitarian shelter and settlements sector towards supporting self-recovery processes (Parrack et al. 2014), rather than implementing donor-built infrastructure, we need to better understand why these households may be less motivated to participate in these community resilience-building activities to determine what support organizations need to incorporate for coordinated community involvement (Maynard et al. 2017).

CONCLUSIONS

This paper analyzed the relationship between social capital, community satisfaction, reconstruction modality and household willingness to take part in community-wide resilience-building activities in regions of the Philippines that were severely impacted by Typhoon Haiyan. Findings revealed social capital and method of reconstruction assistance had statistically significant influence on whether households plan to take action to increase the resilience of their communities. Out of the three reconstruction modalities, households who had been relocated to new communities reported the highest willingness to take part in resilience-building activities. This may be due to the low satisfaction these displaced households reported with their new communities' infrastructure access and quality. Those in donor-built homes that were reconstructed in place of their former homes had the next highest reported resilience action scores, followed lastly by those in the self-recovery condition, who received support through cash or material provisions. This may be because households who received more donor assistance expended far less of their resources in the reconstruction of their homes and thus had increased availability to take part in community-wide infrastructure and planning improvement.

Assisting organizations have the ability to design the type of post-disaster aid they offer, and these decisions can either enable or constrain homeowner willingness and ability to prepare for

future natural hazards. To help these organizations as they make project decisions, there is a need to understand the factors or conditions that influence the willingness of disaster-affected people to take action towards reducing risk to future hazards in their communities. These findings demonstrate the need for organizations working within the construction industry after disasters to consider the impact of social capital, community satisfaction, and reconstruction modality when working with communities to build capacity for safer construction practices, promote the development of disaster risk reduction plans, and otherwise build resilience on the community-level.

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