

Community Resilience and Self-Help Housing After a Natural Disaster: A Case-Study from Southwestern Uruguay

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Abstract

Community resilience approaches aim to understand how communities respond and adapt to changes and disturbances. In this paper, we use a community resilience approach to understand self-help housing in the context of housing reconstruction after a tornado in a small-town in southwestern Uruguay. Methods included semi-structured interviews, participant observation, Geographic Information Systems mapping, and analyses of secondary data. This paper reveals how resources were mobilized to address short term and long-term housing solutions through subsidized and self-help housing after an extreme weather event. Findings suggest that subsidized and self-help housing can represent short term resilience, but these solutions can be undermined by top-down decision-making processes limiting long-term capacity of housing solutions to resist future climatic stresses.

Introduction

Like other rural communities in southwestern Uruguay, Dolores has been affected and transformed by industrial agriculture, informal housing development, and climate change effects such as severe weather events and extended periods of draught and floods, among others. ^[1,2,3,4,5,6,7]

On April 15th, 2016, the small-town Dolores was disrupted by an F3 tornado. ^[8] It was the first time a tornado of this magnitude affected an urban area in Uruguay. The tornado impacted different areas including the center of the town and low-income neighborhoods with both formal and informal housing located closer to the periphery of the town and in proximity to a large industrial agriculture facility. ^[9,10]

A community resilience approach enables us to understand how communities respond and adapt to changes and disturbances ^[11,12,13,14]. In this study, we use a community resilience approach to understand self-help housing in the context of post-disaster housing reconstruction in a town located in southwestern Uruguay. After the tornado, housing relief was delivered in different ways, ranging from short term responses to long term responses, that included self-help housing “on-site” reconstruction, among other solutions. We focus on post-disaster housing reconstruction that was based on self-help construction and took place “on-site”, where the affected residents were impacted by the tornado.

Methods for this paper included purposive snowball sampling to identify key stakeholders and actors, and interviews with a semi-structured questionnaire to understand short-term and long-term impacts and community responses on the aftermath of the 2016 tornado. The original field work and data collection was conducted in June and July 2018, and we used Geographic Information Systems (GIS) to map areas impacted by the tornado and major transformations in the urban fabric. This spatial analysis was cross-referenced with information from *Relevamiento Emergencia Dolores* ^[15] and triangulated with data collected from the interviews and site visits. Additionally, we used secondary data including reports from governmental and non-governmental institutions.

Community Resilience and Adaptation

Community resilience have broad and multiple definitions, but it mainly focuses on the significance and nature of community responses to stresses or disturbances created by anthropogenic and/or natural changes. Collective agency and the mobilization of community resources are critical for effective community responses and adaptations to environmental stresses. ^[16,17,18,19]

When communities experience significant stresses or severe weather events, like the tornado in Dolores, communities can reorganize and collectively mobilize to respond and adapt to environmental stresses or disruptions. ^[20,21,22,23,24,25] In this context, self-help housing initiatives can be an indication of community resilience, ^[26] where residents adapt to disruptive climatic events by mobilizing resources and building and transforming their own homes and actively participating with their labor to reconstruct their built environment.

In the developing world, a great deal of the housing production in both formal and informal sectors is produced through self-help construction. Self-help housing with government assistance has long standing tradition in Uruguay. Since 1968, the “Ley de

Vivienda” (housing law) allows self-help housing cooperatives to receive funding so residents can build their own homes. ^[27] In Dolores, self-help housing initiatives were spontaneous responses of residents to solve their immediate housing needs, but these initiatives were also integrated into the top-down governmental responses to post-disaster on-site housing reconstruction that included subsidies, technical assistance, and material supply.

In summary, by analyzing the self-help initiatives in post-disaster housing relief in Dolores, we explore collective agency to address the housing solutions and the long-term sustainability of the on-site housing reconstruction to resist and adapt to future climate change threats and severe weather events. Although self-help housing can be understood as resilient and empowering strategy that creates sense of ownership and community, this positive outcome can be undermined when fundamental decision-making processes adopt a top-down approach on how community resources are allocated and distributed after a disruptive climate event. Additionally, given the characteristics of self-help housing, with limited resources and use of non-specialized labor in some contexts, these types of housing solutions can compromise long term sustainability and capacity of dwelling structures to resist future climatic stresses.

Housing Resilience: Self-Help

Low-income neighborhoods comprised by both formal and informal housing were severely affected by the tornado (see Figure 1). The affected neighborhoods had access to basic infrastructural services such as drinking water supply system, public sewage system, electricity grid, and public street lighting. However, the informal housing characteristics such as their overcrowded conditions, represented some challenges for the housing solutions. Additionally, housing structures had precarious conditions, lack of safe structural systems and light roofing materials. ^[28,29,30]

After the disruption of the tornado, the municipal government along with a group of

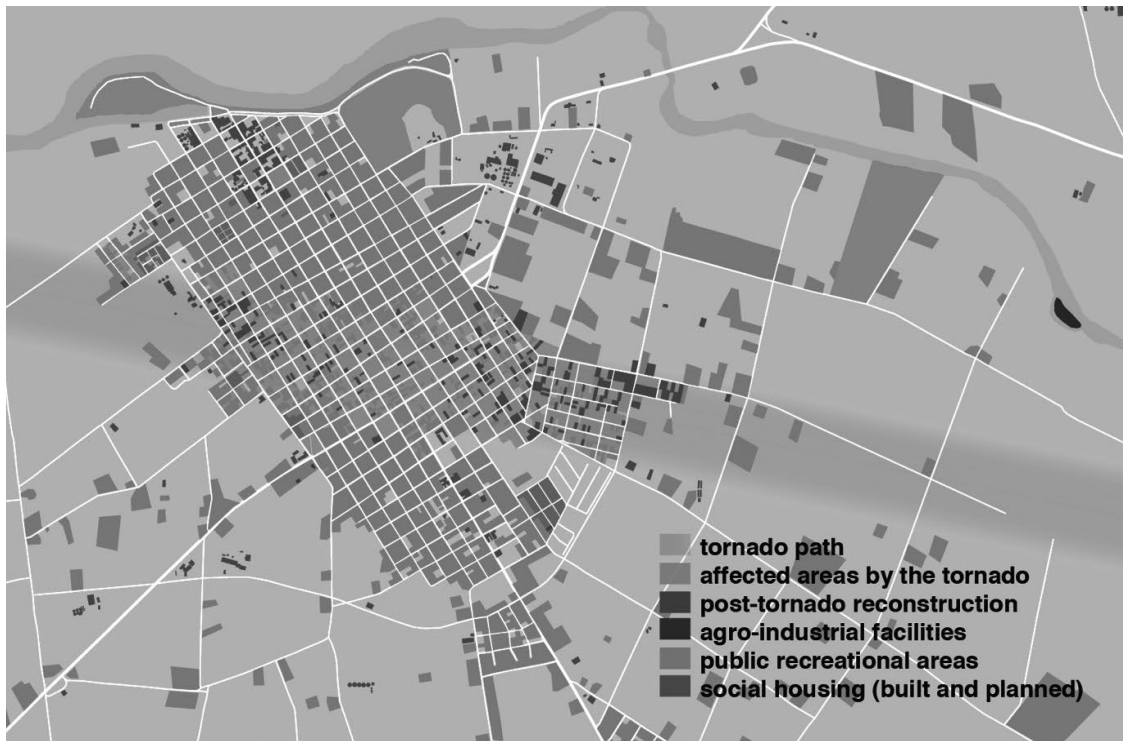


Figure 1. Dolores Post-Tornado Map.

local architects, and other national and local organizations conducted two surveys to assess the damage on housing units and public buildings. These surveys enabled them to identify the affected urban blocks and to measure the housing damage which were used to formulate potential solutions. Surveys classified the affected residential units and parcels into different categories, depending on the level of damage which specifically assessed damages on roofs, load-bearing structure, exterior, and interior walls. ^[31]

To solve local and urgent housing needs, immediate housing relief actions were implemented and improvised based on the surveys' results. Transitional housing was provided in a temporary shelter located in the municipal stadium; and shipping containers emergency homes placed on municipal sites and on the affected sites where residents had land tenure. The top-down nature in the decision-making process of the distribution of resources reduced participation of local residents in the decision-making process of housing reconstruction. ^[32]

Mid-term and long-term post-disaster housing rehabilitation and reconstruction took many forms and several organizations and institutions collaborated in the process. On-site reconstruction was implemented for residents that had land tenure. Depending on the level of damage, in some cases, reconstruction focused on structural stabilization, conducting repairs on walls, windows, and roofs. In many cases rebuilding to the original situation was not an option so different strategies for housing reconstruction were implemented.

Several governmental institutions and organizations were involved in the post-disaster reconstruction. For the affected residents that were land-owners or home-owners, on-site reconstruction was facilitated through donated materials for self-help housing and through the assistance of MEVIR and other governmental institutions. MEVIR is an organization that has had an important social role in rural Uruguay for more than 50 years, facilitating access to housing in rural areas and small towns. MEVIR homes are subsidized housing for which the construction process involves residents' self-



Figure 2. Reconstructed Homes for Residents with Land Tenure.

help and technical assistance provided by this organization.

After the tornado, MEVIR assisted a total of 77 families in this town, stabilizing or partially reconstructing 16 housing units; and fully reconstructing a total of 61 homes^[33] (see Figure 2). The MEVIR homes used a basic evolving core^[34] that consisted of 30 square meters, including a single room with a bathroom and an integrated kitchen. The idea is that families could potentially add more rooms to fulfill their needs.^[35] It is important to highlight that often times families struggle to access to resources to add rooms to their ‘basic evolving core’, and this housing units sometimes exhibit construction challenges that are associated to the use of low-quality materials and some cases lack of quality control.

As we mentioned before, another important response to housing reconstruction was self-help housing with governmental assistance for residents that had land tenure. This was done through the delivery of donated construction materials by different governmental institutions, from the national and local level. This type of assistance was called “canasta de materiales” and consisted on the supply of donated construction materials for self-help housing reconstruction. Affected residents that qualified for this type of assistance had to fill out a request form and an architect assigned specific materials and quantities based on the assessment of the housing damage survey. A total of 1025 housing reconstructions were assisted through this program. The materials

supplied for self-help housing reconstruction included metal roof panels, dimensional lumber, Portland cement, windows, doors, steel rebars, bricks, and pvc pipes, among others.^[36]

Like in many post-disaster reconstruction contexts, decision-making process tended to prioritize the solution of immediate and urgent needs compromising long term building performance and sustainable housing solutions. An employee of a regional governmental institution stated:

“In reality, we were not planning on the long term...it was more: ‘today this happen, tomorrow we need to do this’...we discussed what we will do the following day...”

The use of low-quality construction materials and poor-quality control were consequences of timeline and budget constraints, lack of specialized construction labor, and the use of self-help. These type of housing solutions tended to have low performance on energy efficiency and used light roofing materials, compromising their long-term sustainability and capacity to resist future hazard climatic events.

Long- term sustainability of housing reconstruction was discussed by the community and different stakeholders during the reconstruction process. However, sustainability concerns were not addressed because of limited resources, lack of post-disaster reconstruction protocols, and top-down decision-making process. An elected official stated:

“We discussed how reconstructed housing could resist future disasters... it was a topic of discussion of the reconstruction committee, residents, and local architects... but in developing countries sometimes those solutions are neglected, because most of the housing reconstruction utilized light roofing materials. We wanted to include at least a bathroom with solid materials with reinforced concrete... A lot of people wanted this... but it wasn't considered by the national housing agency, we asked them, but it didn't happen.”

The long-term capacity of housing to resist future climatic stresses represented a challenge for the self-help housing reconstructions using the “canasta de materiales” and MEVIR homes which mostly used light roofing materials and did not include a safe shelter area within the houses.

Despite the shortfalls of self-help housing solutions (i.e. lack of control during the construction, low-quality materials, and non-specialized construction labor) they represented some social benefits for community residents. The spontaneous nature of self-help housing, somehow, challenged top-down urban planning and it offered some advantages over “handed-over” housing solutions. Participants described how self-help housing encouraged community-building, empowered local residents, and created some sense of ownership.

In this case, self-help housing reconstructions illustrated bottom-up community resilience strategies by collectively mobilizing resources to adapt to a disruptive climatic event. Additionally, after the post-disaster housing reconstruction was underway, different murals were painted in some of the areas affected. These art works aimed to create a positive image for the town, showing how housing and art can be used together as community strategies to strengthen resilience and empowerment (see Figure 3).

On the other hand, self-help housing reconstruction implied some distribution of construction materials and institutional assistance characterized by bureaucratic and top-down decision-making processes, which



Figure 3. Mural Painted on a Reconstructed House

also benefited some residents with land tenure and relocated and displaced affected residents without land and homeownership. ^[37]

Conclusions

This case-study illustrates the importance of self-help housing as a community resilience strategy. Self-help housing can be used by community residents to challenge top-down nature of urban planning and it can facilitate community-building, empower local residents, and create sense of ownership. However, these positive outcomes of self-help housing can be undermined by top-down decision-making processes, considering that small communities often depend of outside stakeholders and resources used for adaptation after natural disasters.

Self-help housing regarding construction quality (i.e. lack of control, low-quality materials, and non-specialized construction labor) can compromise the capacity of the dwelling structures to resist future extreme weather events. In the aftermath of the tornado, factors such as limited resources, lack of disaster relief protocols, and top-down decision-making undermined long-term or sustainable housing solutions. This case-study highlights the way communities adapt to a dramatic climatic disruption can compromise the long-term sustainability and capacity of housing to resist and adapt to similar events in the future.

Endnotes

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