
Treball Fi de Màster

*Economic recovery and vulnerable communities' resilience:
insights from two case studies in Mexico*

Rocio García Santamaría



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MASTER THESIS

**ECONOMIC RECOVERY AND
VULNERABLE COMMUNITIES’
RESILIENCE: Insights from Two
Case Studies in Mexico**

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Abstract

Most strategies developed to support recovery in the aftermath of disasters tend to address psychological, social, economic, and infrastructure issues separately. Drawing upon literature, authors agree on three key aspects for disaster recovery: stronger linkages among different aspects of recovery (economic, cultural, and built environment); creation of strategies for effective recovery of local economies from disasters; and application of long-term programs to reduce formal and informal economies vulnerability. This paper, through a thorough analysis of two municipalities in Mexico, after September 2017 earthquakes, aims to explore and discuss the economic and built environment recoveries of vulnerable communities in post-disaster processes. The research interest stands within the relationship between the reactivation of local economies and the rebuilding of urban built environment. For this, the research design is framed around desk review of documents along with interviews that address the current condition of the local economy. Results show how, in both cases, communities are resilient enough to find their own ways into reactivating their cultural and socio-economic activities, through the self-construction of businesses. Even though institutions are collaborating in the reconstruction, this does not necessarily make an impact on economic recovery. This paper contributes to the awareness of the need of a holistic approach based on the communities' necessities.

Key words: Local economy, post – disaster reconstruction, resilience, recovery, small business, built environment, communities, socio-economic activities, housing.

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1. Introduction: Disaster recovery

As defined by the United Nations (UN), a disaster is: a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources (UNISDR, 2017). Over the past several decades, the frequency and magnitude of disasters has significantly increased, with both climate change and population growth aggravating this issue. In this context, it is not only the physical damage to infrastructures that is a cause for concern but also the effect it can have on vulnerable communities.

Herewith, governments, NGOs, and other institutions have focused their actions on disaster recovery by incorporating methods and policies with the sole aim of aiding vulnerable communities the return to pre-disaster states while applying the concept of resilience. Although many of these approaches, both in research and practice, are mainly focused on measures of analysis of the built environment and on community involvement, local economic activity is key to disaster resilience (Handmer & Choong, 2006; Wein & Z. Rose, 2010; R. Webb, Dahlhamer, & Tierney, 2000; Zhang, K. Lindell, & S. Prater, 2008; Lizagarre, Johnson, & Davidson, 2010). Without the income generated by such activity, the capacity to recover under such circumstances is challenging. Therefore, working within a holistic framework is key in addressing recovery measures (E. Chang & Z. Rose, 2012; Liu, Shi, Lu, & Wang, 2017; Sadiqui "Wardak", Coffey, & Trigunarsyah, 2012).

This paper, through a thorough analysis of the current post-disaster context found in Juchitán de Zaragoza and Unión Hidalgo, in Mexico, aims to address the link between both economic and built environment recoveries. For this purpose, it explores how formal and informal local economies have been affected and the challenges the communities endured in reactivating their economies.

The theoretical framework provided below intends to separately cover the three main topics of research on which this paper is based.

- (1) The concept of recovery in post-disaster scenarios.*
- (2) Resilience through involvement and empowerment of communities.*
- (3) Local economic structures in post – disaster recovery.*

2. Theoretical Framework

2.1 The concept of recovery in post-disaster scenarios

According to the United Nations Office for Disaster Risk Reduction (2017), recovery is defined as “the restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and ‘build back better’, to avoid or reduce future disaster risk (AEMI, 2011; UNISDR, 2017). In order to define a successful recovery, it is essential to understand that both communities and individuals have a series of needs that should be addressed within a holistic framework that includes all these components (MacDonald, et al., 2015).

The discussion of what forms the concept of recovery is misguided by specifying for whom or for what we are achieving recovery (J. Alesh & Siembieda, 2012). This may or may not be applied for individuals or communities, or even for urban systems. Theory has come to understand that recovery is relative; there is no fixed point in which it can be absolutely demonstrated to be achieved (J. Alesch & Siembieda, 2012). Consequently, if we had to determine a way of measuring how recovery occurs, it is the process through which a system is capable of becoming a viable entity (J. Alesch & Siembieda, 2012). Hence, the measure of viability is stated by J. Alesh et. al.: as the level of stability within the city functions or its system elements (J. Alesh & Siembieda, 2012, p. 205). A practical example of the case study presented is in the built environment being able to provide basic services on regular basis, more specifically housing, infrastructure, public spaces, transportation, and livelihoods (J. Alesh & Siembieda, 2012; Brown, et al., 2018)¹. With regards to the “economic environment, providing employment or income flows is required as well as infrastructure while in the social environment, ensuring people’s aggregate sense of trust, security, and connection” (J. Alesch & Siembieda, 2012, p. 205).

2.2 Resilience through the involvement and empowerment of communities

“There are potential similarities between recovery and social vulnerability theories, which suggest that vulnerable groups may be more susceptible to losses and have more difficulty recovering” (Brown, et al., 2018, p. 1). Communities have the potential to function effectively and adapt positively in the result of disasters (Liu, Shi, Lu, & Wang, 2017). A well-known topic in disaster literature is that of community involvement. Often, communities go through a series of challenges during long-term recovery periods due to the lack of viable community involvement processes, mostly in reconstruction and economic practices (Sadiqi, Trigunaryah, & Coffey, 2016). This economic resilience depends on both, the capacity of reactivating individual businesses, and the

¹ Further explained in the methodology chapter.

capacities of all entities that depend directly on them (H. Norris, P. Stevens, Pfefferbaum, F. Wyche, & L. Pfefferbaum, 2007). “Land and raw materials, physical capital, accessible housing, health services, schools, and employment opportunities create the essential resource base of a resilient community (H. Norris, P. Stevens, Pfefferbaum, F. Wyche, & L. Pfefferbaum, 2007, p. 136).”

According to Coles and Buckle (2014), an effective recovery can only be achieved when the community is fully involved in processes from decision – making to management and operational activities, while having “the capacity, skills, and knowledge to make their participation meaningful.” (Coles & Buckle, 2014, p. 6) The affected communities have a vital role to play in recovery during post–disaster scenarios (Coles & Buckle, 2014) for it is seen as an essential factor to contribute in the overall empowerment and identity of individuals and communities to achieve resilience on their own (MacDonald, et al., 2015). Local communities have a clear understanding of the risks they face, and therefore act on behalf of their priorities (Coles & Buckle, 2014).

2.3 Local Economic structure – both formal and informal – in post disaster recovery

Much of the research on the economic impacts produced by natural disasters is mainly focused in macro–economic impacts involving both national and regional business losses (Zhang, K. Lindell, & S. Prater, 2008). Although these big–scale studies are essential to know the overall effect of disasters within a nation, this level of generalization has left unnoticed the negative impacts of disasters on specific types of businesses, both formal and informal, within vulnerable communities (Zhang, K. Lindell, & S. Prater, 2008).

(1) *Small Businesses*, which are often more physically vulnerable, depend primarily on local customers, have less access to financial means, and have limitations for disaster awareness.

(2) *Local businesses*, more related to commercial industries and specific service sectors that focus their products on a particular market needs.

(3) *Marginalized informal economies*, who present high levels of economic decay, and often struggle even before the disaster (E. Chang & Z. Rose, 2012; Zhang, K. Lindell, & S. Prater, 2008; J. Alesch, N. Holly, Mittler, & Nagy, 2001).

These businesses are exposed to greater difficulties when achieving economic recovery because of the lack of resources to begin reactivation processes. In order to have a general understanding of the concept, economic recovery can be defined “as the process by which local economies and businesses return to their “natural” conditions of stability before the disaster” (E. Chang & Z. Rose, 2012, p. 172) by overcoming economic impacts. However, theory and practice prove that

recovery is in fact not about a return to a state of stability, but about the “regeneration” needed to achieve a ‘new normal’ (E. Chang & Z. Rose, 2012; MacDonald, et al., 2015).

Business recovery after an earthquake becomes crucial for community recovery. When economic activities’ function is significantly exposed, the expected long-term sustainability of community life can be threatened (MacDonald, et al., 2015). On the other hand, when businesses develop the capacity to recover, they are able to provide employment to sustain livelihoods of individuals, and to restore the identities of the community with their surroundings (MacDonald, et al., 2015). In this context, there are two interests regarding the reactivation of economic activities. “Affected households need income for survival, and local governments and commerce are dependent on local economic activities” (Handmer & Choong, 2006, p. 8): Economic activities in relation to markets (locally based); domestic economies; non-domestic economies, typically focused on field activities² (J. Alesh & Siembieda, 2012). In situations where there is a lack of public welfare, the need to activate local economies becomes crucial. In this context, economy is not only made up by the formal businesses, but includes the informal activities, which are often significant for communities and local livelihoods. (Handmer & Choong, 2006).

Moreover, theory argues that while research has presented insights into economic recovery itself, it is still necessary to combine this knowledge into a more specific applications of disaster recovery (E. Chang & Z. Rose, 2012). As such, the emphasis has been merely on the recovery of the economic structure, rather than considering the relation with the overall essential aspects of recovery in other fields. This framework should contemplate the link between economic recovery and other essential aspects, such as the reconstruction of the built environment and the social recovery (E. Chang & Z. Rose, 2012; I. Marshall & L. Schrank, 2014).

When discussing the holistic framework for achieving recovery, the spatiality in the reconstruction of the built environment and the use of spaces that shape the dynamics of communities in post-disaster scenarios together in relation to the basic services communities need are essential. Given that economic and social activities in pre-disaster states depend on infrastructure of both private and public services or facilities (e.g., electric power, water and gas supply systems, communication networks, rescue center, and transportation system), there is a need for immediate restoration of these to reactivate social, economic and physical conditions after a disaster (Hwang, Park, Lee, & Lee, 2013). Therefore, a broad understanding of the space dynamics that shape the recovery of small businesses after natural disasters is required to fill key gaps around the concept of recovery and resilience of these local economies and communities. With this, the purpose of this paper addresses the interrelation between the post-disaster reconstruction process and its impact on local economies to explore how communities reactivate

² Further explained in the methodology chapter.

economic structures to create resilient communities. Moreover, it also addresses how economic recovery is linked with the recovery of the building environment and how communities make use of both existing and rebuilt spaces to reincorporate economic practices.

In an effort to answer these questions, this paper sets one main objective: to understand how disasters affect the local economy of the most vulnerable communities whose main source of income is through formal or informal businesses, with the purpose of contemplating the challenges these communities endure to reactivate their economic activities in built spaces.

Each of these theoretical positions, and the subsequent analysis, make an important contribution to the understanding of what is the relation between the recovery of the built environment and the long-term formal and informal economic recovery.

3. Methodology

3.1 Research Design

Qualitative and quantitative data collected during three months of field research provide the basis for this paper. The overall research design is shaped around desk review of the elements needed to achieve both economic recovery and the recovery of the built environment. This research also included semi structured interviews and surveys.

Table 1, as mentioned in the theoretical framework, is built from literature review on the recovery of the built environment (Brown, et al., 2018) and the main economic activities of both case studies (Instituto Nacional de Estadística y Geografía, 2000; Instituto Nacional de Geografía y Estadística (2), 2015). The table below demonstrates how the results acquired from the methods described will be structured for further analysis.

Elements of Economic Recovery		Elements of the built environment	Needs to achieve recovery
Income Flows and Employment (J. Alesh & Siembieda, 2012)	<i>Economic activities in the markets</i>	Retail trade (INEGI, 2000; INEGI (2), 2015)	<i>Public Spaces</i> (Brown, et al., 2018)
		Food Preparation (INEGI, 2000; INEGI (2), 2015)	Parks Squares Sidewalks
<i>Domestic Economy</i>	<i>Domestic Economy</i>	Food preparation (INEGI, 2000; INEGI (2), 2015)	<i>Accessibility</i> (Brown, et al., 2018)
		Textile (INEGI, 2000; INEGI (2), 2015)	Road access
<i>Non Domestic Economy</i>	<i>Non Domestic Economy</i>	Construction (INEGI, 2000; INEGI (2), 2015)	<i>Housing</i> (Brown, et al., 2018)
		Agriculture (INEGI, 2000; INEGI (2), 2015)	Shelter Temporary housing Sidewalks
		Fishing (INEGI, 2000; INEGI (2), 2015)	<i>Infrastructure</i> (Brown, et al., 2018)
		Manufacture Industries (INEGI, 2000; INEGI (2), 2015)	Water Electricity <i>Market</i> (Brown, et al., 2018)

Table 1. Elements of Recovery. Relation between economic recovery, and the recovery of the built environment. Source: author

The analysis of the timeframe from emergency to post-emergency response becomes vital to define the context and the role of the government, NGOs, communities and other institutions in each of the stages. Furthermore, the economic background and actual conditions of the region were studied to create an outline of the actual situation during the pre-disaster stage.

3.2 Document Analysis

Document analysis involved the evaluation of papers and studies relevant to post-disaster reconstruction and recovery processes from the two case studies. Examination of post-disaster reconstruction recovery-related documents included: interventions made through the process, including progress reports, governmental reconstruction plans, guidelines, seismic studies and damages produced after the earthquake. Documents were obtained mostly from academic sources, electronic searches related to the topic and first hand from case study participants during the interviews conducted.

3.3 Observation

The approach used in this part of the investigation is descriptive of the current situation around the economic, and the built environment recovery. By having a direct contact with both Juchitán de Zaragoza and Unión Hidalgo, a first discovery of the dynamics of the environment as well as its surroundings were obtained along with an analysis of: what the main activities which take place are, how the environment has been affected after the disaster, and how the urban context has been altered by the different socio-economic activities. With the sole aim of understanding its structure and discovering the relations of the characteristics which define it, information was gathered in form of notes, photographs, and recordings.

To support the data collected from the interviews and to develop visual understanding of site-based research, it was necessary to map the studied locations, and to identify the limits and spatial appropriations to help understand the adaptation methods to the urban context after the disaster.

3.4 Interviews and Surveys

In order to develop a more profound understanding on the topic, the use of the triangulation method of both, the interviews and the documentation provided by the participants, helped to validate the findings established in the first phase of the investigation and build the results of the discussion and conclusion sections.

As a primary source of data, fifteen semi structured interviews were conducted between March 2019 and April 2019 with academic experts from different institutions and individuals of the community. On the other hand, the survey, conducted between April 2019 and May 2019, was directed to different NGOs working on the field. The aim of the interviews and the surveys was

to focus on two aspects essential to understanding the economic and built environment impacts from a local and institutional perspective.

Two interviews were conducted with two academic experts: an Architect from La Universidad Iberoamericana in Mexico City and a Geotechnical engineer. The first interview provided background information on the emergency response practices of both NGOs and government institutions. The second interview helped to understand the impacts produced by the disaster. The interviewees provided documentation on seismic studies regarding the different affected areas and official reports with background information on the disaster. In these interviews, there were no previously prepared questions. This was intentional to allow the conversation to reveal their vision on the current status of the affected cities, the different studies made on the impacts after the disaster, as well as the measures of economic support and reconstruction projects since the event.

The survey conducted to eight NGOs working in the field, was distributed to identify the different economic, reconstruction, health, and other currently administered programs. This was done to obtain an overview of whether these programs include an integration plan between all the aspects needed for recovery, or if each aspect of recovery is being addressed separately. The survey questions (Annex II), mainly address whether these institutions consider the relation between the reconstruction of the environment and the reactivation of local economies – if so, how these institutions are working towards the correct application of a holistic framework. The institutions were selected based on previous research and their intention on participating with the survey.

Name	Program	In collaboration with
Construyendo Comunidades Integrales A.C.	Housing reconstruction	Social programs
Habitat for Humanity Mexico	Housing reconstruction	Reconstruction programs
Techo	Housing reconstruction	Funding programs
Fundación Leon XIII	Local Economy	No collaboration
Pieza Sostenible	Housing reconstruction	Social programs
Casa y Ciudad A.C	Housing reconstruction	Reconstruction programs
Fundacion Merced A.C	Funding	8 NGOs. (reconstruction, local economy, social)

Table 2. Information from the NGOs participating in the surveys. Source: author.

Conversely, the semi structured interviews which consisted of twenty questions conducted with eleven members of the local community, served to get a clear view of the current situation on the ground. This was done to help identify, in their opinion, the main problems to be addressed on the post-disaster reconstruction process and in regards to the local economic structure in terms of the types of damages found. The interviews were conducted asking a set of questions as guidance

(Annex D), but freely developed new ones depending on the direction given by the answers. The informants were selected based on the characteristic of both case studies³, and their intention on participating with the investigation (*Table 3*).

Gender	Heróica Ciudad de Juchitán de Zaragoza	Unión Hidalgo
Male	0%	17%
Female	100%	83%
Age		
20 – 40	17%	40%
41 – 60	33%	20%
61 - 80	50%	40%
Working position		
Merchants	100% market	100% domestic/market

Table 3. Demographics of members of the local community interviewed. Source: author

Each interview was recorded and registered. Resulting reports serve for the recognition of important variables that relate to the main objectives of this paper. All the names of the participants have been changed to protect their identity and are referenced by number.

³ As seen on the table, mostly women under 50 years old were interviewed due to the economic characteristics of the region. This is further explained in the Case Study chapter.

4. Case Study

On September 7, 2017, a severe earthquake with a magnitude of 8,2 degrees in the Richter Scale hit the Pacific coast of Mexico, followed by a second one on September 19 (7,1°) which affected the capital city and several regions around it, ending with a replica on September 23rd (6,1°) (Universidad Nacional Autónoma de México (UNAM), 2019). With an official loss and damage of 171.925 households, the country suffered one of the strongest disasters since 1985, leaving the states of Oaxaca (35% of dwellings) and Chiapas (27% of dwellings) the most affected areas (Secretaría de Desarrollo Agrario y Territorial Urbano (SEDATU), 2017).



Fig. 1. States of Mexico affected by the three Earthquakes. Source: author. Map: Instituto Nacional de Estadística y Geografía (INEGI) Marco Geoestadístico Municipal. Earthquake information: Servicio Sismológico Nacional (UNAM).

The initial response to the disaster involved primarily national stakeholders of private, public and social sectors, whose coordination was structured by the *Plan Mx*⁴, activated by the government (Instituto Nacional para el Federalismo y el Desarrollo Municipal, 2017; Secretaria de Gobernación, 2015). This plan established three objectives to tackle the emergency; provide aid to the most affected areas, evaluate the condition of households, and begin the reconstruction phase as soon as possible⁵ (Oficina del Coordinador Residente en México, 2017).

⁴ Official Plan activated in emergency situations for the “coordination and concentration of the public, private and social sectors in the framework of the National System of Civil Protection, in order to create plans, programs, strategies, mechanisms and resources” (Secretaria de Gobernación, 2015). <https://www.gob.mx/inafed/articulos/gobierno-municipal-sabes-que-es-el-plan-mx> and http://dof.gob.mx/nota_detalle.php?codigo=5415383&fecha=13/11/2015

⁵ Quote extracted from original text in Spanish, translation by the author of this paper.

According to several studies and local non-government organizations, the setup of shelters was highly unsuccessful (OXFAM México (2), 2017; OXFAM México, 2017; México & SNU, 2017). Although they were provided, communities refused to use them because of the inadequate physical conditions or the fear of leaving their belongings, resulting in communities building their own shelters in front of their houses (OXFAM Mexico, 2017).

In Oaxaca, the focused region of this paper, forty-one municipalities were severely affected (Secretaría de Desarrollo Agrario y Territorial Urbano (SEDATU), 2017), and of those affected, two case studies were analyzed: Heroica Ciudad de Juchitán de Zaragoza and Unión Hidalgo (Fig. 2). By 2016, 70,4% of the population in this region lived in poverty conditions (CONEVAL. Consejo Nacional de Evaluación de la Política de Desarrollo Social., 2010 - 2016). The state's main sources of income are agriculture, construction, commercial activities and tourism (Secretaría de Economía, 2015), mostly held in small shops, homes, or what is locally called “Mercado central”.⁶ These spaces were extremely affected during the disaster together with the loss of employment and the increase in prices of basic resources.

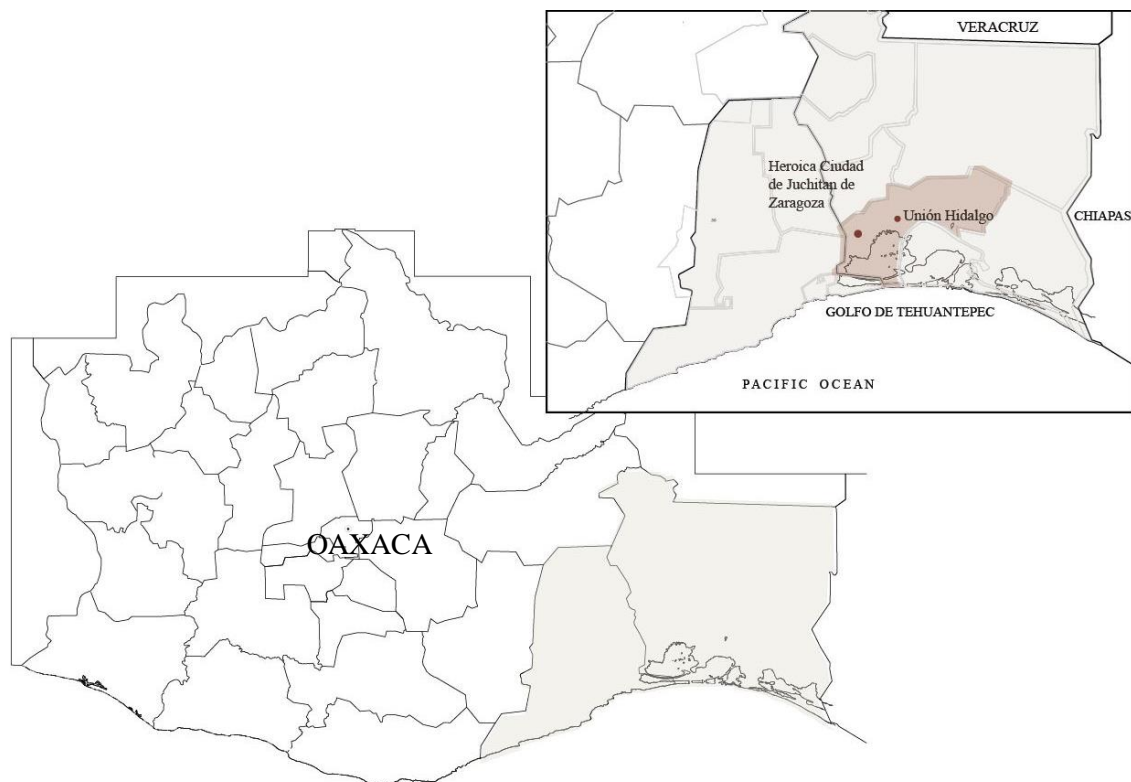


Fig. 2. State of Oaxaca – Istmo de Tehuantepec Region – Heroica Ciudad de Juchitán de Zaragoza and Unión Hidalgo. Source: author. Map⁷

⁶ Central local markets in Mexico are generally located in the central square of the cities or villages, together with important buildings such as the Municipality and the Town Hall.

⁷ File from Bibliocad https://www.bibliocad.com/es/biblioteca/mapa-del-estado-de-oaxaca_49239/.

4.1 Heróica Ciudad de Juchitán de Zaragoza

Juchitán de Zaragoza has a total population of 98.043 inhabitants, the city is registered within medium states of marginalization in the country, considering that in 2015 602% of its population lived in poverty (Secretaría de Desarrollo Social (SEDESOL), 2016). According to SEDATU, Juchitán is the municipality inside the region el Istmo de Tehuantepec⁸, that suffered the most during the earthquake with a total loss of 15.087 households (60%) (Secretaría de Desarrollo Agrario y Territorial Urbano (SEDATU), 2017).

The municipality, as shown in **Table 4**, has a total active population of 46,82%. On the contrary, the 53,05% of the people who belong to the economically non-active population is part of the informal economy (e.g. the small businesses located at the periphery of the markets) (Robles López & Robles López, 2017; Instituto Nacional de Geografía y Estadística (2), 2015).

		Conditions of economic activities				
		Economically active population			Non – active population	Not specified
		<i>Total</i>	<i>Occupied</i>	<i>Unoccupied</i>		
Juchitán de Zaragoza	Total	46,82%	96,09%	3,91%	53,05%	0,13%
	Men	65,72%	95,40%	4,60%	34,13%	0,15%
	Women	29,85%	97,46%	2,54%	70,04%	0,11%
Unión Hidalgo	Total	40,79%	93,87%	6,13%	59,10%	0,11%
	Men	57,90%	92,14%	7,86%	42,00%	0,10%
	Women	25,08%	97,53%	2,47%	74,80%	0,12%

Table 4. Percentage of conditions of economic activities in Juchitán de Zaragoza and Unión Hidalgo. Source: Instituto Nacional de Estadística y Geografía. Encuesta Intercensal 2015.⁹

Juchitán's formal and informal economy is based around commerce and tourism (**Table 5**); these activities are mainly done by women (Instituto para el Federalismo y el Desarrollo Municipal (INAFED), 2006) and, since they are carried out in the central market, they were severely affected by the effects of the disaster.

⁸ El Istmo de Tehuantepec is a region of the state of Oaxaca and Veracruz, Mexico. It is the narrowest area between the Pacific Ocean and Atlantic Ocean. This region includes 41 municipalities.

⁹ Table extracted from original text in Spanish, translation by the author of this paper.

Sector	Percentage	
	Juchitán de Zaragoza	Unión Hidalgo
Primary sector (Agriculture, animal breeding, hunting and fishing).	14%	26%
Secondary sector (Mining, manufacturer industry, construction and electricity).	30%	24%
Tertiary sector (Commerce, tourism and services)	54%	48%
Others	2%	2%

Table 5. Percentage of formal economic occupation according to sector in both municipalities. Source: Instituto para el Federalismo y el Desarrollo Municipal (INAFED), 2006.¹⁰

4.2 Unión Hidalgo

Unión Hidalgo is a small municipality of 15,347 inhabitants, adjacent to Juchitán de Zaragoza (Dirección General de Población de Oaxaca, 2015). Before the disaster, there were 4,115 households (Dirección General de Población de Oaxaca, 2015). Now, it stands within the five most affected areas with a total damage of 2,811 households (Secretaria de Desarrollo Agrario y Territorial Urbano (SEDATU), 2017).

Its economy, just like Juchitán, is based on commerce and tourism (*Table 5*), but in Unión Hidalgo there is a higher percentage of informal domestic economy (Unión Hidalgo A.C, 2005 - 2008). The economically active population represents 40,79% of which 93,87% are working (*Table 4*).

5. Analysis of Results

In order to analyze the undergoing socio-economic impacts taking place in the reconstruction processes, the results are structured succeeding the different elements for recovery explained in the methodology chapter (*Table 1*).

For the economic recovery, the aim is to create, and stabilize the local economy with **income flows and employment** (J. Alesh & Siembieda, 2012). This can be achieved when the main **economic activities** in the region are active: the economic activities in relation to markets, the domestic economies, and the non-domestic economies (Instituto Nacional de Geografía y Estadística (2), 2015). Moreover, in order to recover the **built environment**, there is a need to address factors such as housing, infrastructure, public spaces, transportation, and livelihoods (Brown, et al., 2018).

¹⁰ Table extracted from original text in Spanish, translation by the author of this paper.

5.1 Heróica Ciudad de Juchitán de Zaragoza

After almost two years since the earthquakes took place, it can be observed that the city has been going through a slow process of reconstruction, not only houses and small shops are still waiting to be built, but cultural, governmental, and institutional buildings still are, if not collapsed, presenting important structural damages.

5.1.1 Local economic impacts: recovery through appropriation of space.

Public Spaces

The economic income locations are found in center of the city, specifically in the central market and its surroundings, buildings such as the town hall, the municipality, and public spaces. The area is enclosed with small shops carrying on activities of retail trade, food preparation, and textile. Small businesses were affected through 95% of income loss. This area is not only occupied by residents, but since it is the main point of commerce in the whole area of el Istmo, people from the surrounding areas come to sell their products creating an informal market on the periphery of the former market.

The market building (*Fig. 3*) and the town hall were severely damaged. Two years after the earthquake, the market itself is still under construction, and spaces such as the bottom arcs of the town hall, where merchants used to locate their businesses, are completely disabled. This situation has led to the necessity of small premises and informal businesses (53.05% of unoccupied population) selling food, textiles, baskets, among other products to locate their businesses elsewhere, either in their homes (33%), or all along the roads, sidewalks, parks and squares of the city center (67%) (**Table 6**), causing the temporary alteration of the urban spaces.



Fig. 3. City market’s damages after the disaster in September 2017 vs. City market under reconstruction. Image: Local community member.



Fig. 4. Current state of the City Hall. Image: author

Questions	Answer
1. Was your business affected in some way after the earthquake?	100% of the participants answered yes. All of them completely damaged.
2. How were you able to reactivate your business?	With the support given from the government for housing (50%). With the support of family members (25%). With their savings (25%).
3. How long did it take you to reactivate your business?	Between one and three weeks (67%), between one and three months (17%), one year (16%)
4. How did it affect your income?	Positively (20%). Negatively (80%).

Table 6. Semi structured interviews related to the local socio-economic activities – Juchitán de Zaragoza. Source: author.

Considering that the premises during the pre-disaster stage were located and organized where there was easy access for customer, the fact that all these spaces were gone, became a major problem after the disaster. According to several participants working both in the market (70%) and those working in its surroundings (30%), their priority after the earthquake was to recover as

much of their products as they could to reactivate their business as early as possible, for 83% of the participants had lost their small businesses. Some took longer than others to begin, however most of them had to do it at the earliest possible, for three main reasons: (1) the business is the main source of income (100%) (**Table 6**), (2) public spaces were being occupied by both formal and informal businesses at high speed the first few days after the disaster (**Fig. 5**), and (3) these have been businesses which have been passed on through generations, or which have been kept for many years now (71%).

“People after September 7th began to look for a place to sell. This is our only source of income. When I returned to see how the center was after the earthquake, people were already establishing themselves in the park. We are not all here because there is no space, and that is why people are selling in the streets or at home” (Interview 1).

At first, the products were being sold in the surface of the main square. With time, the limited economic support the government was able to provide for housing, together with family support, or their own savings, merchants have managed to build their small locals made of metal and wood materials covered in cloth (**Table 6**).

Through the performed observation, it was clear that the system of commercial activity in the area after the disaster is undefined. Those who had formal businesses inside the market (67% of the participants) have been forced to temporarily occupy public spaces, passing to a stage of informality, and joining the already existing informal market of the city center (33% of the participants have informal businesses) (**Fig. 5**). In order, to reinforce the previous data, gathered by the interviews, the number of formal merchants inside the market is 892 (Manzo, 2019), of which less than half were able to establish their businesses in the different public spaces mentioned (Manzo, 2019). The difference between who is formal and who is informal is difficult to tell, and is something that does not seem to concern the vendors. For 80% of the participants prioritized the reactivation of their businesses.



Fig. 5. Formal and informal businesses on the city center. Image: author.

The fact that 100% of the formal merchants had to change their business location after the disaster had a direct impact on their income. According to the interviews (to both, formal and informal businesses) 80% of them saw their incomes affected negatively. Only 20% of them were positively affected, due to the new location (**Table 6**).

Comparing the information on the occupation in the city center before and after the disaster, there's a clear evidence of the growth of both formal and informal business settlements in the public spaces surrounding the city center (**Fig. 6**).

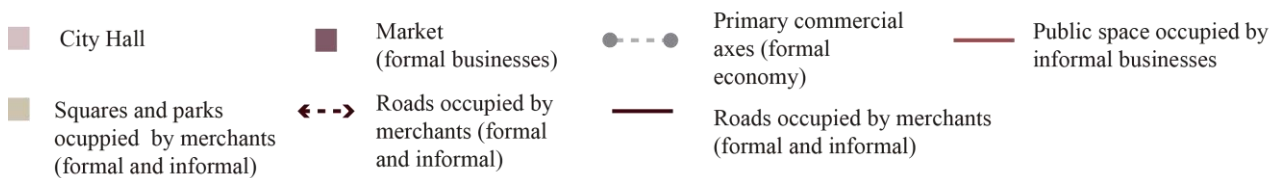


Fig. 6. Public space appropriation to carry out local economic activities in the center of Juchitán de Zaragoza. Source: author. Map¹¹

Before the disaster, the total area occupied by businesses in the city center was 2,1%, in contrast to the 18,7% after the earthquake. The most affected areas were the streets with an increase of 13 percentage points, followed by parks with an increase of 2,4 percentage points. Squares were not used for commercial purposes until after the disaster. (Table 7).

	Percentage of business occupation		
	City Center Total area	Before	After
Roads	95%	1,58%	14,58%
Parks	2,87%	0,49%	2,87%
Squares	1,98%	0%	1,98%
Total	100%	2,07%	18,73%

Table 7. Percentage area of business occupation before and after the disaster. Source: author

Accessibility

As it can be observed in Table 7, the city center is hard to access due to the businesses occupation along the roads, sidewalks and the main square itself (Fig. 7).

The streets' invasion together with the lack of organization in the temporary market represents a high risk of insecurity for merchants, therefore, 67% of the participants have to bring their products from home every day and pick them up at the end of the day.

“Yes, [the earthquake] affected the food transportation. We used to bring the food in a vehicle, now we have to use a tricycle. The streets that were affected by the earthquake are blocked by rubbish. Now it is still hard due to the merchants blocking the roads” (Interview 1)¹².

¹¹ File from Bibliocad https://www.bibliocad.com/es/biblioteca/plano-de-la-ciudad-de-juchitan-oaxaca_55755/

¹² “Sí, me afecto a la hora de transportar la comida. Antes lo traíamos en vehículo. Ahora lo traemos en triciclo. Por las calles que afecto el terremoto no se podía acceder al mercado. Las calles estaban bloqueadas por bloques y arena. Ahora sigue siendo complicado todos los comerciantes han ocupado las calles” (Interviewee 1, translation by author).



Fig. 7. Occupation of businesses in public spaces. Accessibility. Image: author.

As observed in the images, the access to the center of the city has been disturbed by the multiple businesses located in the public spaces. The first image displays how access has been reduced in a way that it is impossible for vehicles to pass through. Vehicles that, according to the participants, are necessary for the arrival of merchandise to the different stands. Likewise, the pedestrian access through the sidewalks has been interrupted due to the proximity of businesses to the buildings, as shown in the second image. Additionally, by completely occupying the central square, the

businesses have altered the original use of the space, moreover organizing the stands in a way that becomes difficult for transit.

The streets' current state not only creates difficulties in transporting the products, but also makes it difficult for clients to access the businesses, which ultimately affects the locals' income as stated by the merchants (**Table 6**).

“I have lost a lot of sales, and therefore incomes. People don't come to buy anymore, because most of us are in the same situation. This space is so full of businesses, people get lost. Clients can't find us anymore” (Interview 4)¹³.

5.1.2 Relation between businesses and housing

Housing

The damage to the market was not the only impact these communities suffered. In this case, 50% of the interviewees' households suffered damages in their households, 20% of them completely collapsed; while others showed, severe damages and families were forced to demolish them (30% of the participants).

Question	Answer
Is your house, in some way, related to your business?	Yes (83%), No (17%)
Have you had to rebuild your home / workplace?	Yes, home (0%) business (50%) both (50%) but prioritized business.

Table 8. Semi structured interviews related to the interrelation between local socio-economic activities and households – Juchitán de Zaragoza. Source: author.

As the 83% of the participants stated, the household's damage affected their economy since the preparation, planning and elaboration of the product takes place at home (66%), or because after the disaster, families, who had no space in the center of the city had to move their businesses to their homes (33%).

“My whole house went down. We haven't been able to rebuild it. With the government's support we received for both our houses, we rebuilt the business. Our main priority was the business. [...] with what we could we started building a temporary hut while we save to build our house” (Interview 3)¹⁴.

¹³ “He perdido muchas ventas y por lo tanto ingresos. La gente no viene a comprar, porque la mayoría estamos todos en la misma situación. Y este espacio al estar tan lleno uno se pierde. Los clientes ya no nos encuentran. (Interviewee 4, translation by author).

¹⁴ “Mi casa entera se derrumbó. No hemos podido reconstruirla. Con el apoyo que recibimos del gobierno para nuestras dos casas, reconstruimos el negocio. Nuestra principal prioridad era el negocio. [...] con lo que pudimos comenzamos a construir una cabaña mientras ahorramos para construir la casa” (Interviewee 3, translation by author).

Out of these 83% of participants whose house is related to their business, the spaces more commonly used are spaces for storage of food, palm leaves, textile (100%), and rooms (40%); covered spaces often used for elaboration of textiles. Following, patios (20%), kitchens (20%), and small premises (20%) built inside property boundaries (*Table 9*).

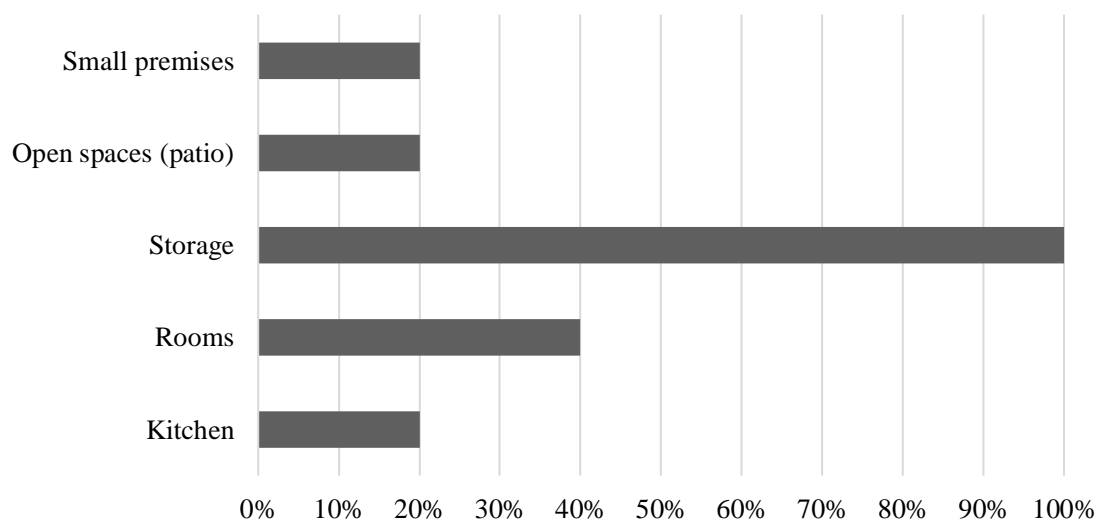


Table 9. Spaces destined for socio-economic activities. Source: author

5.2 Unión Hidalgo

In this municipality, the earthquakes did not affect the public spaces nor the market. This prevented formal businesses to occupy the space. Consequently, accessibility was not affected either. On the contrary, according to the observation, households were severely damaged, affecting local businesses.

5.2.1 Post-reconstruction housing processes: recovery and adaptation

Housing

The economic activities developed in Unión Hidalgo can be classified as **domestic economy**, from house to house and/or in local or nearby markets, since all their products are produced at home (Unión Hidalgo A.C, 2005 - 2008). When asked how the homes of the participants were affected after the earthquakes, 100% answered that the whole house had collapsed.

The presence of different housing typologies in the city was observed. These typologies are based on the built spaces. In 43% of the cases, the typology can be defined as cohousing (43% of the participants) (**Fig. 8**), where families buy a piece of land and divide it, so that each member has its own section to build their house of one or two floors. Free spaces are designed specifically to rest (there are no rooms). As for both the bathroom and the kitchen, they are located in the patios, outside the houses.

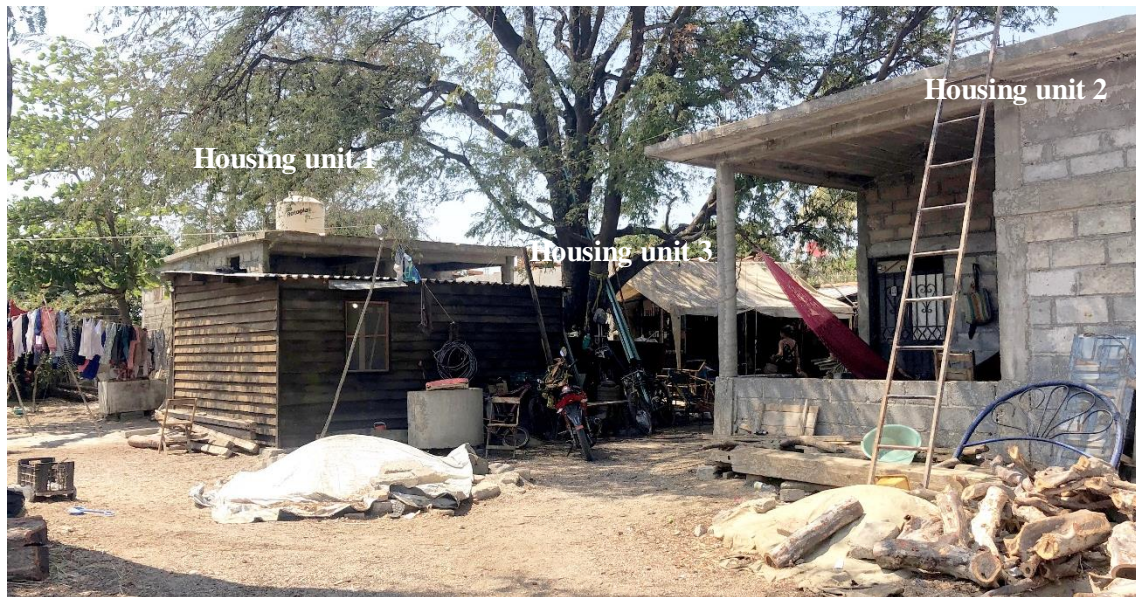


Fig. 8. Housing typology one. Case 1 – Four housing units with common spaces. Image: author.

As observed in the images, the houses surround the common spaces where, in this case the economic activities take place.

In some other cases, as it was observed, housing typologies vary according to number of floors and distribution of the spaces mentioned above. This defined the priorities in the auto reconstruction of the different lost spaces, depending on the case. As seen in **Table 10**, 100% of the participants lost the spaces that were destined for the performance of their socio-economic activities. The 60% of the cases lost their kitchens, while 20% lost covered free spaces, and 20% lost specific rooms. With this said, 60% of the cases coincide in prioritizing these spaces and

using their own means for their auto reconstruction. On the other hand, 100% of the participants had to ask for the support on housing reconstruction NGOs (63%), and governmental aid for the reconstruction of the remaining spaces (33%).

Housing Typology	% of participants	Losses	Spaces needed for socio-economic activities	Auto reconstruction (priorities)	Reconstruction project
1. 2 – 5 housing units and common spaces (Fig. 8)	43%	Case 1. 80% lost. 4 housing units, kitchen, common areas.	Kitchen	Housing units	Kitchen ¹⁵ (Rebuilt before the reconstruction of the houses.)
		Case 2. 50% lost. Kitchen, 1 housing unit.	Kitchen	Kitchen	Housing Unit
2. 1 floor housing unit and patio	31%	Case 1. 100% lost. Kitchen, housing unit, bathroom, common areas.	Kitchen	Kitchen and bathroom	Housing Unit
		Case 2. 80% lost. Housing unit, covered open space for work.	Covered free space (room).		Covered free space, housing unit
3. 2 floors housing unit and patio	26%	Case 1. 20% lost. Specific rooms.	Room and Kitchen		Housing unit

Table 10. Housing typologies in relation to the losses and the spaces for socio-economic activities.
Source: author

The housing reconstruction projects provide a single housing unit with two bedrooms, one bathroom and a kitchen (**Fig. 9**). According to what was observed, 67% of the participants, added this spaces to the already existing housing typology, while the other 33%, had to get use to a new way of organizing the space.

¹⁵ In all the cases observed, kitchens consist of an oven.



Fig. 9. Reconstruction project of one housing unit by Construyendo Comunidades Integrales A.C.
Image: author

5.2.2 The reactivation of local economies: a connection between housing and business

The leading economic activity in the area is that of cooking tortillas with ovens made of clay, located in the kitchens, among others such as the production of textile, and baskets. Even though women go to the central market to sell some of their products (20% of the interviewees sell part-time in the formal market), or informally around the neighborhood houses, generally this activity is homebased (100%). The households being deeply affected by the disaster had a direct impact in the local's economy. According 100% of the participants, there is a direct relation between their households and their business. Having to rebuild both after the disaster (**Table 11**).

Question	Answer
Is your house, in some way, related to your business?	Yes (100%)
Have you had to rebuild your home / workplace?	Yes, Both (100%)
How long did it take you to restart your business?	Haven't been able to reactivate (20%), 6 months to one year (60%), couple of weeks (20%).

Table 11. Semi structured interviews related to the interrelation between local socio-economic activities and households – Unión Hidalgo. Source: author.

In order to reactivate the local business and to help families, one of the main interventions made in this region by the government after the disaster was the donation of ovens so families could start their businesses as soon as possible (50% of the participants whose economic activity was

that of selling tortillas) (**Fig. 10**), for the remaining 50% of the participants selling tortillas, they both had to rebuild the ovens and the structure of the kitchen.

“Once the ovens were donated, we built the rest. We put the structure of the roof, with the reduced amount of income we earned. With that, we bought sheet for the roof and firewood and corn [for the elaboration of the tortillas]. We had to work hard to be able to start the business again while our houses were being built” (Interview 9)¹⁶.



Fig. 10. Domestic Economy. Donated oven for the production of tortillas. Image: author.

The domestic merchants in Unión Hidalgo, had trouble reactivating their business shortly after the disaster, due to the lack of housing reconstruction projects. The 60% of the participants could restart their businesses after six months to one year, 20% did it in a timeframe of a couple of weeks, and 20% are still waiting to have enough resources to restart. For this, some, used part of their plots to reorganize the business (60%), or moved to family members’ houses (20%), while others lived in temporary housing (20%) and had to wait for their own houses to be completed in order to restart and begin selling their products again.

¹⁶ “Una vez nos donaron los hornos, nosotros fuimos construyendo el resto. Le fuimos poniendo la estructura de la cubierta, con lo poco que ganábamos íbamos comprando lámina y leña y el maíz. Poco a poco trabajando un poco para poder levantar el negocio de nuevo. Mientras construían nuestras casas, nos donaron una casa de madera y trabajábamos aquí en la cocina” (Interviewee 9, translation by author).

In addition to the lack of products to sell, 100% of the participants had to increase prices due to the high demand and the rise of the products needed to work, leaving them with less income and harder opportunities to achieve economic recovery.

5.3 The role of Institutions in integrated planning

In extreme events like these, NGOs play an essential role in the reactivation of the different processes taking place after a disaster, both the immediate response, and the long-term needs of the communities. In a post-disaster scenario, the concern is to save lives and attend basic needs, such as food, water, shelter and health, while the long-term program focuses on returning affected people to normality (J.K., L., & D.J., 2009).

It can be observed that institutions have worked, and are currently working on field implementing programs to assist communities on the recovery of their households, socio-economic activities, among others. Based on the data collected through the survey, 75% of the participants are permanently working on housing reconstruction projects that complement social programs that support families in the affected areas. On the other hand, the remaining 25% are focused on economic or educational programs. Nonetheless, 87,5% of the NGOs stated the collaboration with other NGOs in other programs, especially in reconstruction (42,9%) and social (28,6%) programs, as well as in funding programs (14,3%).

When asked for long-term recovery for the families, 100% of NGOs considered important to prioritize housing reconstruction as the first and most important necessity to be covered after a disaster, following the reconstruction of educational facilities and the psychosocial aid to families both with a 62,5% (**Fig. 11**), leaving aside the reconstruction and reactivation of small business, the reconstruction and rehabilitation of public spaces, and basic aid.

What needs do you consider should be prioritized, for the recovery of families affected by the earthquakes of 2017? (Choose 3)

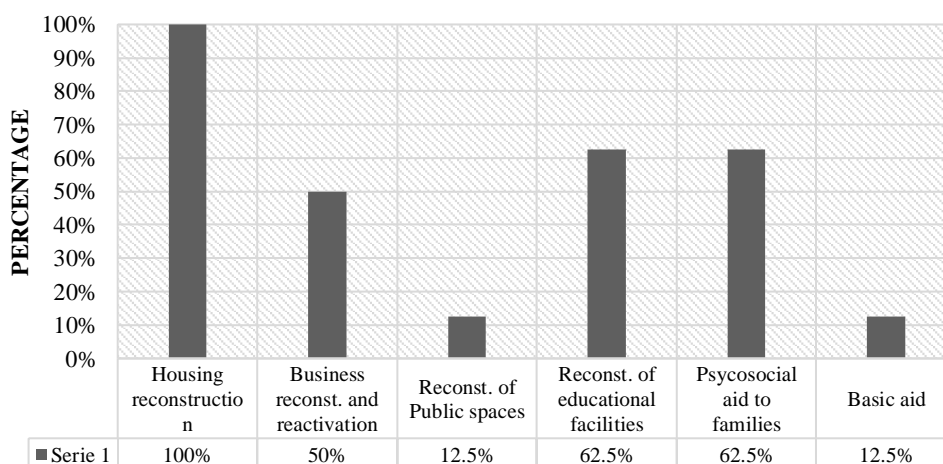


Fig. 11. Prioritized needs for recovery according to Institutions. Source: Survey

When asked if the organizations are doing any additional work to their program to help reactivate the local economy in the area, the results show: 71% of the participants are working towards a program that helps the local economy of the affected areas (**Fig. 12**) by:

- Hiring local workforce,
- Purchase of local materials,
- Lease of real estate to locals, and
- Buying local food and products.

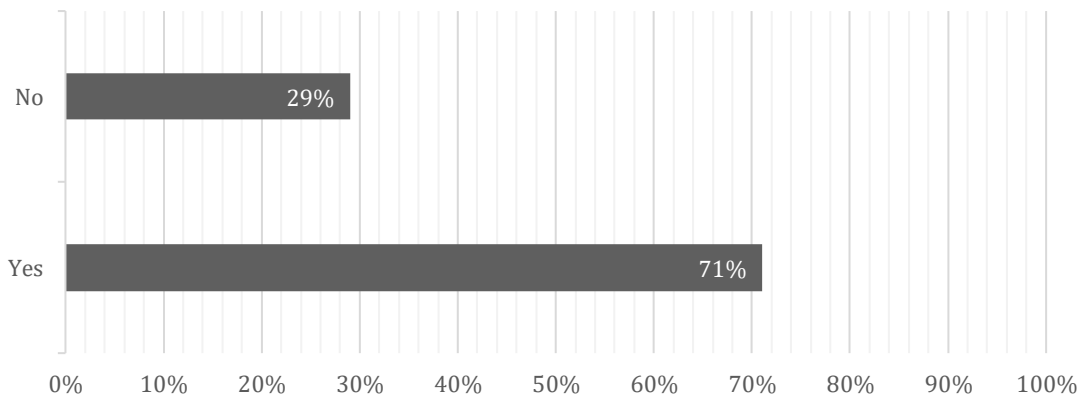


Fig. 12. Additional programs for the reactivation of the economy. Source: Survey

As for additional factors vital for the integral recovery of the affected families, the participants suggested:

- Prevention and resilience activities; psychological support for families
- Strengthen social fabric
- Sanitary Infrastructure
- Social and economic well being

6. Discussion

As was previously stated, both theory and practice show a clear connection between the recovery of the built environment and the recovery of the local economic activities. Regarding this, based on the obtained results, and through the comparison between both case studies, it is possible to establish three main outcomes:

- (1) Vulnerable communities, although slowly, are resilient enough to find their own ways into reactivating their cultural and socio-economic activities, as well as, in some cases rebuilding their own homes.
- (2) The prioritization of necessities established by institutions do not match those of the community.

- (3) The reconstruction of the built environment, although crucial for the recovery of families, is not necessarily the solution for the reactivation of the local economy.

The analyzed cases present two different processes in order to reactivate their economy. To begin with, Juchitán and Unión Hidalgo show important dissimilarities in regards of their socio-economic activities. However, supported by non-domestic economies (such as agriculture and fishing), in the first case economic activities are based on the markets, while in the second one it is on domestic economy. Due to this difference, the needs of recovery of the built environment differ. In Juchitán, the market, where the formal businesses were located, was completely damaged in the aftermath of the disaster, which according to the collected data, forced 100% of the merchants to change the location of their small businesses. Consequently, the formal and informal economies that were easily differentiated before the disaster are now mixed in the improvised market that alters the public spaces occupying 14,58% of the city center. On the other hand, in Unión Hidalgo data shows that 100% of the participants' businesses are homebased and only 38% of them sell part-time in the local market. Thus, even though the earthquakes did not affect the market, local economy was deeply affected due to the damages in the households. In this sense, 60% of the participants have turned to rebuilding on their own (*Fig. 13*).

Therefore, since “resilience is defined as a system’s capacity to absorb disturbance and reorganize into a fully functioning system. It includes not only a system’s capacity to return to the state (or multiple states) that existed before the disturbance, but also to advance the state through learning and adaptation” (Cutter, et al., 2008, p. 599), in both cases the communities’ resilience is clear. They have been forced to resort to their own immediate solutions, exposing the productivity of their business and altering the daily and previous use of these spaces. In the first case by using the public spaces in the city center, while in the second one, by rebuilding their kitchens or business needed spaces.

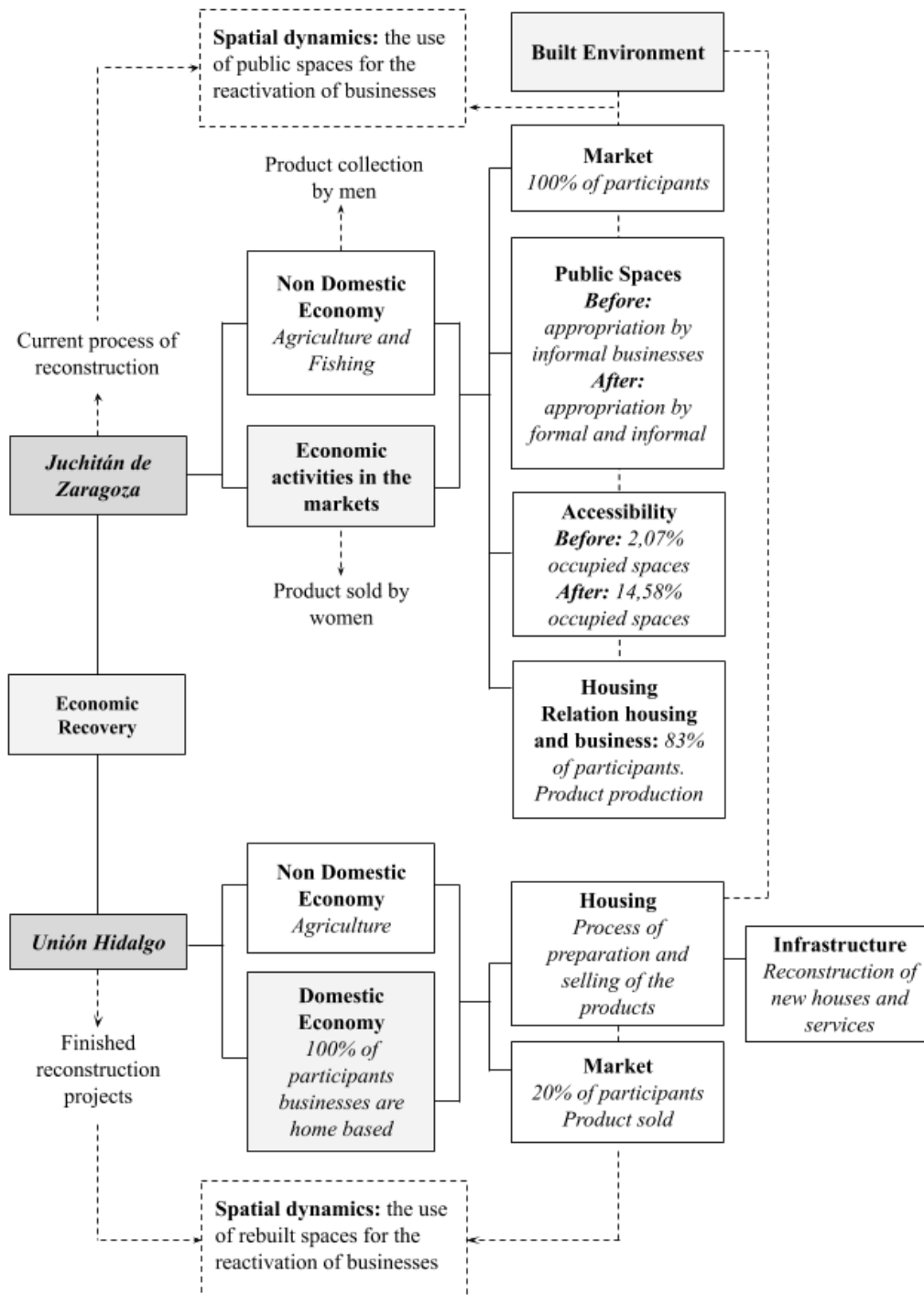


Fig. 13. Case studies' comparison: Analysis of the relation between economic and built environment recovery. Source: author.

Concerning the long-term recovery help provided by institutions, they generally work, as a priority, towards the reconstruction of housing projects (75% of participants). In the case of Unión Hidalgo, this perspective was in accordance to the needs. However, the house units provided by NGOs do not take into account the spatiality nor distribution of the traditional housing typology. These typologies, as could be observed, are inherently related with the economic activity developed in each household. Therefore, even though the house units provided represent an

important help to the locals, it does not affect (positively or negatively) the performance of the economic activities.

In Juchitán, housing reconstruction is not relevant to the business, for 50% of the merchants prioritized their establishments. However, NGOs do not take into account the reconstruction or refurbishment of public space as part of the recovery of the community. It could be considered that, in this case, this need has been overlooked due to the speed at which merchants occupied public places to reactivate their businesses as soon as possible.

As it was established in the theoretical framework, economic recovery after a disaster is the regeneration needed to achieve a ‘new normal’ (E. Chang & Z. Rose, 2012; MacDonald, et al., 2015). According to the results from the case studies analyzed, their immediate long-term priorities revolve around the capacity to reactivate their economic activities to work on achieving recovery (100% of the interviewees). In order to eat and build their homes they need the income received from their sales. To generate this income it is necessary for all the small businesses – both formal (45% between both case studies) and informal (55%)– to function, so the families, who are inevitably in the same situation, are unable to use their own incomes to consume the products from other businesses. Hence, even though they have restarted their businesses, it is still a non-working cycle from which small businesses, and ultimately local economies, struggle to recover from after disaster events. (E. Chang & Z. Rose, 2012; Zhang, K. Lindell, & S. Prater, 2008; J. Alesch, N. Holly, Mittler, & Nagy, 2001).

It is important to note that timing becomes an essential factor for economies to recover in the aftermath of a disaster. It is clear from the results, the owners of small businesses located in the central market in Juchitán, had a faster solution for the reopening of their business (1 to 3 weeks, 67%) since the required structures to establish their new informal stands are not as elaborated as the required reconstruction of households in Unión Hidalgo (6 months to 1 year, 60%).

Additionally, when asked, 71% of NGOs are collaborating in the reactivation of small businesses (by hiring local workforce, purchase of local materials, etc.). Nonetheless, these initiatives help temporarily, in the long-term, this does not help the continuity of the already mentioned cycle.

It is therefore, important to note the limitations of only rebuilding the space where they can perform their socio-economic activities, since this definitely has not helped them get back to have enough earnings to support their families and households. Therefore, until this is achieved these communities cannot come to a complete recovery.

Finally, regardless of all the arguments and findings stated above, the absence of an integral and holistic approach towards all the aspects of recovery is a growing concern. Supported by previous reference, post-disaster reconstruction processes are mainly focused on the built environment

reconstruction, in many cases overlooking socio-cultural-behavioral aspects of long-term recovery.

These case studies serve and give way to unanswered questions for further research in regards to:

- When and how can it be established that local communities have achieved recovery?
- How can a strategy integrate all the elements that comprise recovery based on the communities' needs and priorities?
- There is a need to compare case studies on the local economy of vulnerable communities in post-disaster scenarios in order to create further research, and therefore work in the development of strategies that integrate a holistic framework.

7. Conclusion

The completed research has established a deeper understanding of the importance of local economies for vulnerable communities after disasters by evaluating the different processes followed in two case studies. Following a major disaster, a key element to cope with vulnerability is the adaptation and recovery of local economic activities, both formal and informal, for the support of local livelihoods. With this, the research sought to determine, by exposing the current economic situation of vulnerable communities in both Juchitán de Zaragoza and Unión Hidalgo, that there is a need to prioritize a unified approach of economic, social built environment elements of recovery. Furthermore, the results show the flexibility and adaptation to new conditions and living opportunities of the affected communities, which have found ways to recover their businesses by their own means. Nevertheless, based on the observations and research, it can be noted that that recovery cannot be considered restoration to pre-disaster conditions, for full restoration after a disaster is not possible due to extreme damages.

Finally, it can be concluded that, while there is an approach to facilitate recovery by addressing psychological, social, economic and infrastructure individually, there is a lack of theoretical background and a need for a more comprehensive and holistic framework to conceptualize disaster recovery. Moreover, political, economic, and social factors influenced the obtained results of the studied locations. Therefore, future replicability of the results found in this paper could be further analyzed by applying the quantitative and qualitative methodology stated, and used to facilitate the improvement in strategies based on holistic recovery frameworks and community resilience.

Annex I

Guiding questions for interviews with the local community in both Juchitán de Zaragoza and Unión Hidalgo

1. Profession
2. For how long have you been living in this city?
3. How many people live in your home?
4. Is your house, somehow related to your business?
5. What is the principal economic activity in the area?
6. How was the environment you live in, affected after the earthquakes?
7. How was your house affected after the earthquakes?
8. Does your house have basic services? How were they affected by the disaster?
9. Have you had to rebuild your home/business?
10. What spaces you use/used to develop your business? (public space, house, markets)
11. How were these spaces affected after the disaster?
12. How was the business affected? (sales, production, income)
13. For how long have you worked in this business?
14. In which way have you reactivated your business after the disaster?
15. Where have you resettled the business?
16. Has the access to the business and transportation of products been affected in some way since the earthquakes? (accessibility)
17. How long it took you to re start the business?
18. Were workers affected in some way? How?
19. Did you receive any economic support?
20. Has anybody talked about the resettlement of the businesses affected during the earthquake?

Annex II

Survey questions to Institutions working on the field.

1. Name of the institution
2. For how long have you been working in the affected areas?
3. In what type of projects have you worked on/ are you working in?
 - a) Temporary
 - b) Permanent (currently)
 - c) Of what kind? (Specify)
4. What program is your organization based on, to support families after the 2017 earthquakes in Mexico?

- Reconstruction	- Integral projects
- Re activation of the local economy	- Health
- Psychosocial assistance	- Others
5. Do you work in collaboration with other organizations?

- Yes	- No
-------	------
6. If the answer was yes, with what programs?

- Reconstruction	- Health
- Reactivation of the local economy	- Social
- Funding	- Other (Specify):
7. What needs do you consider should be prioritized, for the recovery of families affected by the earthquakes of 2017? (Choose 3)

- Housing Reconstruction	- Reconstruction of educational facilities
- Business Reconstruction	- Psychological help for families
- Reconstruction of open spaces	- Basic aid
8. What other factors do you think are essential for the integral recovery of these families?
9. Is your NGO doing any additional work to the program, to help activate the local economy in the area?

- Yes	- In what way?
- No	

Annex III

Guidelines for Systematic Observation for Juchitán de Zaragoza

Basic Characteristics of the Population	
Gender	<i>Male/Female</i>
Products sold	<i>Characteristics of the products. Majorities.</i>
Places occupied for economic activities	<i>Parks, squares, sidewalks, streets. (Mapping)</i>
Permanence	<i>Schedules</i>
Occupation Characteristics	
Does these merchants have a specific place to sell?	
How do they interact with their surroundings?	
How do the presence of businesses affect the environment?	
Organization	
Basic Characteristics of the environment	
Accessibility	<i>Roads, sidewalks. How easy is to reach the different places of the city?</i>
Public Spaces	<i>Occupied vs. Free spaces.</i>

Guidelines for Systematic Observation for Unión Hidalgo

Basic Characteristics of the Population	
Gender	<i>Male/Female</i> <i>How this relates to the economic activities taking place?</i>
Products sold	<i>Characteristics of the products. Majority</i>
Permanence	<i>Schedules</i>
Basic Characteristics of the environment	
How and where economic activities take place?	<i>Housing, roads, sidewalks, parks, squares</i>
How the surroundings relate to the different economic activities?	<i>Center of the city, housing, roads.</i>
Occupation Characteristics	
Housing distribution	<i>How are the spaces distributed? What spaces are destined for the different activities?</i>
Activities	<i>What are the activities carried out at home?</i>
Business Characteristics	
Have they been able to restart their businesses?	
What are the main points of economic activities?	
What spaces are destined for economic activities?	

References

- AEMI. (2011). Australian emergency management handbook series: Community recovery, handbook 2. In Australian Emergency Management Institute. Australian Institute for Disaster Resilience. Retrieved from <https://knowledge.aidr.org.au/media/5634/community-recovery-handbook.pdf>
- Brown, D., Saito, K., Spence, R., Chenvidyakarn, T., Adams, B., Mcmillan, A., & Platt, S. (2018). Indicators for Measuring, Monitoring and Evaluating Post-Disaster Recovery. Retrieved from https://s3.amazonaws.com/academia.edu.documents/25855732/4.3_-_brown.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1551721532&Signature=kT%2ByOwfBkesHE7m0tj5oO2lqaAA%3D&response-content-disposition=inline%3B%20filename%3DIndicators_for_measuring_monitor
- Coles, & Buckle. (2014). Developing community resilience as a foundation for effective disaster recovery. *The Australian Journal of Emergency Management*, 19(4).
- CONEVAL. Consejo Nacional de Evaluación de la Política de Desarrollo Social. . (2010 - 2016). *Porcentaje, número de personas y carencias promedio por indicador de pobreza*. Retrieved from https://www.coneval.org.mx/coordinacion/entidades/Oaxaca/PublishingImages/Oaxaca_cuadro1.JPG
- Cutter, S., Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, 598-606. Retrieved from http://people.oregonstate.edu/~hammerr/SVI/Cutter_etal_GEC_2008.pdf
- Dirección General de Población de Oaxaca. (2015). *Libro Demográfico. Unión Hidalgo*.
- E. Chang, S., & Z. Rose, A. (2012). *Towards a Theory of Economic Recovery from Disasters*. Published Articles & Papers. Retrieved from http://research.create.usc.edu/published_papers/203
- Gómez Mena, C. (2017, November 15). Daños por sismo en 70% de las casas de Unión Hidalgo. *La Jornada*, p. 38.
- H. Norris, F., P. Stevens, S., Pfefferbaum, B., F. Wyche, K., & L. Pfefferbaum, R. (2007). Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness.
- Handmer, & Choong. (2006). Disaster resilience through local economic activities in Phuket. *The Australian Journal of Emergency Management*, 21(4).
- Hwang, S., Park, M., Lee, H.-S., & Lee, S. (2013). *An Analysis of Post-disaster Resources Supply and Work Environment for Restoration Planning of Facilities*.
- I. Marshall, M., & L. Schrank, H. (2014). Small business disaster recovery: a research framework.
- Instituto Nacional de Estadística y Geografía. (2000). *INEGI*. Retrieved from Censos Económicos.

- Instituto Nacional de Geografía y Estadística (2). (2015). *INEGI*. Retrieved from Censos Económicos.
- Instituto Nacional para el Federalismo y el Desarrollo Municipal. (2017). *gob.mx*. Retrieved from ¿Gobierno Municipal sabes qué es el Plan MX?: <https://www.gob.mx/inafed/articulos/gobierno-municipal-sabes-que-es-el-plan-mx>
- Instituto para el Federalismo y el Desarrollo Municipal (INAFED). (2006). *Enciclopedia de los Municipios de México. Estado de Oaxaca. Juchitán de Zaragoza*. Oaxaca.
- J. Alesch, D., & Siembieda, W. (2012). The Role of the Built Environment in the Recovery of Cities. *International Journal of Mass Emergencies and Disasters*, 32(2), 197 - 211.
- J. Alesch, D., N. Holly, J., Mittler, E., & Nagy, R. (2001). *Organizations at Risk: What Happens When Small Businesses and Not-for-Profits Encounter Natural Disasters*.
- J. Alesch, D., & Siembieda, W. (2012). (2) The Role of the Built Environment in the Reconstruction of Cities and Communities from Extreme Events. *International Journal of Mass Emergencies and Disasters*, 32(2).
- J.K., V., L., O., & D.J., C. (2009, July). Developing NGO Competencies in Post-disaster Reconstruction: A Theoretical Framework. *Disaster Advances*, 2(3), 36-43.
- Liu, J., Shi, Z., Lu, D., & Wang, Y. (2017). Measuring and Characterizing Community Recovery to Earthquake: the Case of 2008 Wenchuan Earthquake, China. *Natural Hazards and Earth System Sciences*.
- Lizagarre, G., Johnson, C., & Davidson, C. (2010). *Rebuilding after Disasters: From Emergency to Sustainability*. Spon Press.
- MacDonald, C., Davies, B., Johnston, D., Paton, D., Malinen, S., Naswall, K., . . . Stevenson, J. (2015). A framework for exploring the role of business in community recovery following disasters. *GNS Science Report*, 22.
- Manzo, D. (2019, Enero). Reabrirán en 2 meses mercado de Juchitán, devastado por terremoto. *La Jornada*, p. 24.
- Martínez-Laguna, N., Sánchez-Salazar, M. T., & Casado Izquiero, J. M. (2002). Istmo de Tehuantepec: un espacio geoestratégico bajo la influencia de intereses nacionales y extranjeros. Éxitos y fracasos en la aplicación de políticas de desarrollo industrial (1820 - 2000). *Investigaciones Geográficas, Boletín del Instituto de Geografía, UNAM*, 118-135.
- México, O. d., & SNU. (2017). *México: Sismo 8.2 grados Richter. Reporte de Situación No. 01*. México.
- Oficina del Coordinador Residente en México. (2017). *México: Sismo 8.2 grados Richter Reporte de Situación No. 01 de la Oficina del Coordinador Residente*.
- OXFAM México (2). (2017). *Diagnosis and Recommendations from Oxfam Mexico Facing Earthquake*. Retrieved from <https://www.oxfam.mx/sites/default/files/Diagnosis%20and%20Recommendations%20from%20Oxfam%20Me%CC%81xico%20Facing%20the%20Earthquake%20%20Emergency.pdf>

- OXFAM México. (2017). *Inadequate and Insufficient Response of the three Government Levels when faced with the disaster caused in Oaxaca by the Earthquake*.
- R. Webb, G., Dahlhamer, J., & Tierney, K. (2000). Businesses and Disasters: Empirical Patterns and Unanswered Questions. *Natural Hazards Review*.
- Robles López, M., & Robles López, M. (2017). *The Istmeña woman in the economic, political and social context in the Istmo of Tehuantepec, México*.
- S. Gabriel, F. (2018). The Role and Contribution of Home Economics to National Development. *The UP Journal of Home Economics*, 25, 21-34.
- S. Gabriel, F. (n.d.). The Role and Contribution of Home Economics to National Development. *The UP Journal of Home Economics*, 25, 21-34.
- Sadiqi, Z., Trigunaryah, B., & Coffey, V. (2016). Community participation in post-disaster reconstruction. *ICE Publishing*. Retrieved from https://www.researchgate.net/publication/281829404_Community_participation_in_post-disaster_reconstruction
- Sadiqi "Wardak", Z., Coffey, V., & Trigunaryah, B. (2012). Rebuilding Housing after a Disaster: Factors for Failure. *Proceeding of 8th Annual International Conference of the International Institute for Infrastructure, Renewal and Reconstruction (IIIR)*, (pp. 292-300). Kumamoto, Japan.
- Secretaría de Desarrollo Agrario y Territorial Urbano (SEDATU). (2017). *Censo de Viviendas Dañadas por los Sismos del Mes de Septiembre de 2017*. Retrieved from <http://transparencia.sedatu.gob.mx/#>
- Secretaría de Desarrollo Social (SEDESOL). (2016). *Informe anual sobre la situación de pobreza y rezago social*.
- Secretaría de Economía. (2015). *Informe 2015*. Mexico. Retrieved from https://www.gob.mx/cms/uploads/attachment/file/67840/Informe_Oaxaca_2015.pdf
- Secretaría de Gobernación. (2015, November 12). *ACUERDO POR EL QUE SE EMITE EL PLAN NACIONAL DE RESPUESTA MX DE LA ADMINISTRACIÓN*. Retrieved from http://dof.gob.mx/nota_detalle.php?codigo=5415383&fecha=13/11/2015
- Unión Hidalgo A.C. (2005 - 2008). *Unión Hidalgo, Oaxaca*. Retrieved from http://www.unionhidalgo.org/index_2.html
- UNISDR. (2017, February). *United Nations Office for Disaster Risk Reduction*. Retrieved from <https://www.unisdr.org/we/inform/terminology>
- Universidad Nacional Autónoma de México (UNAM). (2019). *Servicio Sismológico Nacional (SSN)*. Retrieved from <http://www.ssn.unam.mx/sismicidad/ultimos/>
- Wein, A., & Z. Rose, A. (2010). *Economic Resilience Lessons from the ShakeOut Earthquake Scenario*. Non-published Research Report. Retrieved from http://research.create.usc.edu/nonpublished_reports/86

Zhang, Y., K. Lindell, M., & S. Prater, C. (2008). *Vulnerabilty of community businesses to environmental disasters*. Retrieved from <https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1467-7717.2008.01061.x>