CULTURAL ASSETS FOR DISASTER RECOVERY:

A study of community involvement at the Isthmus of Tehuantepec after the 2017 earthquakes.

Betzabe Valdés López

Para toda la gente de
Iztepec, Ixtaltepec, El Espinal, Juchitán y Xadani

Pasa La Voz | *Bicheeche Diidxa'*

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INTRODUCTION

Juchitán de Zaragoza, Oaxaca, 2018

As natural disasters become increasingly frequent in the face of changing climates, so does the claim that they represent valuable opportunities to incorporate innovative urban development models. Nonetheless, this idea is continuously overshadowed by the sheer urgency to restore the pre-existing built environment (along with its problems) when catastrophes strike. Said urgency makes it difficult to consider the different characteristics of the affected sites, including the varying risk perceptions of the local residents and their views as to whether such events are routine or exceptional. To the extent that these views of what can and should be addressed in the context of disaster are mediated by local culture as much as by more abstract technical assessments, they will impact the nature and objectives of post-disaster recovery.

Perceptions of risk will affect the degree to which residents will initiate their own responses instead of accommodating more generalized recovery measures frequently associated with top-down managerial approaches to disaster. Equally important, risk perceptions may redirect citizens' energies towards a preparation for epiphenomenal disasters instead of reinforcing a concern with the enduring, quotidian conditions that can turn a "manageable" disaster into a full-blown crisis. At stake are questions concerning who defines the main rebuilding or recovery priorities in the context of disaster, and whether locals or outsiders are in the best position to manage such post-disaster recovery efforts, given their various understandings of risk.

The post-disaster recovery scene at the southern coastal region of the Isthmus of Tehuantepec in Oaxaca, Mexico is a valuable case study for this problem. I will use it to argue that government imposed, top-down definitions of disaster rebuilding priorities in the aftermath of the 2017 earthquakes both built upon and reinforced a narrow definition of risk among local residents, thus directing attention away from the more fundamental social, ecological, and economic vulnerabilities of the region. Interest in the area also stems from its unusual, unique, and strong cultural traditions, which are often understood, and perhaps even stereotyped, as functioning networks of solidarity. Nonetheless, such traits are not regarded as an asset for contextualized risk management, disaster response, and overall development strategies.

I suggest that local risk perceptions help explain why citizens have been unable to mobilize around or proactively address the deeper-seeded social and economic problems that were revealed by the earthquake and that continue in its aftermath. Taking this interpretation as a point of departure, I argue that the conventional "restore the pre-existing built environment" paradigm associated with disaster recovery schemes does nothing to address the problems associated with local risk perception, which stand in the way of proactively dealing with recurrent and pre-existing vulnerabilities, disaster-related and otherwise. Moreover, I propose and review ways in which the increased sensibility towards risk, brought by the earthquakes, may be used to re-frame pre-existing capacities to address other pressing and chronic problems in the region.

This thesis accounts for part of a collective research project spearheaded by three master's degree students specializing in the fields of critical conservation, risk and resilience, urban design, and landscape architecture at the Graduate School of Design. The arguments are based on quantitative and qualitative data pertaining to the origins, nature, and impacts of risk perception, gathered between November of 2017 and January of 2019 in five municipalities along the Las Nutrias River: Ciudad Ixtepec, Asuncion Ixtaltepec, El Espinal, Juchitan de Zaragoza, and Santa Maria Xadani. The results bring together interviews across all sectors and scales, a cross-sectional survey, a series of cognitive mapping workshops, and a spatial data and photographic compendium.

In what follows, I will tell the story of an ill-prepared disaster-prone region that still struggles to recover, in part, because authorities lacked an understanding of the central role of culture, geography, and local risk perception. Likewise, residents' contextually-embedded attitudes towards risk focused their attention away from the region's well-ingrained vulnerabilities, hindering their capacity to move forward constructively in the face of disaster. Chapter 1 explains the literature review, the geographic context, and the research methodology. Chapter 2 investigates the post-disaster effects of earthquakes on the natural, social, and built environment of the area of study. Chapter 3 extends the discussion to other recurrent vulnerabilities of the context, which were magnified by the earthquake. Chapter 4 explains the cultural assets I believe could be reframed to strengthen recovery and overall development. Finally, Chapter 5 concludes with recommendations for how to build on existent risk perceptions so as to lay the groundwork for resilient and proactive efforts to secure a more stable future while also preparing for the next disaster.

RISK, CULTURE, AND THE ISTHMUS OF TEHUANTEPEC

Juchitán de Zaragoza, Oaxaca, 2018

In ontological research, incorporating cultural traits in risk management is critical but not new. Several authors have made compelling cases for the importance of understanding how these areas interact, but fewer studies have focused on contributing with measurable outcomes to support the claim. Moreover, contemporary research on environmental risk tends to focus on technical specificities related to urban resilience and climate adaptation, often overlooking the role of culture in community engagement. This thesis intends to provide data that begins to fill said gap and to propose actionable goals regarding long-term disaster recovery and urban adaptation, building on pre-existing anthropological studies. I will use this section to situate this study within the existing understanding of the relationship between risk and culture. I will then show how other existing sources, particularly those related to the dynamics of top-down approaches in disaster response vis-à-vis local governance, may contribute to find viable means to materialize the larger concept. Next, I will introduce the geographic and cultural context of the area of study: the Zapotec towns and cities along the Las Nutrias River at the Isthmus of Tehuantepec in Oaxaca, Mexico. Finally, I will explain the methodology.

Risk perception stems from social constructs and geographical characteristics, varying between communities and throughout different time periods.[1] Pressing threats in one part of the world may be regarded as quotidian environmental changes in another, resulting in diverse levels of community engagement when dealing with prevention and response. In 2011, for example, a moderate but rare 5.8 earthquake caused New York City residents to flood the streets in distress, while a similar movement in 2014 did not disrupt daily activities in (seismically-active) Mexico City.[2] Likewise, environmental threats that were once considered manageable or routine, such as floods, may result in full-blown crisis today because of several factors brought by modernity, such as urban expansion, industrialization, deficient infrastructure, and population growth.

[1] Jasanoff, Sheila. *Science and Public Reason*. The Earthscan Science in Society Series. Abingdon, Oxon; New York: Routledge, 2012.

[2] Seelye, Katharine Q. "Above All Else, Eastern Quake Rattles Nerves." *The New York Times*, August 23, 2011, sec. U.S. https://www.nytimes.com/2011/08/24/us/24quake.html.

As a multidimensional concept, risk perception is also shaped by the interaction between traditions, modernity, individual experiences, and systems of values.[3] Moreover, it has direct bearing on the mobilization dynamics of societies who intend to drift away from uncertainty and into more secure futures.[4] Yet, as an ever-changing concept, it does not alter norms immediately. In other words, facing imminent or chronic danger does not always materialize into immediate action, perhaps because learning often happens *ex post facto*. Hazards evolve alongside modernization, but that does not necessarily mean that individuals know how or why they do so and cannot envision the potential risk these hazards pose.

Plastic, for example, came with global industrialization and quickly made its way into our daily lives, but recycling culture came only after facing the effects of its improper handling. In developing nations particularly, disposing of garbage along streets or natural areas is a deeply-rooted behavior, but in the past, it did not cause the problems that it does today. In the absence of plastic, food packaging, for example, was made out of natural fibers, which presented no threat when discarding into nature. As disposable plastic came in with modernization, wrapping materials changed but the disposal behavior persisted. This led to seemingly unforeseen problems such as sewage clogging, floods, or public health crises. Yet, drawing these kind of connections is not a straightforward process, particularly in socio-economically and geographically segregated societies.

"Traditional cultures," that British sociologist Anthony Giddens refers to, do not have the same notion of environmental risk as post-industrial civilizations[5]. In these societies, behavior often stems from preconceptions of fate, luck, or theology, and many of those ideas impact how communities act when managing risk. The challenge is in understanding that traditions do not necessarily have a negative impact on risk management, even when they seemingly clash with expert opinions or perpetuate "unacceptable" behavioral preferences. For Giddens, "tradition is perhaps the most basic concept of

[3] The Royal Society. "Risk: Analysis, Perception and Management." Report of a Royal Society Study Group. London: The Royal Society, 1992.

[4] Giddens, Anthony. *Runaway World: How Globalization Is Reshaping Our Lives*. 2nd ed. New York: Routledge, 2003.

[5] Ibid.

conservatism, since conservatives believe that it contains stored-up wisdom."[6] However, he also argues there is no *pure tradition*. All traditions evolve over time, and have been transformed at some point; they are invented and reinvented. Taking this further, American Historian David Hackett Fischer states that, "decision making of some areas is dominated by the culture of their ancestors, and it is defined by their customs and traditions.[7] For example, it could reflect on law and education changes. In the case of Oaxaca, we could argue that risk management decisions were made through flawed risk perception, influenced heavily by both contemporary and ancestral local culture.

It is here that British anthropologist Mary Douglas argues that "cognitive scientific and other techno-scientific approaches" to studying risk fail to incorporate cultural theory, a tool capable of acknowledging and interpreting the assets embedded in collective attitudes and behaviors to develop productive notions of risk.[8,9] She criticizes the individualistic ways in which the concept is currently framed, arguing that contemporary practices are superficial and do not address the morally complex and overly politicized idea of risk. Douglas also worries about the exclusion of certain kinds of risk, particularly those that fall outside the "politically-valuable" spectrum. She argues that the real threat in risk management is not that people fail to understand the consequences of their actions of preferences, but that the clientelistic nature embedded in addressing certain dangers is unavoidable and results in an unproductive prioritization.[10] In fact, she states that "a community uses its shared, accumulated experience to determine which foreseeable losses are most probable, which probable losses will be most harmful, and which harms may be preventable. A community also sets up the actors' model of the world and its scale of values by which different consequences are reckoned grave or trivial".[11]

6 Ibid.

7 Fischer, David Hackett. "Introduction." In *Albion's Seed: Four British Folkways in America*, 3–11. New York: Oxford University Press, 1989.

8 Douglas, Mary. *Risk Acceptability According to the Social Sciences*. Social Research Perspectives ; 11. New York: Russell Sage Foundation, 1985.

9 Lupton, Deborah. *Risk. Key Ideas*. London ; New York: Routledge, 1999.

10 Douglas, Mary. *Risk and Blame: Essays in Cultural Theory*. London ; New York: Routledge, 1992.

11 Douglas, Mary. *Risk Acceptability According to the Social Sciences*. Social Research Perspectives ; 11. New York: Russell Sage Foundation, 1985.

For her, risk is so intertwined with political accountability that its study should push for a nuanced understanding beyond culture and into power dynamics.

All these issues and characteristics of risk, its perception, and its management manifest clearly in the study of the long-term impact of recurring natural disasters, in which the strong bond between lifestyles, preconceptions, and behavior is understudied in relationship to the built environment. This is worrisome in the face of changing climates and rapidly-expanding small and mid-sized cities with strong cultural traits. In agreement with Douglas, politicization is particularly relevant in this area of study, as it often results in disaster recovery plans that fail to grasp how different urban and social systems when dealing with recurring threats, disaster related or otherwise. This is better expressed by urban designers Stephen Gray and Mary Anne Ocampo, who argue that "theoretically, urban resilience relates to any one system as much as it does to the dynamic interplay of multiple systems; but in practice, overly simplistic interpretations have tended to focus more on protecting city-wide physical, cultural, or economic infrastructures against the threats and impact of natural hazards than on sector-specific human considerations."[12]

To support this claim, Carol Silva, political scientist and co-Director of the National Institute for Risk and Resilience, states that "people aren't necessarily good at managing one kind of risk just because they are good at managing another kind of risk... People will be deathly afraid of one kind of risk and blasé about another."[13] Likewise, urban sociologist Diane Davis argues that "a city is more than its buildings, and thus resilience must be understood as more than physical reconstruction," so recovering from a specific disaster or responding to a narrowly-framed category of hazards does not constitute resilience and neither does doing so through compartmentalized action.[14] Different authors

12 Gray, Stephen F., and Mary Anne Ocampo. "Resilient Imaginaries: Socio-Ecological Urban Design in Metro Manila." *Landscape Architecture Frontiers* 6, no. 4 (2018): 98.

13 Silva, Carol. Interview by Lewis, Michael. *The Fifth Risk*. First edition. New York: WWNorton & Company, 2018.

14 Davis, Diane. "Reverberations: Mexico City's 1985 Earthquake and the Transformation of the Capital". In *The Resilient City: How Modern Cities Recover from Disaster.*, edited by Vale, Lawrence, and T Campanella, 255-280. Oxford ; New York: Oxford University Press, 2005.

have identified how existing top-down disaster response schemes tend to overlook the importance of integrating decentralized actions and are, therefore, quickly dismissed during emergencies.[15] As geographers Muh Marfai, Andung Sekaranom, and Philip Ward argue, inadequate infrastructure and poor maintenance, paired with a lack of communication between institutions and local actors involved in solving problems, causes higher vulnerability levels.[16]

This suggests that governments should address long-term recovery strategies alongside local actors, as neither of them functions properly without the other. As top-down schemes fail to incentivize community engagement and often disregard local culture, bottom-up efforts are futile without economic resources and lack a territorial scale beyond the level of the municipality. Among other things, this requires improvement of the links between stakeholders and across scales, particularly at the local level, and as previously suggested, this should be done through a comprehensive lens that integrates culture and risk perception. In other words, disaster governance should not only create efficient guidelines but also follow-up with on an integrated vision of vulnerability through capacity building for residents, local governments, and other institutions to develop efficient recovery and prevention models.[17]

[15] Daly, P, Ninglekhu, S, Hollenbach, P, Duyne Barenstein, J and Nguyen, D. "Situating Local Stakeholders within National Disaster Governance Structures: Rebuilding Urban Neighbourhoods Following the 2015 Nepal Earthquake." *Environment & Urbanization* 29, no. 2 (2017): 403–24.

[16] Marfai, M, Sekaranom, A and Ward, A. "Community Responses and Adaptation Strategies Toward Flood Hazard in Jakarta, Indonesia." *Natural Hazards* 75, no. 2 (2015): 1127–44.

[17] Daly, P, Ninglekhu, S, Hollenbach, P, Duyne Barenstein, J and Nguyen, D. "Situating Local Stakeholders within National Disaster Governance Structures: Rebuilding Urban Neighbourhoods Following the 2015 Nepal Earthquake." *Environment & Urbanization* 29, no. 2 (2017): 403–24.

Moreover, history shows that the tendency is (and generally will be) to remain in place, despite solid arguments for relocation based on recurrent social and environmental vulnerabilities.[18,19] This mindset also pushes for a more nuanced understanding of risk-prone cities, including their geographic particularities, cultural characteristics, economic conditions, and governance structures. According to the United Nations Development Programme, for example, women, boys, and girls are 14 times more likely to die during disasters than men, mainly because of pre-existing conditions of inequality that exacerbate imbalanced access to resources and services.[20] This shows that disasters do not affect everyone in the same way, and suggests that new interventions need to put forward ways of working with the most affected groups within already vulnerable populations to allow for bottom-up action.

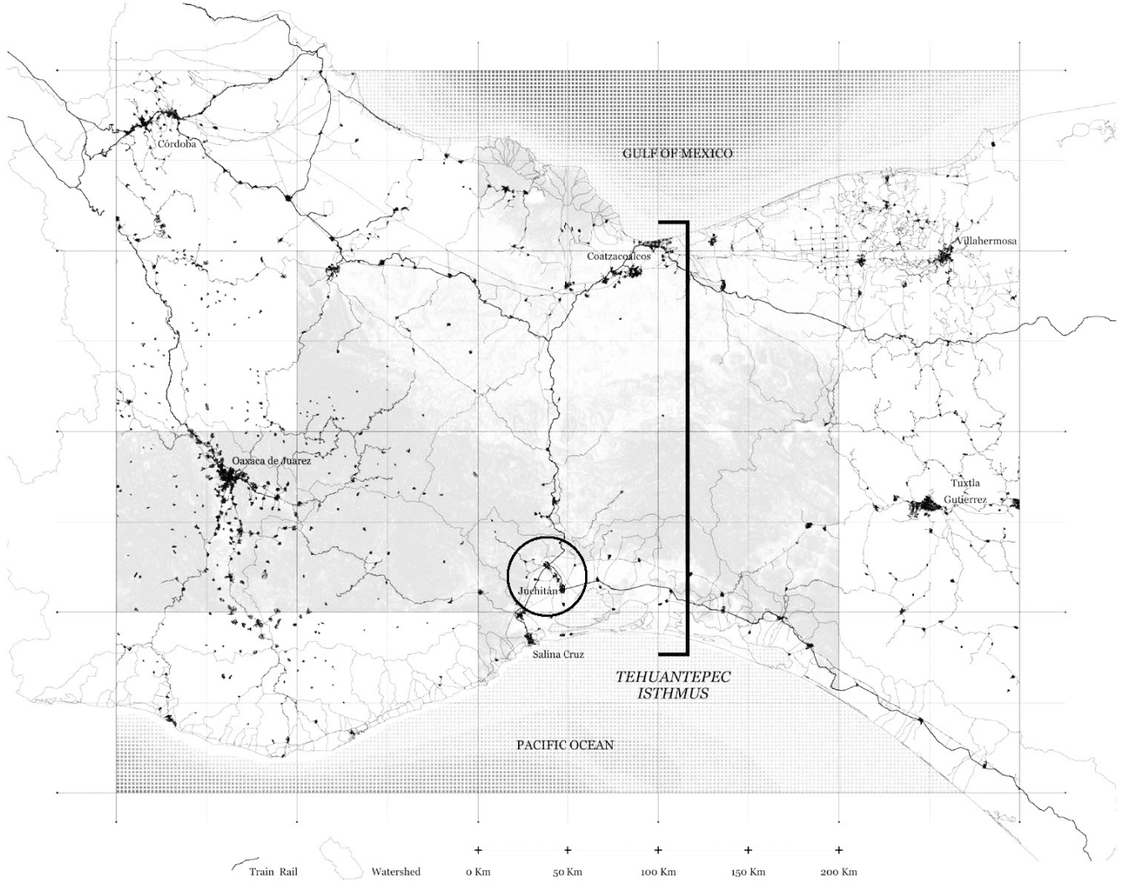
ZAPOTEC SOCIETIES AT THE ISTHMUS OF TEHUANTEPEC

It is at the intersection of all these concepts that I believe the post-earthquake scene at the Isthmus of Tehuantepec in Oaxaca, Mexico to be a valuable case study. Apart from going through a ravaging earthquake series in 2017 (to which response is still underway), the region is appealing due to its geographically contested position and strong cultural traits as a contemporary Zapotec society. For reference, the state of Oaxaca is in the southeast of Mexico, relatively close to the border with Guatemala. Its easternmost region is part of the Isthmus of Tehuantepec, a stretch of approximately 220 kilometers that connects the Pacific Ocean and the Gulf of Mexico and includes parts of the states of Veracruz, Tabasco, and Chiapas *(see map 1)*.

[18] Vale, Lawrence, and T Campanella. *The Resilient City: How Modern Cities Recover from Disaster.* Oxford ; New York: Oxford University Press, 2005.

[19] Elkin, Rosetta, and Jesse Keenan. "Retreat or Rebuild: Exploring Geographic Retreat in Humanitarian Practices in Climate Change Impacts and Adaptation Strategies to Coastal Communities," Vol. Ch 10. Birkhauser: W. Leal, 2018.

[20] Habtezion, Senay. "Gender and Disaster Risk Reduction." Gender and Climate Change - Asia and the Pacific. United Nations Development Programme, 2013.



Map 1. The Isthmus of Tehuantepec is the narrowest region in Mexico. Before the Panama Canal opened in 1914, it worked as a commercial corridor that connected the United States to South America. Map by Nadyeli Quiroz Radaelli, 2018.

Oaxaca is the second most impoverished state in Mexico, with 70.4% of the population living in poverty.[21] It has 570 municipalities spread throughout its territory, the majority of which are small cities and rural areas that account for almost a fifth of Mexico's total of 2,457 municipalities.[22] Most communities are separated by mountain ranges and connected through deficient roads, which caused a significant cultural variation. The state has 14 original languages and numerous variations within them, spoken by over a third of its residents.[23, 24] As stated by Gonzalo Villalobos, one of the interviewees of this study, "Oaxaca is like eight different *Oaxacas*. People from the valleys are not the same as people from the coast, the isthmus, or the hills. We are very different, but few outsiders understand those nuances. What we do have in common is that we are very complicated, in all regions. Even having no problems is a problem. People would be like, "why are there no problems?" And then it would become a problem."[25]

Throughout history, the Isthmus of Tehuantepec has been the center of attention due to its productive geographic characteristics and potential use as a connection between the United States and South America. At the beginning of the 21st century, for example, this area served as the main commercial corridor through a robust railroad network, which led to rapid industrialization and increased foreign investment that ceased with the opening of the Panama Canal. The region also handles petroleum, and it has a partially-working refinery in the southernmost port of Salina Cruz, Oaxaca. In addition, the narrowest part of the isthmus does not exceed 1,000 feet in altitude, acting as a long canyon with

[21] CONEVAL. "Informe de Medición de Pobreza." Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL), 2017.

[22] INEGI. "Encuesta Intercensal 2015." National Institute of Geography and Statistics, 2015.

[23] INEGI. "Oaxaca. Hablantes de Lengua Indígena. Perfil Sociodemográfico." Instituto Nacional de Estadística, Geografía e Informática, n.d.

[24] Castillo, Isabel. "¿Qué Lenguas Indígenas Hay en Oaxaca?" *Lifeder* (blog), August 10, 2017. https://www.lifeder.com/lenguas-indigenas-oaxaca/.

[25] Villalobos, Gonzalo (Agrarian Prosecutor's Office, Federal Delegate), interviewed by the lead project researchers, Oaxaca, August 20, 2018.

strong wind gusts that reach up to 124 miles per hour (200 km/hr).[26] This last condition resulted on an additional wave of foreign investment, but this time from eolic companies that manage the largest wind-energy producing area in Latin America and often clash with indigenous communities.[27]

Moreover, the southern coast of the isthmus is an earthquake and flood prone region. It lies in close proximity to the junction of the North American, Cocos, and Caribbean tectonic plates and within the plain of the Pacific Ocean, an area categorized as seismic zone D by the Federal Electricity Commission (CFE). Zone D has a soil that can exceed 70% of the acceleration of gravity, and it has a high number of epicenters registered by the National Seismological Service (SSN) network. This number is much greater with respect to zones A, B and C. For reference, Mexico City is in Zone B, and it is already regarded internationally as a place subject to grave seismic-related damage *(see map 2)*. Oaxaca has a high number of earthquakes annually, and zone D is the seismic zone with the most epicenters every year. Over the course of five years (2011-2016), it endured around 1,498 earthquakes with intensities over 4.0 M_w. During the same time period, Mexico City had no significant seismic activity[28] To be clear, seismic activity at the Isthmus of Tehuantepec can easily result in grave economic and livelihood loss, and it will continue to happen in the foreseeable future.

For the purpose of this study, I will focus on five Zapotec communities in the southernmost area of the Isthmus of Tehuantepec: Ciudad Ixtepec, Asuncion Ixtaltepec, El Espinal, Juchitan de Zaragoza, and Santa Maria Xadani. In total, these municipalities have 159,155 inhabitants, and they are all joined by the Las Nutrias River.[29] This region suffers from periodic inundations caused by hurricanes and intense rainfall, ranging from 0.20 to 2.70 meters.[30] Most of this damage concentrates in Juchitan de

[26] García, Miguel. "Vientos en Oaxaca alcazarían 200 kph y tiran tráileres." Oaxaca, January 29, 2018. http://oaxaca.eluniversal.com.mx/municipios/29-01-2018/vientos-en-oaxaca-alcazarian-200-kph-y-tiran-traileres.

[27] Delgado, A. K. "Las luchas del viento en el istmo de Tehuantepec." *El País*. July 18, 2016, sec. Planeta Futuro. https://elpais.com/elpais/2016/07/15/planeta_futuro/1468592019_398642.html.

[28] Servicio Sismológico Nacional. "SSN - Catálogo de Sismos | UNAM, México." http://www2.ssn.unam.mx:8080/catalogo/.

[29] INEGI. "Encuesta Intercensal 2015." National Institute of Geography and Statistics, 2015.

[30] SEDESOL. "Atlas de Riesgos Naturales Del Municipio de Heroica Ciudad de Juchitán de Zaragoza." Oaxaca: Gobierno Federal SEDESOL, January 31, 2012.

Map 2. The Isthmus of Tehuantepec in relation to the rest of Mexico and the nearby tectonic plaates. The are is part of the most seismically -active region in Mexico, Zone D. Map by Deni Lopez and Betzabe Valdes, 2018.

Zaragoza and Santa María Xadani, the two settlements at the southernmost river basin. The towns were also the most affected after the 2017 earthquakes *(see map 3)*. Given their geographic proximity and everyday level of interaction, the five municipalities along the river will soon be declared a metropolitan area, which implies that decisions taken by one of them have repercussions on the rest.[31]

The five communities are very different from each other, but they share Zapotec traits and may be regarded as indigenous cities. As such, their cultural characteristics differ significantly from the rest of Mexico. Contemporary Zapotec identity in these towns stems from modernity as much as it does from tradition. They are known, for example, to be a matriarchal society (although some locals would argue they are more of an egalitarian one). This trait was developed in the late nineteenth century with the construction of the Tehuantepec railway, which resulted in a thriving labor market and increased migration rates. It is important to note that both Ciudad Ixtepec and Juchitan de Zaragoza, the areas biggest cities, are part of the Tehuantepec railway system. According to Mexican anthropologist Leticia Reina (2015), Zapotec women played a central economic and social role when local men were substituted by foreigners during this time, and this situation caused women to become the "heads of households" and carriers of social capital and prestigious culture.[32] Family structure at the time consisted mostly of widowed or single women with an average of four children. This led to the integration of women into the economic life of the cities, but only as an extension of their domestic duties.

In many aspects, the way in which Zapotec communities live today is a product of redefined identity that came with post-industrialization and development. The economic independence and insertion in the social scene that this increased activity gave to women, allowed them to assimilate foreign men in their society and made them receptive towards the adoption of elements from foreign cultures. Nowadays, Zapotec women have a central role in the financial resource management of each family, which places them in equal standings in terms of decision-making as their male counterparts. This quote from Tomás Chiñas Santiago, another local interviewee, expresses the concept eloquently:

[31] Vocería, Comunicación Social y. "Impulsa Sinfra Campaña 'Oaxaca Resiliente' y Busca La Creación de Cuatro Zonas Metropolitanas." http://www.comunicacionsocial.oaxaca.gob.mx.

[32] Reina, Leticia. "Las Mujeres Zapotecas del Istmo de Tehuantepec – México en el siglo XIX." *Nuevo Mundo, Mundos Nuevos.*, December 1, 2015. http://journals.openedition.org.ezp-prod1.hul.harvard.edu/nuevomundo/68503.

> Women are excellent administrators. Traditionally, men gave women the profits for management. No one could make isolated decisions, because those always happened as couple.[33]

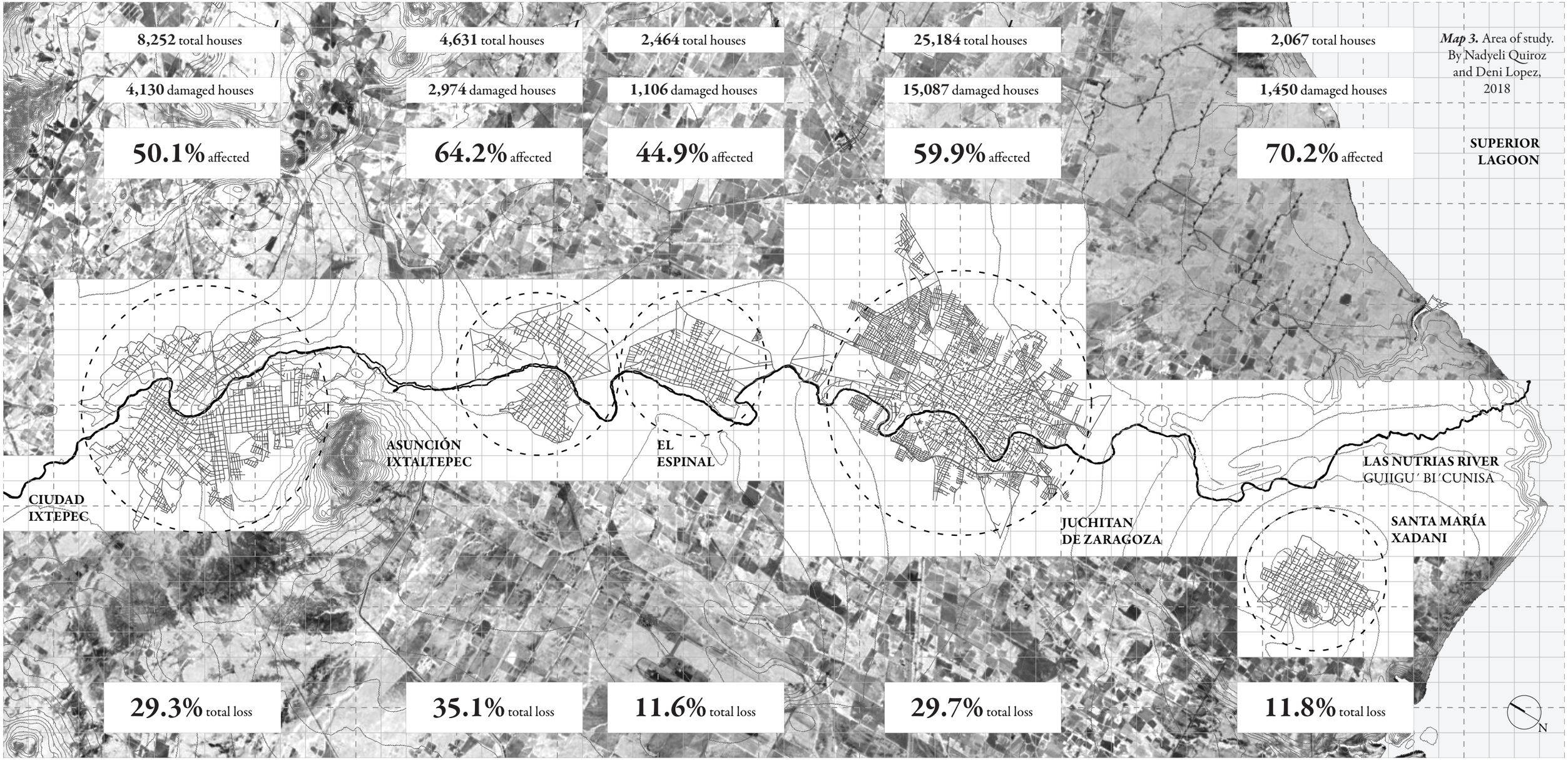
Another important trait of Zapotec communities is their social structure, which is mainly based on solidarity and reciprocity. According to Juan José Rendon Monzon, an anthropologist that spent several years working in Oaxaca with indigenous communities, these societies work through a complex organizational system.[34] Through a series of workshops and conversations with intellectuals in the region, he identified the main economic, political, and productive traits of the region, and his analysis resulted in what is known today as the *Flor Comunal*, or Communal Flower *(see Figure 1)*.

Rendon Monzon argues that all communities differ in setting secondary principles like traditional education, language, and cosmovision, but they all share a few traits regarding communality. For him, communality in this region is not a finished entity, but rather an ever-changing way of living that will experience gains and losses as culture evolves. Therefore, the Communal Flower depicts the main aspects of daily life in indigenous communities as an ensemble of knowledge, institutions, and activities that result in communal life. It represents the four main principles of the lifestyle of indigenous towns, which revolve around corn, their core. These principles are:

Communal Territory. This refers to the physical space that communities inhabit. However, the understanding of territory can range from natural resources to the built environment; it accounts for all the resources that belong to them. It is through this possession that they can demand respect, autonomy, and recognition of their self-determination or identity. In the history of indigenous towns, there has been discrimination and a consistent problem with property rights, as some societies have been excluded from top-down decision-making processes related to their land (such as megaproject implementation).

[33] Chiñas, Tomás, interviewed by the lead project researchers, Oaxaca, May 25, 2018.

[34] Rendón Monzón, Juan José. "La Flor Comunal. Explicaciones para interpretar su contenido y comprender la importancia de la vida comunal de los pueblos indios." vdocuments.mx. 2011. https://vdocuments.mx/la-flor-comunal-565dc2d59ea72.html.



Map 3. Area of study. By Nadyeli Quiroz and Deni Lopez, 2018

Figure 1. La Flor Comunal. Juan José Rendón Monzón, 2011.

Communal Political Power. If one of the members of the community holds a political position, they are obliged to serve at the will and favor of their fellow community members. To establish priorities, be accountable, and execute communal will, these societies hold frequent assemblies. If the leader fails to fulfill the wishes of the community, he or she risks losing respect or rights, becoming an outcast.

Communal Work. There are two different classifications of communal work. The first one is to satisfy the personal and family needs; the second one is between Zapotecs, either through *tequio* or other means of solidarity. *Tequio* is a reciprocal chain of voluntary work, based on the idea that citizens should support their village and their community. It is defined as "collective work that is organized around projects of the formal municipal authority" and is based upon civic duty. However, this principle was significantly altered by increased migration. Many migrants who were out of the community for more than three years, would send money to cover their part in the *tequio* or pay for a replacement. Therefore, the communal work also became an employer-employee relationship. This altered quotidian relationships significantly, and, at the same time, it helped reinforce and objectify economic and social divisions within communities. Another problem with *tequio* is the complexity of the tasks to accomplish. Given that it mainly is communal work, not everyone has the necessary skills to fulfill their role. This reinforces the need to rely on employees, particularly those with training in specific areas. Moreover, this change resulted in altered labor schedules, leaving some inhabitants without the possibility of participating in communal activities.

Communal Party. One of the main characteristics of these communities are their parties, which render a cult either to saints or natural deities. Parties are always organized and enjoyed in a communal way. In the specific case of the Isthmus of Tehuantepec, the main celebrations are known as *velas*, which I will explain in more detail further along this document.

In the upcoming chapters, I will explain how the previously-described notions of risk perception and management manifested in the post-earthquake scene at the Isthmus of Tehuantepec. I will describe the effects that the earthquake had both on the physical and social fabric, identify other vulnerabilities to be addressed in the area, expand the discussion on the assets embedded in Zapotec culture, and move forward to set recommendations for further recovery action.

METHODOLOGY

This thesis accounts for one part of the results of a larger research project regarding post-earthquake recovery and rubble management in the corridor of Ciudad Ixtepec, Asunción Ixtaltepec, El Espinal, Juchitán de Zaragoza, and Santa Maria Xadani, the main municipalities along the Las Nutrias River in Oaxaca. Said project consisted on working with two other master's degree students at the Graduate School of Design (GSD), who specialize in the fields of risk and resilience, urban design, and landscape architecture. As a team, Dení López (*MDes Risk and Resilience/MAUD 2019*), Nadyeli Quiroz Radaelli (*MLA I AP /MDes ULE 2020*), and I (*MDes Critical Conservation 2019*) gathered data on the ground from May to August of 2018 and subsequently worked together with several professors within Harvard University and the Massachusetts Institute of Technology to process the results of the study. We used a mixed methodology approach to build on the strengths of each specialty and create a base information compendium that would result in diverse projects and thesis.

The project officially began between November of 2017 and April of 2018, when we conducted initial archival and historical research and designed the study to be implemented over the summer. For the design of the project, we partnered with social studies and public health experts both in Mexico and the United States. There were four main categories for our on-the-ground methodology: a community-needs survey, a series of cognitive mapping workshops, multi-sectoral interviews, and the creation of a robust photographic record and spatial data compendium. Upon returning to the United States, we processed data between August of and December of 2018, once more with the help of several professors. During January of 2019, we went back to the site to conduct a traveling exhibition to showcase the results in each of the five municipalities and to expand our photographic record.

Before arriving to Oaxaca, we developed the community needs survey and created an initial list of potential interviewees, which grew substantially through snowball sampling. These interviews were the key for us to establish partnerships on the ground, which were eventually the core of our implementation process. One of the first people we interviewed was Tomás Chiñas Santiago, the President of the Las Nutrias River Basin Committee, and he became our key informant and partner throughout the summer and winter. Our landlords, Vicente Marcial Cerqueda and Lilia Cruz Altamirano, a couple of rural sociologists and long-term residents of Juchitan de Zaragoza, were also essential to the development of the project, as they helped us be well-received in the community. In Ciudad Ixtepec, we were also lucky to meet Guiexhooba De Gyves, a long-term resident and community leader who adopted the project as her own and helped us develop workshops with community members.

Another key element in the success of this project was deciding to create an organization for accountability and trust-building. Mexico underwent federal elections on July of 2018, and with the earthquake having passed only a few months behind, distrust in foreigners was the first barrier to overcome. This is how we became *Pasa la Voz* (*Bicheeche Diidxa'* in Zapotec or *Spread the Word,* in English), a group devoted to creating a publicly-accessible information compendium regarding the reconstruction process that no one else was working on at the time. To legitimize *Pasa la Voz*, we made uniforms and badges and created an online social media profile and a website to make all of our results publicly available.

We decided to begin our project by working with Mr. Chiñas Santiago on documenting the problems with the river during the first month. This helped us develop trust throughout the towns, as we visited most of them on a daily basis alongside locals. Being students also helped us be well-received, particularly because all of us graduated from the National Autonomous University of Mexico, one of the most well-regarded and neutral institutions in the country. By the end of the first month, we had gained enough confidence to start the survey and workshops, which lasted until the end of our stay. It is important to note that, for the survey, we hired local college students that had previously worked with doctoral students from foreign universities. We decided to work with locals because we noticed that people felt more comfortable with them, and because, in some cases, it was better to conduct the assessment in Zapotec. Initially, the group of surveyors asked us to avoid conducting the study digitally upon arrival to Juchitan de Zaragoza (the fourth surveyed town), where the threat of losing their mobile devices due to rising urban violence rates was overwhelming. We agreed and created a paper version of the questionnaire, but soon realized that the students were fabricating the results and answering each other's surveys to avoid having to work in undesirable areas in Juchitan de Zaragoza. after this finding, we decided to start over with the help from a local religious group of young adults who was willing to complete the study.

In short, the research components were the following

Multi-Sectoral Interviews. To get a broader understanding of the current and historical situation, we met with several key actors within and outside the local community. These included 5 federal officials, 5 state government officials, 8 municipal officials, 7 academics, 2 private sector workers, 13 non-profit representatives, and 11 local residents, for a total of 51 interviews selected through snowball sampling. All the interviews were conducted by us in Spanish, and they ranged from 30 minutes to 3 hours. The interviews were semi-structured and we addressed three areas: the immediate response to the earthquakes of 2017, the state of recovery and rubble management until the point of the interview, and the role or potential role of each interviewee in post-earthquake action in Oaxaca. To process the results, we coded the interviewees manually.

Cognitive Mapping Workshops. The objective of these workshops was to explore qualitatively the value that the inhabitants of the region give to their urban and natural environment. We worked with groups of 8-10 children in the five municipalities, 3-8 women in Juchitan de Zaragoza and Asuncion Ixtaltepec, and 4-10 mixed-gendered adult groups in Ciudad Ixtepec, El Espinal, and Santa María Xadani to create visual representations that helped us identify the primary needs, concerns, and changes related to the earthquakes of September 2017. The workshops studied three areas: seasonal floods, perception and interaction with the Las Nutrias River, and changes in public spaces after the earthquakes. Each session also served as a forum for environmental discussion and education that encouraged citizen participation concerning the reconstruction process. We developed and processed the workshops with help from Susan Snyder and George Thomas, the heads of the MDes Critical Conservation program at the GSD.

Community Needs Survey. We carried out a cross-sectional study through a randomized-sample survey with a margin of error of 5%. The sample size took into consideration that the target population in the five municipalities consisted of 159,155 inhabitants, and it required 384 complete surveys to get statistically significant results. The number of interviews per municipality was allocated in proportion to its population size: 69 in Ciudad Ixtepec (17.99%), 37 in Asunción Ixtaltepec (9.49%), 21 in El Espinal (5.39%), 236 in Juchitán de Zaragoza (61.60%), and 21 in Santa María Xadani (5.53%). The participants needed to be 18 years or older and had to have lived in the same residence for at least ten years to assure they had witnessed the last major flood caused by river overflows, which

Figure 2. Interview with the *Tecnosuelos* team, National Autonomous University of Mexico. Photo by *Pasa La Voz*, 2018.

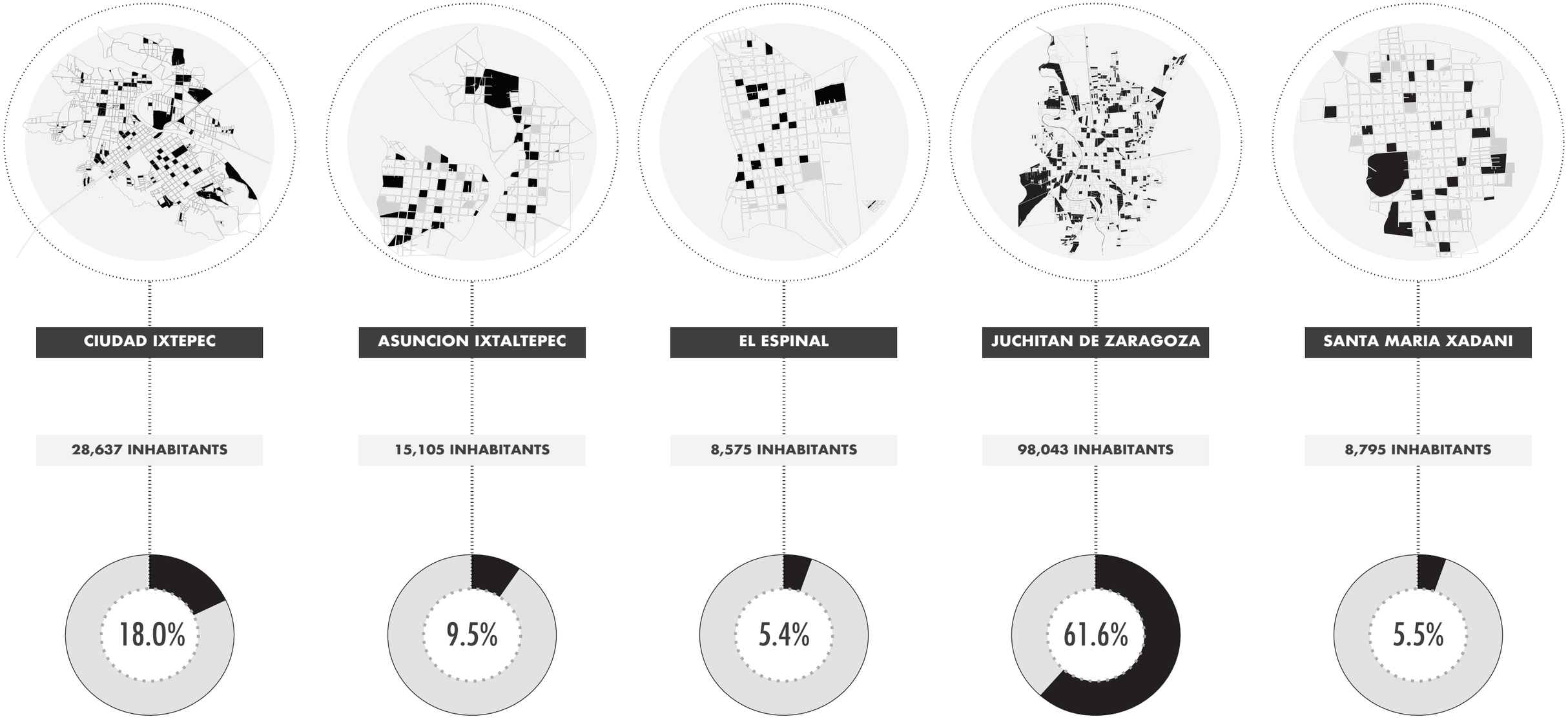


Figure 3. Survey design according to population per town. Diagram by Betzabe Valdes and Deni Lopez, 2018.

Figure 4. Community mapping workshop for children, Ciudad Ixtepec. Photo by *Pasa la Voz*, 2018.

happened in 2010. Since cadasters did not exist, the study randomly selected blocks (with a surplus of 43%) to obtain one interview per block. The surveyed houses in each block were chosen systematically, beginning in the northwest corner and moving clockwise until obtaining a response. If no one was willing to respond, the block did not have eligible residents, or if the block had no houses, surveyors moved on to the next randomly selected block. The survey contained 120 questions regarding identification, the Las Nutrias River, floods, earthquakes, rubble management, waste management, post-disaster aid perception, culture and identity, public space, and economy, safety, and health. To carry it out, the research team hired two groups of eight surveyors each, all of whom were local young adults. The study lasted approximately five weeks, with the first group working for the initial two, and the second group taking over afterward. To design it and process it, we partnered with Lizbeth Lopez Carrillo, a senior researcher at the National Institute of Public Health in Mexico.

Spatial Data Compendium. The maps produced by the research team to showcase the reality on the ground are made up of different datasets. These include Geographic Information System (GIS) layers produced by the National Institute of Statistics and Geography (INEGI), spatial datasets produced by the team regarding the location of rubble (made with GPS trackers), the outcome of 11 participatory mapping workshops conducted across the five municipalities, and the results of the survey. Even though pre-existing GIS data is technically public, there were some instances in which it was challenging to obtain it. Therefore, the group worked with several government agencies to attain all data available regarding the geographic characteristics of the river, earthquake damages, topography, built environment, official rubble dump sites. Given the scarcity of information, the group also created its own mapping repertoire, which included water treatment and waste management infrastructure, unofficial rubble landfills, material extraction sites, critical risk points along the river, landfills, flood-prone areas, and water runoffs. The photographic compilation used imagery from drone flights, tablets, and cameras. To process the results, Nadyeli Quiroz worked on an independent study with Robert Pietrusko, associate professor of the Department of Landscape Architecture at the GSD.

In particular, this thesis draws on the interviews, surveys, and workshops to present results, although it also showcases some of the findings from the mapping analysis and photographic record.

THE EARTHQUAKE(s)

Santa María Xadani, Oaxaca, 2018

On September 7th, 2017, an 8.2 M_w earthquake ravaged the southern Mexican states of Oaxaca and Chiapas. It was the strongest one recorded to date, or, as some would call it, "the strongest of the century".[35] Twelve days later, on September 19th, the North American plate broke in the center of the country, causing a 7.1 M_w earthquake that hit Mexico City and its surrounding states: Morelos, Puebla, and the State of Mexico. This second event happened on the same date as the most destructive one known to people from the capital, an 8.1 M_w earthquake that occurred 32 years earlier, in 1985.[36] As a result, global and national attention shifted to the capital, downplaying international response and engagement in areas like Oaxaca. A third earthquake, with an intensity of 6.1 Mw, hit the south of the country again on September 23rd, 2017.These events caused a simultaneous state of emergency in six of the thirty-two states, an unprecedented situation in the country.[37]

Responses, however, varied significantly across Mexico. As civilians, state officials, soldiers, nonprofits, private companies, and international aid groups mobilized swiftly to work in Mexico City, Oaxaca relied solely on fragmented federal state capacity. The provinces simply did not have the same resources as the capital. After 1985, Mexico City invested significant amounts of human and economic resources on preemptive strategies, including strict construction regulations. Commemorative earthquake drills, for example, are held every year on September 19th in all institutions and sectors, using the city's state-of-the-art seismic alarm system. In fact, the 2017 earthquake happened roughly two hours after the whole city conducted its yearly drill, when people knew exactly what to do.

[35] Redacción. "Terremoto de Magnitud 8,2, El Mayor En Un Siglo, Sacude El Suroeste de México, Deja Al Menos 61 Muertos y Miles de Afectados," October 12, 2017, sec. América Latina. https://www.bbc.com/mundo/noticias-america-latina-41197767.

[36] "SSN - Detalle de Sismo Seleccionado | UNAM, México." Servicio Sismológico Nacional. http://www2.ssn.unam.mx:8080/detalle/.

[37] Redacción. "Cuán Preparada Estaba La Infraestructura de México Para Soportar El Impacto Del Terremoto Más Fuerte Del Último Siglo," September 9, 2017, sec. América Latina. https://www.bbc.com/mundo/noticias-america-latina-41209298.

Contrastingly, residents from places like the Isthmus of Tehuantepec in Oaxaca were seemingly unaware of the imminent danger they faced regarding earthquakes, and they had no previous experiences to build on. The last major earthquakes near the area happened in 1787 and 1931, but neither of them left a significant mark at the isthmus.[38] The intensity of former is unknown, as the National Seismological Service began operating in 1910, but the estimations are that it neared 8.6M_w. According to the Gazette of Mexico, it caused "the great Mexican tsunami".[39] The latter ravaged Oaxaca City, the capital of state. Both of them were felt at the isthmus, but neither of them caused major damages that exist in recordings or altered the region's lifestyle. In other parts of the state, however, they did give birth to new festivals and traditions, including the world renowned *Guelaguetza*.[40, 41] Yet, as previously stated, Oaxaca is significantly divided both geographically and socially, so the new seismically-aware culture did not fully reach the Isthmus of Tehuantepec.

There are indeed references that indicate that earthquakes at the isthmus are recurring, but none of them suggests that tremors were perceived as a threat. If anything, they were perceived as routine behavior in the natural environment. According to Vicente Marcial Cerqueda, a rural sociologist and long-term resident of Juchitan de Zaragoza, the traditional Zapotec calendar included a day named after earthquakes, called *Xu*.[42] There are even clear distinctions in the language between tremors and mayor earthquakes, known as *xu ro'*. Nonetheless, there is no Zapotec word for rubble, which suggests

[38] Sigüenza Orozco, Salvador. "Oaxaca. Los eternos segundos de una sismicidad histórica." Relatos e Historias en México, November 17, 2017. https://relatosehistorias.mx/nuestras-historias/oaxaca-los-eternos-segundos-de-una-sismicidad-historica.

[39] Ibid.

[40] Lizama Quijano, J. "La Guelaguetza en Oaxaca: fiesta, relaciones interétnicas y procesos de construcción simbólica en el contexto urbano," México: *CIESAS*, p.357. 2006.

[41] Guelaguetza, in Zapotec, refers to an *ofrenda* or gift that you have to give it back eventually after receiving it. Nowadays, it is the name of a festival commonly referred to as the "maximum party of *oaxaqueños*." It was created in 1932 as a way to promote the Oaxacan culture, as well as to receive funds to recover from a decimating earthquake that destroyed Oaxaca City in 1931. The festival brings together the seven regions of Oaxaca, who send representatives to showcase local dance rituals and parades.

[42] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

one of two possibilities (or perhaps even both). The first one is that traditional construction materials were not regarded as waste, as they consisted of earth, wood, palm trees, manure, and other organic elements. The second one is that there were no major earthquakes in the region that caused the levels of devastation of the one in 2017, at least since the opening of the Tehuantepec railway introduced "non-recyclable" industrialized construction materials at the beginning of the 21st century.

According to Natalia Toledo Paz, another long-term resident of Juchitan de Zaragoza and co-founder of *Colectivo Binni Biri*:

> [Earthquakes were] not like this before. It did tremble, but it happened rarely. I remember vaguely that, when I was a kid, we used to go out to the patio of the house and kneel. My grandmother would then make us ask the earth for forgiveness. And then, we would go back inside the house. But that was years ago. This is unprecedented.[43,44]

Furthermore, Mr. Marcial Cerqueda stated that a popular belief in the region was that earthquakes were signals for abrupt changes in weather; they were believed to "announce" temperature variations, heavy rains, or strong winds, and, therefore, were not regarded as dangerous.[45] I later confirmed this in the following conversation I overheard between two local residents:

> *Individual A:* Did you feel that tremble? It was not the wind. It was an earthquake. Listen to the dogs barking.
>
> *Individual B:* But I do not think it's going to rain. The sky is clear. It must mean that the temperature will change.

[43] *Colectivo Binni Biri* is an organization created by Natalia Toledo Paz and her colleagues to help children from the most impoverished areas of Juchitan de Zaragoza recover from the mental toll the earthquake put on them through artistic workshops.

[44] Toledo, Natalia, interviewed by the lead project researchers, Oaxaca, May 28, 2018.

[45] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

This third quote from Claudina De Gyves Mendoza, a former resident of Ciudad Ixtepec, empathizes Oaxaca's divide and the lacking seismic culture at the Isthmus of Tehuantepec.

> The people [of Ixtepec] did not know what had happened. They thought it had only shaken there. The first person I contacted was my cousin, and she asked how we knew that there was an earthquake. I told her I felt it, that such intense tremors are felt everywhere. And she said, "well, since the light went out and we got cut off, we thought it had only been here." At first, people did not realize the magnitude of what was happening. We have an airport and a battalion in Ixtepec. You would think that, at least, people would have received news from either of them, but not even the municipality quite understood what had happened.[46]

All of this shows that there was no seismic culture that could prepare locals for what happened in 2017, a worrisome thought for municipalities in the most seismically active region in the country. In fact, our survey showed that, 93.2% percent of the residents of Ciudad Ixtepec, Asuncion Ixtaltepec, El Espinal, Juchitan de Zaragoza, and Santa Maria Xadani had never received training on how to act in case of an earthquake. Unfortunately, these five municipalities along the Las Nutrias River were the ones that the 2017 earthquakes hit the hardest. The official census of damage conducted by the Secretariat of Agrarian Land and Urban Development (SEDATU) states that roughly 58.10% of the 159,155 inhabitants of the region suffered either from partial or total loss of their houses.[47, 48]

As previously stated, this resulted in a response that relied heavily on federal state capacity. According to Malaquías López Cervantes, National Director of Health Planning and Development at the time of the crisis, president Enrique Peña Nieto and representatives from every Secretariat landed in Juchitan on September 8th, 2018, the morning after the first earthquake.[49] After a tour of the towns, Peña

[46] De Gyves Mendoza, Claudina, interviewed by the lead project researchers, Oaxaca, June 23, 2018.

[47] INEGI. "Encuesta Intercensal 2015." National Institute of Geography and Statistics, 2015.

[48] SEDATU. "Censo de Viviendas Dañadas Por Los Sismos Del Mes de Septiembre de 2017," 2018. http://transparencia. sedatu.gob.mx/#.

[49] López Cervantes, Malaquias, interviewed by the lead project researchers, Cuernavaca, July 5, 2018.

Nieto assigned each stricken municipality to a specific Secretariat, who would supposedly oversee response and recovery efforts. Except for El Espinal, the rest of the towns in this study were assigned a "sponsor". These were technically in charge of overseeing the recovery efforts in their respective municipalities, although some were substantially more involved in said process than others. The Secretariat of Health, for example, was in charge of helping the town that was hit the hardest: Asunción Ixtaltepec. As such, they coordinated the efforts to conduct the damage assessment, distributed incoming aid, and helped municipal authorities make their first decisions. Moreover, the president assigned SEDATU as the overall coordinator.[50]

Nonetheless, this strategy did not flow as swiftly as expected. To begin with, there was no clear response plan, so solutions were created on-the-go. Furthermore, the federal, state, and local authorities had difficulties in working together, as they had not done so before during an emergency of this magnitude. This is better expressed by the following quotes from Mr. Lopez Cervantes and Mr. Elpidio Desiderio Concha Arellano, SEDATU's delegate in Oaxaca:

> There was no long-term plan. The president's role was to go around the stricken communities and order people to work intensely to help them. Showing up is not the same as having a plan. The only thing that resembles a disaster response plan in Mexico is the DN-III-E, but even that one is not concrete. In short, it says that "we need to do whatever is necessary to solve what we find".[51]

> We did not solve things exactly as they should have been solved, partly because of the magnitude of the problem in Oaxaca and even in the country. We were not prepared for something like this. From now on, we need to be prepared and understand how different actors can work together.[52]

[50] Ibid.

[51] Ibid.

[52] Concha Arellano, Elpidio Desiderio , interviewed by the lead project researchers, Oaxaca, August 25, 2018.

What followed was a fragmented top-down response that disregarded the cultural context and built environment almost entirely and focused solely, at first, on the quick restoration of housing and primary services (like hospitals). This narrow-sighted response brought several complications with it. In Asuncion Ixtaltepec, for example, the urgency to clear the streets from rubble combined with the major resources as businessman in the construction industry and upcoming bid for reelection, resulted in the creation of a humongous, unplanned, and unprotected riverside rubble landfill meant to protect the town against potential floods. It is important to note that the river crosses the town right at the center, and the only ways in and out are two bridges that pass right on top of the new landfill. This initiative got community backing for several reasons, including the lack of bottom-up capacity to deal with rubble, the pressing urgency to provide shelter and restore housing conditions, the widespread (erroneous) notion that those materials could not be recycled or used for any productive purposes, and an unsubstantiated fear of imminent floods in the town. While the area does suffer from periodic inundations caused by hurricanes and intense rainfall, most of the damage concentrates in Juchitan de Zaragoza and Santa María Xadani, the two settlements at the southernmost river area. According to Tomás Chiñas Santiago, President of the Las Nutrias River Basin Committee, said floods are rarely caused by river overflows and are most-often related to deficient urban sewage systems.[53] In fact, the last registered river overflow happened in 2010, but it mainly affected the two aforementioned settlements and not Asuncion Ixtaltepec. Despite receiving several warning and fines from environmental protection agencies in Mexico, he did not stop this action, which meets a short-term need for rubble removal, at the expense of grave environmental damage *(see Figure 5)*.[54]

[53] Chiñas, Tomás, interviewed by the lead project researchers, Oaxaca, May 25, 2018.

[54] Ambiente, Procuraduria Federal de Proteccion al. "Clausura PROFEPA Zona Federal en Asunción Ixtaltepec, Oaxaca, Por Deposito de Residuos Provenientes de Sismos" gob.mx. http://www.gob.mx/profepa/prensa/clausura-profepa-zona-federal-en-asuncion-ixtaltepec-oaxaca-por-deposito-de-residuos-provenientes-de-sismos.

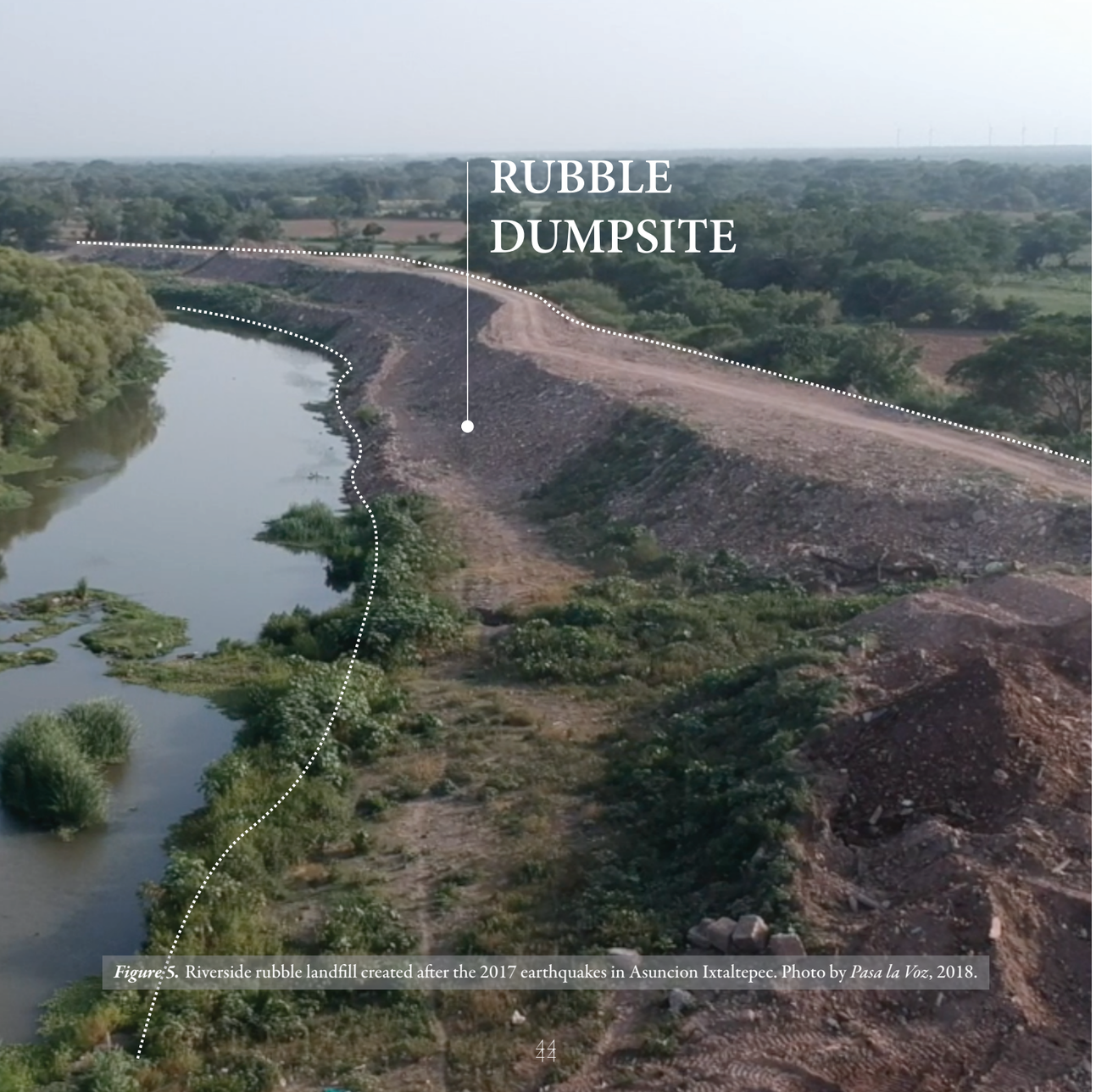


Figure 5. Riverside rubble landfill created after the 2017 earthquakes in Asuncion Ixtaltepec. Photo by *Pasa la Voz*, 2018.

In terms of housing provision, the National Fund for Natural Disasters (FONDEN) distributed debit cards to each person that either lost their house completely or suffered partial damage, according to the official census.[55] The greatest amount a person could receive was 120,000 pesos (approximately 6,000 USD), 75% of which was to be used to buy construction materials from a pre-authorized store and the remaining 25% to cover labor costs. There were three problems with this solution. First, many of the vernacular construction materials such as wood, clay tiles, and adobe could not be bought at authorized stores. Second, given the shortage of resources and trained construction workers, labor and material costs skyrocketed right after the crises making the aid insufficient. This situation pushed locals to give their aid packages to private developers that came to each town offering to demolish their traditional homes in exchange for a 40-square-meter concrete house that completely disregarded their lifestyle and climate conditions. Finally, the new dynamic resulted in unnecessary demolitions which further complicated rubble management.

Once more, these dynamics are better expressed by the stories from our interviewees. All the local residents we talked to expressed the same concern: that traditional houses were rapidly disappearing due to the reconstruction policies and ill-informed top-down responses. Mr. Marcial Cerqueda stated, for example, that he was pressured to demolish his traditional home:

> Brigades of all kinds came to help. SEDATU managed them and was in charge of releasing the goal: demolish. That was their official slogan, even though [the National Center for Prevention of Disasters] CENAPRED recommends to shore up and assess the extent of the damage before making any decisions. Think about it; it was an excellent business. If in Juchitan there were 8,000 houses in a state of total loss and each one received 90,000 pesos in materials cards, there was a large money fund captive for private companies. Multiply it. There were 720 million captive pesos. Many entrepreneurs came to spin around. They rubbed their hands and toured the area with SEDATU. And they pressured demolition with false threats. They said that those who did not demolish did not get the 120,000 pesos. Then, people began

[55] SEDATU. "Censo de Viviendas Dañadas Por Los Sismos Del Mes de Septiembre de 2017," 2018. http://transparencia. sedatu.gob.mx/#.

Figure 6. Inscription on the wall of a house in Ciudad Ixtepec that reads: "This is my inheritance. It must not be destroyed". Photo by *Pasa la Voz*, 2018.

> to demolish without thinking first if it was right or wrong. [Federal officials] told me "demolish, demolish, demolish" and I said "*mangos, mangos, mangos* [no way, no way, no way]." This house belongs to my great grandmother. She left it for me. What were they thinking?[56]

This sentiment was shared by Olga Zuñiga Loera, the chief anthropologist of Cooperacion Comunitaria, a nonprofit working in reconstruction in Ciudad Ixtepec.[57] She further elaborated on how the policy impacted some of these towns in a different way, reinforcing existing structures of resistance in some places while weakening community engagement in the others.

> Several mayors gave the order to demolish affected houses, even without an expert's opinion. In Ixtaltepec, there are blocks where only one [original] house is standing and the rest were made by developers. They are experiments. Ixtepec is different. There is a strong and important civil organization that emerged since the 50's. In 2012, there was a fight against the mining companies. The same thing happened eventually with the eolic companies, and now with the developer houses. We talk about the importance of not tearing down the traditional *Istmeña* homes. New approaches show a cultural ignorance of the way of life here. The 120,000 pesos that [SEDATU] gave out barely cover the cost of a house of 40-45 square meters. Additional financing is needed to recover what they had, and not everyone has access to it.[58]

Ms. Zuñiga Loera further explained that, aside from urgency, fear and misinformation led people to take rash decisions regarding their homes. A big problem she mentioned is that President Peña Nieto triggered collective hysteria in Oaxaca a week after the earthquake by stating publicly that houses fell because they were made of earth.[59] Nonetheless, his claim lacked foundation, as most houses in the region were built concrete or brick.

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[56] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

[57] Zuñiga Loera, Olga, interviewed by the lead project researchers, Oaxaca, June 30, 2018.

[58] Ibid.

[59] Zatarain, Karina. "Peña Nieto afirma erróneamente que 'la caída de viviendas [tras el sismo en Oaxaca] se debió a que están hechas de adobe.'" ArchDaily, México, 2017. http://www.archdaily.mx/mx/880216/pena-nieto-afirma-erroneamente-que-la-caida-de-viviendas-tras-el-sismo-en-oaxaca-se-debio-a-que-estan-hechas-de-adobe.

> Deferring from widespread public policy, our model for new houses acknowledges that we are not building 40 square meters, a tiny cube, or an urban dwelling. We are building a traditional *istmeña* home with everything that it implies. These houses were built with a specific brick technique, *tizón y soga*, and without columns. But people were afraid of our proposal. They asked how it would be possible to not have any columns. There were dynamics that unraveled from this and, as outsiders, we did not see them at first. The family, the *compadre*, arrived and told them that the house was going to fall, they started to distrust something that had worked at the isthmus for generations. Many people stopped wanting our help because of that.[60]

Another expression of collective fear was expressed by Lilia Cruz Altamirano, a rural sociologist and long-term resident of Juchitan de Zaragoza.[61] She explained how misinformation regarding the aid packages created a cascading effect of civilian-led demolitions:

> When the earthquake hit and the first aid came in, a rumor began about the possibility of receiving 120,000 pesos if your house was deemed a total loss. So people started to demolish their own homes. They thought that they would get all of it in cash. They did not. 30,000 pesos were cash funds to pay for labor and 90,000 came in a card that could only be used for materials in specific warehouses where they could not buy the materials that their houses were made from initially.[62]

This claim was also backed up by Ms. De Gyves Mendoza, who added that the lack of contextualization in the reconstruction policy led to a complete oversight of true needs of the community and eventual loss of culture and identity.

> No one came to explain what had happened. No one took the time to go to the public squares with specialists to clarify that this is something normal. There were incredible theories and paranoia: a volcano was being born, it was fracking, it was because of the mines...

[60] Zuñiga Loera, Olga, interviewed by the lead project researchers, Oaxaca, June 30, 2018.

[61] Cruz Altamirano, Lilia, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

[62] Ibid.

> Moreover, SEDATU's program was terrible. Some cards got cloned, and they forced you to buy in certain establishments. In this region, we are brick-makers. Ixtaltepec's bricks are the best, but you could not buy them. [The cards] only [worked] in pre-authorized stores and brands. People ended up buying materials to re-sell. You could only purchase concrete, sand, steel mesh, and bathroom furniture, but what people needed the most were refrigerators and other appliances. Yet, they put a thousand obstacles to buy [the latter]. It was as if they wanted you to go to Oaxaca [city] to buy in Home Depot. Who was going to do that with all the pressures the earthquake put on people?[63]

All of this led to one of the biggest problems that stemmed from the unplanned process: the loss of a familiar and longstading past that was a foundation for people's identity. As developers convinced more and more people that there rapidly-built houses were the ultimate and easiest solution, the image of the traditional home was almost wiped out. Private developers came from different parts of Mexico, mainly form large urban areas like Mexico City. Therefore, they were not necessarily familiar with rural areas and small cities. Some of their companies were not strictly related to construction. A few of them were associated with big chains of supermarkets such as Soriana and Aurrera, while others were part of much bigger private companies like Grupo Carso (owned by Carlos Slim, the richest man in Mexico). Sadly, there were also several reports of some "ghost" companies, who collected recovery funds from affected residents and proceeded to leave town. Miguel Covarrubias, explains that istmeña homes consisted on interior rooms, with bathroom and kitchens outside, as well as an open hallway where where people could relax and have some fresh air in the shadow.[64] This design reflected people's needs and adaptations to weather. Due to the extremely high temperatures, ventilation is essential in their day to day life. Nonetheless, the new developer houses are mostly enclosed and have all services on the inside (aside from being built with thin concrete slabs, a technique that responds poorly to warm weathers). As Mr. Marcial Cerqueda and Ms De Gyves Mendoza put it:

[63] De Gyves Mendoza, Claudina, interviewed by the lead project researchers, Oaxaca, June 23, 2018.

[64] Covarrubias, Miguel. *Mexico South: The Isthmus of Tehuantepec*. 1st ed. New York: Alfred Aknopf, 1946.

Figure 7. Open corridor of a traditional *istmeña* house in Juchitan de Zaragoza. Photo by *Pasa la Voz*, 2018.

Figure 8. Facade of a traditional *istmeña* house in Ciudad Ixtepec. Photo by *Pasa la Voz*, 2018.

> [Developers] are building concrete homes for this heat of 45 or 50 degrees [Celsius]. That cannot be. How are people going to live there?[65]
>
> The housing models [the developers] are making are not even adequate. This solution that was apparently the least complicated is not suitable for this climate. And there is no turning back. It will stay forever.[66]

Other aspects that the response failed to account for incorporate were the need for economic reactivation and the changing market dynamics. Throughout the region, for example, many women depend on selling bread and *totopos*, a crispy corn chip that goes with every meal. To make it, they need special ovens, many of which collapsed during the earthquake. Nonetheless, FONDEN only offered 15,000 pesos (approximately 750 USD), which was nowhere near enough for people to reactivate their ovens and family economy. This resulted in further tensions with state officials, who were (justifiably) more worried about establishing basic urban services, while locals asked for further attention on matters other than housing. It is here where, in the absence of international aid, many local nonprofits arrived and intended to fill the gap that arose from the dichotomy between top-down and bottom-up action.

Likewise, new labor markets arose. Being a mandatory stop on the way from Central America, to the United States, the area became a hotspot for construction jobs offered, in part, to passerby migrants. This was both positive and negative. The good side of it was that the new dynamics helped some local residents de-stigmatize migrants, particularly in Ciudad Ixtepec. Because this city has a main stop on the Tehuantepec railway and an official migrant shelter, it has historically had a significant influx of travelers. Nonetheless, interviewees told us that these people were generally perceived as "delinquents" who would not do anything for the good of the town. So, upon participating in the reconstruction process, some of these prejudices ceased. The negative side of this process, along with the model for developer houses, contributed to the lack of permanence of new knowledge in the area.

[65] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

[66] De Gyves Mendoza, Claudina, interviewed by the lead project researchers, Oaxaca, June 23, 2018.

According to Ms. Cruz Altamirano, "local masons started charging double per day because they were few. It was supply and demand at its most basic state. That resulted in the 30,000 pesos destined to labour being insufficient. If the 120,000 pesos by themselves were not enough in the first place, these new dynamics rendered them worthless." [67] Migrants, contrastingly, did not expect high-paying jobs; they just needed a short-term job that would give them enough money to keep going. Therefore, many of the safe construction techniques were learned by them and not local residents, who are ultimately the ones who will most likely modify their houses in the future through self-construction.[68]

This failed understanding of market dynamics and local lifestyles also materialized in the most basic of aspects in disaster response: food. Few would imagine that there could be such a thing as too many donations or too much food in a situation like this, but it did occur. As I understand it, this problem arose from the lack of plan as well, which gave space for well-intended people from other states to send waves of aid, in whichever form that came. The best example of this I found is the following anecdote from Ms. De Gyves Mendoza:

> Amid the chaos [brought by the earthquake], there came a time when we did not know what to do with the tuna cans sent to us as an aid. People did not want to eat tuna anymore. It is normal to send canned food in situations like this, but people do not eat like that here. Cans accumulated, and no one wanted them. [Francisco] Toledo started a very nice project in Juchitan of local kitchens. Then, the Melendre Committee decided to start the "basic basket." Instead of sending canned food, they gave money to local people who sold *totopos*, shrimp, etc. That way, they created basic baskets of regional food. Afterward, other projects like this unleashed. Another was for clothes, and they bought from local artisans.[69]

[67] Cruz Altamirano, Lilia, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

[68] In Mexico, self-construction accounts for almost 70% of all the housing stock, in Redacción. "Por Qué México Es Proclive a Sufrir Tantos Terremotos y Tan Fuertes," February 17, 2018, sec. Otras noticias. https://www.bbc.com/mundo/noticias-41201053.

[69] De Gyves Mendoza, Claudina, interviewed by the lead project researchers, Oaxaca, June 23, 2018.

Figure 9. Prototypical developer house made in Asuncion Ixtaltepec after the earthquakes. Photo by *Pasa la Voz*, 2018.

Figure 10. Prototypical developer house made in Ciudad Ixtepec after the earthquakes. Photo by *Pasa la Voz*, 2018.

Once more, this situation increased tensions between locals and state officials, as the latter decided to filter incoming aid from other states to distribute it equitably. This was not well-received by locals, who regarded it as a highly-politicized move. With federal elections in the coming month of July, some residents argued that aid packages (which consisted of non-perishable goods), were being kept by municipal authorities to distribute during the upcoming political campaigns. Ironically, the authorities' positive intentions to make sure aid got to everyone that needed it backfired and increased mistrust in them. According to Ms. De Gyves Mendoza and Mr. Marcial Cerqueda:

> Outsiders contacted us to say that they wanted to help, but they asked us to guarantee that the aid was not going to be channeled through the government, This is how they made sure that it was going to the people. That was everyone's concern. There was a lot of distrust.[70]

> The worst thing is that everything happened during an electoral period and became a political career. All the candidates came to be photographed with the victims. One of them even rebuilt a church as fast as he could, but he did not even do it properly. He went for a tin sheet roof. Here, there are wind gusts that reach a speed of 200 km/hour. That roof will be blown away, but I'm sure he'll be fine. People will surely remember him positively for a while.[71]

There is, of course, another side to this story. Some federal officials argue that it was very complicated to work in the area and provide help, as locals often try to cheat the authorities and obtain extra benefits. There are many accounts of people getting as many aid packages as possible by getting in line several times or asking family members to make line for them. Other well-known and frequent stories revolved around two or more people from the same family claiming federal reconstruction funds for the same lost property, or whisky bottles and flat screen TVs being sold out in local stores days after the first economic aid packages arrived. Mistrust and deceit, at a certain point, also came from locals. The best example in the interviews is the following story from Mr. Lopez Cervantes:

[70] Ibid.

[71] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

> Locals did help us, but it was very complicated. They had a very unfavorable attitude sometimes. They expected [the authorities] to do all the work. A great tension arose, particularly with the army, because, upon arriving to help and asking for local support, they would receive answers like: "I will not help you. I'm not paid for doing this work, but you are. So do it." I understand that they were probably scared or did not quite know what to do to help, but they were not willing to cooperate with us either.

In short, the earthquake brought good and bad things to the Isthmus of Tehuantepec. It gave birth to new social dynamics and productive responses and even awakened dormant relationships that can potentially be good for the communities. Moreover, it acted as an opportunity for resources to center on a historically neglected area. Nonetheless, the lack of a prevention culture and disaster response plan also resulted in a chaotic, fragmented, and contextually-unaware reconstruction scene, despite good intentions of several actors across sectors and scales.

But more importantly, as I will argue in the upcoming chapter, the crisis revealed other vulnerabilities that were already in place. These cannot and should not be downplayed by a new narrow- sighted view on resilience as mere "capacity to respond to earthquakes". Thinking about earthquakes could represent a barrier as much as an asset, particularly when they become the sole focus of all efforts and lack an understanding of the interconnection of diverse vulnerabilities and urban systems. Reconstruction and robust resilience go beyond bouncing back to pre-existing flaws, especially in areas that are subject to diverse and recurring threats, disaster-related or otherwise.

THE OTHER VULNERABILITIES

Juchitán de Zaragoza, Oaxaca, 2018

Generally speaking, crises magnify pre-existing problems. For disaster relief and long-term recovery, this amplification of issues often manifests in the built environment, but it can also touch upon social, economic, and political complexities. Functioning road networks with primary and secondary arteries, for example, are essential during an emergency. If such a system do not work, it is likely that respondents will find it complicated to bring in support. As stated by Rafael Mayoral Palafox, a community activist and resident of Salina Cruz, in Oaxaca "the roads were damaged. We needed heavy machinery, but there are no [economic] resources here. There are communities that had to walk a lot to collect food and aid."[72]

The same concept applies to a wide array of components that make a city work, which may range from physical infrastructure to economic capacity or potential for community engagement. This suggests that, in order to achieve resilience, a holistic understanding of local vulnerabilities must be in place. It is useless to prepare or react to a single threat (such as earthquakes) if it is or will be directly affected by other unattended conditions or weaknesses, particularly in communities that have suffered from historic neglect and are, therefore, more likely to have numerous ones.

As outsiders, it is very complex to understand existing vulnerabilities upon reacting to a crisis, particularly when local capacity is already insufficient. This narrow-sighted view often exacerbates pre-existing issues, especially if decisions are made with urgency. In the words of Mario Medina, the CEO of *Arquitectura Biosustantable*, "What will happen in 70 years? We currently have a panoramic vision, and we need to change it to a telescopic one."[73] If the interrelatedness of vulnerabilities is misunderstood, post-disaster rapid housing provision, for example, may quickly become the number one priority regardless of quality, contextualization, and the rest of the underlying problems in a given city. The same applies to creating programs to recover from earthquakes (which usually center on housing provision) above all other chronic problems such as periodic floods, increased violence, lack of connectivity, or low access to education, all of which could complicate an upcoming earthquake response.

[72] Mayoral Palafox, Rafael, interviewed by the lead project researchers, Oaxaca, August 22, 2018.

[73] Medina, Mario. interviewed by the lead project researchers, Mexico City, June 12, 2018.

As mentioned in the previous chapter, a good example of this problem is the rubble landfill created in Asuncion Ixtaltepec after the 2017 earthquakes. Despite seemingly trying to address two conditions at once, clearing the city while creating a barrier against periodic floods, this action will potentially have a negative overall impact in the area and its surroundings. Although specialists agree that such a barrier could have worked, the way in which it was created was not adequate. For one, the landfill has the product of demolitions with no previous filter, including electrodomestics, led paints, and kitchen oils, and other pollutants. Moreover, it sets an example that discarding waste along the river could be acceptable, despite improper waste management being one of the main issues in the area before the earthquake. Finally, due to its understudied form and location, the landfill could worsen the effects of upcoming floods. According to Christina Siebe Grabach, a researcher from the Institute of Geology at the National Autonomous University of Mexico, reducing the river's waterway and having no particular morphology to respond to fluvial flows could result in increased water speed and rupture of the barrier, which could subsequently impact the towns downstream, alter the overall behavior of river, or create a dam-like structure that ultimately worsens the effects of floods on the town.[74]

Nonetheless, the increase in sensibility towards vulnerability brought by the earthquake could be beneficial if recovery functions as a period for local capacity building in terms of dealing with multiple hazards. For this thesis, the alternate vulnerabilities of Ciudad Ixtepec, Asuncion Ixtaltepec, El Espinal, and Santa María Xadani were studied through a series of mapping workshops in each municipality in conjunction with a cross-sectional survey. As shown by the survey results on Figure 11, when asked if certain urban conditions were an issue in their daily lives and for their communities, most of the residents of the five towns classified their priorities in the following descending order: waste management, earthquakes, river conservation, rubble management, and floods. This shows the earlier problem: that locals are presently more worried about a sporadic event like the earthquakes than a recurrent and perhaps much more worrisome one like periodic floods caused by increased rainfall, deficient sewage systems, and growing pollution.

[74] Siebe Grabach, Christina, interviewed by the lead project researchers, Mexico City, August 27, 2018.

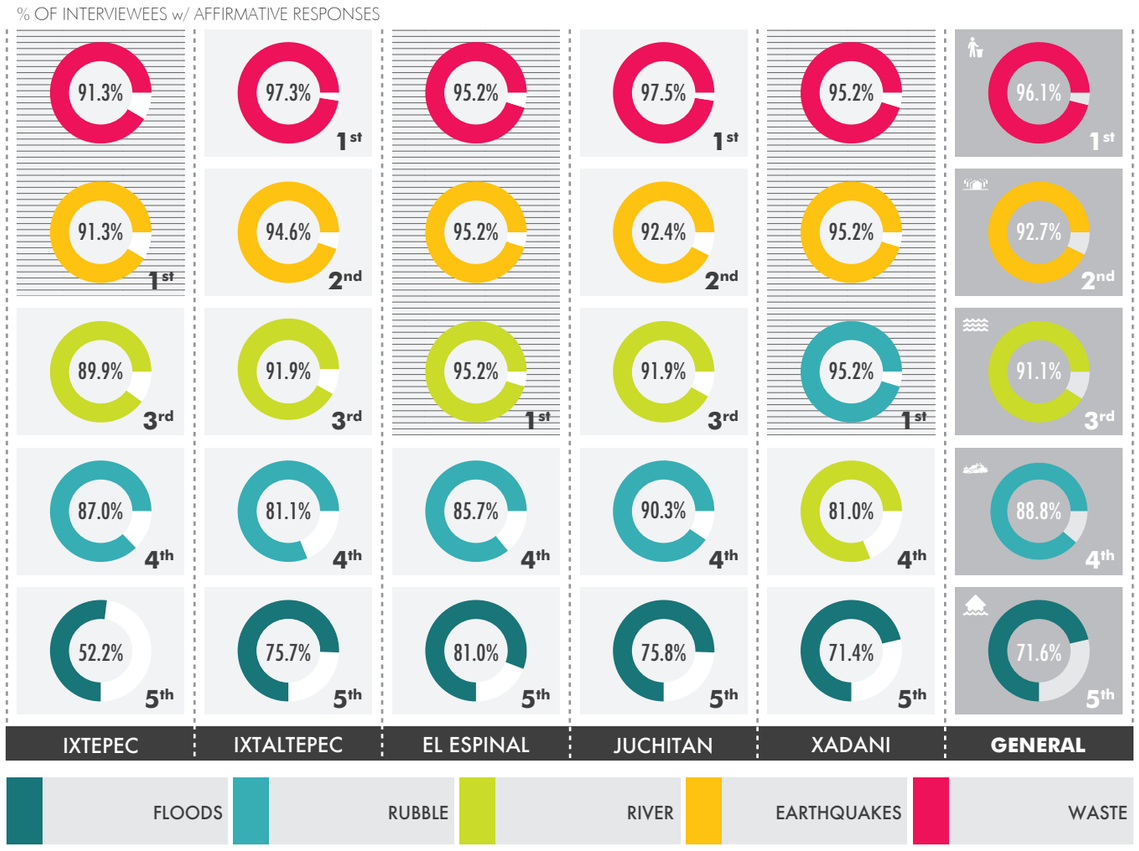


Figure 11. Classification of urban issues in the are of study. Despite the graph being statistically representative only at the regional level, it shows a similar trend in each of the towns for the classification of current problems. 2018.

SEASONAL FLOODS

In fact, the relationship between pollution, derelict sewage infrastructure, increased rainfall and floods is one of the main recurring urban issues in the area. Neglect in one of these areas translates into worsening of the others. In here, there are two types of floods and they are both related to and exacerbated by unregulated waste management and increased pollution. The first is caused by river overflows, but according Tomás Chiñas Santiago, it is currently the least prevalent.[75] The last recorded event happened in 2010, and it mainly affected Juchitan de Zaragoza, the largest city in the region.[76] The mayor at the time stated that only the two streets next to the municipal government headquarters were useful, as the rest of them became rivers on their own.[77] This type of inundation happens when increased rainfall combines with weak riverbanks and unattended critical overflow points.

One of the other vulnerabilities associated with this type of floods is deforestation, particularly upstream. The loss of trees along the riverbank causes soil to move towards the river's waterbed, which then serves as new land for large trees to grow. According to Mr. Chiñas Santiago, this phenomenon affects the river flow substantially, and results on extra budget needed to dredge the river periodically.[78] Moreover, the staggering levels of river water pollution are increasingly worrisome and have been historically neglected. According to Rey David Melendez Ordaz, the representative of the Secretariat of Environment and Natural Resources at the Isthmus of Tehuantepec:

> The river has been a deposit for hazardous and non-hazardous waste for some time now. It is a place where people go to throw their garbage. That's not something from a year or two, it's from a long time ago. The problem is that there is no interest in preserving it.[79]

[75] Chiñas, Tomás, interviewed by the lead project researchers, Oaxaca, May 25, 2018.

[76] C.V, DEMOS, Desarrollo de Medios, S. A. de. "La Jornada: La situación es de desastre en Juchitán; imposible hacer más," September 5, 2010. https://www.jornada.com.mx/2010/09/05/politica/002n1pol#.

[77] Ibid.

[78] Chiñas, Tomás, interviewed by the lead project researchers, Oaxaca, May 25, 2018.

[79] Meléndez Ordaz, Rey David, representative of the Secretariat of Environment and Natural Resources at the Isthmus of Tehuantepec, interviewed by the lead project researchers, Oaxaca, June 4, 2018.

The five water treatment plants along riverine corridor are all abandoned or unfinished *(see Figure 12)*, which means that all the waste water from the five towns (and the four smaller ones upstream) ends up in the river. In addition, several municipal landfills exist within the riverbank even before the rubble dumpsite started in Asuncion Ixtaltepec. That same stream finishes at the Superior Lagoon, the main fishing point for people of Santa María Xadani (who sell it to the whole area). Yet, the potential threat of these issues is not currently a priority within the communities. In the words of Gonzalo Villalobos:

> Shouldn't [the earthquake] be the opportunity to propose a wastewater treatment system? It's a serious problem, but people do not care. They need to go through something serious or have an exceptional group within civil society emerge to make them value what is important.[80]

Most floods, however, are caused by nonexisting fluvial drainage and deficient sewage systems. In the lack of infrastructure dedicated specifically to channel rainwater runoffs, streets themselves become canals that conduct large volumes of liquid combined with overflowing waste water. These are now the most prevalent floods and have even become routine, particularly in Juchitan de Zaragoza. This suggests two things: that existing sewage systems have no capacity to handle rainfall and waste water simultaneously, and that the prevalent culture of polluting streets could seriously worsen this problems by creating blockages. The main issue with this kind of floods is that they carry heavily contaminated water, as rainfall combines with sewage overflows. According to Mr. Chiñas Santiago, this has caused public health issues before, such as a hepatitis outbreak in a kindergarten in Juchitan de Zaragoza located next to a critical sewage accumulation point. Moreover, Leonor Bravo, a resident from Ciudad Ixtepec, stated that "There have been outbreaks of cholera, even hepatitis. It is a public health issue. We know that. We also know that there are studies to prove it, but they are not public."

In the context of earthquake response, these issues were also critical, as seismic activity affected existing infrastructure both above and below the ground. Moreover, the proliferation of rubble along the streets added to issues of pollution and blockages. Further complications arose as heavy rainfall followed the telluric movements, while people were still living on the streets in fear of potential earth-

[80] Villalobos, Gonzalo, interviewed by the lead project researchers, Oaxaca, August 20, 2018.

Figure 12. Derelict water treatment plant in Juchitan de Zaragoza. Photo by *Pasa la Voz*, 2018.

Figure 13. Community mapping workshop with adults in Ciudad Ixtepec. Photo by *Pasa la Voz*, 2018.

quakes aftershocks. In relation to this, the Secretariat of Health issued the following statement on September 26th, 2017:

> Upon the start of the rainy season, the health sector of Oaxaca foresees the potential proliferation of respiratory, gastrointestinal, and vector-borne diseases such as Dengue, Zika, and Chikungunya, especially in areas affected by the recent seismic events, where people living on the streets are exposed to waterlogging and bacteria.[81]

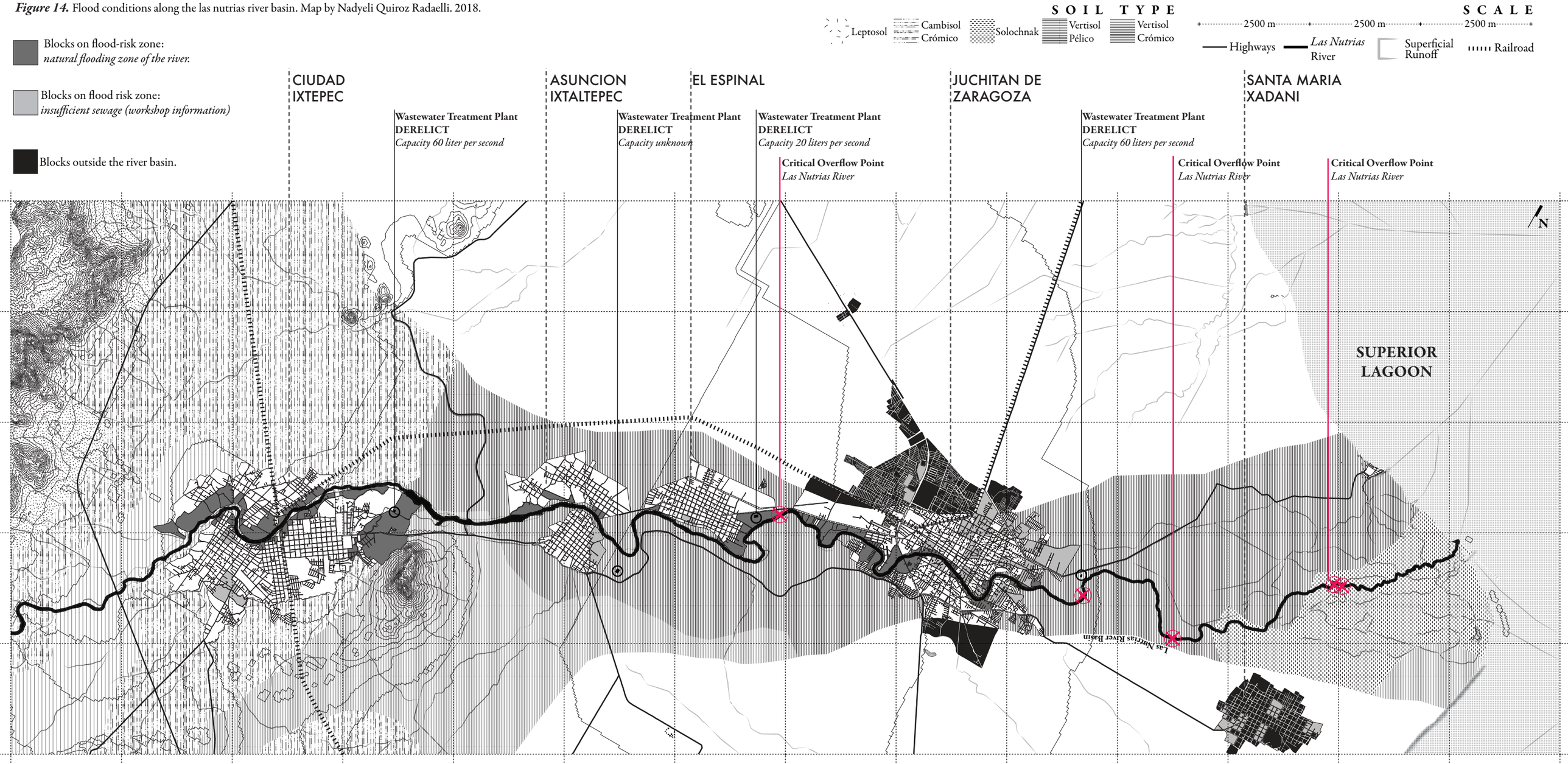
Both of the flood types are illustrated on Map 6, which shows the problem along the five municipalities. This map is made from a combination of existing Geographic Information Systems (GIS) data from the National Institute of Statistics and Geography (INEGI) and from community reports recorded through our workshops in each town *(see Figure 13)*. The map shows that four of the five municipalities (Ciudad Ixtepec, Asuncion Ixtaltepec, El Espinal, and Santa Maria Xadani) along the river are almost entirely within its basin, making them even more likely to endure floods caused by river overflows (although there are several reports of these types of floods happening in Santa Maria Xadani as well). However, a prevalent issue in all five towns are floods in seemingly random points, which suggest spread out infrastructure deficiencies.

FLOODS vs EARTHQUAKES

Perhaps more importantly, the issue with all of the flood types is the way in which they are currently perceived as routine and even harmless events by most community members, as they do not perceive them as, for example, source of disease. As shown in Figure 11, floods consistently received the lowest ranking within the studied urban vulnerabilities despite their yearly occurrence. This may be explained by several reasons, the first of which is that floods tend not to be as ravaging as earthquakes (both in terms of deaths and damages to the built environment). This is better explained by the following quotes from Vicente Marcial Cerqueda and Lilia Cruz Altamirano:

[81] Jiménez, Christian. "Sector salud en Oaxaca, alerta por posible brote infeccioso en el Istmo." El Universal. Oaxaca, September 26, 2017.

Figure 14. Flood conditions along the las nutrias river basin. Map by Nadyeli Quiroz Radaelli. 2018.



> I think that, historically, floods have not had a connotation of catastrophe. They were not something that could threaten one's life; they only threatened the crops. I even remember that my mother told me that children would go out to "play with the flood", trying to find funny-looking tree branches brought by the water. Floods were festive because they didn't cause damage; they were not a godsent catastrophe.[82]
>
> Floods by river overflows were the worst-case scenario we could face before, but they did not have the same magnitude as earthquakes. You could lose some appliances and furniture, but you didn't lose life. They even brought a sense of joy with them, as children would go to the bridges and watch how tree trunks and other things were carried away by the current. It was also fun to jump into the water from the sidewalk. We were used to them.[83]

Comparing the perceived importance of floods and earthquakes to the damage they respectively cause also rendered interesting results in the cross-sectional survey. As a side note, these results may be impacted by how each individual perceived floods. Interestingly enough, the surveyors that worked on this study reported that the idea of what constituted a flood varied consistently between interviewees. In other words, there was a very thin line in the distinction made by people between what classifies as a flood versus waterlogging, reinforcing the idea that a deeply-rooted coexistence with water may make a person stop regarding floods as a problem. Interestingly enough, for example, people continue to walk on streets despite the increased presence of heavily-polluted water, which is not widely perceived to be the cause of significant diseases.

On Figure 14, for example, we see that significantly more houses in the region have endured damage caused by earthquakes than by floods. In the whole region, 31.3% of the inhabitants reported that their house had sustained physical damages caused by floods, in comparison to a staggering 89.8% who reported their homes were damaged by the earthquake. This resulted on a steady classification of earthquakes as a more concerning problem than floods in people's lives; 92.7% of the people said they

[82] Cruz Altamirano, Lilia, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

[83] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

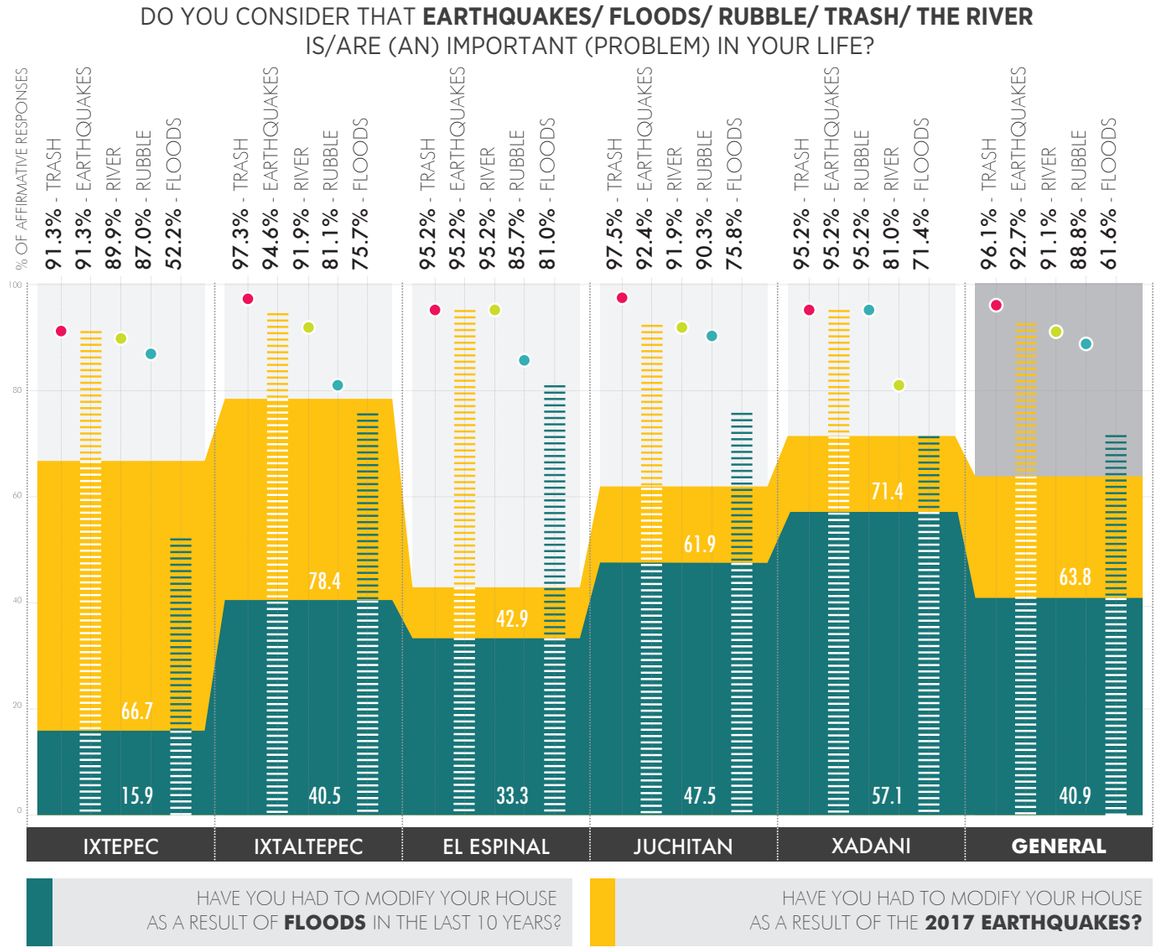


Figure 14. Comparison between classification of urban issues by town and damage suffered by earthquakes and floods at the level of the household. 2018.

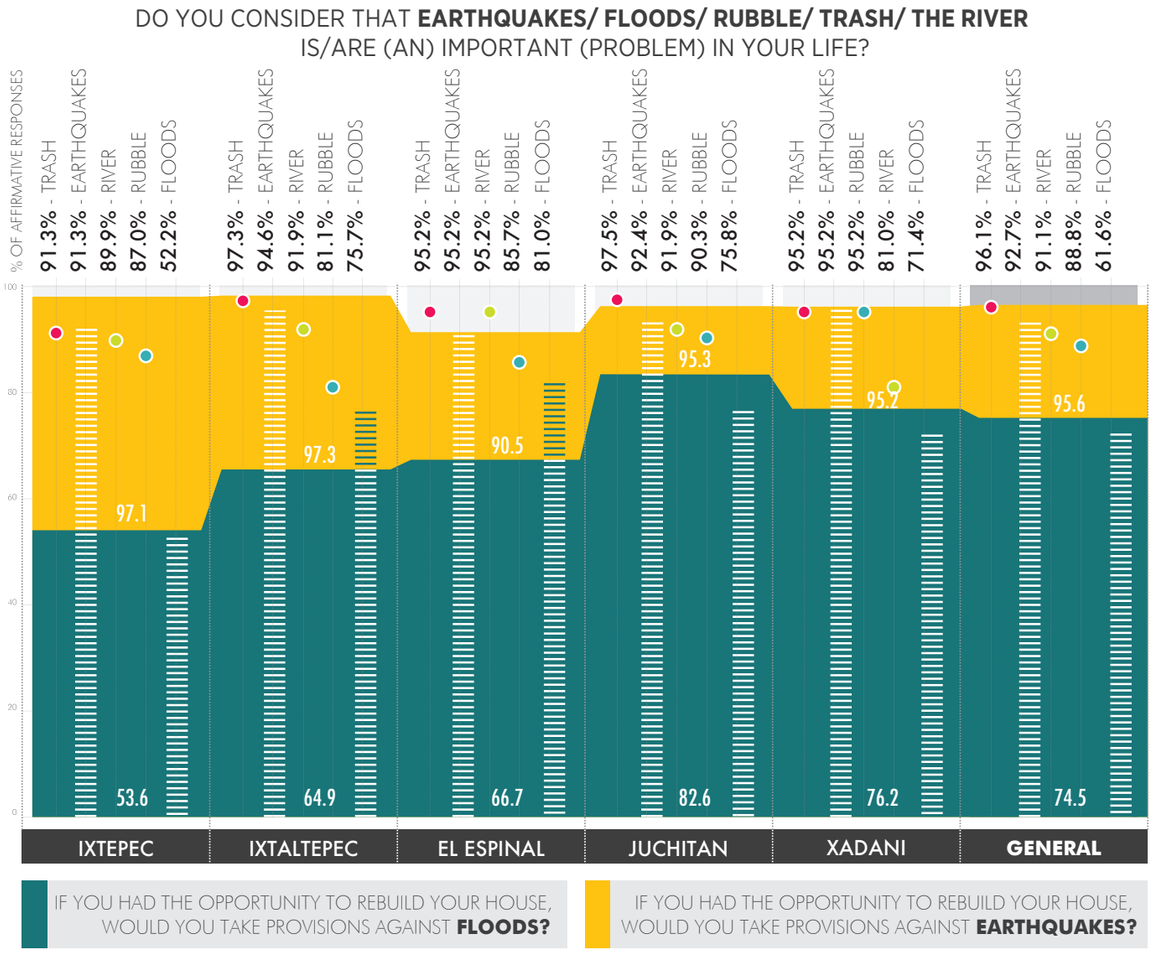


Figure 15. Comparison between classification of urban issues by town and willingness to take earthquake and flood previsions if given the opportunity to rebuild their house. 2018.

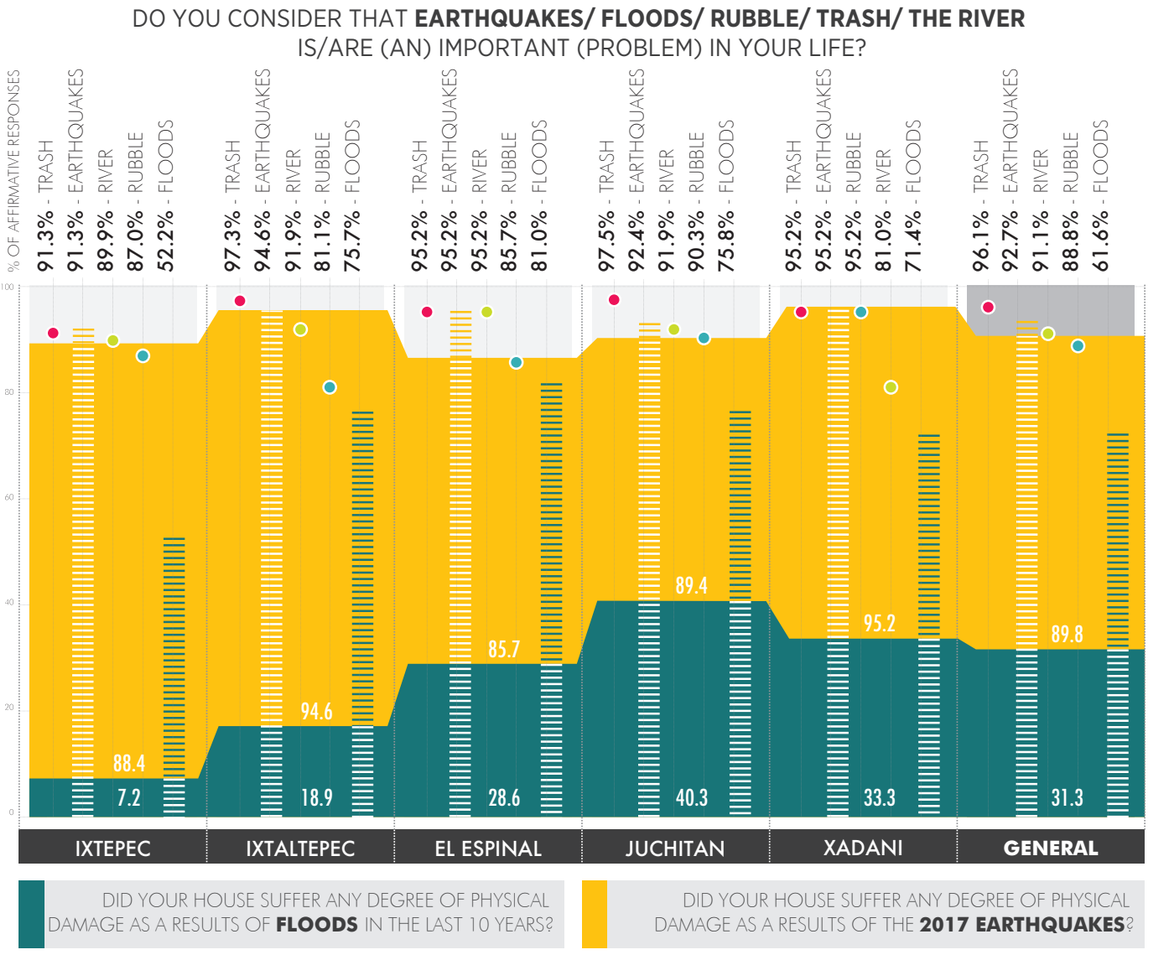


Figure 16. Comparison between classification of urban issues by town and modifications performed on houses due to damages caused by earthquakes and floods. 2018.

considered the former as an issue, while 61.6% thought the same of the latter. A similar comparison shown on Figure 15, indicates almost a direct relationship between the importance assigned to a given issue and the willingness of people to act preemptively. When asked if they would take seismic and flood considerations if they had the opportunity to rebuild their houses, the percentage of affirmative responses in both cases (95.6% and 74.5%, respectively) fell right above that of the question that asked if people consider the phenomena to be a problem in their lives (92.7% and 61.6%, respectively).

However, having to modify each person's house as a result of disasters had almost no significant impact on people's perception of earthquakes and floods as concerning issue, suggesting that there is more than individual experience to the classification of urban issues. Figure 16 shows that 40.9% of the people in the region have had to modify their homes due to floods, but 61.6% consider them a significant concern in their lives, suggesting that there is more to risk perception than individual experience. Similarly, 63.8% reporting on having to make modifications to their homes as a result of earthquakes, but, as expressed previously, 92.7% consider them to be a problem in their lives. As shown in Figure 17, modifications to houses brought by floods are so prevalent that they effectively altered the character of cities. Many houses and sidewalks along flood-prone areas are raised significantly from the ground, and there are several accounts of people building interior mezzanines to safeguard belongings during floods. Nonetheless, these changes occurred over a long-time period, as opposed to the swift one caused by earthquakes. This suggests that there has been a long-standing managerial neglect that led people to take matters into their own hands and that made them live with this quotidian water-related issue without further regard for potential consequences (such as diseases brought by increased pollution). Neglect is also exacerbated by politicization, as expressed by Mr. Chiñas Santiago and Juan Ferra Valedo, a long-term resident of Juchitan de Zaragoza:

> There is no preemptive plan. No one cares about that. The state waits for the flood to come and then they see what they can do. I have said several times that we do not want aid; we want preemptive programs. It would even be cheaper. The economic cost is less than the social cost. But it might not even be about the cost. It is all clientelism. Politicians need these problems to obtain a good standing when they "solve" them.[84]

[84] Chiñas, Tomás, interviewed by the lead project researchers, Oaxaca, May 25, 2018.

Figure 17. Elevated house for flood protection in Santa María Xadani. Photo by *Pasa la Voz*, 2018.

> A former mayor tried to build a bridge to connect to one of the neighborhoods on the other side of the river. His neighborhood. But he didn't finish the bridge, so he filled half of the river. Logically, this detains the water flow and creates problems. Further up, there are other popular neighborhoods. I think they belong to the current mayor. Those have a municipal garbage dump sites next to the river., and when they burn the trash, they consume the whole reedbed. It is a problem for everyone else, but we cannot really complain.[85]

In combination, the historic perception of floods as non-threatening natural phenomena and managerial neglect, result in people's perception of water as less of a pressing issue in their lives, despite its potential exacerbation of issues like earthquake response and by increased environmental pollution *(see Figure 18)*.

Once more, this information suggests that risk perception does not evolve at the same pace as risk itself, making it harder for lifestyles to change under "regular" circumstances. It is here where exceptional events such as earthquakes could be useful to develop interventions that address more than one problem at once, but to do so, there ought to be a nuanced understanding of the issues, their causes, and their relationship to each other. In the words of Michael Lewis, an American financial journalist and author of The Fifth Risk, "You imagine the thing doing the damage you would like to see done, and no more. It's what you fail to imagine that kills you."[86] At the Isthmus of Tehuantepec, this reflects partially on the poor understanding of people's agency in preparing their homes for a disaster, expressed on Figure 19. Despite geographic location and house construction age, technique and materials being highly related of the amount of damage sustained during an earthquake or flood, less than a third of the people consider them to cause the damage in their homes. Contrastingly, earthquake and flood intensity is perceived to be the main cause for enduring damage (with 95.7% and 88.3% of people responding affirmatively), suggesting that people believe to have little or no agency in diminishing damage during future events.

[85] Ferra Valedo, Juan, interviewed by the lead project researchers, Oaxaca, June 6, 2018.

[86] Lewis, Michael. *The Fifth Risk*. First edition. New York: WWNorton & Company, 2018.

Figure 18. Floods in Juchitan de Zaragoza caused by rainfall and sewage overflows. The green wall at the left side of the picture belongs to the kindergarten where hepatitis outbreaks have ocurred, as reported by Tomas Chiñas Santiago. Photo by *Pasa la Voz*, 2018.

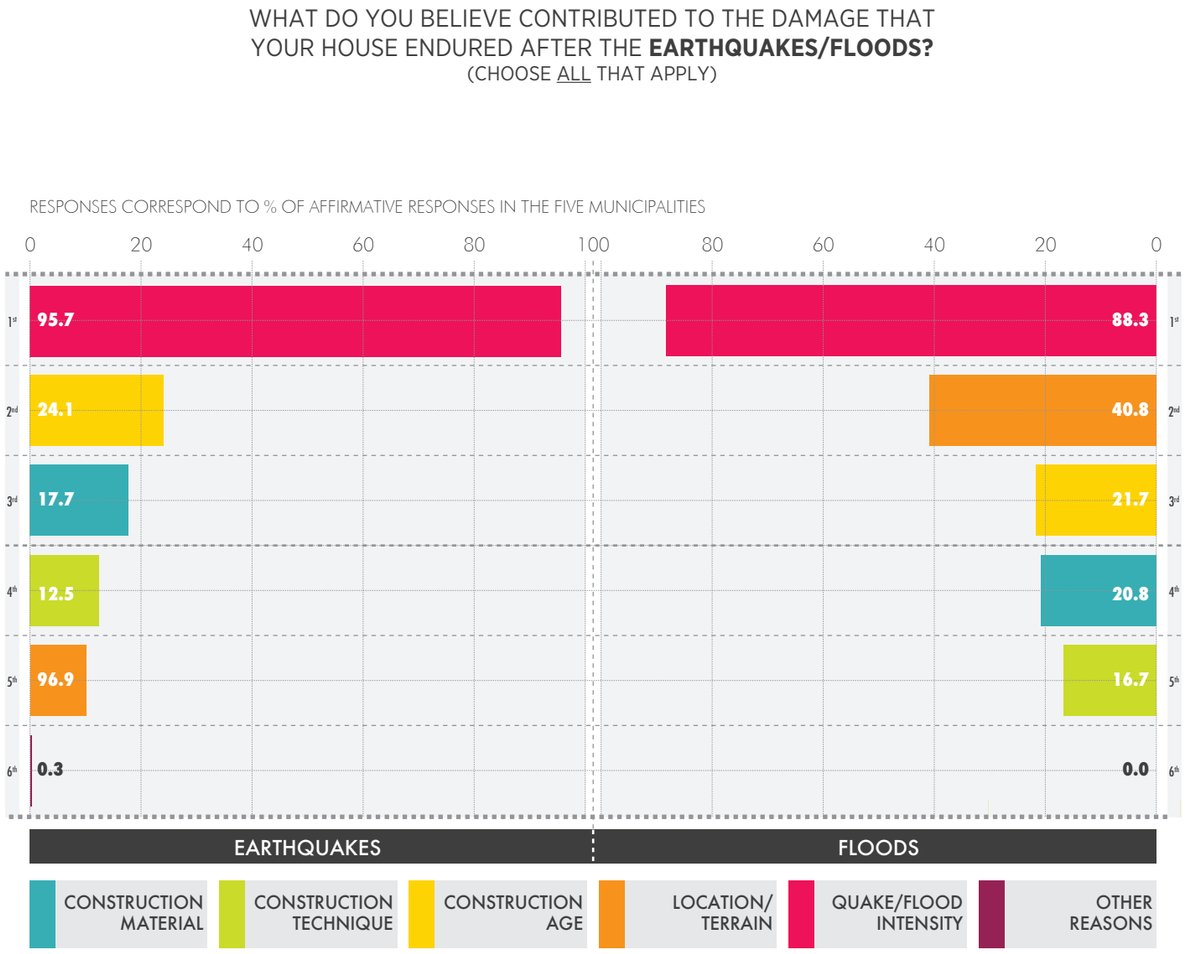


Figure 19. Less than a third of the residents from the area believe construction location, material, age, and technique have a direct bearing on the damage sustained by floods and earthquakes. 2018.

CONSERVATION OF THE LAS NUTRIAS RIVER

The same concepts of normalization of risk, historical neglect, and decreased agency applies to the preservation of the Las Nutrias River, another aspect related to periodic floods. According to the survey, 77.1% of the residents from the area believe the river to be in the worst possible conditions, mainly because of pollution *(see Figure 20)*. The historic neglect of the river may be again attributed to several reasons and a wide arrange of actors. Firstly, industrialization brought with it a dramatic change in lifestyles, which altered the relationship between the townspeople and the river completely. This is better explained by the following accounts form Mr Marcial Cerqueda:

> The current system is broken. As a child, I bathed in that river and drank its water. Pollution came with industrialization. Nowadays, there are plastics, bottles, etc. But everything belongs to the new consumer society. Back then, we used banana and almond leaves as wrappers. We did not use oil; we used lard in reusable bottles. Also, the mountain was our bathroom. The usual thing was to make a hole at some distance from the wells. Drainage arrived with modernization, and all the sewage water started going to the river. [87]

There are even registered accounts that illustrate the past relationship of the community to the river, which reinforce that neglect came with modernization and unregulated urban growth. Perhaps one of the most beautiful one is from Enedino Jimenez, a Zapotec writer and professor that describes the way in which a grandfather talks about the river to his grandson as a bedtime story.

> In the Zapotec villages, in the past, every evening, the elders relived a custom: having the sky as their witness, on a bed made with palm leaves, they spread a mat and went to bed with their grandchildren to tell them life lessons or pieces of their memories. That happened every afternoon. It was like a ceremony where those elders awaited the birth of the gentle light of heaven so that their blood would penetrate them and prolong their life.

[87] Marcial Cerqueda, Vicente, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

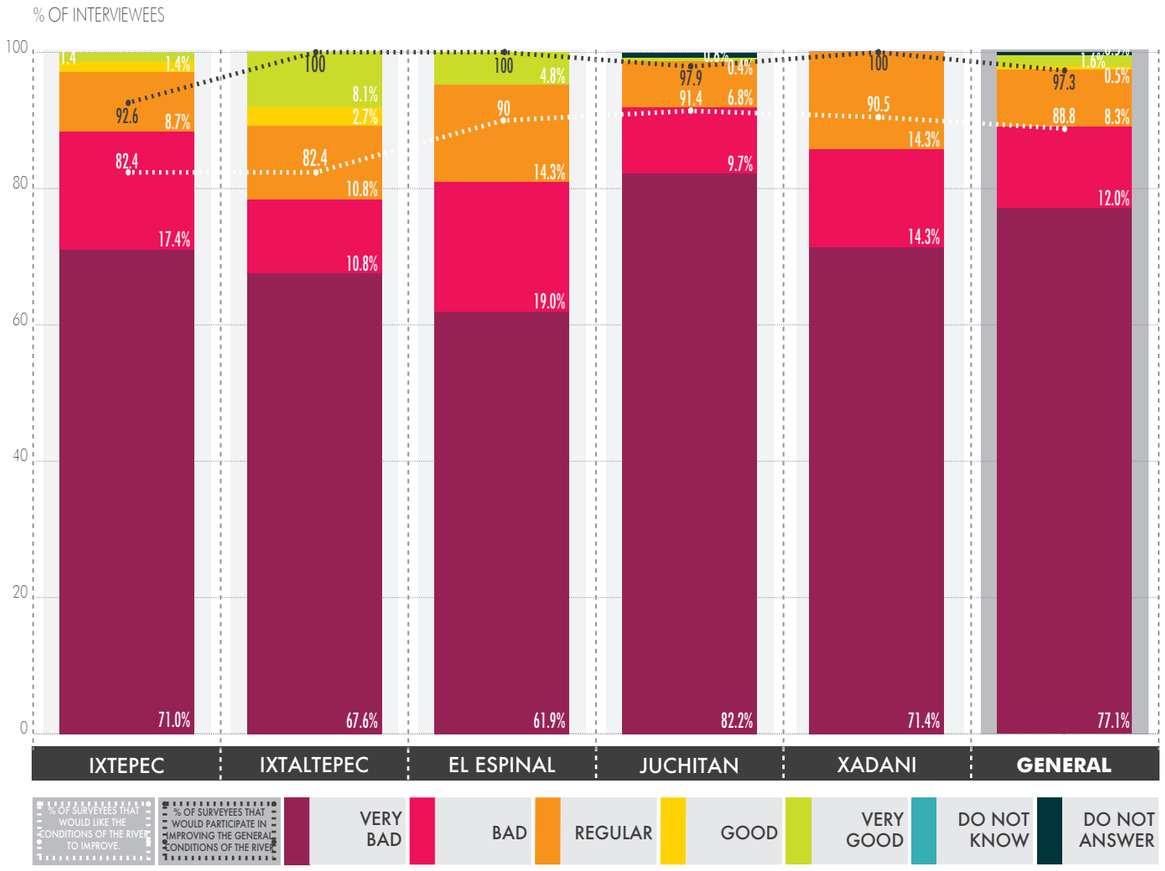


Figure 20. Comparison between perceived conditions of the river, desire for it to improve, and willingness to participate in improving it. Graph is only statistically representative at the level of the region, but it shows trends by town. 2018.

These are the words that an elderly man told his grandson one day:

-- Many years ago, son, when the water-providing network was not laid in the streets of our town, young men and women would go down to the river in the mornings and afternoons; they took their pitchers to bring water.
-- In the mornings - said the old man, as if reading the phrases from a mirror - you could see them. Hurrying to work, their pace was fast, but the afternoons were different. When the sunset extended its shadow to the half of the earth we inhabit, it seemed that those boys and girls filled their pitchers with joy, and thus, they took them down to the river. Ah, if you saw them with their games on the sand or the water! Their voices were confused with the diverse trill of birds among the flowers and leafy trees that lived on the river.

The boy, drawn in by the exquisiteness of the talk, listened attentively, while his graceful body lay on his grandfather's arms.
--You could say that there were evening festivals at the river during those years, said the old man sighing. When the stars began to be born in the sky, that party was suspended.

Those boys and girls returned to their homes with their pitchers full of water. But those mud garments did not contain any water; the running water of the river was useful for the daily chores at home; the water born in the pores of sand, was the one that refreshed the heart of the thirsty. That is why, since then, there is a voice that runs among people from nearby or far away towns: those who drink fresh water contained in the clay pots of a *Juchiteca* home, are forced to new visits by a superior entity.
--So it was, son, the custom in Juchitan in the past, now it has been lost - the old man said between sigh and sigh. The boy still listened attentively to his grandfather's quiet voice. The stars, little by little showed their faces in the sky.
--The leafy trees fell, they fell silent; the flower plants that made the nectar for bees and birds dried up; those birds, they flew, they left, they disappeared; The river's springs faded because of sadness, you can only see their trace every day; the joy of those boys and those girls took other paths. Now, my son, the worry that torments me is that these people also take other paths, and that, any day, only their traces dawn.

> Let us try to keep the Sun illuminating us, so that our memory keeps the words that that elderly Zapotec said to his grandson, in an afternoon, having the sky as a witness.[88]

Once more, the negative actions related to the river stemmed a cascade of interrelated problems. Upon facing modernization and unregulated urban growth, sewage systems discarded waste water in the river. This discouraged locals from perceiving it as a highly symbolic element, particularly because its water was no longer useful (at least in the way it used to be). In one of the workshops we conducted in Ciudad Ixtepec with adults, for example, one of the ladies told us that she did not use the river frequently because "she could not even wash her clothes there anymore", as if suggesting that the river was not worth attention if it could not benefit people's lives. Moreover, as explained by Mr. Melendez Ordaz, the river has increasingly been regarded as a source for economic support after disasters, particularly during the last decades.

> In 1972-74, we could still see the otters [that gave the river its name], swimming under the *Huanacaxtle* trees. No one thought that they would disappear. Unfortunately, the cities grew horizontally and consumed the river. Residential areas that expand towards the river are now used, for example, as excuses to receive emergency funds when water comes with the floods. Everyone may have their reasons, but the one who suffers the consequences is the river.
>
> I believe that things are not going to change until someone insists that we need to regard the river as the site of all the towns. Our coexistence with the river has marked us, both culturally and economically. Many people used to benefit from it. My dad used to fish there.[89]

According to Juan Ansberto Cruz Geron, a researcher from the Institute of Engineering at UNAM, this phenomenon of occupying waterbeds is prevalent across different societies and may also be attributed to what he calls *hydrological forgetfulness*.[90] This concept occurs when from year to the next

[88] Jimenez, Enedino. *Palabras de Un Anciano Que Extraña a Su Río.* n.d.

[89] Meléndez Ordaz, Rey David, interviewed by the lead project researchers, Oaxaca, June 4, 2018.

[90] Cruz Gerón, Juan Ansberto, interviewed by the lead project researchers, Mexico City, June 11, 2018.

Figure 21. Waterbed and riverside pollution across the five towns. Photos by *Pasa la Voz*, 2018.

(or one generation to another one), communities forget about recurrent floods and settle in areas they should not. As he explains it, living by a river normalizes its existence and related problems, and facing a lack of awareness, results in ill-informed settlements prone to high risk.

Lastly, all these conditions combined to reflect that polluting the river was a seemingly acceptable practice. As previously stated, the river is now home to several unprotected landfills (both of rubble and trash), and it receives the outflow of waste water from all the towns. This culture of neglect permeated into society and became a norm, reflected in a popular Zapotec saying that states that "If something is useless, [one should] throw it to the river (*Bisa'bi' nga ra guiigu'*)". As shown in Figure 21, polluting the river is now a widespread practice, extending across the five towns both within and outside the river.

SOLID WASTE MISMANAGEMENT

There are several problems related to improper waste management, and they are related to both top-down and bottom-up practices. As Gonzalo Villalobos states, there is no formal mechanism for managing solid waste, despite recurring efforts to implement it. In Juchitan de Zaragoza, for example, the last municipal authorities inaugurated a recycling plant within one of the official landfills, but they never had the budget to operate it and is currently not functioning. However, even if it were, there are several prevalent aspects in these contemporary societies that would still be problematic and would not be able to be addressed through recycling.

Styrofoam containers, for example, are used almost in all parties, such as weddings, baptisms, and *velas*, the biggest and most important traditions in the region. As seen in Figure 22, these disposable containers accumulate in great quantities during every celebration. In wedding, hosts offer multi-course menus, and each of the courses is served on a separate styrofoam container. This means that each wedding guest (of which there are typically hundreds) uses at least three separate disposable styrofoam containers during a single event. This custom comes from the change from clay platters to styrofoam, the former of which was used traditionally for the same purposes as the latter. Moreover, burning trash is a common practice across the region, regardless of its components that may include

Figure 22. At least three styrofoam containers are used and disposed by each guest at weddings in the region, as multi-course menus are served in separate boxes. These parties typically have hundreds of guests.Photo by *Pasa la Voz*, 2018.

plastics, styrofoam, and other hazardous waste. Once more, this practiced stemmed from past behaviors that remained despite the changes in lifestyles. brought by modernization. According to Ms. Cruz Altamirano, burning waste was a traditional practice to get rid of leftovers used to feed cattle. These consisted of several organic materials that did not pose the same threat upon burning as they do today.

Furthermore, the issues of waste management extended to the earthquake response as rubble mismanagement, resulting in a significant amplification of the pre-existing pollution issue. According to Rafael Mayoral Palafox, "Rubble was another problem. There is debris everywhere almost a year after the earthquakes. [Throwing it on the river's edge] was just savage."[91] In conjunction waste and rubble management are now perceived to be two of the most pressing issues in these five towns. This is perhaps because of the palpability of both issues and their effects, shown in Figure 23. This graph shows that more than 90% of the population believes that waste and rubble mismanagement emphasizes other issues such as pollution, deterioration of urban image, street blockages, sewage clogging, and insect proliferation.

Again, this problem is prevalent across societies that face rapid urbanization rates or recurrent disasters. According to Mario Medina, "Incorrect handling of construction waste is a problem you see every day, but everyone has other things in mind. It is something that we learn to live with, that we survive.[92] It is something so close to us, so palpable, that we, unfortunately, do not give the importance it deserves." Therefore, a shift towards actionable goals needs to build on pre-existing understanding of issues. In the case of the Isthmus of Tehuantepec, local residents already have the idea that both trash and rubble may be useful *(see Figure 24),* and this general perception ought to be followed up by investments in increased awareness and behavioral shifts. According to Claudina De Gyves Mendoza, there are places like Juchitan de Zaragoza where this issue needs to be tackled at its core, which are weak norms.

[91] Mayoral Palafox, Rafael, interviewed by the lead project researchers, Oaxaca, August 22, 2018.

[92] Medina, Mario. interviewed by the lead project researchers, Mexico City, June 12, 2018.

DO YO CONSIDER THAT **TRASH/RUBBLE** CONTRIBUTES TO ANY OF THE FOLLOWING ISSUES?
(CHOOSE ALL THAT APPLY)

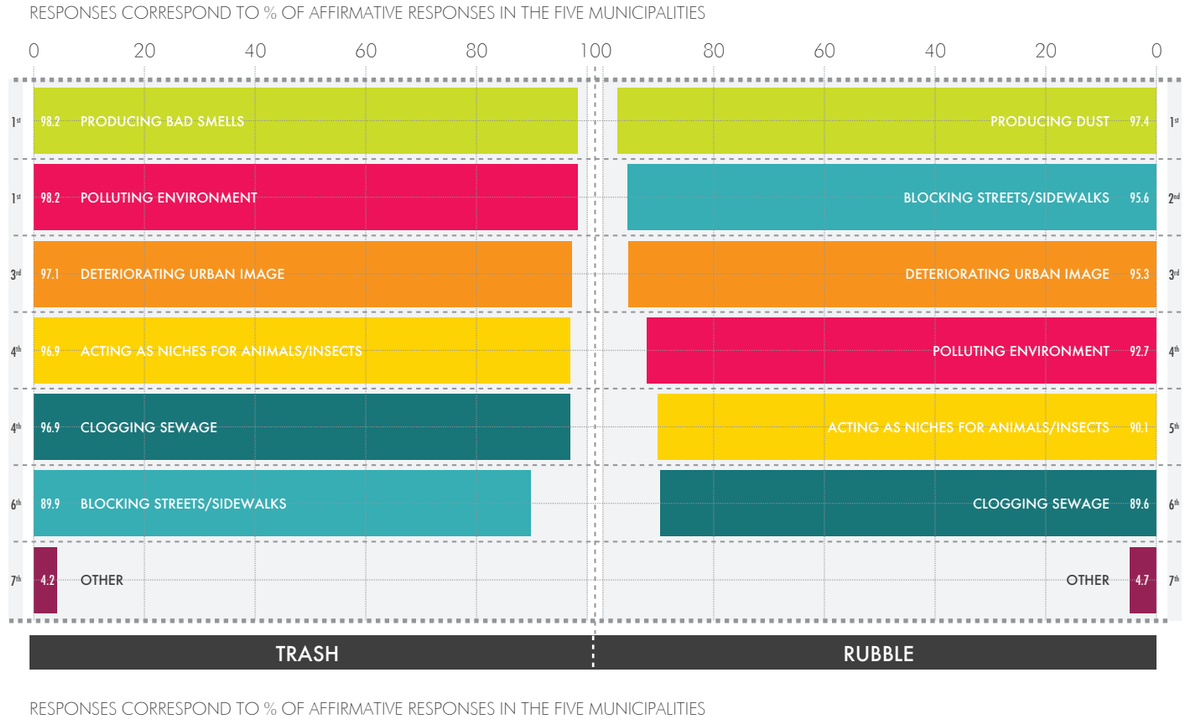


Figure 23. Perception and classification of problems that are exacerbated by trash and rubble mishandling at the level of the region. 2018.

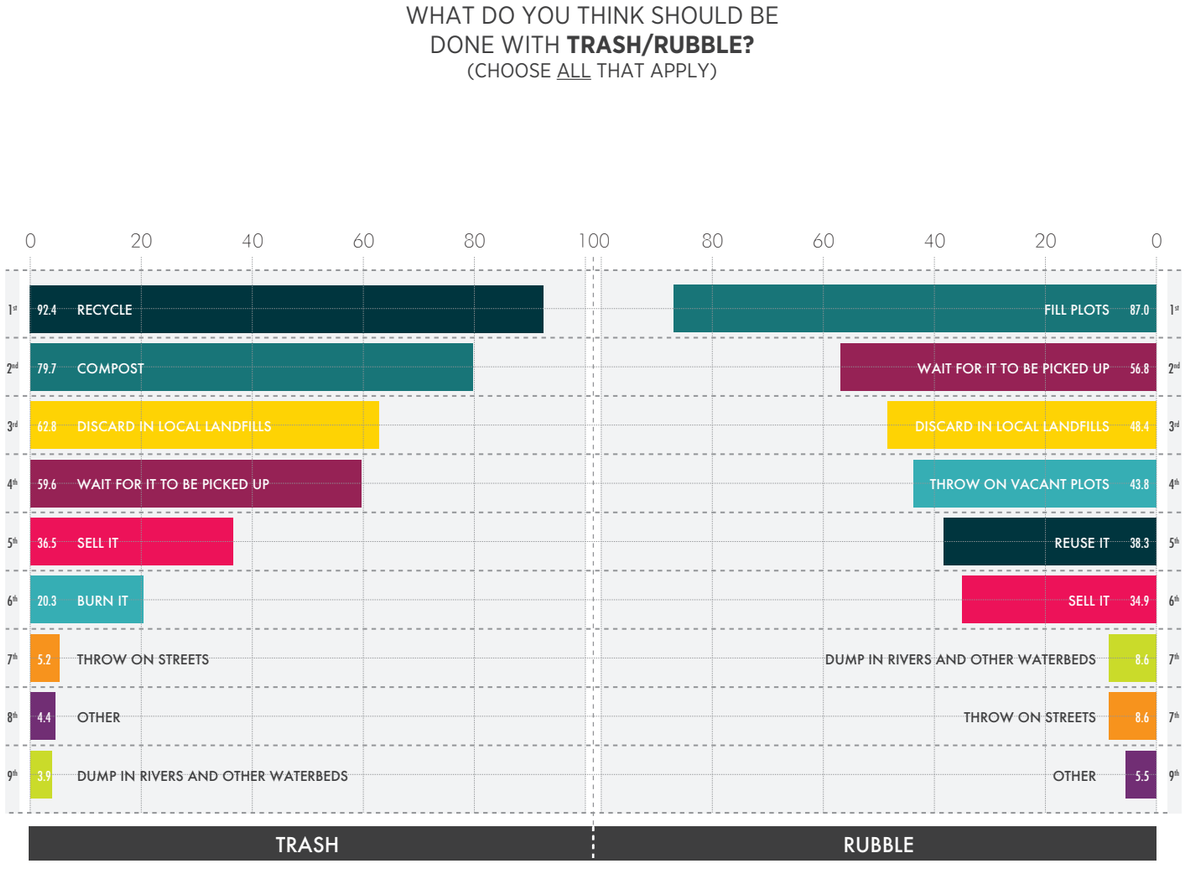


Figure 24. Perception and classification of possible uses for rubble and trash at the level of the region. As a note, there was no functioning recycling infrastructure at the time of the survey. 2018.

> In Juchitan, everything is broken. They need systemic change, to enter a peace-making process, like Medellin, so that people understand that living like that is not right nor is it normal. It's not just about rebuilding and removing the rubble. There is a deeper issue that has to do with culture and social life. It is weird because all the people at the isthmus have a strong sense of identity. People dress daily in traditional clothes; the dishes are very local; the parties are very rooted; the language [Zapotec] is still here... Particularly in Juchitan, there are neighborhoods where people do not even speak Spanish. Normally, this strong identity reflects on other things as well, such as cleanliness. That's when I do not know what happens in Juchitan. None of these identity features help them. It seems that they are wired differently.[93]

Moreover, Ms De Gyves Mendoza argued that there are other issues, such as insecurity, related to a seemingly acceptable state of chaos in the daily lives of places like Juchitan de Zaragoza. In her opinion, the earthquake only made the existing problems much more evident.

> [Ixtepec] is an orderly town. El Espinal is as well. They are spotless. Ixtaltepec is not doing well because of the destruction, but it has always been clean too. Juchitan does not have that. They do not have that culture, and it is a pervasive problem. There is no sense of collective order and cleanliness. They do not have that in their radar as a community. They are so used to being like that, that it spreads to other issues as well, such as insecurity. It's a bubble, and they do not recognize their mess as an issue. The earthquake aggravated it, but that atmosphere was there from before. The quake only made it physically evident.[94]

[93] De Gyves Mendoza, Claudina, interviewed by the lead project researchers, Oaxaca, June 23, 2018.

[94] Ibid.

INSECURITY AND URBAN VIOLENCE

Insecurity is a widespread issue in the region, particularly in Juchitan, and it shows how catastrophic events can exacerbate issues other than those present in the built environment. In Mexico, chronic urban violence is an issue that has worsened over the past decade in the face of changes in national security policies. Ever since President Felipe Calderon Hinojosa launched the *Guerra Contra el Narcotráfico (*War on Drugs) in 2006, thousands of Mexican civilians have become direct or indirect victims of the rapid increase in urban violence throughout the nation. Federal policies of armed intervention against drug cartels and organized crime groups have paved the way for a rising problem of insecurity that reshaped the social fabric of the nation. Media accounts and official ciphers fail to reflect the true complexity of the transformation of some urban centers, given that a lot of the information is lost through a seemingly victorious governmental account of success in the fight against organized crime. Nowadays, a violent and relentless struggle mingled with the everyday lives or the population of several cities that have been abruptly reconfigured due to a chaotic fight between criminal and state forces.

Within days of the start of his presidency in 2006, Calderon Hinojosa launched an unprecedented, unexpected, and controversial fight against organized crime in Mexico. Many believe that his policies broke an "unspoken peace agreement" between the former ruling party and the local drug cartels, which led to the rapid increase of violence throughout the country. On December 11th, 2006 Calderon Hinojosa sent 6,500 soldiers to "end drug violence" in the western state of Michoacan, an event that marked the ultimate spread of conflict in Mexico. As the war move forward through the years urban violence rates rose steeply across mid-sized cities. As armed forces intervened in the attempt to eradicate the drug cartel leaders, the nation underwent an era of pronounced social instability due to the state's relentless fight against cartels (who simultaneously fought each other for control over newly "available" territories). As an example of the effects of rapidly-increasing violence, a CNN report from January 20th, 2012 states that, "according to figures released on January 11 by the Mexican Government, 12,903 people were killed in drug-related incidents in the first nine months of 2011."[95] To make

[95] Fantz, Ashley. "The Mexico Drug War: Bodies for Billions - CNN." https://www.cnn.com/2012/01/15/world/mexico-drug-war-essay/.

a comparison, The United Nations reported a record number of 3,021 civilian deaths as a result of the war in Afghanistan in the same year.[96]

Around the same era, a fleet of rickshaws arrived to Juchitan de Zaragoza as a means to address issues of connectivity and transportation infrastructure, one of Oaxaca's most pressing issues. However, local accounts state that those rickshaws quickly became a complex network of drug distribution and organized crime, managed by local politicians, influential businessmen, and known criminals. Such event brought with it a marked increase in insecurity, which worsened substantially in the past few years. Yet, this problem did not entirely extend throughout the region, as rickshaw were forbidden to enter El Espinal and Ciudad Ixtepec, the two towns with the highest education levels and strongest civil societies.

Moreover, the incoming floating population brought by earthquakes, added to an already a fragile social environment, causing several complications during response and recovery. This claim also reflects in the results of our survey, which show that, regardless of age, interviewees perceived each town to be safer during their childhood. Given that the youngest participants were 18 years old at the time of the survey, this suggests that the marked increased in urban violence happened recently. Figure 25 shows this change by stating that 78.9% of the population in the five towns considered their neighborhood to be very safe during their childhood, a cipher that dropped to 20.8% in the era before the earthquake, 15.4% during the immediate response, and 18.8% 10 months after the earthquake. This is further emphasized by the following quote from Lilia Cruz Altamirano:

> "From September to December, delinquency stopped. Executions ceased. Everyone was in shock. But later it even went up. In Oaxaca, Juchitan is number one in organized crime."[97]

[96] Sieff, Kevin. "Afghan Civilian Deaths Hit Record High in 2011, U.N. Report Says." Washington Post. https://www.washingtonpost.com/world/asia_pacific/afghan-civilian-deaths-hit-record-high-in-2011-un-report-says/2012/02/04/gIQAfyl9oQ_story.html.

[97] Cruz Altamirano, Lilia, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

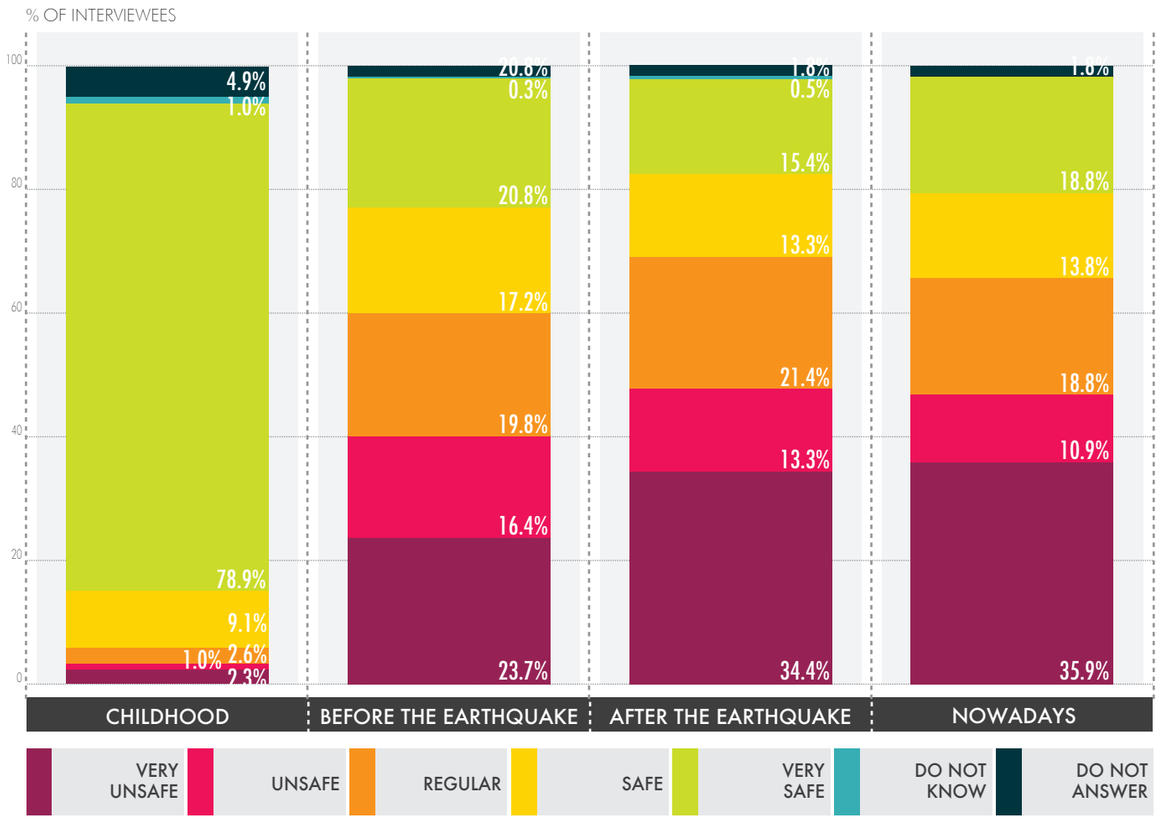


Figure 25. Perception of safety in the region across different time periods. This graph shows how the recent years have witnessed a significant rise in urban violence (as the youngest participants were 18 years old). 2018.

Our workshops also showed similar results. When asked about the aspect that both children and adults liked the least about Juchitan de Zaragoza, half of the responses revolved around insecurity. In contrast, participants in Ciudad Ixtepec expressed that their major concern was waste management.

In short, insecurity impacts response and recovery ways that might not be obvious to outsiders, but that need to be understood before acting. Natalia Toledo Paz, for example, stated the following:

> It's amazing that in a place like this, where it's so hot, does not have more spaces like this public pool. There was a river. I lived it, but now it's dirty. All the rubble was thrown there. The municipality did not do its job. At all. Those things could be avoided. It's ecocide, but no one denounces it. Here, you say something and they kill you. But we should still do it.

Other pressing vulnerabilities included broken transportation networks, inadequate provision of connectivity and urban services, historic managerial neglect, socioeconomic segregation, and tensions between community members and private companies. Yet, these were not the center of our study and should be developed more thoroughly. What their presence does suggest is that there should be a way of regarding all the vulnerabilities addressed in this chapter and condensing their relationships into actionable programs that tackle more than one at once. These interventions should also consider people's understanding of risk and allow for entry point through which communities may be active participants. In such a scenario, the increased resources and sensibility that resulted from the earthquake, could be used during post-disaster recovery to address other pressing (and perhaps more concerning) issues.

CULTURAL ASSETS FOR DISASTER RESPONSE

Ciudad Ixtepec, Oaxaca, 2018

Beyond the physical necessities present before and after a disaster, there is also a great need for social healing, both at the individual and community level. Nonetheless, this is difficult to achieve when recovery actions do not stem from, include, or even understand the strengths and weaknesses of a given society. If a grasp of such cultural traits is present when creating preemptive and response approaches, recovery actions may truly start to move in unison with communities, a much-needed strategy to condense top-down and bottom-up action that tackles multiple vulnerabilities at once throughout an extended time period. Neither one works entirely without the other, as both have assets that need to come together. Top-down action has increased resources and a wider vision of territorial scales, while locals have a better grasp of ever-present issues and their effects on their daily life. Both networks possess valuable knowledge but also threatening weaknesses that come afloat upon misunderstanding or undermining each other's worth. This is not a new idea in ontological research, but its practical outcomes are rare.

At the Isthmus of Tehuantepec, cultural assets are ubiquitous but often misunderstood, resulting not only in their exclusion from the present post-earthquake recovery process, but also from past efforts for community development. It is as if their dichotomous nature as traditional behaviors acting in modern societies rendered them inevident for both outsiders and locals to integrate in their actions. As I will further explain, these assets are mainly related to a strong cultural identity, a deeply-seeded nature for social mobilization, and existing networks of communal solidarity and cooperation. Nonetheless, said characteristics of the region have mingled with modernity in ways that do not necessarily make them obvious at first glance, decreasing people's agency and the capacity for further reflection regarding their inclusion in processes of urban development.

What is needed the most in order to integrate cultural traits in actionable goals is to identify them among current behaviors, disentangle them from negative traits acquired through time, and use them as already existing social forces that are both respectful towards the local context and useful for future development strategies. In other words, there needs to be a way of keeping cultural identity and rituals that come from life patterns of tradition while bringing them into modernity in fruitful ways that allow for local agency to be restored. This, of course, is a fairly complex process when facing emergencies

in unknown contexts, which is why long-term recovery ought to be regarded as a useful time period in disaster-prone cities both for healing from past cataclysms and preparing for new ones. In this chapter, I will explain the different cultural traditions found at the Isthmus of Tehuantepec that I believe could be used to build on social mobilization and the recognition of local autonomy for a more integrated strategy to move forward during and beyond reconstruction.

THE EMERGENCE OF MODERN ZAPOTEC CULTURES

Anya Peterson Royce, an American anthropologist who conducted research and lived in Juchitan de Zaragoza for several years, noted that contemporary Zapotec cultures have three different social classes at their core: high, middle, and low.[98] In every scenario, the wife's affiliation is defined by her husband's occupation. These classes are, of course, associated with economic revenue, but perhaps more so to the type of activity that each family performs to earn a living and access a certain lifestyle. The humblest of the classes refers to people that mainly engage with physical work to support their family; middle class members have office-based employment that does not require manual labor; the high class comprises families that acquire resources from investments and goods and may or may not hold jobs, depending on their preference. As Peterson Royce defines it "it is not about if they work or not, it is about if they *have* to work." Middle and high classes also tend to have the possibility to study outside the region and incorporate Zapotec knowledge into their studies. Thus, they are able to use both cultures to maximize their opportunities both outside and inside their community.[99]

Furthermore, she adds that more classes stemmed from the arrival of "the opposition" (or outsiders).[100] There were two main waves of migration to the Isthmus of Tehuantepec, the first of which occurred between 1840 and 1880 as a result of liberal policies in Mexico that promoted the occupation

[98] Royce, Anya Peterson. *Prestigio y afiliación en una comunidad urbana, Juchitán, Oax.* 1. ed. en español. Colección Presencias; 29. México, D.F.]: Dirección General de Publicaciones del Consejo Nacional para la Cultura y las Artes : Instituto Nacional Indigenista, 1975.

[99] Ibid.

[100] Ibid.

of "unpopulated" areas. As Juchitan de Zaragoza grew and became a prosperous urban center during that time, it also became an immigration hotspot. Incoming people, however, were almost all national, although a few outsiders did arrive at the time (mainly Europeans). The second migration wave happened between 1880 and 1912, with the emergence of the Tehuantepec railway, created to facilitate trade between the United States and South America. During this period, a significantly wider array of nationalities populated the region and settled in alternative places like Ciudad Ixtepec.[101]

This resulted in three new social classes (equivalent to the ones above) arising for the "non-indigenous", Thus, ethnic affiliation became a key factor to be included or excluded from certain groups. This allowed Zapotecs to engage with duality: they were able to maintain their traditional lifestyles through decades, while carefully selecting the aspects of incoming cultures that they wanted to incorporate into their own. For example, indigenous cultures kept their language, clothing, and most important festivities, known as *velas*, but incorporated other celebrations such as parties for *quinceañeras* or products like beer, machine-made *tortillas*, and styrofoam containers. Through these changes, Zapotecs acquired several new customs, particularly those that made their lives easier, which resulted both in positive and negative outcomes. The key component for locals to achieve this was cohesion, as it allowed for the preservation of internal norms, power dynamics, and core economic values.[102]

Moreover, new settlements allowed for each of the five towns we studied to acquire distinct "personalities". As much as all of them share traditional Zapotec lifestyles, they also have other defining characteristics that arose with migration. Juchitan de Zaragoza, for example, is currently the biggest urban area, and, therefore, the most complex. They refer to themselves as an indigenous city, and they have one of the largest Zapotec-speaking populations in the region. They are also known for their

[101] Reina, Leticia. "Las Mujeres Zapotecas del Istmo de Tehuantepec – México en el siglo XIX." *Nuevo Mundo, Mundos Nuevos.*, December 1, 2015. http://journals.openedition.org.ezp-prod1.hul.harvard.edu/nuevomundo/68503.

[102] Royce, Anya Peterson. *Prestigio y afiliación en una comunidad urbana, Juchitán, Oax.* 1. ed. en español. Colección Presencias ; 29. México, D.F.]: Dirección General de Publicaciones del Consejo Nacional para la Cultura y las Artes : Instituto Nacional Indigenista, 1975.

propensity for social mobilization and growing rates of urban violence.[103] Highway blockages, for example, are currently the main form of protest, and they stem from many possible motives, ranging from a loved-one getting fired unjustly to the community demanding better services. Ciudad Ixtepec is currently the fastest growing urban area, as it has recently become the alternative hub due to the turbulent character of Juchitan de Zaragoza. This city has a very organized civil society, and they mainly use it to resist unwanted changes brought by outsiders. hey have successfully prevented the entrance of foreign mining and eolic companies, as well as the rickshaw network associated with increased crime.[104] Ironically, they are the city with the widest array of foreigners embedded in their social fabric, as they used to be one of the stops of the Tehuantepec railway. They also have a significant influx of passerby migrants coming from Central America on board of *La Bestia*, a series of freight trains used to travers Mexico and reach the United States. El Espinal is the smallest town along with Santa Maria Xadani.[105] Yet, they are very different. The former has the highest educational level in the region and one of the highest in the state.[106] They are also known to be a prosperous town of skilled administrators. The latter is the humblest town of them all, the town of fishermen and farmers. They are also the one that speaks the least Spanish, and they are known for their beaches and seafood restaurants.[107] Of the five towns, they also have the most lacking urban infrastructure. Most of their streets, for example, are still unpaved. Lastly, Asuncion Ixtaltepec is the town of the craftsmen. Its center was divided into occupational-oriented barrios like those of the clay and bread makers. Prior to the 2017 earthquakes, they were the town with the most traditional houses in the area. Ixtaltepec endured the highest dam-

[103] "Juchitán, Oaxaca, entre los 10 municipios más peligrosos del país." Oaxaca, May 22, 2018. http://oaxaca.eluniversal.com.mx/seguridad/22-05-2018/juchitan-oaxaca-entre-los-10-municipios-mas-peligrosos-del-pais.

[104] Gilet, Eliana. "Frenan en Ixtepec, Oaxaca asamblea que pretendía dar paso a proyectos de energía para mina canadiense." Desinformémonos, May 31, 2016. https://desinformemonos.org/vecinos-de-ixtepec-frenan-asamblea-que-pretendia-dar-paso-a-proyectos-de-energia-para-mina-canadiense/.

[105] *La Bestia* is a known cargo train that goes from Guatemala to the North.

[106] INEGI. "México en Cifras," January 1, 1998. https://www.inegi.org.mx/app/areasgeograficas/?ag=20#.

[107] Ibid.

age rates with 64.2% of their inhabitants suffering from either partial or total loss of their homes.[108]

Although every municipality has its own particularities, all do share some traits. British social scientist and geographer Doreen Massey argues, that the "local uniqueness" of a place is already a product of different contacts called "global forces," which refers to the relations and connections that happen not only with locals, but also with "externals."[109] At the Isthmus of Tehuantepec, the five municipalities are so close, that they have a clear interchange of characteristics and connections. The connection and communication between them happens all the time, and has happened since a long time ago. Therefore, they do not have a "pure" tradition, but a tradition that has been constructed through time and through different connections and influences, even from different cultures. Therefore, it is difficult to talk about "local uniqueness" since they all share some characteristics, and their culture, we could argue, has been influenced by different nationalities that came through migration waves. However, it is important to find these common characteristics in order to see what are the advantages and what are the limitations of working as a region. Furthermore, Massey talks about boundaries, declaring that "these lines do not embody any eternal truth o places," but rather they are lines that serve to certain purposes as political or economic divisions. Boundaries, although they exist, do not define the identity of the place, a community or a territory. Therefore, in order to create change, we might concentrate on how these places have common characteristics and find a way to influence change through a bigger scale only then local.

Harvey goes further in this topic, declaring that talking about the how the "local" could not be used as a basis for the construction of a radical politics.[110] One of the main reasons is for the local struggle, and the reliance on tradition, as he believes it becomes particular from the place, avoiding progressive

[108] SEDATU. "Censo de Viviendas Dañadas Por Los Sismos Del Mes de Septiembre de 2017," 2018. http://transparencia. sedatu.gob.mx/# and INEGI. "Encuesta Intercensal 2015." National Institute of Geography and Statistics, 2015.

[109] Massey, Doreen. "Places and Their Pasts." *History Workshop Journal* 39, no. 1 (March 1, 1995): 182–92. https://doi.org/10.1093/hwj/39.1.182.

[110] Harris, Cole, and David Harvey. "The Condition of Postmodernity." *Economic Geography* 67, no. 2 (1991): [154]. https://doi.org/10.2307/143544.

change. However, Massey argues that "traditions do not only exist in the past. They are actively built in the present to."[111] So, as Giddens and Hobabswan argue, they change all the time.

All these traits affected the way in which each community engaged with the response after the earthquakes, and they are defining aspects that need to be considered in the search for regional cooperation. In the words of Gonzalo Villalobos:

> You have to approach each community in a different way. Juchitan is complicated and, to intervene, you need to understand their social dynamics very well. When the disaster hit and the aid arrived, there was rapine. People got in line two or three times in a row. And if the aid did not arrive, there were protests. They will always expect something in return for everything. The people of El Espinal are preppy, stingy, rich kids. They do not mingle easily, and they are the most civilized. Ixtepec is the new point of reference for everyone. It grew a lot after becoming the trading point for coffee farmers from the hills. Ixtaltepec is very big. It extends all the way to the highway that connects with Matías Romero. It has money, but it was destroyed.
>
> What they all have in common is the [*Las Nutrias*] river.[112]

As shown in Figure 26, for example, the willingness of people to work voluntarily to restore the damages caused by natural disasters decreased from 91.4% willing to act at the level of their household, to 81.3% at the level of the community, and to 76.0% in the region.

[111] Massey, Doreen. "Places and Their Pasts." *History Workshop Journal* 39, no. 1 (March 1, 1995): 182–92. https://doi.org/10.1093/hwj/39.1.182.

[112] Villalobos, Gonzalo, interviewed by the lead project researchers, Oaxaca, August 20, 2018.

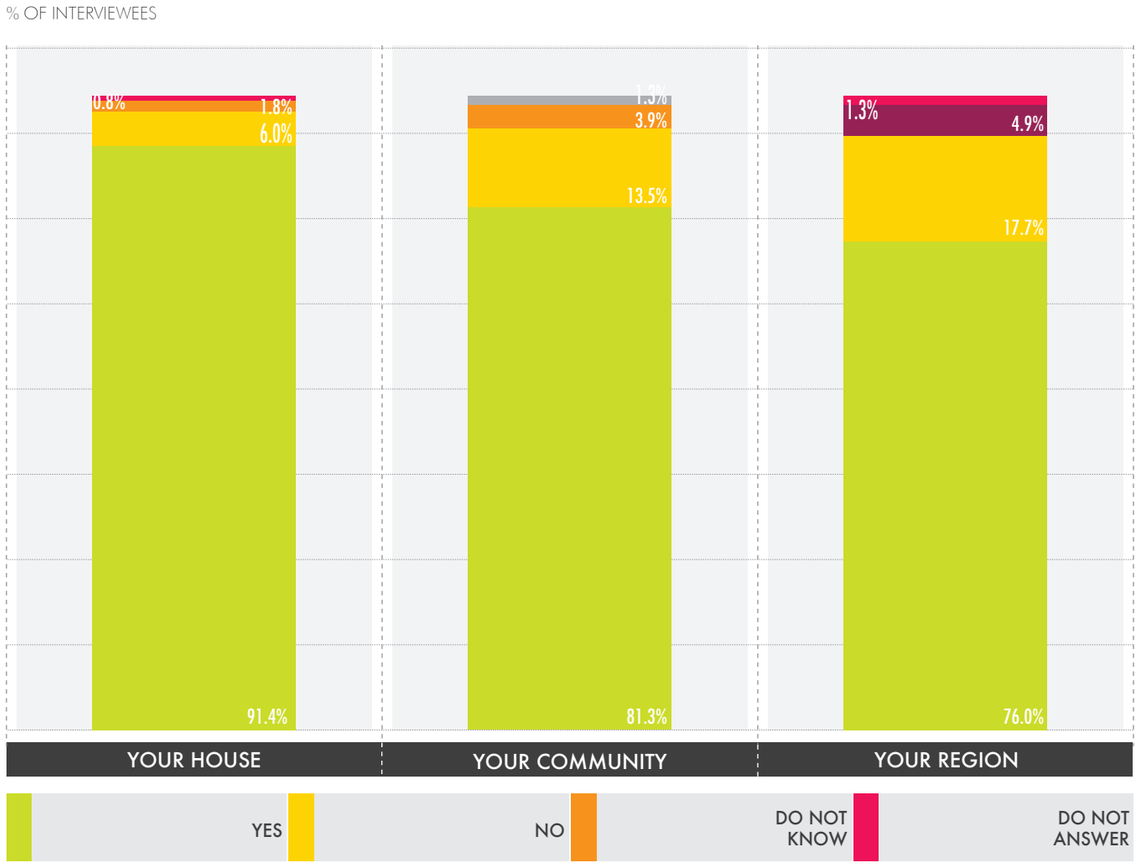


Figure 26. This graph shows the decrease in willingness to participate voluntarily in reconstruction efforts when comparing the level of the household, the community, and the region. However, the majority would indeed participate. 2018.

ZAPOTEC VALUES AND THE COMMUNAL FLOWER

All of these differences resulted in regional complexities that may not be perceived by outsiders at first glance, but define how locals relate to each other. However, to understand community interactions better, it is also important to unpack their similarities, which mainly come from Zapotec culture. As stated in the introduction, these are mainly related to the existence of the Communal Flower, a model proposed by Juan Jose Rendon Monzon to unpack the core structure of these societies.[113] As recapitulation, he argues that all communities differ in setting secondary principles like traditional education, language, and cosmovision, but they share a few traits regarding communality. For him, communality in this region is not a finished entity, but rather an ever-changing way of living that will experience gains and losses as culture evolves. Therefore, the Communal Flower depicts the four main aspects of daily life in indigenous communities as an ensemble of knowledge, institutions, and activities that result in communal life: communal territory, political power, work, and parties.[114]

Perhaps the two most straightforward aspects of the Communal Flower to be regarded as assets for disaster recovery are work and parties, as they can be both easily related to actionable goals for community engagement. Moreover, the existing structures of political power that have historically worked to mobilize the region and allowed for sustained social cohesion, may also be used as the foundation for new models. Communal work, for example, includes a term known as *tequio*, a chain-like system of reciprocal and voluntary work that used to be heavily present in the creation of the built environment. It is defined as "collective work that is organized around projects of the formal municipal authority" and is based upon civic duty.[115] Perhaps one the clearest accounts of this process are found in the following Zapotec poem by Pancho Nacar, which describes a community getting together to build the house of a recently married couple:[116]

[113] Rendón Monzón, Juan José. "La Flor Comunal. Explicaciones para interpretar su contenido y comprender la importancia de la vida comunal de los pueblos indios." vdocuments.mx.

[114] Ibid.

[115] Ibid

[116] Nácar, Pancho. *Cayuu Beñe Yoo*. n.d.

CAYUU BEÑE YOO de Pancho Nácar

Dxeca' cayuu beñe yoo,
ne ma' cayaca ridxi;
cha'ca ni bichagana'
rieche' caluxe lidxi.

Rihuinni stale gunaa
xa ñee *ti du'ga' ro';*
rixhinni cadaapa gueta
ne cayuu beñe yoo.

Chonna tu candaa lu guiiche
ne chupa caguiibi' xuba';
xa ñee *ti yaga biquiiche*
cagaanda' ti rigola zuba.

Rihuinni zuba ique ñee
ti gunaahuiini' sicarú,
cayuni gu'xhu' ludé,
ne rihuinni ruxhuuni' lu.

Ta Cha ne stipa rindisa'
caadxi gunixhi' layú;
ta Pitu canacaa nisa
ne stobi tu rudxiee ñee *yu.*

Bedaganda galaa dxi
ti gunaahuiini' cayacané,
canaguiizi' xiga bupu,
ne ti cha'ca' ruxidxiné.

Fan Chuutu' cutiipi rigubayú
doo ziña liibi gunixhi';
rii cuachi zuba layú
naze bizugue'la' ti'xhi'.

Che Man caguiizi' gueza
ndaani' ti xiga ro';
gati gati riasa ridxi,
ne cayuu beñe yoo.

Ma' guyuu beñe yoo
ne bianadxí ridxi;
cha'ca' ni bichagana'
rieche' biluxe lidxi.

CAYUU BEÑE YOO by Pancho Nácar

Hey! the house is getting covered by mud,
you can hear the ruckus;
the married man is happy
his dwelling culminates.

Several women are seen
under a leafy fig tree;
making *tortillas* until dusk
and the house keeps getting covered by mud.

Three grinding with the *metate,*
two wash the nixtamalized corn;
under a double-necked pitcher tree
an old man rests sitting.

Sitting on her feet you can see
a beautiful young woman,
smoking the stove,
you can see her frowning.

Mr. Cha lifts forcefully
from the floor the wooden beams;
Mr. Pitu carries water
And another one mixes the earth.

At noon
a young lady helped,
distributing cups of *bupu*,
and with a young man she smiles.

Juan "*Chuutu*" whistles while he pulls
the threads of palm;
the pitcher on the ground
is surrounded by wasps.

Che Man distributes cigars
with an enormous cup;
you can hear constantly,
that the house keeps getting covered by mud.

Now the dwelling is done
the ruckus ceased;
the married man is happy
his dwelling is done.

As shown in Figure 27, some organizations, like Cooperacion Comunitaria, have even attempted to put forward this model in current recovery efforts, although the process has not been that simple. According to Olga Zuliga Loera:

> We have tried a different approach with people here. We talk [to them] a lot. We explain the process and the importance of recovering traditional practices. We are not showing them a participatory method because they already have it. They have lived like this, with *tequio*, all their lives. We only invite them to reproduce these dynamics again, but with this different type of project. There is a pervasive assistentialist mindset nowadays, and we don't want to enhance it. People are always waiting for you to give them something. It is understandable, but we would rather emphasize the importance of teamwork. The entire process is intended for each person to find a way to react, to become part of the process. They really can help themselves.

Sadly, *tequio* in construction has all but disappeared in some of these towns, although it still applies for other purposes, such as parties. In the words of Lilia Cruz Altamirano:

> Before, people would call their friends to build the roof of a house. The hostess would give you something to eat and drink. There were no payments. Now, there is no such thing in Juchitan, but it does still happen in smaller towns. We currently pay for everything related to construction, but not parties. For that, there is still cooperation and support. The evident side of the festivities is the tequila, beers, and food, but there is a complex organizational system set-up behind the curtains that consists of *mayordomías* and societies. There is still a ritual. There are even big parties that are done to call the rain, for example, or for there to be fruitful corn harvests.[117]

In these sense, parties show that solidarity and cooperation are still pillars of Zapotec societies, and could be regarded as assets during recovery. Probably, most of the townspeople would classify them as one of their most defining characteristics, as they are the pride and joy of the region. The most

[117] Cruz Altamirano, Lilia, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

Figure 27. *Tequio* for reconstruction of mud houses and kitchens organized by Cooperacion Comunitaria (NGO) in Ciudad Ixtepec. Photo by Cooperacion Comunitaria, 2018.

important of these parties at the level of the community are known as *velas*, a yearly set of communal festivities that may be divided into four categories: those that honor a saint, those related to a sacred space, those based on a group's occupation, and those organized by particularly well-established families.[118] In general, they are hereby explained by Ms. Cruz Altamirano.

> A *vela* is a night dance, an evening [*velada*]. A society organizes the party and rents a large room. Each society is made up of families (or members), and each member brings a stand. The stand is a table where you place your snacks and your beer, which are meant for your own guests. As a guest, you can go from stand to stand. It depends on how many acquaintances you have there. Also, men have to donate a box of beer and women have to cooperate with cash or snacks.[119]

However, these parties also emphasize the issues of social stratification, and they should be understood within said context before moving forward to propose them as models for integration. As Ms. Cruz Altamirano explained, *velas* can be as exclusive as they are inclusive, as participation depends on your social stand. Moreover, they may result in unnecessary overspending in the search for recognition. She explained that some women spend a whole year planning the outfit they will wear during a particular *vela*, which may cost more than five times the minimum monthly wage in the nation.[120] In addition, lavish golden accessories are often used by women to signal economic capacity.

Other important parties are weddings, which also serve as platforms for more successful models of community support. Rendon Monzon explains that weddings work through *apadrinamientos*, a system of sponsors chosen by the families of each soon-to-be-married couple. Sponsors are allocated different chores and have different levels of relevance throughout parties. In other words, being a sponsor means that you will cover one of the different expenses of a wedding, and in return, you can ask for

[118] Royce, Anya Peterson. *Prestigio y afiliación en una comunidad urbana, Juchitán, Oax.* 1. ed. en español. Colección Presencias; 29. México, D.F.]: Dirección General de Publicaciones del Consejo Nacional para la Cultura y las Artes : Instituto Nacional Indigenista, 1975.

[119] Cruz Altamirano, Lilia, interviewed by the lead project researchers, Oaxaca, June 5, 2018.

[120] Ibid.

the same favor eventually. But not all help during parties is based on economic support. There are also models like this one, explained by Ms. Cruz Altamirano:

> There is a term in Zapotec that refers to giving support. For example, if your daughter is getting married, your female acquaintances would give you "their hand." Their job would consist of making snacks or food. It is there, at that moment in the life of the people, where the identity is maintained.[121]

Within this topic, there are also good examples of how locals have accepted and incorporated changes brought by modernization. Admittedly, not all these changes have been positive (like the adoption of styrofoam containers), but they still explain how creating new norms is possible even in societies with such strong traditional values. Sadly, the ones that have understood how to trigger norm cascades through parties are not necessarily the ones interested in helping these communities the most. Beer companies, for example, infiltrated the area by initially offering to sponsor different elements of each celebration. According to Vicente Marcial Cerqueda, there was a longstanding tradition of using *tequio* to build fresh reed roofs for weddings, similar to those shown in Figure 28, which usually take place on the streets of each town. Therefore, said companies began offering pre-fabricated roofs to locals to use during their parties, like the one shown in Figure 29, diminishing costs and labor intensity.

Moreover, weddings tend to be more inclusive, as invitations usually spread through entire towns or happily include foreigners. As a personal anecdote, we passed through Asuncion Ixtaltepec on a weekend and noticed a reed roof covering the street. Upon taking a closer look at it, we started a conversation with some of the family members preparing the party, who were gathered to cook the food for the next day. We exchanged a few words and got quickly invited to return for the party during the next day. We did, of course, and the family's hospitality was overwhelming. More importantly, this happened to us more than once, even when in company of fellow American students. I believe this reveals that parties may perhaps be a good foundation to establish models of cooperation and increased trust between outsiders and locals.

[121] Ibid.

Figure 28. Temporary party roof made out of dry reed. Sometimes, locals close the street to have their parties. Photo by *Pasa La Voz*, 2018.

Figure 29. Example of temporary plastic roof provided by beer company for a party. Photo by Ramón Bragaña for Cortamortaja, 2016.

Using celebrations for recovery in the state is also not a new concept, although it is perhaps a forgotten one. In 1932, one year after the earthquake that decimated Oaxaca City and its surroundings, a new festival known as *La Guelaguetza* was born to help the city recover from the damage it sustained.[122] At the time, the idea was to foster dialogue between the regions, acquire funds for reconstruction, and promote further investment in the area, so the proposal centered on adapting a pre-Hispanic celebration to suit those needs. Thus, *La Guelaguetza* is a celebration that showcases the cultural diversity of Oaxaca in a public setting. To this day it is the most famous tradition in the state, and perhaps even in the country *(see Figure 30)*. Nonetheless, this celebration is no longer associated with the disaster that gave birth to it, as hardly anyone knows its origins. It was never directly associated with vulnerability, and quickly lost its relationship to it. Moreover, some critique it as having become a staged celebration for touristic purposes, as it is now one of the main attractions in the region.

As a new tradition, however, it succeeded in adapting to new realities. As Eric Hobsbawm, a British historian explains, may be invented, constructed, and instituted, particularly if they are flexible enough to reference the past while incorporating the present. In his words,

> The term "invented tradition" is used in a broad, but not imprecise sense. It includes both "traditions" actually invented, constructed and formally instituted and those emerging in a less easily traceable manner within a brief and dateable period (old or new) and establishing themselves with great rapidity. "Invented tradition" is taken to mean a set of practices, normally governed by overtly or tacitly accepted rules and of a ritual or symbolic nature, which seek to inculcate certain values and norms of behaviour by repetition, which automatically implies continuity with the past.[123]

[122] Lizama Quijano, Jesús. La Guelaguetza en Oaxaca: fiestas, relaciones interétnicas y procesos de construcción simbólica en el contexto urbano. 1. ed. México, D.F.: Centro de Investigaciones y Estudios Superiores en Antropología Social, 2006.

[123] Hobsbawm, E. J., and T. O. Ranger. *The Invention of Tradition*. Cambridge: Cambridge University Press, 2005.

Figure 30. La Guelaguetza. Photo by Redacción Imparcial, 2018.

Lastly, within the pillars of the Communal Flower, the role of political power is critical in understanding how and when does strong social cohesion take place in order to use it as a force to incorporate in further action. A good example of the precedents of such power dynamics is the foundation of the Coalition of Workers, Peasants, and Students of the Isthmus (COCEI) a socialist party born in the 1970s out of discomfort with the government authorities of the time.[124] COCEI focused on rescuing Zapotec culture, investing on education, engaging with unions, and seeking for an agrarian reform, which led to their victory in 1981, when Leopoldo De Gyves became mayor of Juchitan de Zaragoza. However, the movement inspired fear to the national opposition and ruling party, the Institutional Revolutionary Party (PRI), as they were the first of its kind to win in Mexico and were feared to be so powerful as to create a significant state in spite of the existing one. After years of pressure and delegitimization by the state, COCEI became less of a controversial and more of a conventional political party in order to survive, but lost several of its followers along the way. Nonetheless, it did set up a precedent for the political force of these communities, who are nowadays much more organized when it comes to resisting unwanted changes in their cities such as the arrival of foreign mining and eolic companies.[125, 126]

In Ciudad Ixtepec, for example, there is currently a group called the *Ixtepecano* Committee for Defense of the Life and Territory, and they constitute one of the strongest civil movements of the town. They were born to deflect mining companies from their region, expressed in their slogan: "The life of towns is weaved through water; the *Ixtepecano* Committee says no to mining."[127] However, they have also acted as leaders during the reconstruction process and now oversee projects related to it. Cooperacion Comunitaria, for example, began working in the region because of a direct invitation from the committee, which effectively allowed them both to reach a more significant portion of the

[124] Campbell, Howard B., and Martha Tappan. "La COCEI: Cultura y Etnicidad Politizadas En El Istmo de Tehuantepec." *Revista Mexicana de Sociología* 51, no. 2 (1989): 247–63. https://doi.org/10.2307/3540686.

[125] Llopis, Enric. "Rebelion. Comunidades de Oaxaca Rechazan Los Parques Eólicos de Las Multinacionales." Accessed May 11, 2019. http://www.rebelion.org/noticia.php?id=246108.

[126] Admin. "Comunidades de Oaxaca rechazan los parques eólicos de las multinacionales – Red Crítica."http://redcritica.net/comunidades-de-oaxaca-rechazan-los-parques-eolicos-de-las-multinacionales/.

[127] Comité Ixtepecano, Vida y Territorio, Facebook page, cover image, August 14, 2016.

population. Together, they spearheaded projects of housing and public space provision, as well as economic revitalization initiatives. This group is fierce, protective, and efficient, allowing for Ciudad Ixtepec to maintain its character despite external interventions. In fact, we faced their resistance as a research group who was originally thought to be associated with American mining companies because we came from an American institution. Upon clearing this misunderstanding, we still had to gain their trust to be able to keep working in the area, so we attended meetings, volunteered to build a community center, and presented our research and goals to some of its members with as most transparency as possible.

Political power may be both an ally or an enemy to outside efforts to intervene during recovery, and they should be considered in the formation and management of proposals within the region. This a double-edged sword, however, as politicization of issues may lead to unwanted clientelistic approaches, who may ultimately be more damaging than beneficial.

THE ROLE OF WOMEN

Outside of the pillar of the communal flower exits another pillar for Zapotec societies: the role of women as heads of households and leaders of these societies. As explained in the introduction, increased migration rates of men in the region paved the way for women to become the main provider for their families, which led to a very distinct social phenomenon in Mexico: the rise of much more egalitarian society (often referred to as a matriarchy).[128] According to Tomas Chiñas Santiago, "Women are excellent administrators. Traditionally, men gave women the profits for management. No one could make isolated decisions, because those always happened as couple. We did not have a matriarchy, we had an egalitarian society."[129] As of today, women hold enormous social capital and cultural prestige, as they are at the front and center of many of the most important traditions in the area.

[128] Miano Borruso, Marinella. Hombre, Mujer Y Muxe' En El Istmo De Tehuantepec. 1.st ed. Antropología (Plaza Y Valdés (Firm)). México, D.F.: Plaza Y Valdés : CONACULTA, INAH, 2002.

[129] Chiñas, Tomás, interviewed by the lead project researchers, Oaxaca, May 25, 2018.

Figure 31. Girl participating in a religious procession, or *regada* in Santa Maria Xadani. These parades consist on participants giving away goods while touring towns to culminate in a religious celebration. Such goods traditionally consisted of fruits, but were soon replaced by plastic containers and other similar artifacts. Photo by *Pasa La Voz*, 2018.

During weddings, for example, it is common to see women celebrating and dancing with each other, displaying their lavish dresses and beautiful ornaments while men remain seated. Moreover, male party clothing is the polar opposite of its counterpart, as it is constituted by mostly unornamented pants and shirts, or *guayaberas*. The same applies for town festivals and religious processions *(see Figure 31)*.

The central role of women has also allowed for another "unconventional" social group (at least in Mexico) to thrive in this context: *muxes*. According to journalist Padmananda Rama, "The indigenous Zapotec culture of Oaxaca is not divided by the usual dichotomies: gay or straight, male or female. There's a commonly accepted third category of mixed gender: people called *muxes*. Some are men who live as women, or who identify beyond a single gender."[130] In fact, *Muxes* are such an essential part of Zapotec identity that they have their own *vela*, known as *La Vela de Las Intrépidas Buscadoras del Peligro* (the Vela of the Intrepid Seekers of Danger). As shown in Figures 32 and 33, they also participate in communal celebrations through their own means and identity.

Understanding the role of gender is particularly important during disasters. According to the United Nations Development Programme, for example, women, boys, and girls are 14 times more likely to die during disasters than men, mainly because of pre-existing conditions of inequality that exacerbate imbalanced access to resources and services.[131] This shows that disasters do not affect everyone in the same way, and suggests that new interventions need to put forward ways of working with the most affected groups within already vulnerable populations to allow for bottom-up action.

In short, recovery practices in this area in particular need to build on networks of reciprocity, a respect for traditions, an understanding of internal social conflict, a careful reading of economic activity, and increased opportunities for female leader interventions. Such models allow for both community engagement and top-down support if embedded within frameworks that prove to be beneficial at the scale of the household, community, and region.

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[130] Padmananda, Rama. "In Mexico, Mixed Genders And 'Muxes.'" NPR.org. Accessed May 11, 2019. https://www.npr.org/sections/pictureshow/2012/05/30/153990125/in-mexico-mixed-genders-and-muxes.

[131] Habtezion, Senay. "Gender and Disaster Risk Reduction." Gender and Climate Change - Asia and the Pacific. United Nations Development Programme, 2013.

Figure 32. A *muxe*-led truck used during a town parade, or *regada*, held after the 2017 earthquakes. The sign reads: "Rescatando una sonrisa entre el escombro y el dolor. Las otras hijas de san Vicente Ferrer (Rescuing a smile amidst the rubble and pain. The other daughters of St. Vincent Ferrer)." Photo by *Pasa La Voz*, 2018.

Figure 33. *Muxes* participating in the same parade mentioned on the image on the left, the *regada*. Photo by *Pasa La Voz*, 2018.

MOVING FORWARD

Asunción Ixtaltepec, Oaxaca, 2018

The real issue is that, in the future, marginalized communities will most likely be destabilized by chronic and unattended phenomenon other that punctual catastrophes. As explained in previous chapters, crises at the Isthmus of Tehuantepec are more likely to be related to water, insecurity, environmental degradation, or socioeconomic segregation, and they could subsequently complicate response upon facing another ravaging natural disaster. If people truly care about diminishing the damage from the next big catastrophe, there are other networks that cannot fall back as a result of narrow-sighted recovery and development actions. Moreover, it is critical to understand that creating these strategies does not always refer to providing public infrastructure goods; it can also mean that actions need to strengthen existing relationships and work with and within the culture of each place. There is a constellation of resources that communities draw upon to make sense of cataclysms, which tend to come from the ground up and are not imposing. These should not be set aside. Proposals ought to understand these resources from within and establish frameworks for partnerships in which local agency is augmented, cultural assets are highlighted, risk perception is taken into account, and vulnerability is understood as a network of interrelated issues, physical or otherwise. Recovery actions need to consider that, were some outsiders may see weakness, there is actually immense strength.

In Oaxaca, these ideas may be put in place by getting people to build on the increased sensibility towards the built environment brought by the earthquakes in order to propose integrative recovery actions to increase local capacity by building on existing societal assets. This is a great opportunity for action at any level, as it lays the ground to think about other vulnerabilities in conjunction with recovery. The challenge is to develop said actions in ways that prevent communities from going back to existing issues , which is what often happens with rushed reconstruction. This may be achieved by being mindful about using culture as a path forward, but also by developing strategies that can be adopted as norms in these communities further down the road. As Rafael Mayoral Palafox explains it, "No one is creating new policies or trying to trigger better behaviors. No one stays here [for extended periods] and helps to trains locals. Everyone comes to give brief talks and leaves."[132]

[132] Mayoral Palafox, Rafael, interviewed by the lead project researchers, Oaxaca, August 22, 2018.

So, what would be a framing of cultural traditions that allows people to focus their attention, not only on earthquakes, but also on other issues in which they have agency without realizing it? And which aspects should such framing consider to stay alive throughout time? To begin with, a few of the most successful interventions we found throughout the region were spearheaded either by locals or by highly diligent non-profit organizations, both of which lack the resources to impact a wider scale but possess great levels of trust and resources within communities. Trust building is as essential as it is complex, which suggests that, perhaps, it should be at the front and center of the creation of culturally-aware solutions, alongside the understanding that the solutions need to tackle more than one vulnerability at once. Recovery models should build on existing networks rather attempting to impose new ones expecting full cooperation. To do so, they need to be mindful of traditions, internal conflicts, and social strengths. Communities like these need this type of sensitivity to stay on the trajectory of using the synergy that emerged from cultural traditions and social structures to face multiple looming threats.

NEW MODELS FOR THE ISTHMUS OF TEHUANTEPEC

There are programs already in place that build on solidarity built on social traditions, but they are yet to be flexible and far reaching enough to truly address the next big crisis. Cooperacion Comunitaria, is a non-governmental organization working in Ciudad Ixtepec that has implemented some the ideals described above. They are a group of architects, engineers, and social science experts from Mexico City that work with rural and indigenous communities throughout Mexico to promote self-sufficiency by transferring knowledge through active community engagement. They arrived at the region shortly after the earthquakes after receiving an invitation from one of the most active social groups in Ciudad Ixtepec, the *Ixtepecano* Committee for Defense of the Life and Territory, and they have remained there since then. The committee was familiar with their work and knew that they had important resources within the region (as the NGO's director is married to one of the most well renowned artists from Juchitan de Zaragoza). This made them an ideal candidate with well-established credibility within and outside the community.

Their success relied on developing strategies that listened to people's requests before engaging in action. They could do this because Ciudad Ixtepec was one of the last to receive aid, as the extent of the damage in Asuncion Ixtaltepec and Juchitan de Zaragoza consumed most of the resources allocated by the state for immediate response. Instead of solely focusing on providing rapid housing reconstruction, they understood that women, as heads of several households, needed help to reactivate their economy more than anything Therefore, they proposed programs to rebuild kitchens and ovens with traditional techniques, like *tizón y zoga,* and through traditional methods, such as *tequio*. This way, they focused on more than reconstruction by working towards the recovery of quasi-lost values and promoting knowledge about safe building methods in an area that relies heavily on self-construction. One of the most pressing problems with developer housing models presented earlier in this study is that they rendered future adaptations almost impossible, as alterations of their physical structure could signify danger to its inhabitants. These words by Natalia Toledo Paz illustrate this idea better:

> Here, a house is built over time, according to your resources. Each generation increases a room. It is done little by little. It is always collective.[133]

In addition, the model of Cooperacion Comunitaria was flexible enough to adapt to the local context quickly and constantly. For example, they were one of the first to hire passerby migrants for reconstruction, helping them get integrated into the social fabric of the town more successfully. They also adapted quickly to the reality of building with brick in safer ways, as it was not originally their specialty. Finally, they provided communities with opportunities to intervene in the creation of both public and private spaces. Figure 34, for example, shows one of their ongoing projects that moved beyond housing and kitchens: an arts and trades community center. Their understanding of the need to combine actions for the built, social, and economic environment allows them to tackle both recovery and pre-existing flaws at once. However, their progress has been relatively slow in comparison with other developers in the area, which has led them to lose several participants along the way.

[133] Toledo, Natalia, interviewed by the lead project researchers, Oaxaca, May 28, 2018.

Figure 34. Center for Arts and Crafts in Ciudad Ixtepec. Project by Cooperación Comunitaria (NGO). Photo by Cooperacion Comunitaria, 2018.

Another successful model is the one of *Una Mano Para Oaxaca*, a non-profit organization working in Asuncion Ixtaltepec. This group of three young women (two Mexican and one French) from Queretaro, a city north of Mexico City, arrived to provide help in the region during the immediate aftermath of the earthquakes. They have also been there ever since, and their activities and programs have adapted constantly to local needs. Upon partnering with two other local women, they engaged in a wide range of activities, spanning from oven reconstruction to arts workshops. One of their most notorious actions, aside from helping rebuild the town, has been to work on recuperating its social fabric.

Through the creation of diverse workshops to promote awareness, arts, and culture, this organization has managed to obtain sufficient trust to engage the community in the preservation of their natural environment and reactivation of their economy, two issues that were present much before the earthquake. This organization has understood principles as simple as the fact that the main public spaces in this town are the streets themselves, using them for the promotion of culturally-aware recovery. As seen on Figure 35, they reached out to several of the last craftsmen in town and offered them murals outside their houses that highlighted their particular fading trades. This came hand-in-hand with an offer for them to train young adults in their crafts, ensuring that those do not get lost. This way, they infiltrated the town and promoted culture, while effectively providing emotional support to several of the victims from the earthquakes.

In conjunction with a colleague, I also worked on a third exploratory model of how we envisioned the broader ideas of this thesis to unravel in the context of the Isthmus of Tehuantepec. With the help of Gretchen Brion-Meisels, a professor from the Graduate School of Education at Harvard University, we developed the core structure of a program to support recovery in the region. Our program intends to connect four seemingly unrelated conditions that we believe ought to work together to increase the capacity of local governments and communities to deal with recurrent natural disasters.

Firstly, the program builds upon the understanding that the reconstruction period of a disaster-prone urban area is an intense city builds moment in which the involvement of communities is essential, mainly because they could acquire skills to help them recover from the present disaster while preparing for the next one. Secondly, the program advocates for the need to increase environmental risk awareness in communities that refuse to relocate in the face of recurring catastrophes. In other words,

Figure 35. Examples of murals made by Una Mano Para Oaxaca as an impulse for local economy in Asuncion Ixtaltepec. Photos by *Pasa la Voz*, 2018.

it works with the idea that, if people will continue living in the same cities regardless of their disaster-prone conditions, they should at least know as much as possible about their geographic environment to know what to expect from it. Thirdly, the program aims to bring together and reformulate uni-sectoral aid programs because the effects of a catastrophe cut across scales, government sectors, and pre-established political boundaries. Lastly, the program advocates for a culturally-aware participatory process, that in this case, is the creation of a women-led network of reciprocal labor based on reciprocity.

Building on these conditions, we believe that if we were to develop a program to hire women and provide them with technical assistance to rebuild a public space using rubble from the earthquakes, they would then develop skills that could allow them to reinforce or rebuild their own houses during a second stage of the same process. This intervention would then advocate for the need to develop integrative disaster governance strategies that empower local administrations and communities through capacity building in everyday urbanization practices.

As I have previously explained, rubble mismanagement is a critical concern during reconstruction given its pernicious environmental effects, so we regarded it as an asset to aid the recovery process at the Isthmus of Tehuantepec, create employment locally, preserve the remembrance of disasters, and provide safer construction systems for people to inhabit. Yet, given the potentially negative perception towards safety in using rubble for reconstruction, we did not believe that an intervention like this should begin by rebuilding houses, but instead, a public space. This way, people could develop the skills, learn how to use the new technique, see it in action, and gain trust in it while setting an example for the rest of the community. Moreover, the success of a program like this could set a positive example for the other neighboring communities as well given the politically neutral nature and strategic geographic position of Asuncion Ixtaltepec.

In short, we devised a multi-step program for the municipality of Asuncion Ixtaltepec to hire local women who were already working together in rubble management *(see Figure 36)* through pre-existing aid programs and financing mechanisms to improve the public realm while developing skills that would then allow them to reinforce their own houses as part of the second stage of the process *(see Figure 37)*. Within Asuncion Ixtaltepec, we chose the "Margarita Maza de Juárez Elementary School"

Figure 36. Zapotec women working at the Las Nutrias riverbank in Asuncion Ixtaltepec, scavenging steel in the rubble from the earthquakes. Photo by *Pasa La Voz*, 2018.

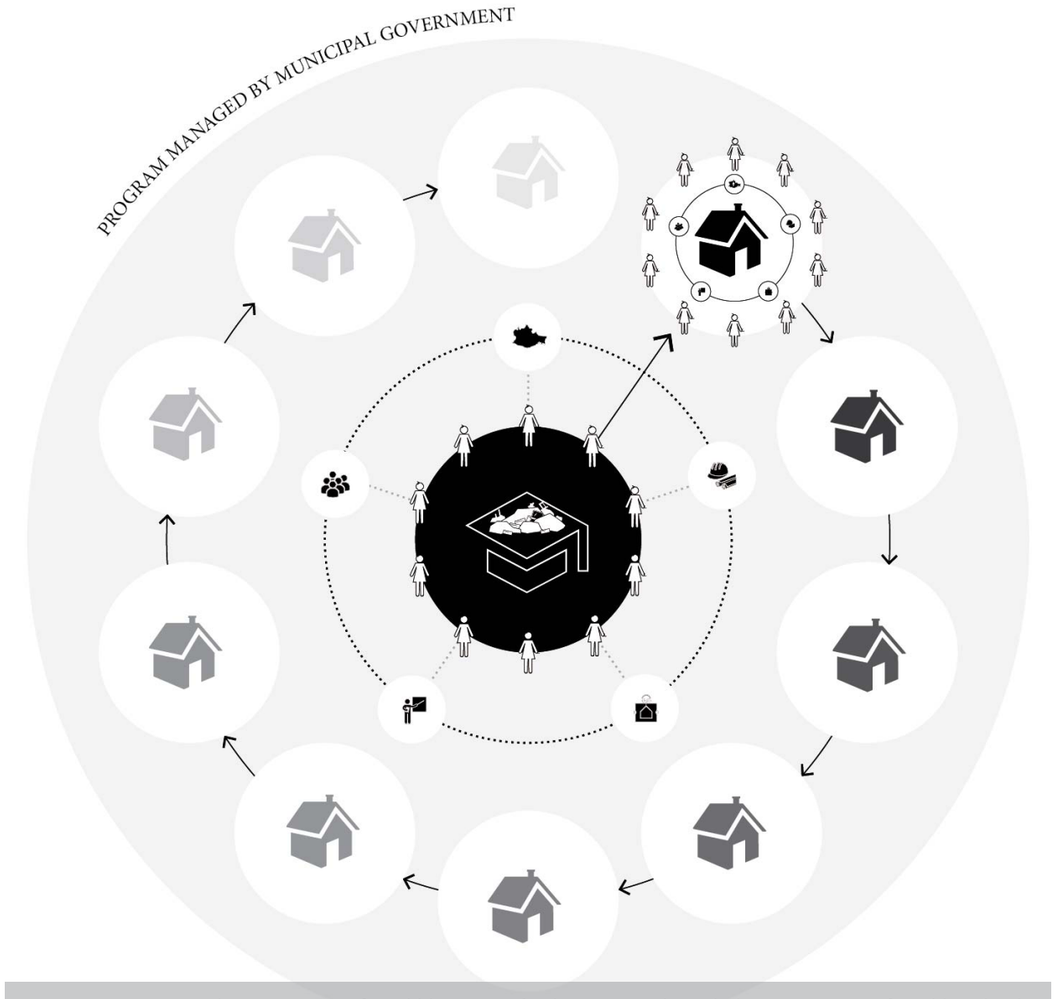

Figure 37. Diagram explaining program for rubble reuse and risk awareness through the construction of a public school in Asuncion Ixtaltepec. Diagram by Deni Lopez and Betzabe Valdes, 2018.

as a potential entry point for several reasons. As shown in Figure 38, the school is located in the center of the town along the main avenue used to go from Juchitan de Zaragoza to Ciudad Ixtepec, making its location very valuable. Moreover, the school was "temporarily" rebuilt by the federal government using very precarious materials such as plastic and tin, in contrast with the more climatically adapted materials used previously like bricks and tile. We put quotes on temporarily because a year and a half after the earthquakes there were no foreseeable plans to rebuild the school permanently. In addition, the school's structure is divided into classroom pavilions that resemble the structure of a traditional house, allowing us to easily explain to people how their new construction knowledge could be transferred to their private spaces. We also believe that many people would be interested in participating in the reconstruction of the school due to its relevance as a public space that has an impact in the whole community.

Models like these could begin to address the issues put forward on this thesis, but they are by no means the only possible solution. In fact, there is no one solution, but rather a need to explore a network of ideas and actions that work towards a common goal in several simultaneous scales (individual, sub-local, local, and regional). What the ideas do offer is insight on how to use the historical value of solidarity networks to act for future actions, a vision that is currently not present. Moreover, they suggest means by which communities are allowed to be a part of the creation and recreation of their environments, hopefully giving space for awareness to combat the pervasive effects of ill-informed risk perception, such as the one described here by Rafael Mayoral Palafox:

> What is happening now is that the masons are the ones calling the shots, building alongside the people, their fears, and their perceptions. Even when some specialists, geophysicists, have come to talk and try to explain what happened, it is very complicated. People are afraid. Masons are too. And then they agree with each other. Reconstruction is happening incorrectly. The house may look okay from the outside, but they are not tackling the heart of the issue. They are overspending.[134]

[134] Mayoral Palafox, Rafael, interviewed by the lead project researchers, Oaxaca, August 22, 2018.

Figure 38. Map showing the "Margarita Maza de Juárez Elementary School" as a possible location to start the program. Map by Deni Lopez and Betzabe Valdes, 2018.

Moreover, none of these models is part of a larger effort that works at the regional scale clearly. The ecologies in which they act are substantially reduced, and they could probably benefit from the networks of support present in state and its institutions. Nonetheless, having faced historic neglect from national authorities, the communities at the Isthmus of Tehuantepec were reluctant to establish those partnerships with them, an aspect that delayed recovery significantly. It is not easy for top-down takeovers to prosper, particularly coming from the stakeholders held accountable from pre-existing problems to begin with.

Moreover, outsiders (both national and foreign) need to be mindful in regard to trust building before jumping into rushed actions. One of the first stories we heard upon arrival was that a group of academic researchers working on project development a few years before had been expelled from Juchitan at gunpoint after making proposals deemed inadequate. To us, this was a major red flag, which is why we dedicated as much time as possible to gain the community's trust before engaging on deep research. The problem with outsiders is that they have historically visited the region to profit from it, making it difficult for locals to trust them quickly. In the words of Rafael Mayoral Palafox:

> Why aren't we all living in abundance here? There have been plenty of [development] projects, but they all come as if they were the first. They come to discover the warm water, but the water here is already rotten. There are too many existing conflicts already and they come to add to them by not taking the time to understand them.[135]

In here, perhaps more than creating regional cooperation networks, recovery programs need to work together towards a common goal through achievable outcomes in each ecology of solidarity Moreover, these actions could integrate new partnerships that are currently not considered, such as non-profits, schools, and universities, the most trusted institutions after the church, according to the results of our survey *(see Figure 39)*.

[135] Mayoral Palafox, Rafael, interviewed by the lead project researchers, Oaxaca, August 22, 2018.

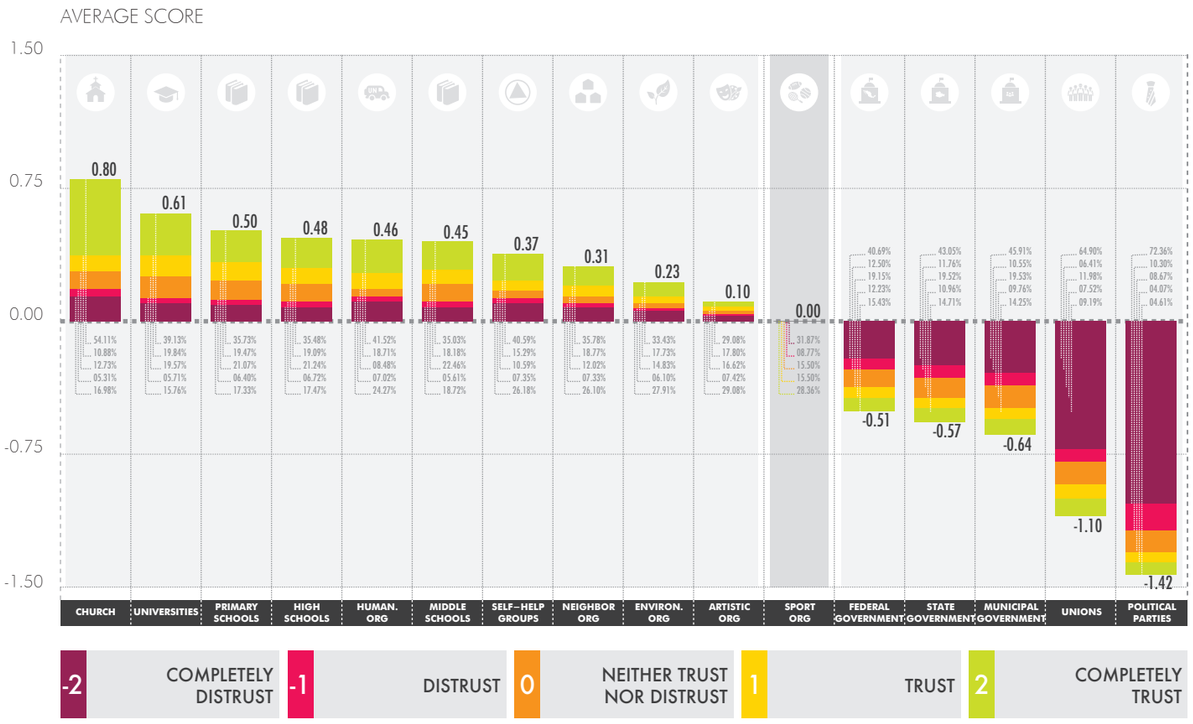

Figure 39. The most trusted (left) and least trusted (right) organizations and institutions. The first three are the church, universities, and schools, while the last three are political parties, unions, and all levels of government. 2018.

The integration of vulnerabilities, local beliefs, and cultural strengths for recovery is also not new in Mexico. There are stories of success within similar context that could also be regarded as option in the search for better development strategies. In fact, Christina Siebe Grabach, shared one of this with us:

> Sometimes catastrophes are useful. I know cases of communities that made an incredible catharsis after a disaster. They organized themselves and are now very prosperous. An example is Nuevo San Juan Parangaricutiro, next to the *Paricutín* volcano [in the state of Michoacan]. The volcano exploded circa 1940. Everyone had to evacuate, but the lava moved so slowly that there were people who thought that nothing was going to happen to them. They ignored the authorities and did not want to leave. Luckily, the lava went around the church, and many thought it was because *el santito* [the saint] was watching over them. The town priest took advantage of that to convince the population to move saying that *el santito* was the one who wanted them to do so. He organized a procession and saved many lives. However, all agricultural land was covered with lava. It was no longer possible to harvest. Then the priest and two other community leaders, one with expertise in law and another in administration, organized the entire community to rebuild and take advantage of the surrounding forest, leaving agriculture aside. This is how they created a community that exploits forests on land assigned to them by the government. They are very prosperous. They have a community assembly, a sawmill, a furniture factory, an ecotourism plan, and other community-managed companies. And there are several other indigenous communities like those [throughout Mexico].[136]

[136] Siebe Grabach, Christina, interviewed by the lead project researchers, Mexico City, August 27, 2018.

CONCLUSIONS

El Espinal, Oaxaca, 2018

The decimating earthquakes that hit the south of Mexico in 2017 revealed several long-standing problems throughout the Isthmus of Tehuantepec, both related and unrelated to the disaster itself. Some of these were apparent to the societies that lived with them routinely, but others were not, as they had become norms throughout the years in the face of historic neglect and segregation. Aside from the damages to the housing stock and public spaces, the disaster exacerbated issues of environmental fragility, lacking connectivity, and deficient infrastructure (among others) on top of a fragmented social cohesion hidden behind seemingly-shared traditional values within indigenous Zapotec communities. In addition, top-down recovery practices, instituted through a centralized system of disaster response, rendered local agency and community engagement useless for the facilitation of outsider interventions in the area.

To address these issues and create viable possibilities for action, there needs to be a more comprehensive understanding to re-frame the role of cultural mindsets and local traditions in a way that they are productive at the level of the household, community, and region, as well as within other tangible and intangible boundaries. In other words, small and mid-sized communities need comprehensive vulnerability programs that build on their culture, offer viable entry points for residents to take part in the recovery process, and help tackle multiple systemic deficits that ought to be resolved before the next major crisis hits. Moreover, there is a pressing need for critical evaluation of who makes the decisions during recovery and how are those decisions made in order to integrate the strengths from above and beneath.

Throughout this document, I explained how local risk perception and societal norms help explain why communities have been unable to be significant players in the recovery of their cities. I also provided data for the critical assessment of various vulnerabilities in the region to provide for a wider framework of action that is mindful of the past but also projective and practical. In this case, the severity of the earthquake opened the door for increased interest in a historically neglected area, allowing for an actionable mindset focused on recurrent and more pervasive threats.

Nonetheless, these bigger ideas may extend to other areas where a critical assessment of boundaries, cohesion, and cultural assets is much needed not only for recovering from a disaster, but also to work for betterment, and development that builds on the understanding that attending a single event is not enough.

These communities do not need earthquake recovery plans, they need strategies to tackle vulnerabilities with the tools that are already in place. Yet, this is easier said than done. This thesis provided some examples of such a new framework, but those could take on many other shapes, insofar as they create consciousness and strengthen capacities to deal with potentially unforthcoming futures. In the end, interrelated vulnerabilities need to be tackled to decrease the amount of damage that another big catastrophe could bring, so connecting them with each other and the ravaging catastrophe itself could be very useful. The idea is to explore if, despite the weakened ties, these communities realize that there are other pressing issues to be addressed in conjunction with the one that currently seems worthier of attention.

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APPENDIX A

Comex

MERCURIO
Coca-Cola

FACTE

Sin ambiente
¡No hay futuro!
Protejamos nuestro ambiente

UN PUEBLO CULTO
CUIDA SUS ÁREAS
VERDES
JUNTOS HAREMOS
DE NUEVO HISTORIA

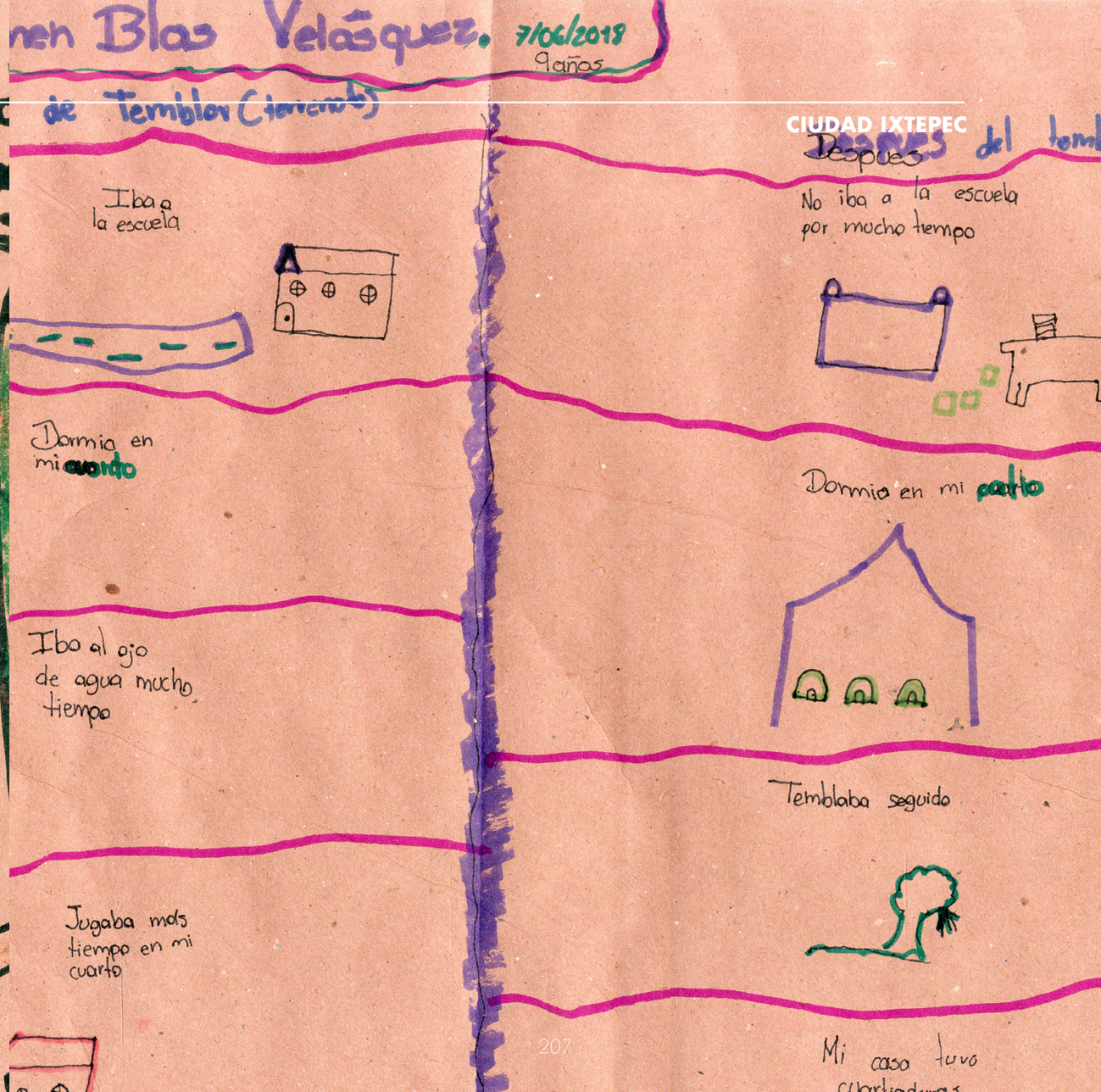
"CINE CLUB" CIELO ABIE
VERDE

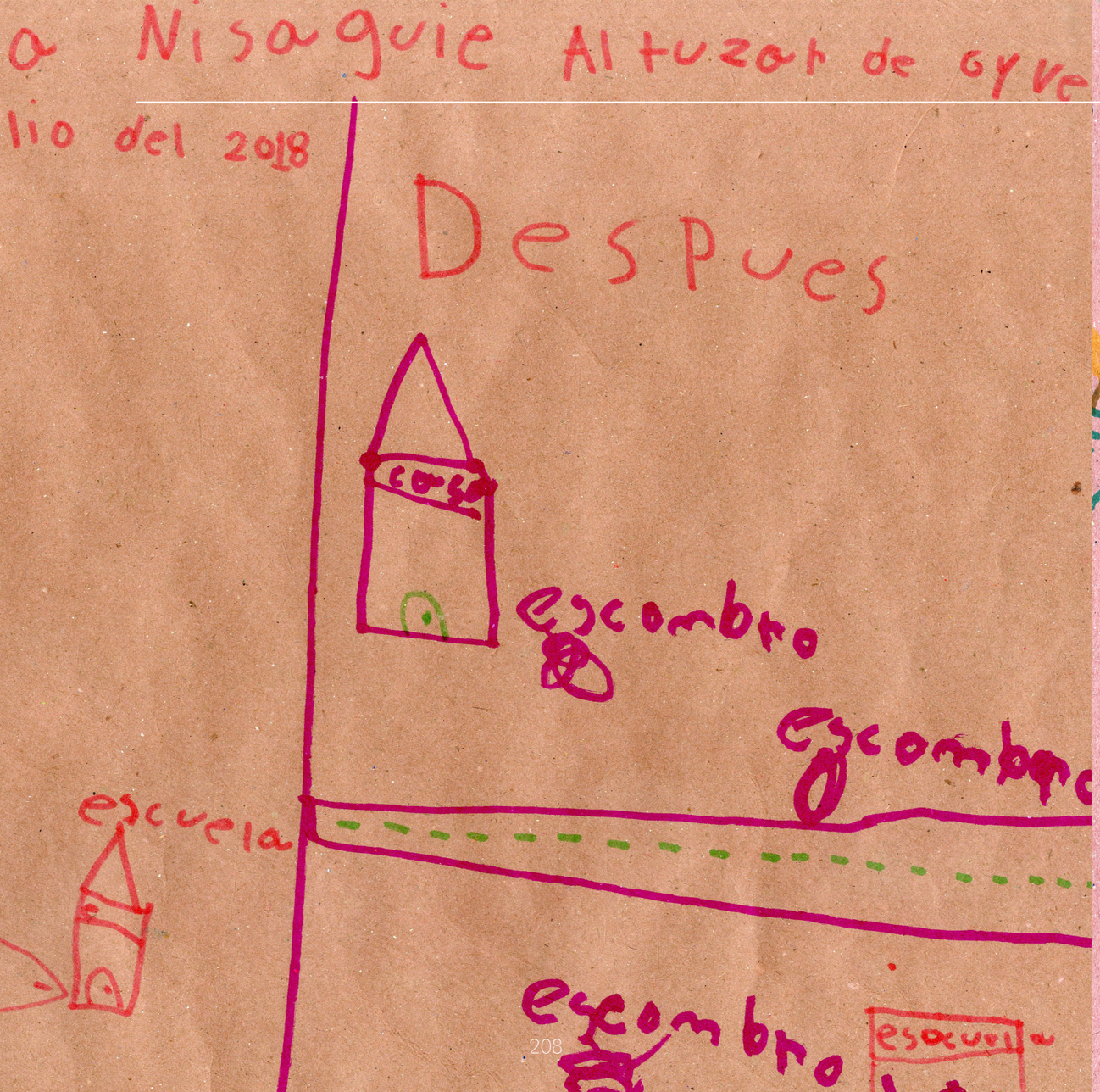
JUCHITAN DE ZARAGOZA

CALLE
JOSEFA ORTIZ

APPENDIX B

e Antonio cabrera. 10 años.
de septiembre del 2017.
Despuès 23
septiem 2017
grietas. grietas
grietas
grietas
Escuela

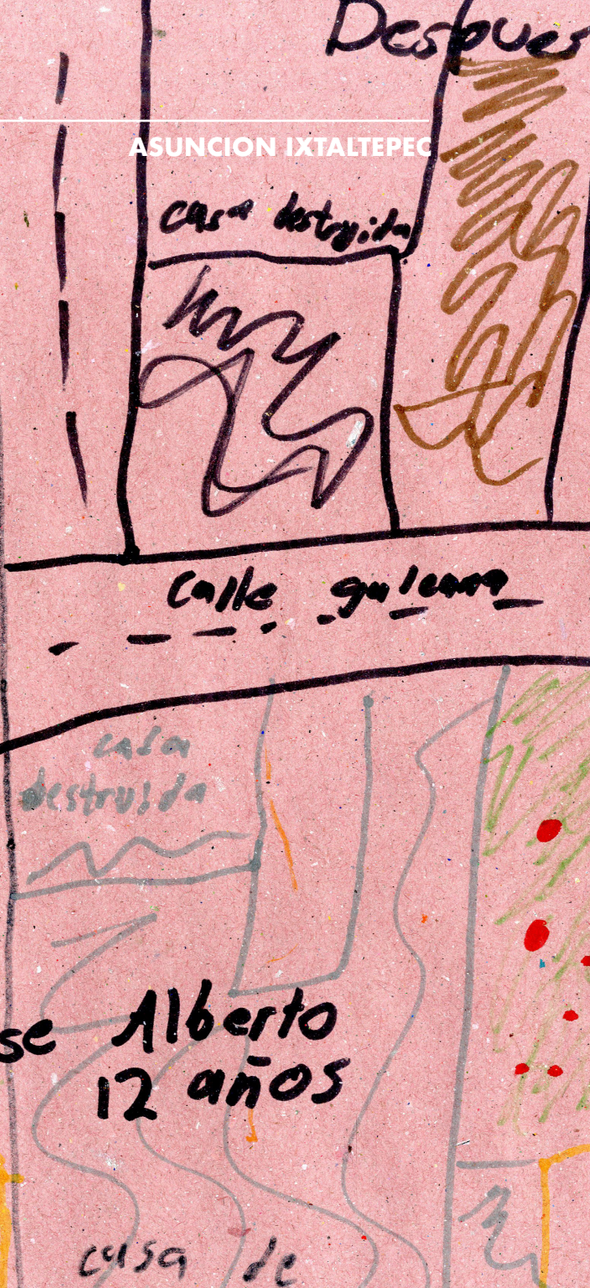

nen Blas Velásquez. 7/06/2018
9 años
de Temblor (terreno)
Iba a la escuela
Dormia en mi cuarto
Iba al ojo de agua mucho tiempo
Jugaba más tiempo en mi cuarto
Despues del temb
No iba a la escuela por mucho tiempo
Dormia en mi cuarto
Temblaba seguido
Mi casa tuvo

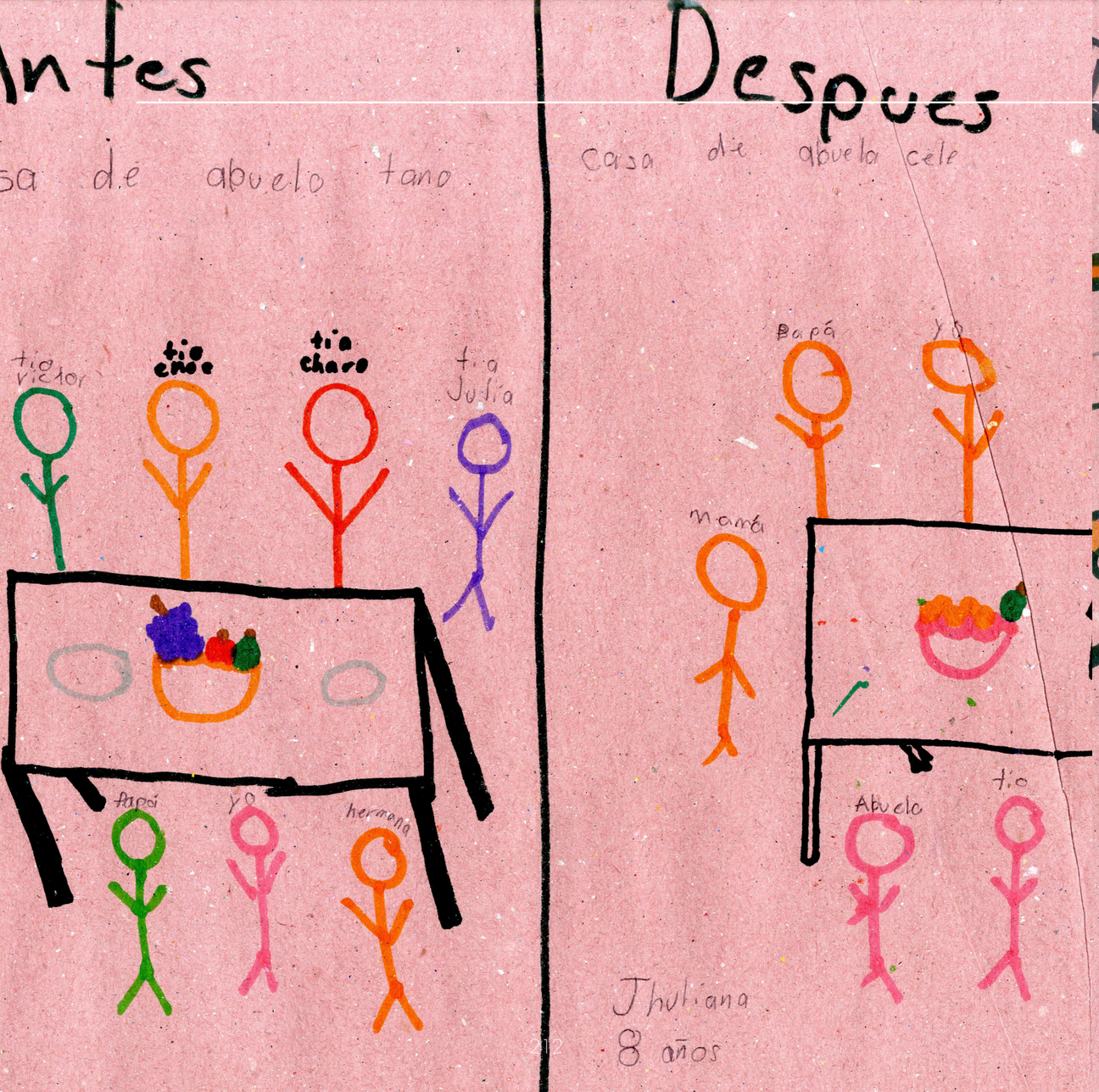

a Nisaguie Altuzat de Gyve
lio del 2018
Despues
escombro
escombro
escuela
escombro
escuela

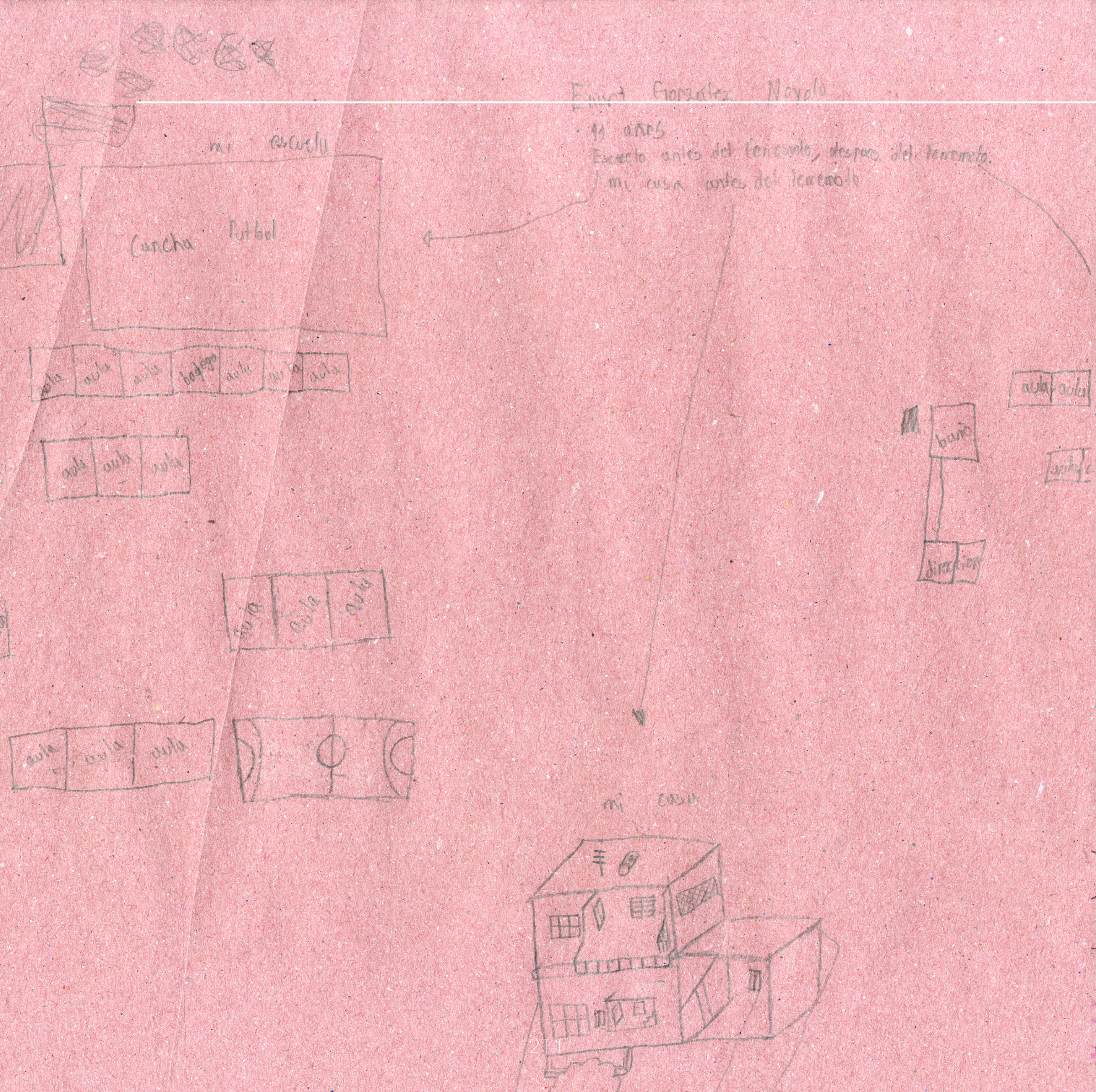
NTES
DESP

RIO DE LOS PERROS
vegetacion
Rio
Escombros

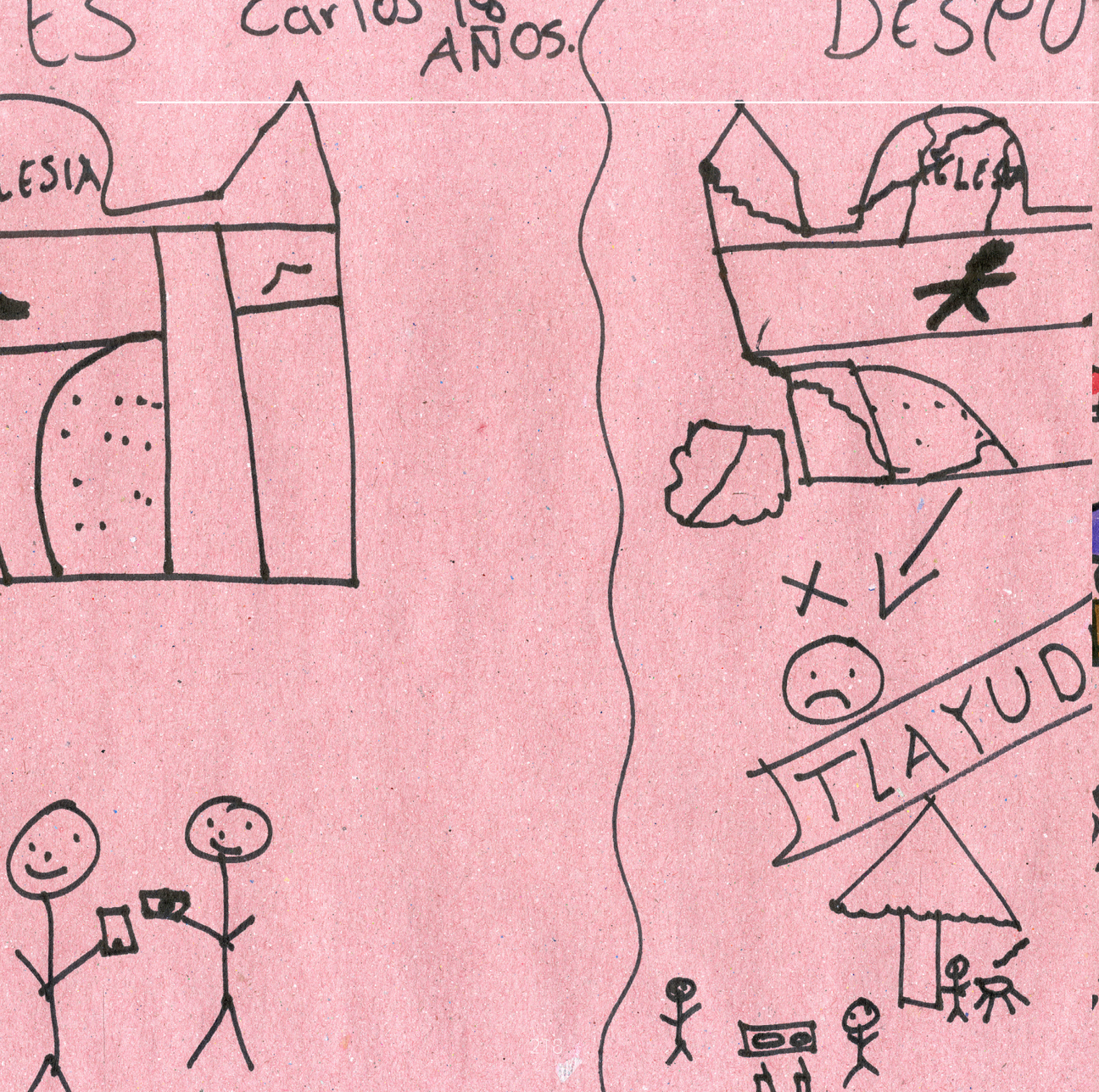
Antes
Escuela
calle galeana


Despues
Casa destruida
Calle galeana
casa destruida
Jose Alberto
12 años
casa de

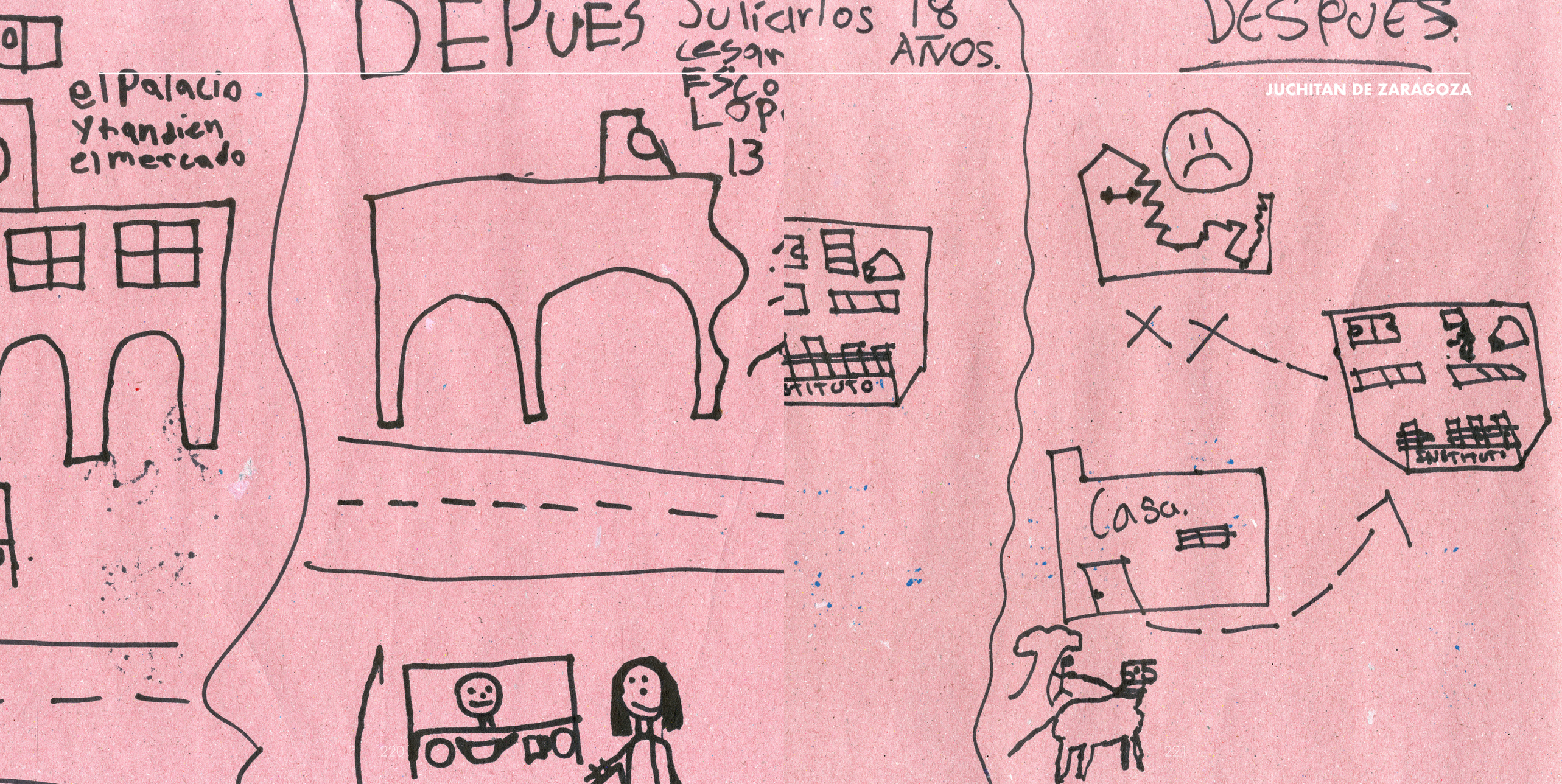

Antes
sa de abuelo tano
tio victor
tio enoc
tia charo
tia Julia
papá
yo
hermana
Despues
casa de abuela cele
papá
yo
mamá
Abuela
tio
Jhuliana
8 años

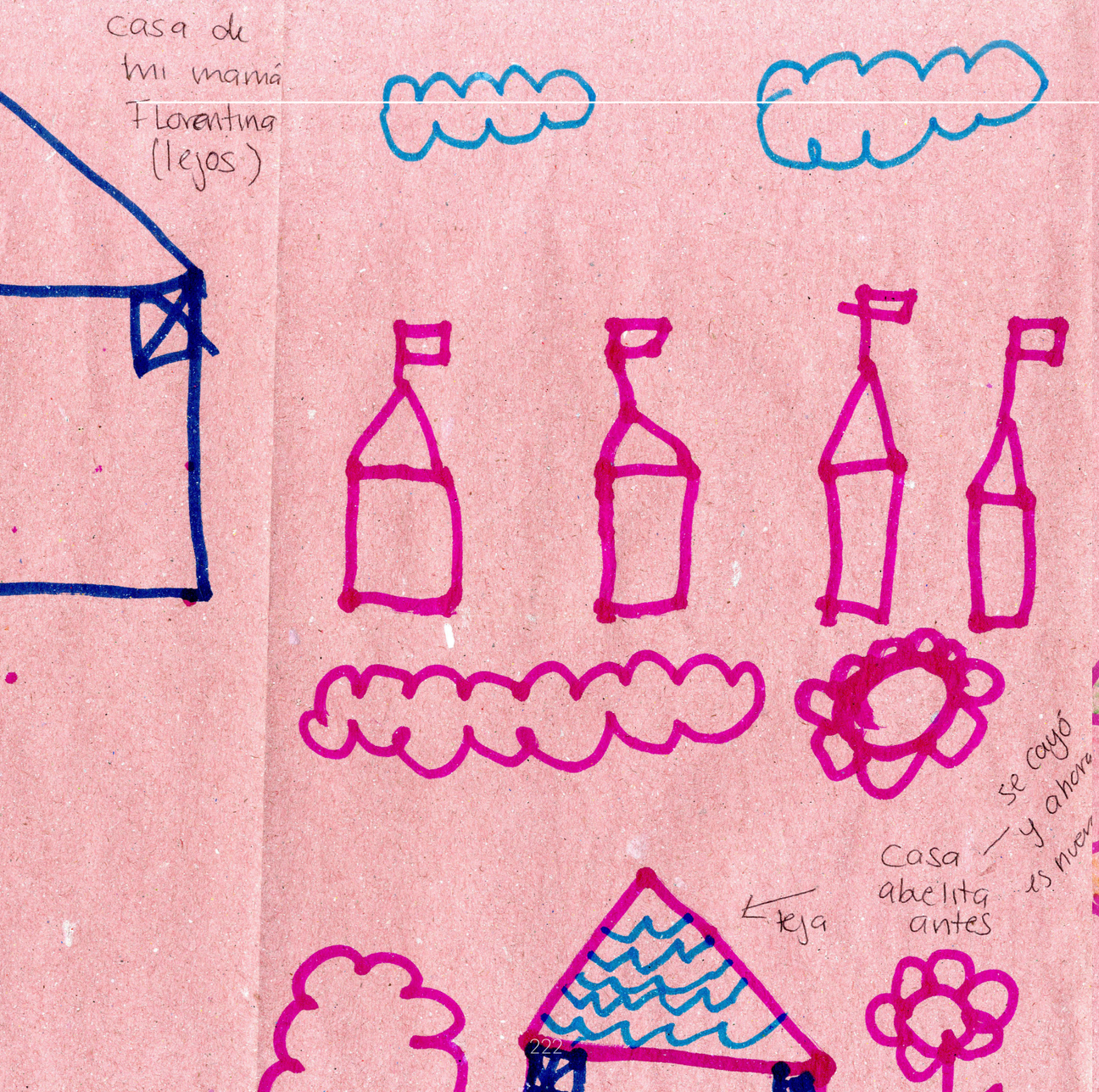

11 años
Escuela antes del terremoto, despues del terremoto.
mi casa antes del terremoto
mi escuela
Cancha futbol
aula
baño
direccion
mi casa

un
ALBERGE
DOMO
Domo


ES
Carlos 10 AÑOS.
LESIA
DESPU
IGLESIA
AYUD

ENIA
DEHESA
SUAREZ


el Palacio
y tandien
el mercado
DEPUES
Juliarlos 18
AÑOS.
cesar
Esco
Lop
13
DESPUES.
Casa.

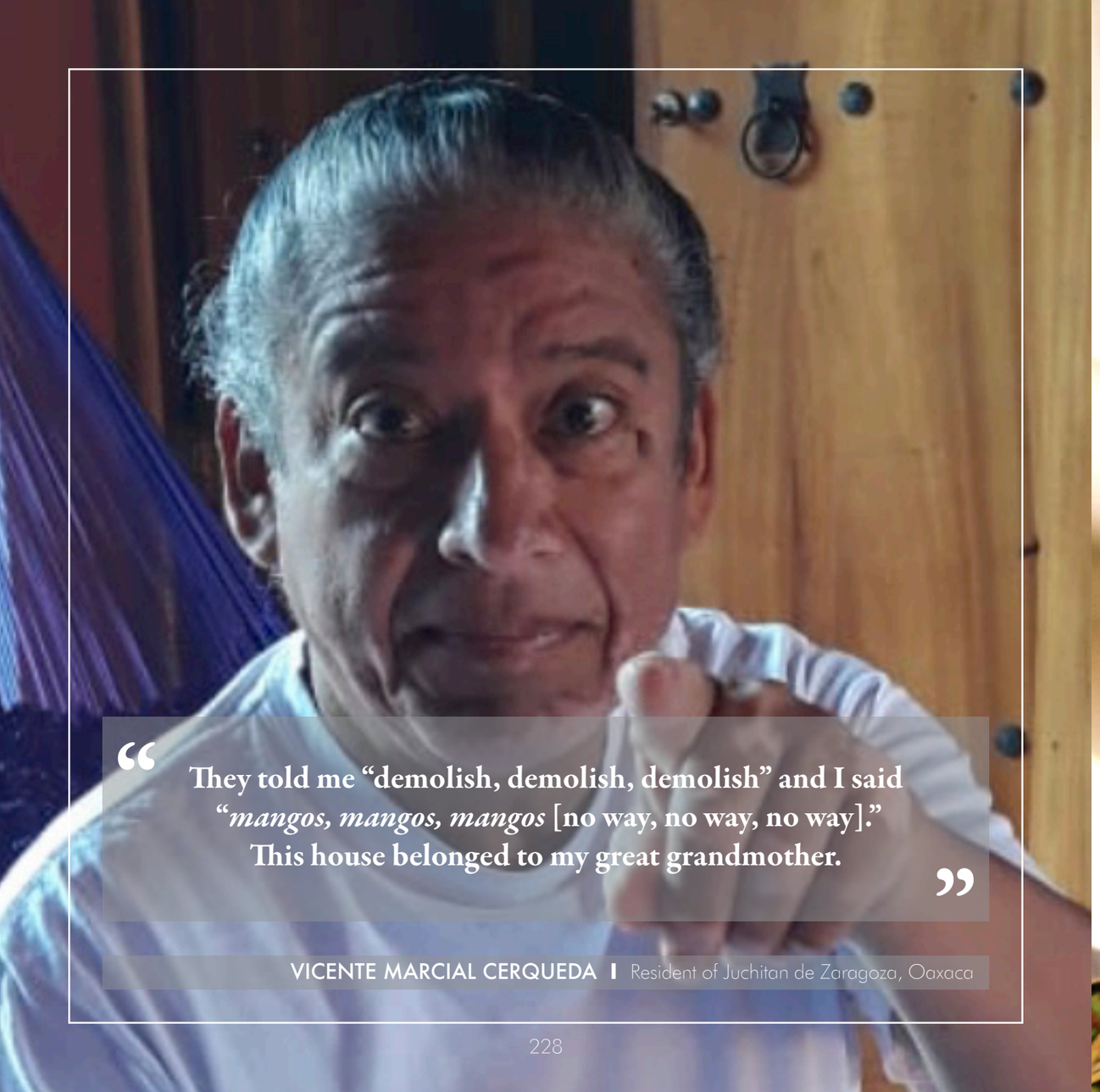

casa de
mi mamá
Florentina
(lejos)
Casa
abuelita
antes
se cayó
y ahora
es nuev
teja

Albera

10 años
arena
pisina
es divertido
MAS ME GUSTA VISITAR.
ANTES
DESPUÉS.
A.D.F

OSIXIS
Roque
CSLuela

APPENDIX C



“They told me “demolish, demolish, demolish” and I said “*mangos, mangos, mangos* [no way, no way, no way].” This house belonged to my great grandmother.”

VICENTE MARCIAL CERQUEDA | Resident of Juchitan de Zaragoza, Oaxaca

“People used to call their friends to build the roof of their house. The hostess would give you something to eat and drink. There were no payments.”

LILIA CRUZ ALTAMIRANO | Resident of Juchitan de Zaragoza, Oaxaca

“Sometimes catastrophes are useful. I know communities that made incredible catharsis after disasters. They organized themselves and are now prosperous.”

CHRISTINA SIEBE GRABACH | Researcher, Institute of Geology, UNAM

“I have said several times that we do not want aid; we want preemptive programs. It would be even cheaper. The economic cost is less than the social cost.”

TOMÁS CHIÑAS SANTIAGO | *Las Nutrias* River Basin Committee, Tona Taati'

“There was no long term plan. The president just toured the stricken communities and ordered people to work intensely to help. Showing up is not the same as having a plan.”

MALAQUÍAS LÓPEZ CERVANTES | National Director of Health Planning and Development

“To help, [the state] has to understand that people here eat certain things, dress in a certain way, and have certain economic activities. We do not need to import everything.”

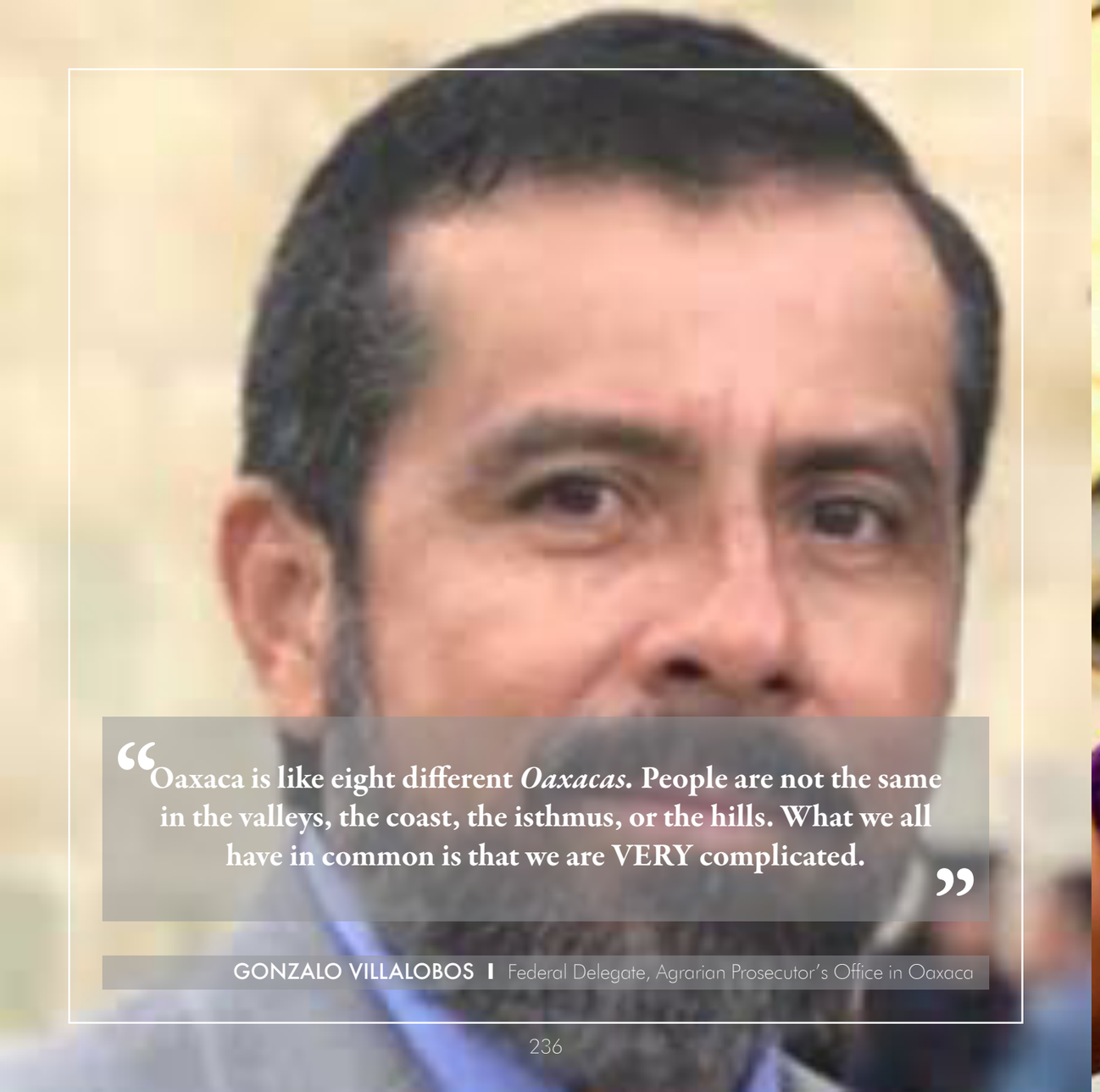
CLAUDINA DE GYVES MENDOZA | Former Resident of Ciudad Ixtepec, Oaxaca

“There’s a pervasive assistantialist mindset nowadays, and we don’t want to feed it. It is understandable, but we would rather emphasize the importance of teamwork.”

OLGA ZÚÑIGA LOERA | Chief Anthropologist, Cooperación Comunitaria (NGO)

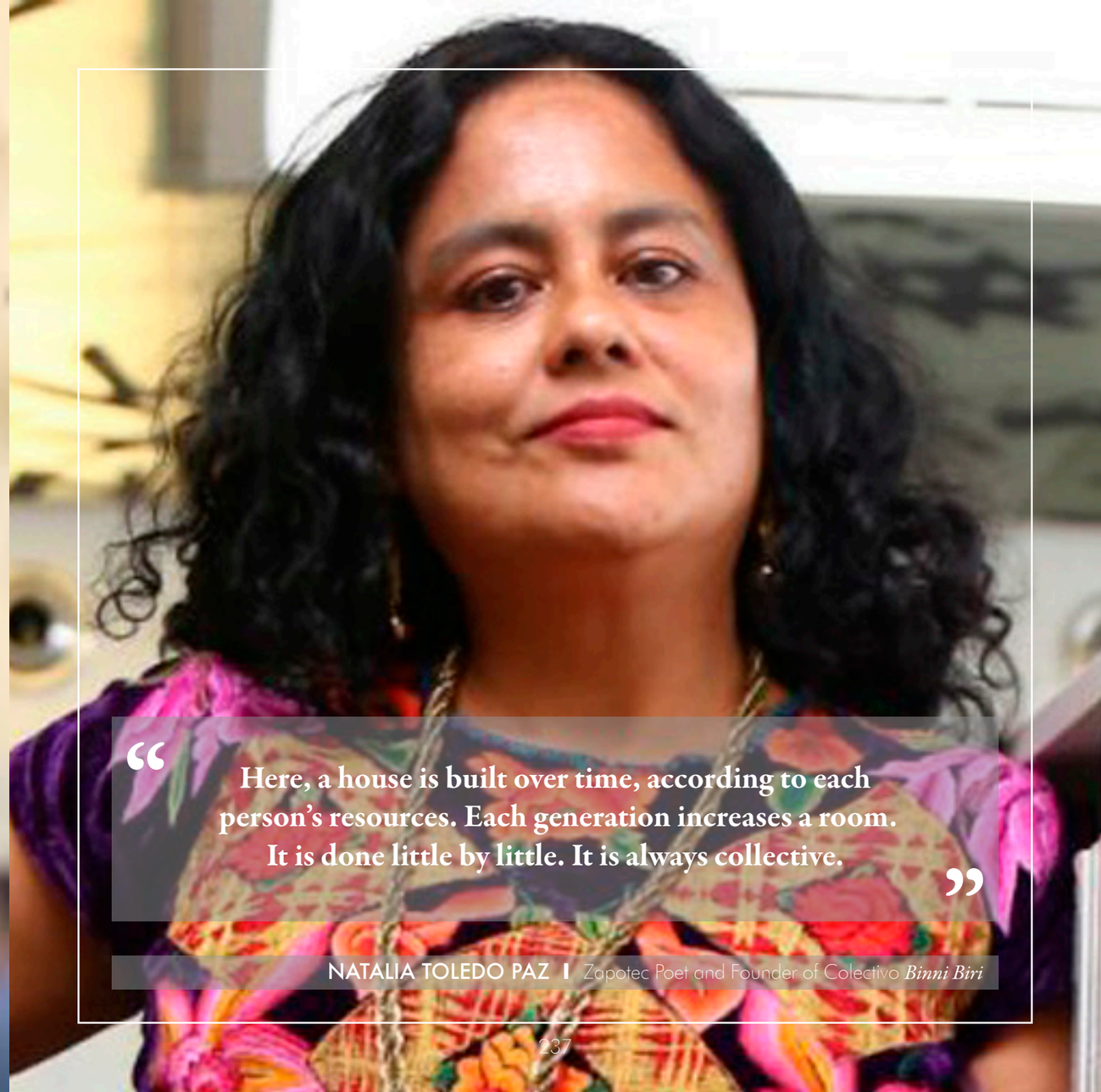
“I want to re-establish the main street [of Ixtaltepec]. It will surpass Masaryk Ave [in Mexico City] because it will grasp urbanity better and incorporate colonial ideals.”

OSCAR TORAL RÍOS | Mayor of Asunción Ixtaltepec, Oaxaca



"Oaxaca is like eight different *Oaxacas*. People are not the same in the valleys, the coast, the isthmus, or the hills. What we all have in common is that we are VERY complicated."

GONZALO VILLALOBOS | Federal Delegate, Agrarian Prosecutor's Office in Oaxaca



"Here, a house is built over time, according to each person's resources. Each generation increases a room. It is done little by little. It is always collective."

NATALIA TOLEDO PAZ | Zapotec Poet and Founder of Colectivo *Binni Biri*

“[The municipality] needs to know the [federal] plans, because we can make the population aware of the problems and show them ways in which they can participate.”

HAZAEL MATUS TOLEDO | Incoming Mayor of El Espinal, Oaxaca

“There is a huge gap in distribution of responsibilities. Municipalities have to invest in development projects, but they usually do not have the necessary resources.”

JUAN ANSBERTO CRUZ GERÓN | Researcher, Institute of Engineering, UNAM

“We tried to establish direct contact between locals and donors because municipal authorities often have dubious motives. We avoided nourishing personal political agendas.”

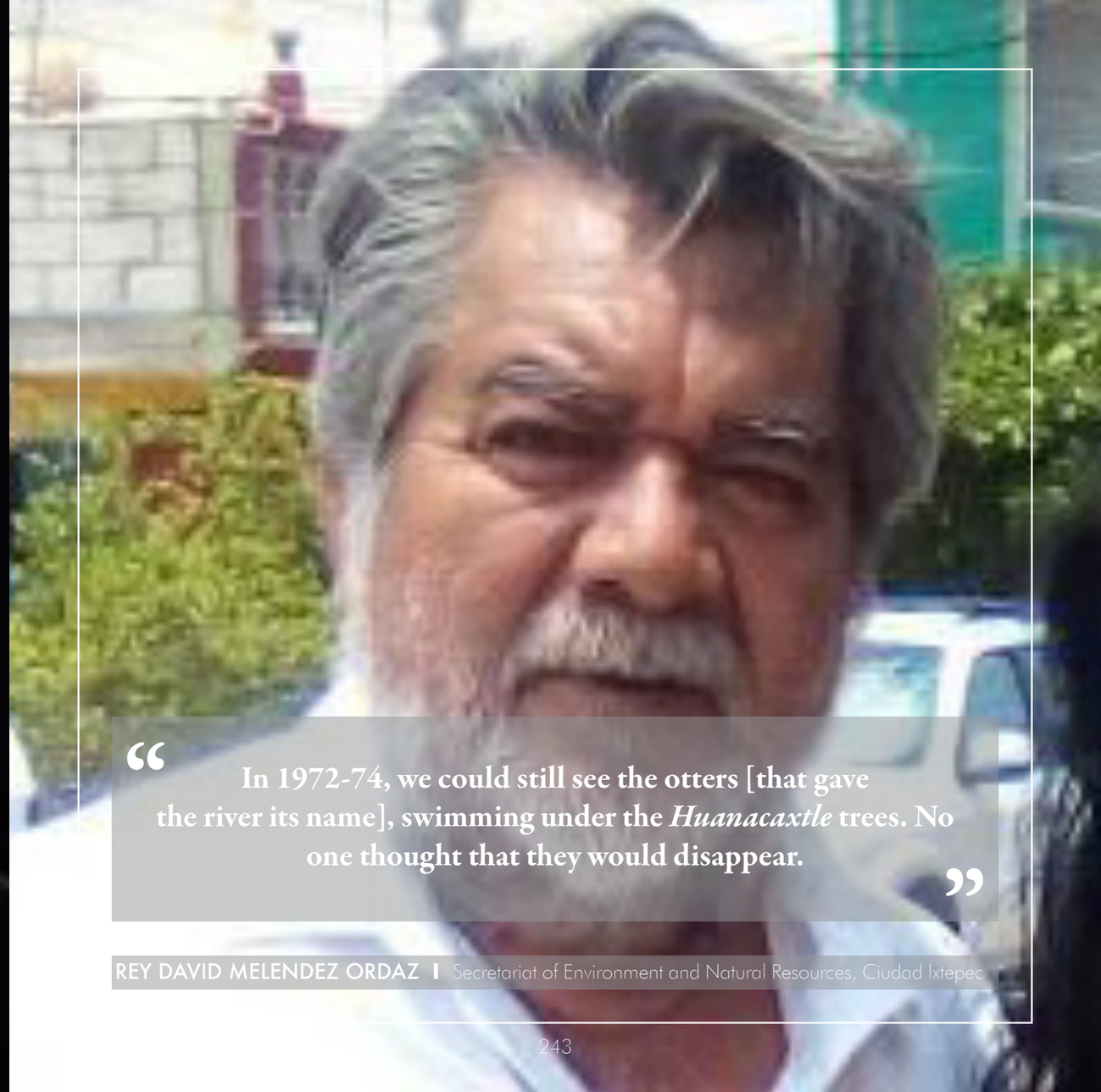
ANDREA QUINTANA | National System for Integral Family Development, Oaxaca State

“No one integrates the different institutions that have to do with the environment. We need to do so alongside education, health, public works, security, etc.”

MAURICIO MARTÍNEZ | Resident of Juchitán de Zaragoza, Oaxaca

“My son and I began by picking up trash, but, a few weeks later, someone discarded construction waste in the same site. And I thought, well how do you pick *that* up?”

MARIO MEDINA | CEO, Arquitectura Biosustentable



“In 1972-74, we could still see the otters [that gave the river its name], swimming under the *Huanacaxtle* trees. No one thought that they would disappear.”

REY DAVID MELENDEZ ORDAZ | Secretariat of Environment and Natural Resources, Ciudad Ixtepec

“A former mayor tried built a bridge to connect one of the neighborhoods on the other side of the river. His neighborhood. But he didn’t finish, so he filled half of the river.”

JUAN FERRA VALEDO | Resident of Juchitan de Zaragoza, Oaxaca

“In theory, the earthquake is an opportunity. There are more funds for these regions than there were (and perhaps will be) in a long time. But again, in theory.”

ELENA TUDELA RIVADENEYRA | School of Architecture, UNAM

“There were engineering consultants who told people if their house was fragile. And now what happens is that all the houses are over structured, which is also not right.”

ALEJANDRA DE LA MORA | Research Center for Sustainable Development, INFONAVIT

“We did not solve things exactly as they should have been solved, partly because of the magnitude of the problem in the country. We were not prepared for something like this.”

ELPIDIO CONCHA | Delegate in Oaxaca, Secretariat of Agrarian, Land, and Urban Development

APPENDIX D

Jesús Álvarez Gutiérrez
Mitzi Antonio González
Viridiana Antonio González
Ángel Antonio Ríos
Deyanira Aquino Pineda
Monica Arzoz Canalizo
Lorena Bello Gómez
Mauricio Benítez Iturbide
Leonor Bravo
Gaspar Cabrera Manuel
Luz Divina Cano Regalado
Tzinnia Carranza Lopez
Elizabeth Carrasco Morales
Rosario Carrasco Sánchez
Héctor Castillo Berthier
Rogelio Cheng López
Tomás Chiñas Santiago
Elpidio Desiderio Concha Arellano
Lilia Cruz Altamirano
Juan Ansberto Cruz Gerón
Naila Paulina Cruz López
Oscar Cruz López
Diane E. Davis
Guiexhooba De Gyves Mendoza
Claudina de Gyves Mendoza
Gerardo De Gyves Ramírez
Alejandra De La Mora Maurer
Quitterie Ducret
Noel Espinosa Hernández
Guadalupe Estrada Gómez
Nizareli Fabián Toledo
Juan Ferra Valedo
Erwin Gasga Pérez
Sebastián Gaviria Gómez
Jimena González Sicilia
Inés González Tovar
Enrique Granell Covrrubias
Olivia Hansberg Pastor
William Hernández Ramírez
Michael Hooper
Lizbeth Ignacio Hernández
Lirio Jiménez López
Aurora Liciaga Montero
Lizbeth López Carrillo
Malaquias López Cervantes
Dení López López
Omar Luis Martínez
Vicente Marcial Cerqueda
Donaji Marcial Cruz
Mauricio Martínez
Jesús Martínez Arreguín
Mavis Martínez Chiñas
Elis Martínez Hernández
Eduardo Martínez Noriega
Jade Martínez Sánchez
Hazael Matus Toledo
Rafael Mayoral Palafox
Mario Medina
Rey David Meléndez Ordaz
Ernesto Meléndez Bravo

Arantza Millán Freyre
Jorge Adolfo Nagaya Castillejos
Ricardo Ortiz Conde
Aurelio Paz López
Robert Pietrusko
Blanca Prado Pano
Andrea Estefanía Quintana
Nadyeli Quiroz Radaelli
Carlos Rojas Sotres
Rian Rooney
Norma Rueda Rasgado
Carlos Sánchez Martínez
Hermenegildo Santiago Guerra
Ruth Santiago López
Heinz Schaub
Christina Siebe Grabach
Enrique Aureng Silva Estrada
Susan Nigra Snyder
Edgar Uriel Tadeo Romero
Equipo *Tecnosuelos* UNAM
Perseida Tenorio Toledo
George E. Thomas
Natalia Toledo Paz
Oscar Toral Rios
Elena Tudela Rivadeneyra
Gerardo Valdivieso Parada
Rubén Velázquez Salinas
Gonzalo Villalobos
Lizet Zaldivar Lopez
Olga Zúñiga Loera

THANK YOU!
¡Muchas gracias!

CULTURAL ASSETS FOR DISASTER RECOVERY:

A study of community involvement at the Isthmus of Tehuantepec after the 2017 earthquakes.

Betzabé Valdés López